ЕВРОПЕЙСКИ СЪЮЗ
ЕВРОПЕЙСКИ ФОНД ЗА РЕГИОНАЛНО РАЗВИТИЕ

ОПЕРАТИВНА ПРОГРАМА НАУКА И ОБРАЗОВАНИЕ ЗА ИНТЕЛИГЕНТЕН РАСТЕЖ

Приложение № 2

Наименование на Участника:	АКВАХИМ АД
Представлявано от :	Камелия Цанкова - Изпълнителен директор и Председател на СД
Седалище по регистрация:	гр. София, бул. Проф. Цветан Лазаров 83
BIC; IBAN:	IBAN: BG38PRCB92301050403301; BIC: PRCBBGSF
Булстат номер:	200984964
Точен адрес за кореспонденция:	гр. София, бул. Проф. Цветан Лазаров 83
Телефонен номер:	02/807 50 00
Факс номер:	02/807 50 00
Лице за контакти:	Елица Рускова
e mail:	aquachim@aquachim.bg

ДО
ПЛОВДИВСКИ УНИВЕРСИТЕТ „ ПАИСИЙ ХИЛЕНДАРСКИ”
ГР. ПЛОВДИВ
УЛ. „ЦАР АСЕН” № 24

ТЕХНИЧЕСКО ПРЕДЛОЖЕНИЕ

за участие в открита процедура за възлагане на обществена поръчка за доставка с предмет: **„Доставка на оборудване за научноизследователска дейност по работни пакети 6, 7, 10, 11 и 12 за ПУ „ПАИСИЙ ХИЛЕНДАРСКИ" гр. Пловдив по обособени позиции –етап 2"**

С настоящото представяме нашето техническо предложение за изпълнение на самостоятелно **обособена позиция № 2,** от посочената по-горе обществена поръчка.

1. Поемаме ангажимент да изпълним предмета на поръчката в съответствие с изискванията на Възложителя, посочени в Документацията за участие, при спазване на действащото законодателство.

2. Задължаваме се да уведомим незабавно възложителя при възникване на пречки от стопански, административен или друг характер, които могат да забавят или да направят невъзможно изпълнението на договора.

3. Нашата оферта е със срок на валидност **6 /шест/** месеца (срокът за валидност на офертата не може да бъде по-малък от шест месеца, считано от крайната дата за подаване на офертите).

4. Приемаме следния начин и срок за плащане:

Проект BG05M2OP001-1.002-0005-C01 Център за компетентност „Персонализирана иновативна медицина (ПЕРИМЕД)", финансиран от Оперативна програма „Наука и образование за интелигентен растеж", съфинансирана от Европейския съюз чрез Европейските структурни и инвестиционни фондове.

4.1. Авансово плащане в размер на 30% от стойността на договора, по банков път в срок до 10 дни след получаване на възлагателно писмо от възложителя и издаване от наша страна на оригинална фактура и срещу представяне от наша страна на гаранция до размера на предвидените за плащане средства в една от формите, посочени в чл.111, ал.5 от ЗОП.

4.2. Окончателно плащане в размер на 70% от стойността на договора, по банков път, в срок до 30 дни след издаване на оригинал на фактура и подписване на двустранен протокол за приемане на извършената доставка, осъществен монтаж и пускане в експлоатация на доставената апаратура.

Всички плащания се извършват по следната наша банкова сметка:
Банка Прокредит Банк ЕАД, IBAN BG38PRCB92301050403301, BIC PRCBBGSF

5. Декларираме, че:

5.1. Сме съгласни с клаузите на проекта на договор, приложен с настоящата документация за участие и ако бъдем определени за изпълнител, ще сключим договора в предложения от Вас вид и в законоустановения срок.

5.2. При изготвяне на офертата сме спазили задълженията, свързани с данъци и осигуровки, опазване на околната среда, закрила на заетостта и условията на труд и ще спазваме същите за срока на валидност на офертата.

5.3. В случай, че бъдем определени за изпълнител, ние ще представим всички документи, необходими за подписване на договора, както и гаранция за изпълнение на договора в размер, съгласно документацията за участие в посочения срок от Възложителя.

6. Предлагаме срок* за изпълнение на доставките до **6 /шест/** месеца след получаване на възлагателно писмо от Възложителя.

Предложения срок за доставка не следва да надвишава **6-шест месеца.*

7. Предложението ни за организация на обучение за работа с доставеното оборудване, включващо срокове, място, ред и начин на протичане и др. е както следва:

Обучението ще бъде извършвано при следните принципни условия като конкретните дати ще зависят от дата на доставка на оборудването, която е свързанас дата на подписване на договора и съгласуване с възможности на възложителя:

Модул за изолиране на единични колонии и допълнителна манипулация	3 x 2 дни с интервали от минимум 3 дни 3 x 1 ден с интервали от минимум 2 дни
Модул за инокулиране на петрита	1 ден
Модул за автоматичен предваритенен скрининг на броя на колониите и просветлените зони	1 ден
Модул за пробоподготовка за количествено определяне на ензимна активност на скринираните колонии	3 x 1 ден с интервали от минимум 2 дни

Обученията ще се състоят от:

Проект BG05M2OP001-1.002-0005-C01 Център за компетентност „Персонализирана иновативна медицина (ПЕРИМЕД)", финансиран от Оперативна програма „Наука и образование за интелигентен растеж", съфинансирана от Европейския съюз чрез Европейските структурни и инвестиционни фондове.

- теоретична част;
- инструкция за бзопасна работа с оборудването;
- информация за устройството и принципа на работа на всеки апарат;
- практическа част с извършване на реален експеримент, където е приложимо;
- интерпретация на резултатите;
- теория и практика за ежедневната и периодична лабораторна поддръжка на всеки апарат.

Предложенията не следва да съдържат финансови условия.

8. Конкретното ни техническото предложение за изпълнение на поръчката представяме в табличен вид*.

Всеки участник следва да представи конкретно техническо предложение, което да съдържа минимум следната информация: наименование на производителя; страна на произход; търговско наименование и модел; технически параметри; комплектация; гаранционен срок от производителя, номер на страницата от **приложен документ (официална документация на производителя, като: оригинални брошури, техническа спецификация, каталози, извадки от интернет страница на производителя, ръководства, разработки), с който участникът доказва съответствието на предложението с минималните техническите и функционални изисквания на възложителя, като отбелязва и наличието или липсата на допълнителните технически характеристики, подлежащи на оценка,, съгласно посочената в документацията методика за*

Проект BG05M2OP001-1.002-0005-C01 Център за компетентност „Персонализирана иновативна медицина (ПЕРИМЕД)", финансиран от Оперативна програма „Наука и образование за интелигентен растеж", съфинансирана от Европейския съюз чрез Европейските структурни и инвестиционни фондове.

оценка. Към техническото предложение всеки участник ***представя и сравнителна таблица****, показваща съответствието на оферираното от участника оборудване с изискванията на възложителя, посочени в техническата спецификация.*

9. Гаранционните условия на производителя на предлаганото от нас оборудване са:

- оборудването следва да се използва само за целите, за които е предназначено;
- с оборудването може да работят само обучени от производителя или доставчика служители;
- по време на гаранционния срок оборудването може да се сервизира и профилактира само от оторизиран сервизен инженер на производителя или доставчика;
- по време на гаранционния срок могат да се използват с оборудването само оригинални резервни части, консуматив, реактиви и други;
- срок на реакция при информация за проблеми – 2 работни дни;
- срок за отстраняване на повредата без влагане на резерни части – 5 работни дни;
- срок за отстраняване на повредта с внасяне на резервни части – 15 работни дни;
- Възложителят е длъжен да осигури достъп до повреденото оборудване на сервизния инженер в рамките на стандартно работно време на сервизния инженер в посочените срокове;
- Съобщения за повреда се изпращат в писмен вид до доставчика;
- Ремонти и подмяна на резервни части при повреди, които де дължат на неправилно използване на апарата, на използването му от неправилно обучении служители и след опити да се сервизира от неоторизирани лица се заплащат;

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- За сервизни посещения без да е установена повреда на апарата се заплаща транспорта на сервизния инженер.

10. Декларираме, че:

Оборудване, които предлагаме да доставим ще е ново и неупотребявано, в оригинална опаковка с ненарушена цялост. Доставеното оборудване ще включва всички принадлежности и комплектации, които са необходими за монтирането, пускането му в експлоатация и правилна работа.

11. Приемаме следните условия за гаранционен сервиз:

Време за реакция след уведомяване за възникнала повреда и/или дефект:

- дистанционно до 24 часа (в рамките на работното време);

В случай, че не е отстранен проблема, посещение на място до 2 работни дни;

Време за отстраняване на възникнала повреда и/или дефект, която не изисква доставка на резервни части – до 5- пет работни дни.

Време за отстраняване на възникнала повреда и/или дефект, която изисква доставка на резервни части – до 15-петнадесет работни дни.

При наличие на повреда и/или дефект, която не може да се отстрани на място, ще транспортираме повредените и/или дефектирали апарати до съответния сервиз за своя сметка. След извършване на ремонта апаратите ще бъдат върнати на възложителя за сметка на изпълнителя.

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В гаранционния сервиз на оборудването е включена и диагностика на възникналите проблеми.
Приложения:

Дата	15/ 03 / 2019г.
Наименование на участника	АКВАХИМ АД
Име и фамилия	Елица Рускова
Длъжност	Пълномощник на: Камелия Трендафилова Цанкова Изпълнителен директор и Председател на СД на Аквахим АД, съгласно Пълномощно № 749 от 01.03.2019 г., заверено от Нели Каракашева, помощник – нотариус по заместване при Ваня Карасанова - Тончева, нотариус в район СРС, рег. № 444 на Нотар. Камара

Подпис на упълномощеното лице _____

СРАВНИТЕЛНА ТАБЛИЦА

за съответствие с изискванията за изпълнение на обществена поръчка с предмет: **„Доставка на оборудване за научноизследователска дейност по работни пакети 6, 7, 10, 11 и 12 за ПУ „ПАИСИЙ ХИЛЕНДАРСКИ" гр. Пловдив по обособени позиции –етап 2"**

По обособена позиция № 2
АВТОМАТИЗИРАНА СИСТЕМА ЗА СТЕРИЛЕН ПОДБОР НА КОЛОНИИ - 1 бр.

предложено от АКВАХИМ АД
(посочва се името на участника)

Предложена апаратура:

Модул 1: Модул за изолиране на единични колонии и допълнителни манипулация
Марка: QPix™ 400 Systems
Модел: QPix 420
Производител: MOLECULAR DEVICES

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Страна на произход: САЩ
Гаранционен срок: 24 месеца

Модул 2: Модул за инокулиране на петрита
Марка: EDDY JET
Модел: EDDY JET 2
Производител: IUL
Страна на произход: Испания
Гаранционен срок: 24 месеца

Модул 3: Модул за автоматичен предварителен скрининг на броя на колониите и просветлените зони
Марка: SPHERE FLASH®
Модел: SPHERE FLASH®
Производител: IUL
Страна на произход: Испания
Гаранционен срок: 24 месеца

Проект BG05M2OP001-1.002-0005-C01 Център за компетентност „Персонализирана иновативна медицина (ПЕРИМЕД)", финансиран от Оперативна програма „Наука и образование за интелигентен растеж", съфинансирана от Европейския съюз чрез Европейските структурни и инвестиционни фондове.

Модул 4: Модул за пробоподготовка за количествено определяне на ензимна активност на скринираните колонии

Марка: LIQUID HANDLING STATION
Модел: LIQUID HANDLING STATION
Производител: BRAND GMBH+CO KG
Страна на произход: Германия
Гаранционен срок: 12 месеца

№	МИНИМАЛНИ ТЕХНИЧЕСКИ ИЗИСКВАНИЯ СЪГЛАСНО ТЕХНИЧЕСКА СПЕЦИФИКАЦИЯ НА ВЪЗЛОЖИТЕЛЯ*	СЪОТВЕТСТВИЕ	ДОКУМЕН-ТАЦИЯ НА ПРОИЗВО-ДИТЕЛЯ	СТРАНИЦА №
1	**Модул за изолиране на единични колонии и допълнителна манипулация**	**Модул за изолиране на единични колонии и допълнителни манипулация - 1 бр.**		
1.1.	**Описание на системата** Модулна система, която да може да се използва за автоматизирано изолиране на колонии при експерименти свързани с изследване на протеинова експресия, ензимна еволюция, откриване на фаги, сложи микробни съобщества	Описание на системата 1.1.1. Модулна система, състояща се от модул за изолиране, работна маса, компютърна станция, принтер и доокомплектована с моодул за инокулиране, предва-рителен скрининг и моодул за пробоподготовка която да може да се използва за автоматизирано изолиране	Всички модули са описани по-долу в документа, съобразно изискванията на Възложителя	

Проект BG05M2OP001-1.002-0005-C01 Център за компетентност „Персонализирана иновативна медицина (ПЕРИМЕД)", финансиран от Оперативна програма „Наука и образование за интелигентен растеж", съфинансирана от Европейския съюз чрез Европейските структурни и инвестиционни фондове.

Модул 4: Модул за пробоподготовка за количествено определяне на ензимна активност на скринираните колонии

Марка: LIQUID HANDLING STATION
Модел: LIQUID HANDLING STATION
Производител: BRAND GMBH+CO KG
Страна на произход: Германия
Гаранционен срок: 24 месеца

№	МИНИМАЛНИ ТЕХНИЧЕСКИ ИЗИСКВАНИЯ СЪГЛАСНО ТЕХНИЧЕСКА СПЕЦИФИКАЦИЯ НА ВЪЗЛОЖИТЕЛЯ*	СЪОТВЕТСТВИЕ	ДОКУМЕН-ТАЦИЯ НА ПРОИЗВО-ДИТЕЛЯ	СТРАНИЦА №
1	**Модул за изолиране на единични колонии и допълнителна манипулация**	**Модул за изолиране на единични колонии и допълнителни манипулация - 1 бр.**		
1.1.	**Описание на системата** Модулна система, която да може да се използва за автоматизирано изолиране на колонии при експерименти свързани с изследване на протеинова експресия, ензимна еволюция, откриване на фаги, сложи микробни общества	Описание на системата 1.1.1. Модулна система, състояща се от модул за изолиране, работна маса, компютърна станция, принтер и доокомплектована с моодул за инокулиране, предва-рителен скрининг и моодул за пробоподготовка която да може да се използва за автоматизирано изолиране	Всички модули са описани по-долу в документа, съобразно изискванията на Възложителя	

Проект BG05M2OP001-1.002-0005-C01 Център за компетентност „Персонализирана иновативна медицина (ПЕРИМЕД)", финансиран от Оперативна програма „Наука и образование за интелигентен растеж", съфинансирана от Европейския съюз чрез Европейските структурни и инвестиционни фондове.

№	МИНИМАЛНИ ТЕХНИЧЕСКИ ИЗИСКВАНИЯ СЪГЛАСНО ТЕХНИЧЕСКА СПЕЦИФИКАЦИЯ НА ВЪЗЛОЖИТЕЛЯ*	СЪОТВЕТСТВИЕ	ДОКУМЕН-ТАЦИЯ НА ПРОИЗВО-ДИТЕЛЯ	СТРАНИЦА №
	експерименти свързани с изследване на протеинова експресия, ензимна еволюция, откриване на фаги, сложи микробни съобщества	колонии при експерименти свързани с изследване на : 1.1.2. протеинова експресия, 1.1.3. ензимна еволюция, 1.1.4. откриване на фаги, 1.1.5. сложи микробни съобщества	Документ 9 Документ 12 Документ 4 Документ 3	1 3 1 1
1.2	Настолен	Настолен апарат	Документ 1	3
1.3.	Максимални размери Не повече от: 2280 mm (ширина) x 830 mm (дълбочина) x 2300 mm (височина) от плота **Не по-тежък от 350 kg**	Размери: 1460 mm (ширина) x 770 mm (дълбочина) x 750 mm (височина) от плота Тегло общо: 349 kg	Документ 1 Документ 11	8 253
1.4	Капак за пълно затваряне на работната камера по време на изолиране на колониите	Капак за пълно затваряне на работната камера по време на изолиране на колониите	Документ 11	10

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1.5	**Вградена система за интегриранена баркод за поне на плаките**	Вградена система за интегриране на баркод за плаките	Документ 1	7
1.6	Стерилизиране на вътрешната работна среда чрез UV облъчване или друг разрешен метод от нормативнаа база, със същата ефективност	Стерилизиране на вътрешната работна среда чрез UV облъчване	Документ 11	33
1.7	Избягване на кръстосано замърсяване Доказан процес на стерилизация на иглите за отбор на колонии	Избягване на кръстосано замърсяване Доказан процес на стерилизация на иглите за отбор на колонии	Документ 1 Документ 6	5 2
1.8	Водна баня Минимум 3 **броя** статични бани за измиване на иглите. **Поне в една от водните бани да може да се поставя халогенен окислител за стерилизация на иглите**.	Водна баня 3 броя статични бани за измиване на иглите. Баня 1: 70 % етанол Баня 2: Стерилна вода Баня 3: 1 % разтвор на хипохлорит (халогенен окислител)	Документ 1 Документ 11	8 28

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1.9	Система за изсушаване на иглите за вземане на клоновете Халогенна **лампа** или друга еквивалентана	Система за изсушаване на иглите за вземане на клоновете Вградена Халогенна лампа	Документ 1	8
1.10	Автоматично определяне на височината на агара Чрез автокалибриране със сензор за автоматично определяне на височината на агара без да се нарушава неговата целостта му	Автоматично определяне на височината на агара: чрез автокалибриране със сензор за автоматично определяне на височината на агара без да се нарушава целостта му	Документ 1	5
1.11	Брой плаки, в които ще се посяват изолираните колонии при едно зареждане Не по-малко от 100 ниско профилни стандартни плаки, които могат да бъдат разпределени в 1, 2, 3 или повече поставки. Поставките могат да са външни или вътрешни спряно камерата за изолиране.	Брой плаки, в които ще се посяват изолираните колонии при едно зареждане 120 ниско профилни стандартни плаки, които могат да бъдат разпределени в 1, 2, 3 или повече поставки. Поставките могат да са външни или вътрешни спряно камерата за изолиране.	Документ 1	8

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1.12	Плаки за инокулиране на изолираните колонии **Апаратът да може да работи със стандартни 24-, 48-, 96-, или 384 ямкови плаки и с дълбоки плаки** **-Да може да работи с плаки на различни производители**	Плаки за инокулиране на изолираните колонии 1.12.1. Апаратът да може да работи със стандартни 24-, 48-, 96-, или 384 ямкови плаки и с дълбоки плаки 1.12.2. Може да работи с плаки на различни производители и различни размери	Документ 1 Документ 7 Документ 11	8 10 16
1.13	Петрита, от които ще се изолират колонии Изолиране на колонии да се извършва автоматизирано (без ръчна работа) поне от: 2 x 15 cm петрита; 10 x 9 cm петрита; 2 x 22 cm петрита **2 x QTray плаки**	Петрита, от които ще се изолират колонии: Изолиране на колонии се извършва автоматизирано (без ръчна работа) поне от: 2 x 15 cm петрита; 10 x 9 cm петрита; 2 x 22 cm квадратни петрита 2 x QTray плаки	Документ 1	8

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1.14	Напълно окомплектована пневматична система за отбор на колонии	Напълно окомплектована пневматична система за отбор на колонии	Документ 1	8
1.15	Глава за изолиране на колонии С 96 игли за стандартни петрита С 96 игли за дълбоки петрита	Глава за изолиране на колонии С 96 игли за стандартни петрита – **1 бр**. С 96 игли за дълбоки петрита – **1 бр.**	 Документ 1 Документ 1	 8 8
1.16	С една глава да може да се обслужват всички видове стандартни плаки С 1 глава да могат да се обслужват всички дълбоки плаки	С една глава да може да се обслужват всички видове стандартни плаки: С 1 глава могат да се обслужват всички дълбоки плаки	Документ 11	16
1.17	Игли за подбор на колинии -Адаптирани за основните групи микроорганизми в морфологично отношение - Бактерии и фаги - Дрожди	Игли за подбор на колонии: 1.17.1. Адаптирани за основните групи микроорганизми в морфологично отношение - Бактерии и фаги - Дрожди	Документ 1 Документ 4 Документ 13	5 2 2

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	-Иглите да са за многократна употреба -Иглите да могат да се стерилизират	1.17.2.Иглите да са за многократна употреба -Иглите да могат да се стерилизират	Документ 13	2
1.18	Компресор -Да доставя чист, свободен от масло въздух чрез филтуране с филтър с размер на порите по малки от 1 микрон - минимално работно налягане – 6 bar -Минимален работен обем – 80 l/min Шум: по-малко от 61 dB	Компресор -доставя чист, свободен от масло въздух чрез филтуране с филтър с размер на порите по-малки от 1 микрон - минимално работно налягане – 6 bar -Минимален работен обем – 80 l/min Шум: 61 dB	Документ 1	8
1.19	Камера за бяла и флуоресцентна светлина CCD камера с резолюция поне 22 pixels /mm. Видимо поле: поне: 32 x 24 mm Епифлуоресценция поне при следните 5 дължини на вълните с възможност за използване на	Камера за бяла и флуоресцентна светлина: CCD камера с резолюция 22 pixels /mm. Видимо поле: 32 x 24 mm Епифлуоресценция при следните 5 дължини на вълните с възможност за използване на	Документ 1	7

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	посочените флуоресцентни багрила: Ex /Em: 377 /447 nm за DAPI /Hoechst Ex /Em: 457 /536 nm за FITC /GFP Ex /Em: 531 /593 nm за Cy3 /DS Red Ex /Em: 628 /692 nm за Cy5 Ex /Em: 531 /624 nm за Rhodamine /Texas Red	посочените флуоресцентни багрила: Ex /Em: 377 /447 nm за DAPI /Hoechst Ex /Em: 457 /536 nm за FITC /GFP Ex /Em: 531 /593 nm за Cy3 /DS Red Ex /Em: 628 /692 nm за Cy5 Ex /Em: 531 /624 nm за Rhodamine /Texas Red		
1.20	Компютърна система Да отговаря на изискванията на производителя, окомплектована с монитор и лазерен принтер	Системата се доставя окомплектована с компютър, монитор и лазерен принтер от производителя	Документ 11	25
	Функционални характеристики	**Функционални характеристики**		
1.21	Капацитет Поне 2500 колонии на час във видимата област Поне 1500 колонии на час във флуоресцентната област			

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1.22	Капацитет От 2501 - 2999 колонии на час във видимата област От 1501 до 1999 колонии на час във флуоресцентната област	Капацитет 3000 колонии на час във видимата облас 2000 колонии на час във флуоресцентната област	Документ 1	8
1.23	Капацитет Повече от 3000 колонии на час във видимата област Повече от 2000 колонии на час във флуоресцентната област			
1.24	Избор на колонии	Избор на колонии	Документ 10	3
1.24.1	Едновременен подпбор по няколко вектора	Едновременен подбор по няколко вектора	Документ 8	1
1.24.2	по цвят - бели – сини или	по цвят - 1.24.2.1. бели – сини	Документ 8	2

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	флуоресценция по форма по размер	1.24.2.2. флуоресценция 1.24.2.3 по форма 1.24.2.4 по размер	Документ 10 Документ 10 Документ 10	1 3 3
1.24.3	Избор на най-добрите колонии Предварителен скрининг на колкониите размер съотношение на осите цялост на ръба интензитет на флуоресценцията	Избор на най-добрите колонии Предварителен скрининг на колониите размер съотношение на осите цялост на ръба интензитет на флуоресценцията	Документ 8 Документ 11 Документ 1	2 102 4
1.25	Количествен анализ на флуоресцентните картини чрез използване на различни филтри, за да могат да се избират колонии със специфичен интензитет на светлината във флуоресцентната област	Количествен анализ на флуоресцентните картини чрез използване на различни филтри, за да могат да се избират колонии със специфичен интензитет на светлината във флуоресцентната област	Документ 1	3

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1.26	Ефективност на подбора >98%	Ефективност на подбора >98%	Документ 1	5
1.27	Проследимост на колониите Всяка колония да може да се проследи чрез: Дата Местоположение Баркод	Всяка колония да може да се проследи чрез: Дата Местоположение Баркод	Документ 1 Документ 11	5 224
1.28	Препосяване Повторно накапване на изолираните клонове (96 към 96; 384 в 384) намаляване на броя на плаките 4 x 96 в 1 x 384 Увеличаване на броя на плаките 1 x 384 в 4 x 96 Препосяването да се извършва без смяна на главата с иглите	Препосяване - Повторно накапване на изолираните клонове (96 към 96; 384 в 384) - намаляване на броя на плаките 4 x 96 в 1 x 384 - Увеличаване на броя на плаките 1 x 384 в 4 x 96 Препосяването да се извършва без смяна на	Документ 1 Документ 1	7 7

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		главата с иглите		
1.29	Проследяване на процеса Баркод четец Баркод принтер	Проследяване на процеса - Вграден баркод четец - Вграден баркод принтер	Документ 1	7
1.30	**Софтуер**	Софтуер		
1.31	Задаване на процеса от потребителя и информацията	Задаване на процеса от потребителя и информацията	Документ 11	39
1.31	Задаване на параметри за подбор на колониите Избор на колони с нисък контраст	Задаване на параметри за подбор на колониите; Избор на колони с нисък контраст	Документ 11	149
1.32	Пълна проследимост на всяка колония Място на първо изолиране Място на препосяване Място на преместване в плака с друг размер	Пълна проследимост на всяка колония Място на първо изолиране Място на препосяване Място на преместване в плака с друг размер	Документ 1	4

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№	МИНИМАЛНИ ТЕХНИЧЕСКИ ИЗИСКВАНИЯ СЪГЛАСНО ТЕХНИЧЕСКА СПЕЦИФИКАЦИЯ НА ВЪЗЛОЖИТЕЛЯ*	СЪОТВЕТСТВИЕ	ДОКУМЕН-ТАЦИЯ НА ПРОИЗВО-ДИТЕЛЯ	СТРАНИЦА №
1.33	Съхраняване на информацията с възможност за търсене на колониите по име баркод потребител дата	Съхраняване на информацията с възможност за търсене на колониите по име баркод потребител дата	Документ 11	224
1.34	Експорт на данни	Експорт на данни	Документ 11	227
1.35	Управление на поддръжката на апарата	Управление на поддръжката на апарата	Документ 11	231
1.36	Окомплектоване Сиситемата да е напълно окомплектована с всички периферни устройства, маса за поставяне на системата, за да може да функционира без допълнително дооборудване	Сиситемата да е напълно окомплектована с всички периферни устройства, маса за поставяне на системата, за да може да функционира без допълнително дооборудване	Документ 11	25

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2	**Модул за инокулиране на петрита**	**Модул за инокулиране на петрита – 1 бр.**	Документ 14	2
	Независим модул за инокулиране на проби	Независим модул за инокулиране на проби	Документ 14	2
2.1	В стандартни 90-милиметрови петрита	В стандартни 90-милиметрови петрита, както и всякакви петри с размер до 100 mm	Документ 14	1
2.2	Накапване на пробата за получаване на единични колонии	Накапване на пробата за получаване на единични колонии	Документ 14	2
2.3	Обем на едно накапване: 50 до 100 микролитра	Обем на едно накапване: 50 до 100 микролитра Минимален обем 10 нанолитра, максимален обем 100 микролитра	Документ 14	1
2.4	Точност на обема на накапване: < 1%	Точност на обема на накапване: < 1%	Документ 14	1
2.5	Гарантирано избягване на процес на кръстосано замърсяване чрез използване на еднократни накрайници или процедура по измиване и	Гарантирано избягване на процес на кръстосано замърсяване чрез използване на еднократни накрайници, стерилизирани с	Документ 14	2

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	стерилизиране на накрайници за многократна употреба	гама облъчване		
3	**Модул за автоматичен предваритенен скрининг на броя на колониите и просветлените зони**	**Модул за автоматичен предваритенен скрининг на броя на колониите и просветлените зони – 1 бр.**	Документ 15	1
3.1	Автоматично преброяване на клониите Възможност за преброяване в ръчен режим Автоматични измерване на просветлените зони	Автоматично преброяване на клониите Възможност за преброяване в ръчен режим Автоматични измерване на просветлените зони	Документ 15	2
3.2	Минимален размер на колониите: 0.1 mm	Минимален размер на колониите: 0.1 mm	Документ 15	2
3.3	Преброяване на повърхностно инокулирани проби и на спирално инокулирани проби	Преброяване на повърхностно инокулирани проби и на спирално инокулирани проби	Документ 15	2
3.4	Автоматично оптимизиране на контраста и чувствителността	Автоматично оптимизиране на контраста и чувствителността	Документ 15	2

Проект BG05M2OP001-1.002-0005-C01 Център за компетентност „Персонализирана иновативна медицина (ПЕРИМЕД)", финансиран от Оперативна програма „Наука и образование за интелигентен растеж", съфинансирана от Европейския съюз чрез Европейските структурни и инвестиционни фондове.

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	Автоматична корекция на дефектите на агара	Автоматична корекция на дефектите на агара		
4	**Модул за пробоподготовка за количествено определяне на ензимна активност на скрининарите колонии**	**Модул за пробоподготовка за количествено определяне на ензимна активност на скринираните колонии – 1 бр.**	Документ 16	2
4.1	Канали за накапване 1 канално и 8 канално накапване	Канали за накапване 1 канално и 8 канално накапване	Документ 16	10
4.2	Глави за накапване 1-едноканална: -1 - 50 µl (с минимални стъпки – 5, 25, 50 µl), -10 - 200 µl (с минимални стъпки – 20, 100, 200 µl) -40 - 1000 µl (с минимални стъпки – 100, 500, 1000 µl) 8-канална глава: -1 - 50 µl (с минимални стъпки – 5, 25, 50 µl),	Глави за накапване 1-едноканална: -1 - 50 µl (с минимални стъпки – 5, 25, 50 µl) - **1 бр.** -10 - 200 µl (с минимални стъпки – 20, 100, 200 µl) – **1 бр.** -40 - 1000 µl (с минимални стъпки – 100, 500, 1000 µl) – **1 бр.**	Документ 16	10

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	-20 - 300 µl (с минимални стъпки – 30, 150, 300 µl)	8-канална глава: -1 - 50 µl (с минимални стъпки – 5, 25, 50 µl) – **1 бр.**, -20 - 300 µl (с минимални стъпки – 30, 150, 300 µl) **– 1 бр.**		
4.3	Връхчета за съответните обеми За единично накапване 1 - 50 µl 10 - 200 µl 40 - 1000 µl За осемканално накапване 1 - 50 µl 20 - 300 µl	Връхчета за съответните обеми За единично накапване 1 - 50 µl - **1000 бр.** 10 - 200 µl - **1000 бр.** 40 - 1000 µl - **1000 бр.** За осемканално накапване 1 - 50 µl - **1000 бр.** 20 - 300 µl - **1000 бр.**	Документ 16	10
4.4	Работни позиции	Работни позиции	Документ 16	10

Проект BG05M2OP001-1.002-0005-C01 Център за компетентност „Персонализирана иновативна медицина (ПЕРИМЕД)", финансиран от Оперативна програма „Наука и образование за интелигентен растеж", съфинансирана от Европейския съюз чрез Европейските структурни и инвестиционни фондове.

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	7 работни позиции: P2 - P8, и P1 кутия за отпадъци	7 работни позиции: P2 - P8, и P1 кутия за отпадъци		
4.5	Видове накапване идентично (96 към 96; 384 в 384) компресия 4 x 96 в 1 x 384 експанзия 1 x 384 в 4 x 96 разреждане на проби накапване на ензимни реакции накапване на PCR реакции	Видове накапване 4.5.1. идентично (96 към 96; 384 в 384) 4.5.2. компресия 4 x 96 в 1 x 384 4.5.3. експанзия 1 x 384 в 4 x 96 4.5.4. разреждане на проби 4.5.5. накапване на ензимни реакции 4.5.6. накапване на PCR реакции	Документ 16	2
4.5	Съдове единични стрипове микроплаки с 96 или 384 ямки	Съдове: единични стрипове микроплаки с 96 или 384 ямки	Документ 16	5
4.7	Картриджи	Картриджи	Документ 16	11

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	за микрорпруветки за 96 ямкови плаики за 384 ямкови плаки. за отпадъци **охладител за 96 ямкови плаки за PCR реакции**	4.7.1. за микрорпруветки – **1 бр.** 4.7.2. за 96 ямкови плаки – **7 бр.** 4.7.3. за 384 ямкови плаки – **3 бр.** 4.7.4. за отпадъци – **2 бр.** 4.7.5. охладител за 96 ямкови плаки за PCR реакции – **1 бр.**		
4.8	Защита Системата да е поставена пластмасова камера	Защита Системата е поставена пластмасова камера – **1 бр.**	Документ 16	5

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№	ДОПЪЛНИТЕЛНИ ТЕХНИЧЕСКИ ХАРАКТЕРИСТИКИ НАД МИНИМАЛНИТЕ, ПОДЛЕЖАЩИ НА ОЦЕНКА, СЪГЛАСНО ПОСОЧЕНАТА В ДОКУМЕНТАЦИЯТА МЕТОДИКА*	ОПИСАНИЕ	ДОКУМЕН-ТАЦИЯ НА ПРОИЗВО-ДИТЕЛЯ	СТРА-НИЦА №
Д1	Капацитет От 2501 - 2999 колонии на час във видимата област От 1501 до 1999 колонии на час във флуоресцентната област	Капацитет 3000 колонии на час във видимата облас 2000 колонии на час във флуоресцентната област	Документ 1	8

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Д2	С една глава да може да се обслужват всички видове стандартни плаки С 1 глава да могат да се обслужват всички дълбоки плаки	С една глава да може да се обслужват всички видове стандартни плаки: С 1 глава могат да се обслужват всички дълбоки плаки	Документ 11	16
Д3	Избор на най-добрите колонии Предварителен скрининг на колкониите: размер, съотношение на осите, цялост на ръба, интензитет на флуоресценцията	Избор на най-добрите колонии Предварителен скрининг на колониите: размер, съотношение на осите, цялост на ръба, интензитет на флуоресценцията	Документ 8 Документ 11 Документ 1	2 102 4

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* При необходимост се добавят допълнителни редове.

Дата	15/ 03 / 2019г.
Наименование на участника	АКВАХИМ АД
Име и фамилия	Елица Рускова
Длъжност	Пълномощник на: Камелия Трендафилова Цанкова Изпълнителен директор и Председател на СД на Аквахим АД, съгласно Пълномощно № 749 от 01.03.2019 г., заверено от Нели Каракашева, помощник – нотариус по заместване при Ваня Карасанова - Тончева, нотариус в район СРС, рег. № 444 на Нотар. Камара

Подпис на упълномощеното лице _____

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Документ 1.

Стр.2.

Стр.3.

1.25. Обективен, количествен анализ използвайки флуоресцентни изображения ви позволява ефикасно да изберете колонии, използвайки няколко различни флуоресцентни филтри, съвместими с голям брой флуоресцентни вектори за клониране.

1.2.. Настолен дизайн за максимална гъвкавост.

Системата QPix 420 осигурява всички приложения и представяне на системите от серията QPix 400 в по-малък, настолен формат. Системата е идеална, ако вие бихте желали да замените ръчното изолиране с автоматизирано, или ако имате нужда от максимална гъвкавост при позициониране на плаките върху масата.

Стр.4.

1.24.3. Софтуера идентифицира индивидуалните колонии с бяла светлина. Колониите се подпират по параметри дефинирани от потребителя: цялост на ръба, отношение на осите, размер и близост.

1.24.3. По избор, предварителен скрининг осигурява уникална информация за идентифициране на най-добрите колонии. Колониите избрани въз основа на дефинирани от потребителя параметри: цялост на ръба, съотношение на осите, размер, близост и ниво на флуоресценция.

Стр.5.

1.27., 1.32

Пълен софтуер за проследяване на данните: пази записи и с него може да се проследи историята на пробата от инокулиране на пробата до изолирането, препосяване (създаване на копиа), пренасочване към база данни и анализи.

1.26. Изолира колонии с типична ефикасност от > 98 %

1.10. сензори детектират височината на агара, помагайки на високопрецизния робот да изолира единични колонии нежно и точно.

1.17. Специфични за микроорганизма игли и глави са специално разработени за да гарантират максимален трансфер на материал.

1.7. Доказан процес на стерилизация на иглите е подходящ за всеки организъм.

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Druzhba - 2
83, Prof. Tsvetan Lazarov Blvd.

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1.5. Бар код четец проследява плаките с пробите, гнездата на плаките и изолираните клонове с оглед перфектното съхраняване на записи.

Стр.7.

1.28. Повторно накапване, експанзия и компресия и създаване на нова матрица

1.28. Идентично копие на плака (96 или 384 ямки), компресия (4x96 ямки в 1 x 384 ямки) и експанзия (1x384 ямки в 4 x 96 ямки) без смяна на главите за отбор

1.19. Камера (бяла светлина и флуоресцентна система) – CCD камера, с резолюция на изображенията 22 Пиксела / mm. Поле за наблюдение: 32 x 24 mm

Флуоресцентни изображения

Епифлуоресценция при следните 5 дължини на вълните с възможност за използване на посочените флуоресцентни багрила:
Ex /Em: 377 /447 nm за DAPI /Hoechst
Ex /Em: 457 /536 nm за FITC /GFP
Ex /Em: 531 /593 nm за Cy3 /DS Red
Ex /Em: 628 /692 nm за Cy5
Ex /Em: 531 /624 nm за Rhodamine /Texas Red

1.5. 1.29. Проследяване:

1 x баркодридер /принтер за проследяване на източника на колонии и плаките, в които са препосети колониите. Данните проследяват във всички приложения за плаки с един и същ идентификационен номер.

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Стр.8.

1.11	Капацитет на плаките, в които се посява	Система QPix420: Изолиране: 12 плаки, копиране и преразпределяне, максимум 120 позиции на плаките до 3 външни и вътрешни държателя
1.13	Капацитет на плаките от които се изолира	Система QPix420: без ръчна интервенция: 2 x 15 cm петрита; 10 x 9 cm петрита; 2 x OmniTrays, 2 x 22 cm петрита, 2 x QTray плаки
1.12.1	Видове плаки, в които се посява	Различни, 24-, 48-, 96-, или 384-ямки, включително и дълбоки плаки
	Височина на отбор на колонии	Интегриран ултразвуков сензор за височина на агара за задаване височината на агара на петрито за точен отбор на колонии
1.14, 1.15	Глава за изолиране	Напълно пневматична система, глави за изолиране на с 96 игли за стандартни и дълбоки плаки и петри. Възможност за замяна на главите за други приложения.
Д1,1.23	Капацитет на изолиране на колонии	3000 колонии за час с бяла светлина, 2000 колонии за час с флуоресцентна светлина
1.8	Бани за промиване	3 статични бани за промиване
1.9	Изсушаване на иглите	Патентована халогенна станция за изсушаване на иглите
1.3	Размери	Система QPix420 (без масата): 1460 mm (ширина) x 770 mm (дълбочина) x 750 mm (височина)
1.18	Спецификация на сгъстения въздух	
	Въздух	чист свободен от масло въздух чрез филтуране с филтър с размер по-малки от микрон
	Минимално работно налягане	6 bar (~90 psi)
	Минимален работен обем	80 L/min
1.18	Модул за сгъстен въздух	чист свободен от масло въздух чрез филтуране с филтър с размер по-малки от микрон
	Минимално работно налягане	6 bar
	Минимален работен обем	80 L/min
	Ниво на шума	61 dB

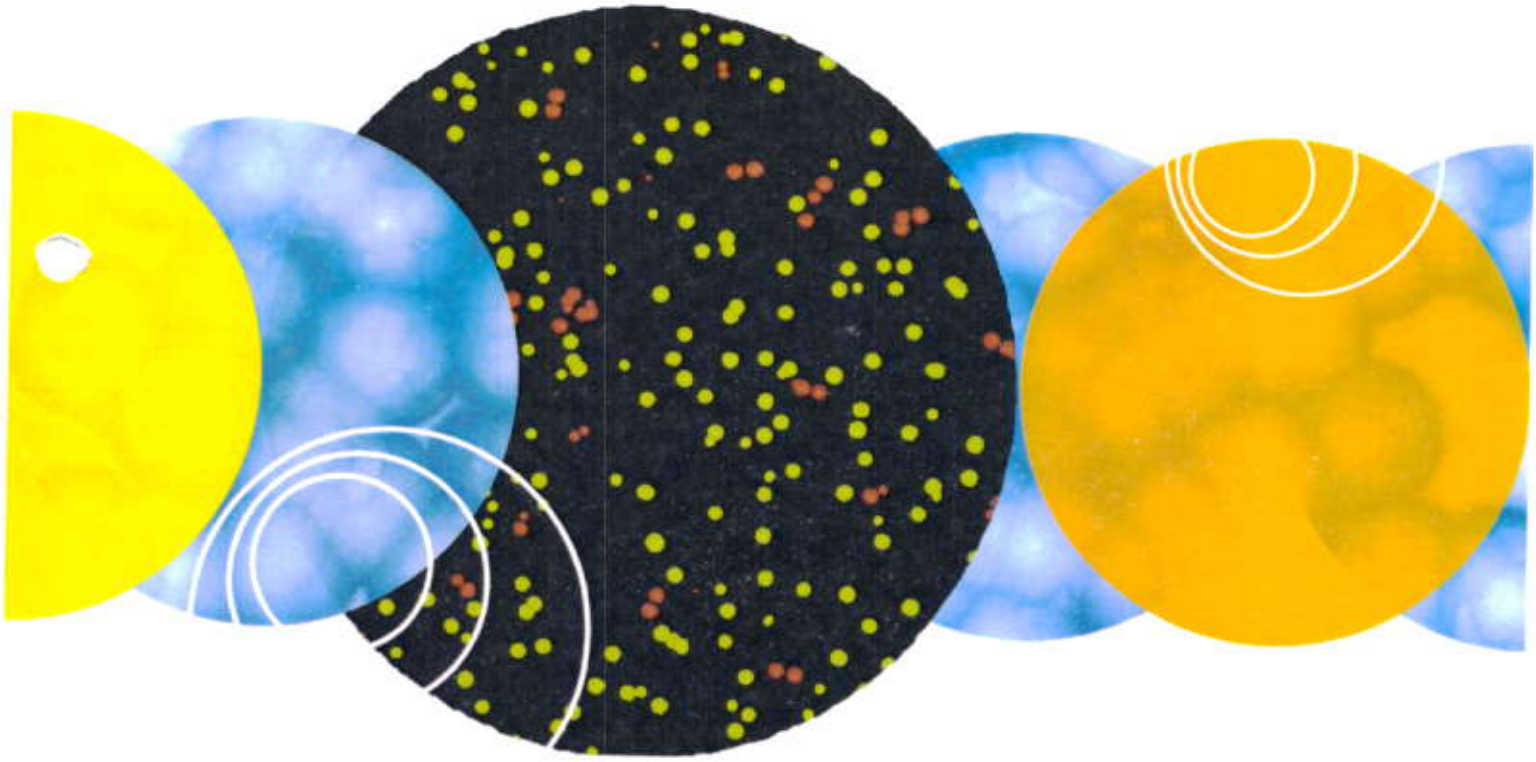
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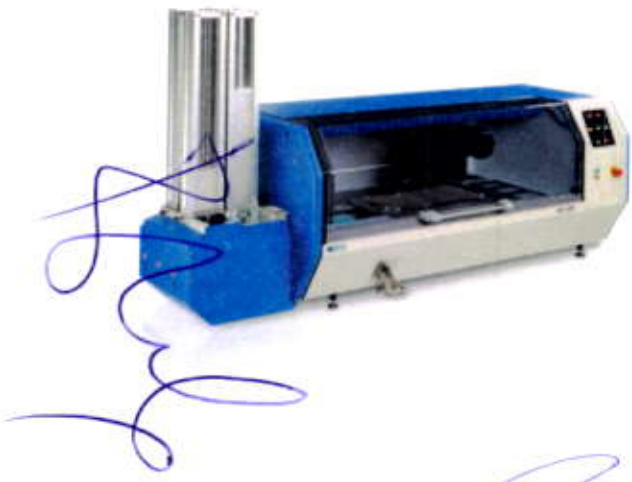
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Документ 1

QPix™ 400 Systems



Empowering you to select the best colonies faster

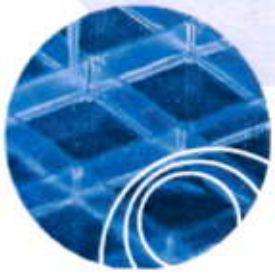


ВЯРНО С ОРИГИНАЛА

MOLECULAR DEVICES

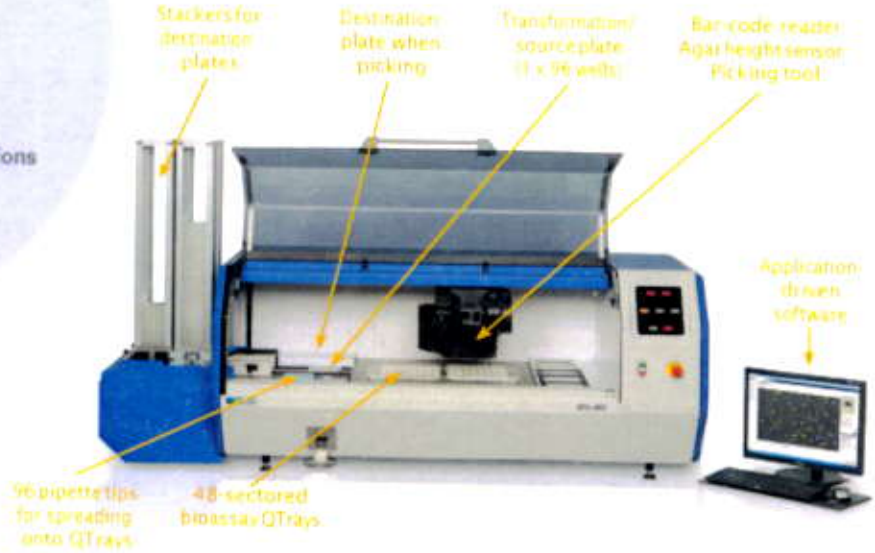
KEY BENEFITS

- Scalable automation to suit your throughput needs
- True walk-away operation with easy setup
- Electronic data tracking for well-documented data control
- Sterile environment with customizable HEPA filtration options



QPix 460 System prepares up to 48 samples per QTray. Incubate overnight and pick your colonies the next day.

SCALE UP COLONY PICKING WITH AUTOMATION SOLUTIONS TAILORED TO YOUR UNIQUE WORKFLOW!



Get the highest level of flexibility in application and experimental design with the QPix 460 System.

Colony pickers that do more

QPix™ systems earned a well-deserved reputation for performance and reliability at major sequencing centers throughout the Human Genome Project. Get ready to discover why research institutes, sequencing facilities, biotech and pharmaceutical companies worldwide use over 600 QPix 400 systems every day.

Tailored solutions for every application and workflow

Imagine picking exactly the right colonies every time. The QPix 400 series gets you there with the unique ability to simultaneously detect colonies and quantify fluorescent markers in a pre-screening step before picking. Just select the system that suits your application, workflow and throughput needs.



Select high value colonies faster

Objective, quantitative analysis using fluorescent imaging lets you efficiently select colonies using multiple fluorescent filters compatible with a broad range of fluorescent cloning vectors. Track fluorescently-labeled proteins to reveal unique information about individual colonies when studying protein folding, secretion or localization. Monitor enzyme evolution, or screen for transformation markers or mutations.



Raw image shows differences in expression (fluorescence) levels

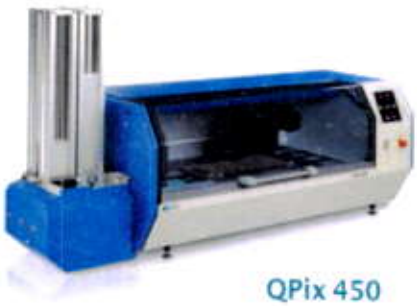


Processed image of an entire plate in a bioassay QTray highlights fluorescent colonies



QPix 420

Benchtop design for maximum flexibility. QPix 420 Systems provide all the application and performance benefits of the QPix 400 Series in a smaller, benchtop format. The system is ideal if you want to replace manual picking with automation, or need maximum flexibility in plate positioning on the deck.



QPix 450

Imaging to picking. Satisfy your capacity needs with the QPix 450 System, which handles up to 210 destination plates in three stacker lanes. This is your choice for applications such as enzyme evolution, clone management, library screening and biofuel development.



QPix 460

Spreading to picking. With a fully automated workflow, the QPix 460 System gives you the greatest flexibility in application and experimental design, including sample spreading. Choose the QPix 460 System for applications such as protein engineering, protein evolution, directed or enzyme evolution, protein expression, transformation and sub-clone management.

"THE QPIX 420 SYSTEM OUTCLASSES RIVAL SYSTEMS, HANDLING FLUORESCENT PICKING WITH AN UNRIVALLED LEVEL OF EASE AND ACCURACY."

Marc McCarthy, High Throughput Robotics Specialist,
Alimentary Pharmabiotic Centre, University College Cork, Ireland

Pick the right colony every time

Transform your whole colony picking process by eliminating the risk of double picks or blank wells, reducing manual picking errors and avoiding cross-contamination. With a QPix system, you can rely on advanced imaging and analysis combined with high precision robotics to pick the right colony every time. Highly robust performance ensures data quality and high viability of picked colonies.

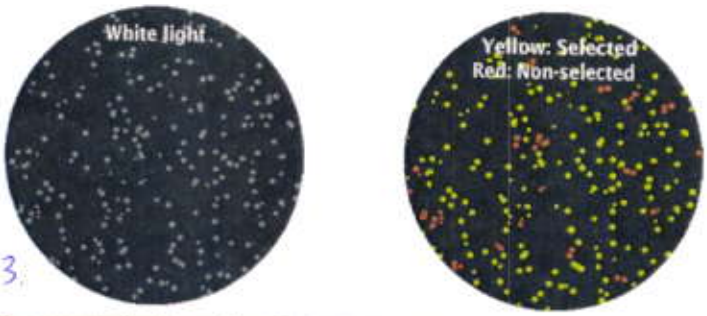
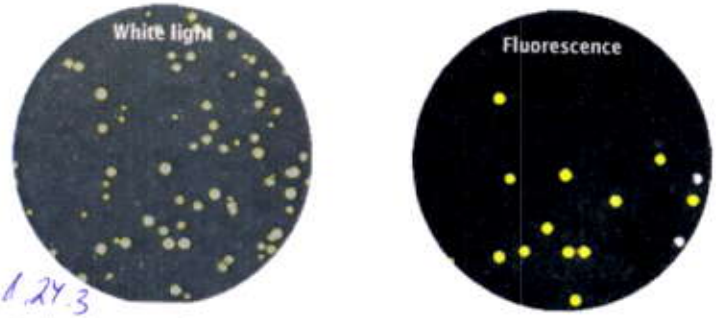
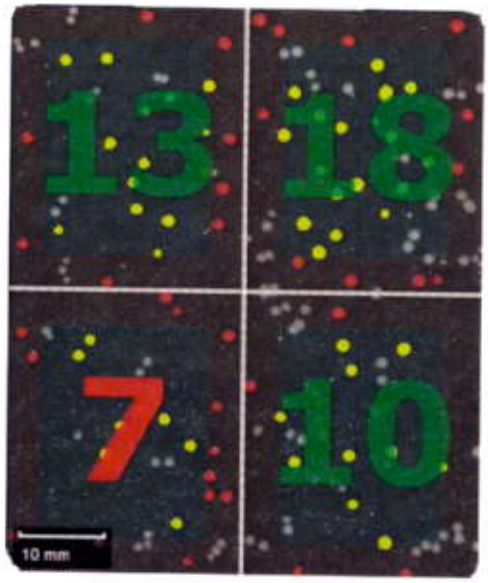


Image analysis software identifies individual colonies in white light. Colonies selected according to user-defined parameters: compactness, axis ratio, size, and proximity.



Optional pre-screening provides unique information to identify the best colonies. Colonies selected according to user-defined parameters: compactness, axis ratio, size, proximity, and fluorescent level.

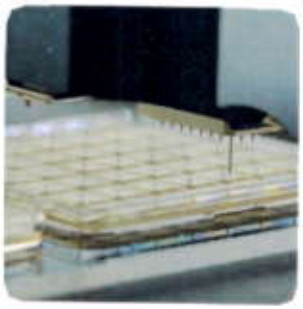


Pre-defined number of colonies selected per region for picking. Yellow: Colonies to be picked based on selection criteria. **Green:** Desired number of colonies met. **Red:** Desired number of colonies not met.

Key features and benefits	
Feature	**Benefit**
Superior picking speed and accuracy	Pick up to 3,000 colonies/hour in white light and up to 2,000 colonies/hour in fluorescent light with > 98% picking efficiency
Ultrasonic agar height sensor	Ensure maximum picking efficiency with auto-calibration of picking height
Large range of organism-specific pins	Successfully pick various organisms other than *E. Coli* and maintain integrity of picked colonies
Fully pneumatic pin picking tools (96-, and 384-pin picking tool options available)	Enables one colony picker to simultaneously supply up to 10 sequencing units
Proprietary halogen pin drying process	Eliminate contamination with a proven pin sterilization process
Liquid handling capabilities (QPix 460 System only)	Fully automate workflow from plating to spreading and picking
Exclusive, application-specific software algorithms for colony selection	Easy to use software ensures the right colony is picked every time and meets your desired experimental criteria
Complete data tracking software	Keep records and track sample histories from sample spreading to picking, replication and re-arraying

Get results faster

Pick colonies with a typical efficiency of >98%



Sensors detect agar height, helping high precision robotics to pick single colonies gently and accurately.



Organism-specific pin heads are tailor-made to ensure maximum transfer of material.



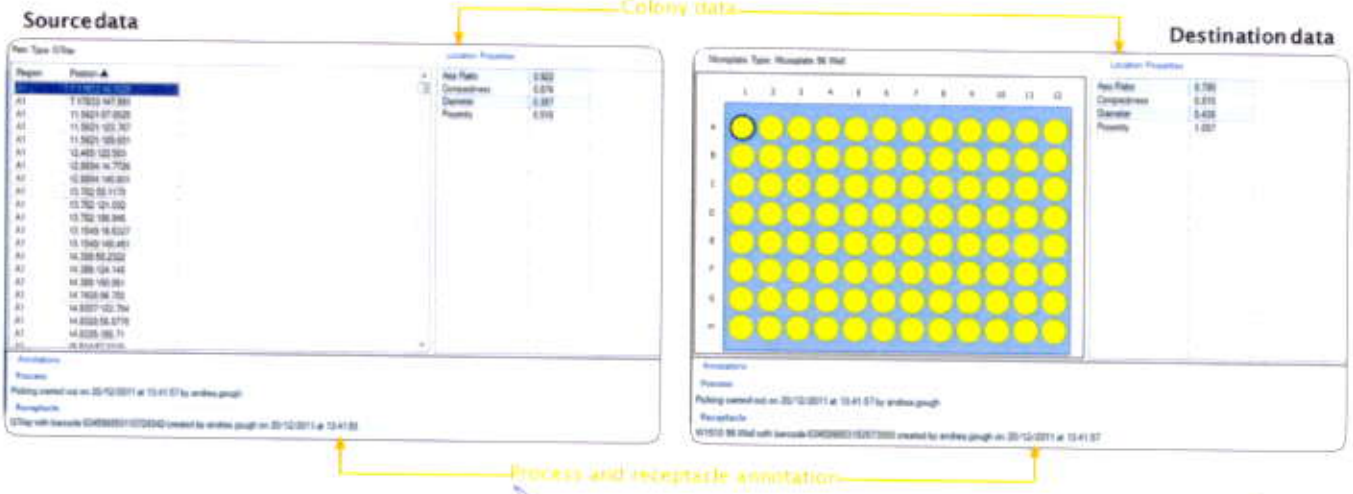
Proven pin sterilization process is suitable for any organism.



Bar-code reader tracks sample plates, wells and picked clones for perfect record keeping.

Track your entire sample history

Track the entire history of your clones from sample spreading (QPix 460 System only) to picking, replication and re-arraying. Tag your most important clones for enhanced visibility and optionally add sample-specific data.



ВЯРНО С ОРИГИНАЛА

Accelerate objective, quantitative colony selection

Develop constructs or target proteins during protein expression faster

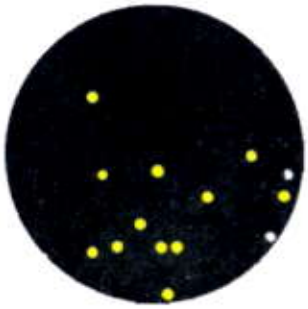
- Pre-screen to pick the right colonies
- Identify colonies that fluoresce at specific intensities of interest
- Automate and track entire workflow from spreading of transformed cells (QPix System 460 only) to colony picking



All colonies detected in white light



Colonies expressing required level of target protein identified in fluorescent channel



Selected colonies ready for picking

Select candidate clones in synthetic biology with confidence

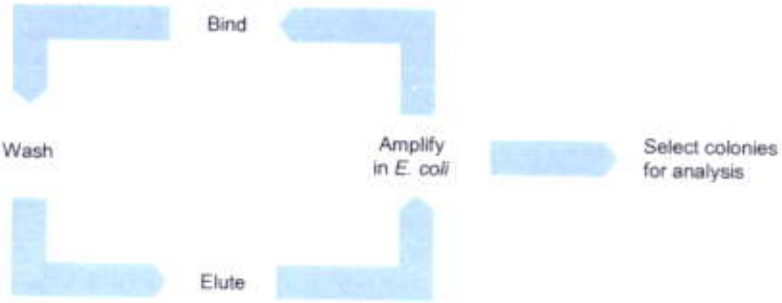
- Automatically image and select clones of engineered micro-organisms
- Pick with high accuracy
- Track all experimental data



White light imaging of an entire plate

Screen phage display libraries to identify antibody candidates efficiently

Automatically select and pick phage-containing *E. coli* colonies

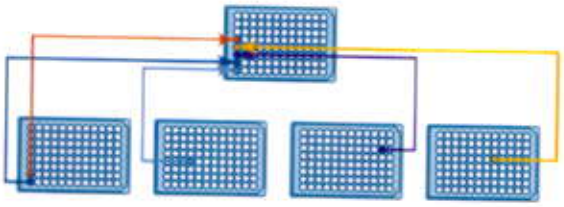


Phage display cycle

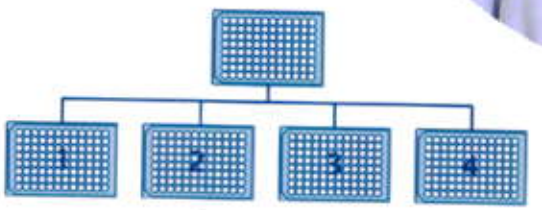
Efficient and cost-effective DNA library generation and clone management



Replicate, grid and re-array with application-specific software modules



Cherry-pick wells of interest into new plates



Replicate plates

Identical replicates (96 or 384 well), Compression (4x96 into 1x384), Expansion (1x384 into 4x96), without picking head change

Imaging	
Camera (white light only system)	CCD Camera, image resolution: 22 pixels /mm. Field of view: 62 x 46 mm
Camera (white light and fluorescence system)	CCD Camera, image resolution 22 pixels /mm. Field of view: 32 x 24 mm
White light imaging	Trans-illumination
Fluorescent imaging (optional)	Epifluorescence illumination, five standard wavelengths included: Ex /Em: 377 /447 nm for DAPI /Hoechst Ex /Em: 457 /536 nm for FITC /GFP Ex /Em: 531 /593 nm for Cy3 /DS Red Ex /Em: 628 /692 nm for Cy5 Ex /Em: 531 /624 nm for Rhodamine /Texas Red
Colony statistics	Colonies selectable based on size, proximity, roundness. Selection performed on whole tray image
Tracking	1 x barcode reader / printer for tracking of source and destination plates. Data tracked through all applications for plates with same I.D.

Software	
Plate replication	Software license and additional head
Re-arraying	Software license and additional head
Gridding	Software license and additional head
Zone of inhibition detection	Software license
Colorimetric colony selection	Software license and filters
Low contrast colony detection (plaque picking)	Included with Software 2.0 and newer

ВЯРНО С ОРИГИНАЛА

Instrumentation	
Spreading capability (QPix 460 System only)	Sampling and spreading source plate: 1 x 96-well (30 minutes for 96 samples). Aspiration volume 10-130 µL. Destination plate: 2 x 22 cm 48 region QTrays. Samples spread from pre-set or customizable pattern.
Destination plate capacity 1.11	• QPix 420 System: Picking: 12 plates; replicating and re-arraying, maximum of 120 plate positions, up to 3 internal and external holders • QPix 450 System: Up to 210 low profile plates, 70 per stacker lane, maximum 3 stackers • Qpix 460 System: Up to 140 low profile plates, 70 per stacker lane, maximum 2 stackers
Source plate capacity 1.13	• QPix 420 System: Without manual intervention: 2x 15 cm petri dish; 10x 9 cm petri dishes; 2 x OmniTrays; 2 x 22 cm petri dishes, 2 x QTrays • QPix 450/460 System: Without manual intervention: 2 x 15 cm petri dish; 10 x 9 cm petri dishes; 4 x OmniTrays; 2 x 22 cm petri dishes, 2 x Qtrays
Picking destination plate type 1.12.1	Various, 24-, 48-, 96-, or 384-well, including deep well
Picking height	Integrated ultrasonic agar height sensor to set agar height per plate for accurate picking
Picking head 1.14, 1.15	Fully pneumatic, 96 pin picking heads for standard and deep plates and petri. Interchangeable heads for other applications
Picking pin types	Range of organism-specific pins
Picking capacity 21, 1.23	3000 colonies per hour in white light, 2000 colonies per hour in fluorescent light
Fluorescent picking	Colonies imaged in white light for location identification and fluorescence for data analysis. WL and FL image multiplexed.
Fluorescence data 1.8	Multiple parameters available e.g. interior mean. Fluorescent intensity recorded for picked colonies.
Wash bath 1.8	3 x static wash baths
Pin drying 1.9	Proprietary halogen pin drying station
Dimensions 1.3	• QPix 420 System (without table): 1460 mm (width) x 770 mm (depth) x 750 mm (height) • QPix 450/460 System: 2200 mm (width, excluding monitor arm) x 800 mm (depth) x 2140 mm (height on table)
Compressed air specifications 1.18	
Air	Clean, oil-free with sub-micron filtration
Minimum operating pressure	6 bar (~90psi)
Minimum operating volume	80L/min
Optional compressor specifications 1.18	
Compressor unit	Clean, oil-free compressor with sub-micron filtration
Dimensions	250 mm (width) x 600 mm (depth) x 750 mm (height)
Weight	60 kg
Minimum operating pressure	6 bar
Minimum operating volume	80 L/min
Noise level	61 dB(A)
Regulatory approval	
Compliance	CE
Quality	ISO9001:2008 certified

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MOLECULAR DEVICES

Документ 2

Стр. 1

1.1.3

Това, което разграничава синтетичната биология от останалите дисциплини при които тази дефиниция е също така подходяща е използването на инженерни принципи за дизайн и конструиране на биологичен материал.

Поддържа различни приложения като синтетичната биология, метагеномикс, биогорива, синьо – бял скрининг и др.

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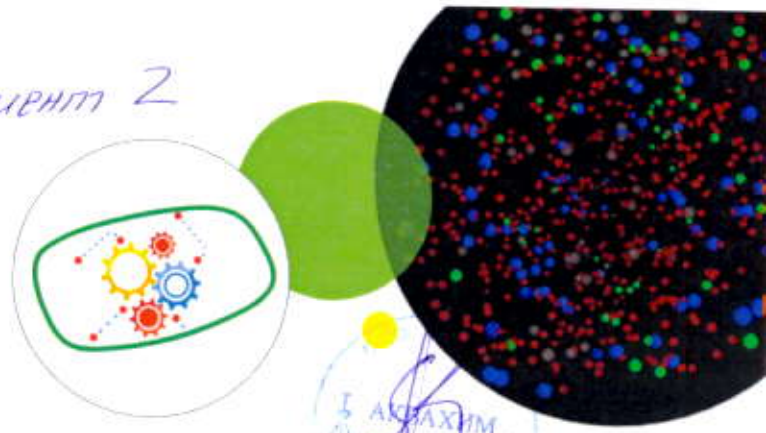
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MOLECULAR DEVICES

Документ 2

Colony picking in synthetic biology



MICROBIAL COLONY PICKERS

- Pick colonies accurately and efficiently using organism-specific pins that maximize material transfer
- Avoid cross contamination with a reliable pin sterilization process
- Support a range applications such as synthetic biology, metagenomics, biofuels, blue/white colony screening and many more



QPix 400 Series Microbial Colony Pickers

WHAT IS SYNTHETIC BIOLOGY?

Synthetic biology is a broad term that refers to the manipulation of metabolic pathways to force microbes to perform a specific biological action (often to over-manufacture molecules or proteins). Sometimes, individual genes are manipulated. Other times, entire organisms are modified for desired characteristics.

However, what appears to differentiate synthetic biology from other disciplines in which this definition may also be appropriate is the use of engineering principles to design and construct biological materials. For example, many synthetic biologists use the strategy of design, build, and test to create their biological material of interest. This strategy is borrowed directly from engineers.

PICKING THE RIGHT COLONIES

For the synthetic biologist, biological 'building blocks' are often generated from bacteria, and the cyclical 'design-build-test' process often requires screening and picking colonies of interest. Traditionally, colony picking is performed manually using sterile pipette tips or inoculation loops, which are usually slow, labor intensive, and time consuming. Synthetic biology research can therefore benefit greatly from the flexibility and throughput of an automated colony picker. Not only will automated colony pickers make the entire process quicker (up to 3,000 clones per hour), but the results are more consistent and reliable.

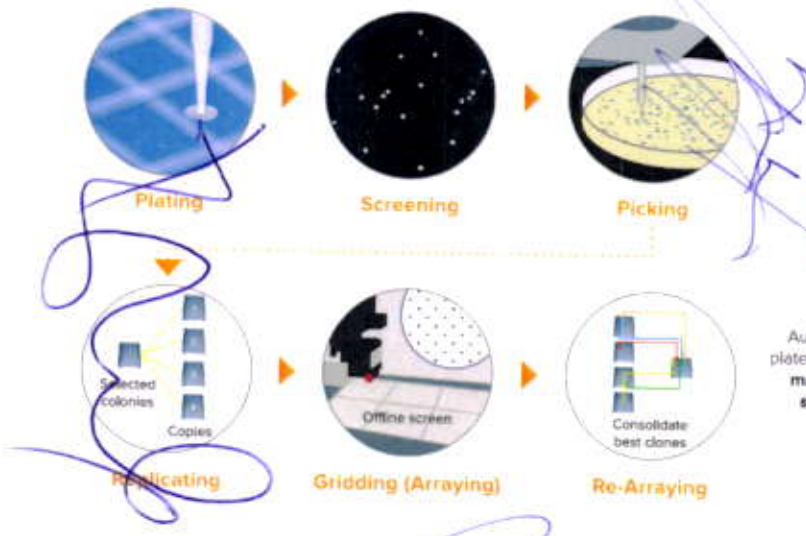
BENEFITS

- Enables higher throughput, while minimizing manual labor
- Provides consistent, objective colony picking instead of subjective, manual picking
- Accommodates a broad range of different applications and automations with versatile features, such as fluorescence screening and liquid handling
- Electronic data tracking allows for well-documented data control

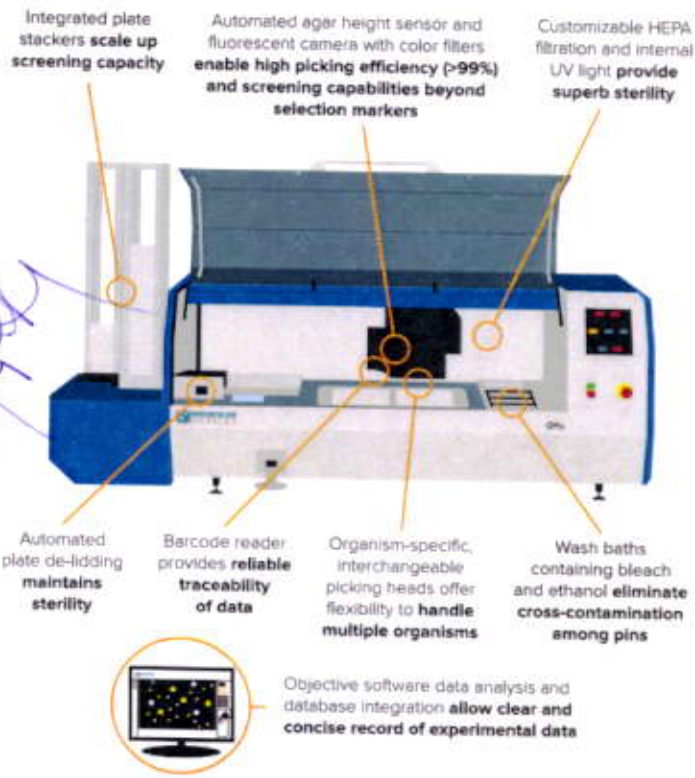
QPIX 400 SERIES MICROBIAL COLONY PICKERS

Our automated microbial colony picking systems offer you the unique option to simultaneously detect colonies and quantify fluorescent markers in a pre-screening step before picking.

A TYPICAL QPIX MICROBIAL COLONY PICKER WORKFLOW



ANATOMY OF A QPIX MICROBIAL COLONY PICKER



Документ 3

Стр. 1

1.1.5

Какво е микробиом?

Микробиомът е колекция от микроорганизми в определена околна среда, които представляват екосистема от паразитни, симбиозни и патогенни микроорганизми. Такава екосистема съществува в нашата храносмилателна система, състояща се от колекция от дрожди, бактерии, плесени, вируси и протозои. Изчислено е, че техният брой е трилиони микроорганизми при хората, повечето от които играят важна роля за подпомагане и поддържане на здрава стомашно-чревна система. Въпреки, че имаме добри познания за някои от тези микроорганизми като E. coli, има огромен брой други микроорганизми, които са още в най-ранна фаза на изучаването. Важността на този микробиом е в основата на създаването на NIH проект.

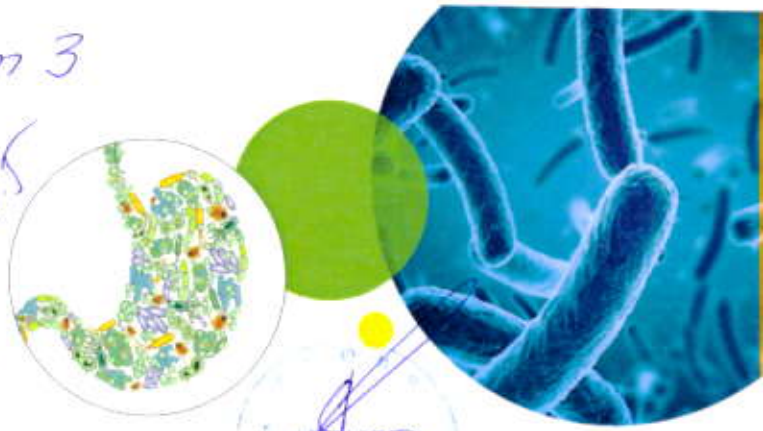
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MOLECULAR DEVICES

Colony picking for microbiome studies



MICROBIAL COLONY PICKERS

- Pick colonies objectively with high robotic accuracy and precision
- Avoid cross contamination with a pin sterilization process suitable for any organism
- Broad applications span microbiome, synthetic biology, metagenomics, blue/white colony screening, and more

WHAT IS THE MICROBIOME?

The microbiome is the collection of organisms within a particular environment, which constitutes a vast ecosystem of commensal, symbiotic and pathogenic microorganisms. Such an ecosystem exists in our digestive system, composed of a collection of bacteria, yeast, fungi, viruses, and protozoans. There are estimated to be trillions of these microorganisms in humans, most of which play an important role in helping to maintain a healthy gut. Although we have a good understanding of many of these microorganisms, such as *E. coli*, there are a multitude of other organisms that we are only just beginning to understand. The importance of the gut microbiome is emphasized by the NIH's creation of the Human Microbiome Project.

PICKING THE RIGHT COLONIES

Scientists need to grow and pick the right microbial colonies or fungi, making colony picking an essential part of microbiome studies. Traditionally, colony picking is performed manually using sterile pipette tips or inoculation loops, which is usually slow, labor intensive, and time consuming. Automated colony pickers make the entire process quicker (up to 3,000 clones per hour) and the results are more consistent and reliable.

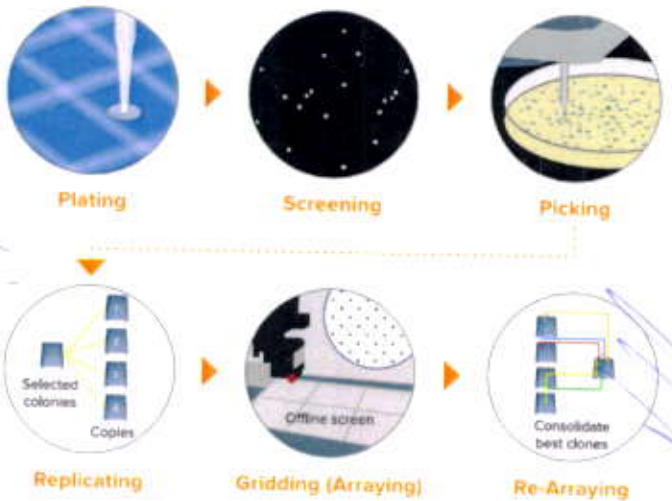
BENEFITS

- Scalable automation to suit your throughput needs, including true walk-away operation and easy setup
- Organism-specific pin heads to ensure maximum transfer of material
- Broad applications range, including fluorescence and liquid handing capabilities
- Electronic data tracking for well-documented data control
- Sterile environment with customizable HEPA filtration options



QPix 400 Series Microbial Colony Pickers

A TYPICAL QPIX MICROBIAL COLONY PICKER WORKFLOW



ANATOMY OF A QPIX MICROBIAL COLONY PICKER





Objective software data analysis and database integration **allow clear and concise record of experimental data**

QPIX 400 SERIES MICROBIAL COLONY PICKERS

Due to the variety of organisms that inhabit our digestive tracts, microbiome studies can benefit greatly from the flexibility and throughput that our QPix automated microbial colony picking system can provide. The QPix system offers you the unique option to simultaneously detect colonies and quantify fluorescent markers in a pre-screening step before picking. Since the microbiome consists of many unknown organisms it can be difficult to know what you are looking for, which is where the colorimetric (blue/white) and fluorescence screening capabilities of the QPix system can help.

If additional functionality is needed, our in-house Advanced Workflow Engineering Solutions (AWES) team can expertly customize our QPix instruments to optimize workflows for your specific needs.

Solutions provided by AWES are subject to Molecular Devices Custom Products Purchase Terms available at www.moleculardevices.com/custom-products-purchase-terms

Документ 4

Стр. 1

1.1.4

Високопроизводителен скрининг на фаги

Типична библиотека от фаги съдържа 10^9-10^{11} варианти, индивидуално експресирани в E. coli. Благодарение на този голям брой клонове, търсенето на най-добрия кандидат фаги изисква огромни усилия. Процесът на ръчно подбиране на колонии е критично стъпало, тъй като този процес е субективен, изискващ много труд и време.

Стр. 2.

1.17.1.

В допълнение, много други задачи при експресия на фаги могат да бъдат автоматизирани, включително инокулиране, скрининг, отбиране, препосяване, реформатиране и пренасочване (Фиг. 3).

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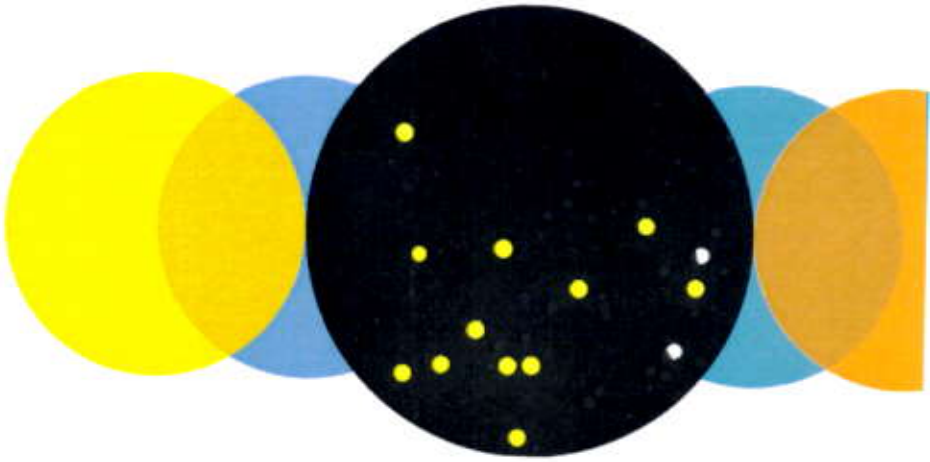
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Документ 4



QPix 400 Series Microbial Colony Picker



High-throughput phage display screening

KEY FEATURES

- Enables higher throughput while freeing up manual labor and increasing the walk-away time
- Provides consistent, objective colony picking instead of subjective, manual picking
- Accommodates a broad range of different applications, such as fluorescence screening and liquid handling
- Tracks data electronically, allowing for well-documented data control

Screen 3000 clones per hour with automated colony picking

A typical phage library contains about 10^9–10^{11} variants individually expressed in *E. coli*. Due to this large number of clones, searching for the right candidate phage requires a huge amount of effort. The process of picking manually poses a substantial bottleneck because it is subjective, laborious, and time consuming.

The automated QPix™ 400 Series Microbial Colony Pickers can significantly reduce the bottleneck with its ability to pick up to 3,000 clones per hour, increasing speed, throughput, and walk-away time.

Significance of phage display

Phage display was initially described over 30 years ago, and the concept was further developed and improved. The development of phage display revolutionized antibody drug discovery. The method is often used to discover and isolate highly specific therapeutic antibodies used in anti-cancer or anti-inflammatory therapeutics. Today, many other selection techniques exist based on this concept, including mRNA display and yeast display.

How does phage display work?

In phage display, individuals from a library of billions of antibody variants are uniquely expressed on the outside a phage, while the genetic material encoding each variant resides on the inside. The phage library is infected into *E. coli*, creating a diverse pool of phage-containing cells. The presence of both the amino acid sequence and the DNA encoding it within the same virus particle creates a physical bridge, allowing for rapid selection based on binding affinity to a given target molecule by an *in vitro* selection process called panning (Figure 1), which consists of 4 steps:

- **Bind**—Displayed peptide from phage library binds to an immobilized target protein
- **Wash**—Wash non-binding phage
- **Elute**—Collect high-affinity-bound phage
- **Amplify**—Eluted phage pool is re-infected into *E. coli*, constituting an enriched mixture

АХВАХИМ АДЖАСИ
ВЯРНО С ОРИГИНАЛА

MOLECULAR DEVICES

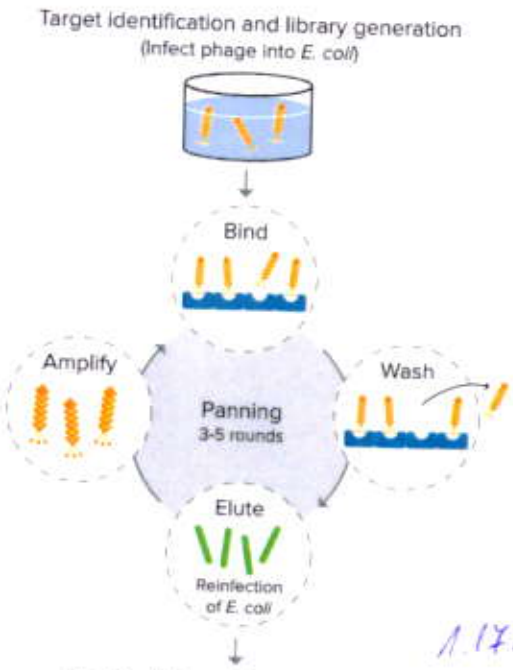


Figure 1. An overview of a typical phage display workflow.

After 3-5 panning rounds, eluted phage pool is infected into bacteria and plated. Phage-forming colonies are grown and characterized.

Phage display libraries contains billions of variants uniquely expressed in individual colonies of *E. coli*. For clones to be characterized, they must be picked following an iterative selection process. Manual picking of clones can be a laborious and time-consuming process, which creates a significant bottleneck.

Microbial colony pickers

- Specialize in picking microbes such as *E. coli*
- Avoid cross-contamination with organism-specific pins
- Broad applications span synthetic biology, metagenomics, biofuels, blue/white colony screening, etc.

The QPix 400 Series Microbial Colony Pickers allow automated picking up to 3000 clones per hour, significantly increasing speed, throughput and walk-away time. Additionally, clones can be screened in white light or fluorescence, and the system can select clones based on user-defined parameters such as compactness, axis ratio, size, proximity, and fluorescence level (Figure 2).

In addition, many other tasks in phage display can be automated, including plating, screening, picking, replicating, gridding, and re-arraying (Figure 3).

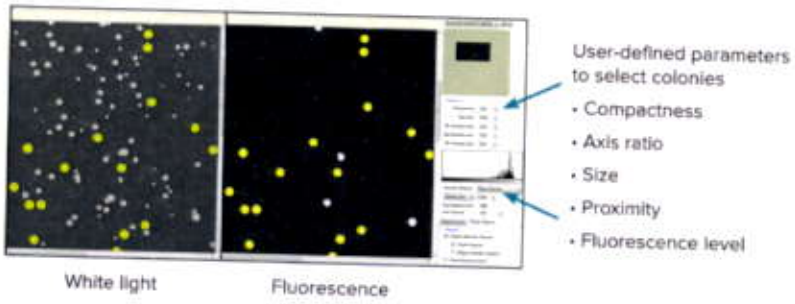


Figure 2. The QPix systems offer the unique option to simultaneously detect colonies and quantify fluorescent markers in a pre-screening step before picking.

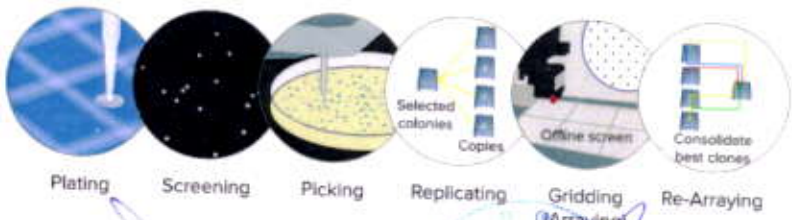


Figure 3. A typical QPix workflow.

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MOLECULAR DEVICES

ВЗЯТО С ОРИГИНАЛА

Документ 5

Стр. 1

1.1.6

Високопроизводителен скрининг и селекция на продуценти на високи нива липиди и биогорива

Използвайки сиснтетичната биология и метаболитните инженерни подходи, учени са създали микроорганизми, които да произвеждат следващо поколение биогорива и възобновяеми енергийни продуктипредназначени за пазарни цели и цели, свързани със защита на околната среда.

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Документ 5

MOLECULAR DEVICES

APPLICATION NOTE

High-throughput screening and selection of high lipid producers for biofuels

Introduction

In recent years, there has been a markedly growing interest in alternative and renewable energy production products. One of the most prominent alternative energy resources is biodiesel, an energy-rich portable fuel mainly composed of triacylglycerols (TAGs). Biofuels produced from crop seeds have recently came under major scrutiny due to the competition between foods vs. fuel. Biodiesel production from lipid producing microbial systems is receiving considerably more attention for generating sustainable and high-quality fuels. Oleaginous microorganisms (bacteria, algae and fungi) capable of accumulating significant quantities of stored TAGs are exploited as precursors for the production of lipid-based biofuels. Using synthetic biology and metabolic engineering approaches, researchers have engineered these microbes to produce next-generation biofuels and renewable energy products aimed to meet both environmental and market demands.

One of the major bottlenecks for biofuel production is robust identification of the high-value hit faster that is enabled by objective, functional readout of the end product in the primary screen. Although essential, manual colony picking followed by bicinchoninic acid assays, optical density measurements and gas chromatography assays can be time consuming, error-prone tasks. To enhance productivity and shorten timelines to find suitable candidates, automated and objective selection of colonies is required. Here we describe how QPix™ 400 Series provides a highly productive, reliable method to select desired lipid-secreting colonies based on quantitative measurement of lipid production with a fluorescent dye.

Culturing of lipid-accumulating bacteria

Rhodococcus opacus PD630 was selected as the model organism due to its high substrate tolerance, rapid growth, and ability to be cultivated to high densities. A strain of *R.opacus* (DSM 44193) was obtained from DSMZ culture collection, and cultured in Trypticase Soy Broth (TSB) medium at 28°C. For non-lipid accumulating negative control organism, a strain of *Escherichia coli* from ATCC (Migula 47076) was cultured in TSB medium at 37°C. Liquid cultures of both organisms were grown aerobically in a shaker incubator for 1-3 days. Strains were then cultured for 48-72 hours at 28°C on solid agar plates containing Trypticase soy agar (TSA) medium and 0.5 µg/mL of Nile red (AAT Bioquest, Inc.).

Benefits

- **Automated picking of up to 30,000 selected colonies per day**
- **User-defined parameters and flexible software for optimal colony picking**
- **Accurate, gentle colony picking at > 98% efficiency**
- **Variety of fluorescence filter sets for increased flexibility**

1.1.6

АКВАХИМ AQUACHIM

ВЯРНО С ОРИГИНАЛА

Objective colony screening using white light and fluorescence imaging

Nile red, a lipophilic fluorescent dye, detects lipid production directly in growing bacterial colonies on cultured agar plates and distinguishes between high lipid-accumulating *R.opacus* strain and non-accumulating negative control *E.coli* bacteria. The culture plates with colonies were imaged with QPix™ 420 system with white light and fluorescence using the FITC filter set (Ex 457nm/ Em 536nm) (Figure 1). Colonies containing high lipid-accumulating *R.opacus* strain displayed robust fluorescence under the UV fluorescence channel on the QPix 420 system, while negative control colonies exhibited no significant fluorescence (Figure 2). Colony detection using both white light and fluorescence imaging on the QPix System enables objective identification and selection of colonies that exhibit fluorescence based on lipid accumulation.

Optimized colony selection using tunable software parameters

The acquired images were analyzed using the QPix Software. Parameters such as size, diameter and compactness were tuned for optimal colony selection. A mean fluorescence intensity threshold of greater than 50,000 was set to select (i.e. gate) colonies demonstrating high fluorescence as a result of high lipid accumulation detected by staining with Nile red (Figure 3).

Both fluorescent and non-fluorescent colonies indicating high and no lipid accumulation, respectively, were picked using the QPix System's fully pneumatic 96-pin picking head. Lipid accumulation levels were further confirmed post-picking. Following an overnight culture in liquid media, cultures were stained with a lipophilic bright green fluorescent dye, BODIPY 505/515 (Life Technologies) at a concentration of 0.5 µg/mL and fluorescence measurements were recorded on SpectraMax® M5 Multi-Mode Microplate Reader. A high degree of fluorescence was confirmed in high lipid accumulating colonies that were originally selected and picked using the

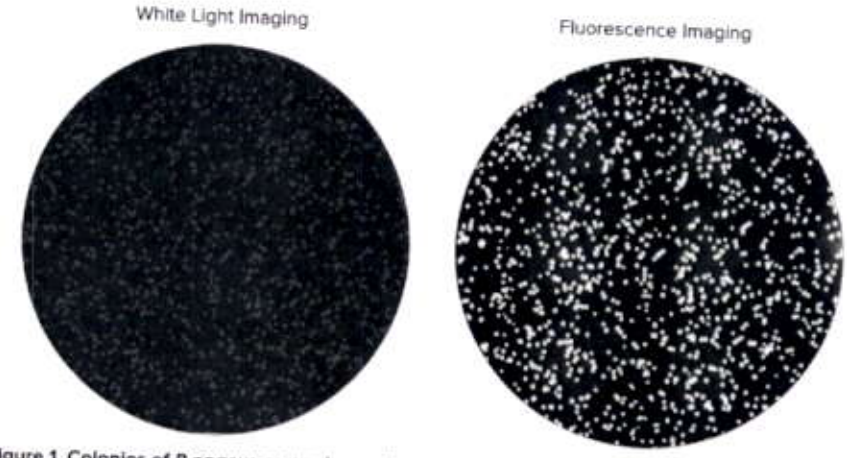


Figure 1. Colonies of *R.opacus* grown in media containing Nile red were imaged on QPix 420 system under white light (left) and fluorescence imaging (right). Colonies accumulating high amount of lipids can be detected based on fluorescence intensity.



Figure 2. Non-lipid accumulating *E.coli* (negative control) were co-cultured with high lipid accumulating *R.opacus* on media containing Nile red and imaged on QPix 420 system with fluorescence imaging module. Green arrows depict colonies accumulating high amounts of lipid as observed by bright fluorescence; blue arrows indicate negative control colonies that do not exhibit any fluorescence.

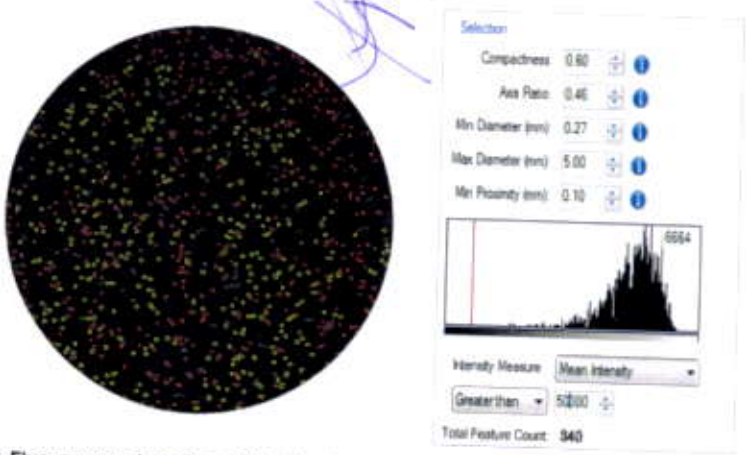


Figure 3. Fluorescence-based quantification that is reflective of lipid accumulation would enable objective colony selection on QPix 400 Series with user defined colony selection criteria (red).

QPix 420 System, while background levels of fluorescence were exhibited by the negative control *E.coli* colonies as depicted in red (Figure 4A). Additionally, images of BODIPY 505/515-stained high lipid producing *R.opacus* were acquired using ImageXpress® Micro XLS Widefield High Content Screening System at 40x magnification (Figure 4B). Bright green fluorescent staining with lipophilic dye is indicative of high lipid accumulation in *R.opacus*.

These data demonstrate the ability to differentially select and pick colonies based on fluorescence exhibited by the high lipid producing colonies. The ability to examine large numbers of colonies for applications such as library screening enables efficient and reliable identification of high-value vs. low-value strains. Additionally, with quantitative fluorescence imaging and objective software analysis provided by the QPix 400 Series, secondary screening assays could potentially be eliminated from the workflow. This would save sample processing time and reduce costs while improving the workflow efficiency to isolate high-value colonies.

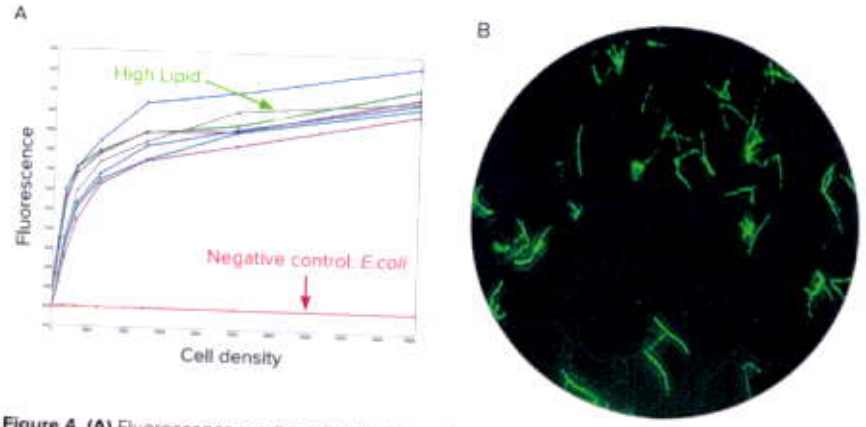


Figure 4. (A) Fluorescence reading of high lipid producing colonies and negative control group stained with BODIPY 505/515 lipophilic fluorescent dye on the SpectraMax M5 Multi-Mode Microplate Reader. High lipid producing colonies exhibited high fluorescence (RFU) values and in contrast the negative colonies exhibited a flat-line signal as depicted in red. **(B)** Fluorescent image of high lipid-yielding *R.opacus* demonstrated bright green staining with lipophilic BODIPY 505/515 dye as acquired using the ImageXpress Micro XLS Widefield High Content Screening System at 40x magnification.

Summary

The QPix 400 Series of automated microbial colony pickers provides a highly productive and reliable alternative to the conventional manual picking approaches. Implementing the QPix 400 Series in experimental workflows may shorten the overall processing time to obtain the colonies of interest. With the aid of fluorescence detection capabilities of QPix 400 Series, high lipid producing bacterial colonies can be accurately detected and selected. Flexible and easy-to-use software allows users to customize and define optimal colony selection criteria for automated picking experiments. This work describes a time-saving approach to isolate high-value colonies in the study of metabolic engineering or protein evolution for biofuel production.

ВЯРНО С ОРИГИНАЛА

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MOLECULAR DEVICES

Документ 6.

Стр.1.

1.14. Автоматична система за микробен скрининг с капацитет за отбор на 3000 колонии / час.

Стр. 2.

1.7.

Поддържане на стерилност

Налични са приспособления, свързани с поддържането на стерилност, включително UV лампа за стерилизиране на камерата на апарата, както и почистване на иглите и изсушаване на иглите.

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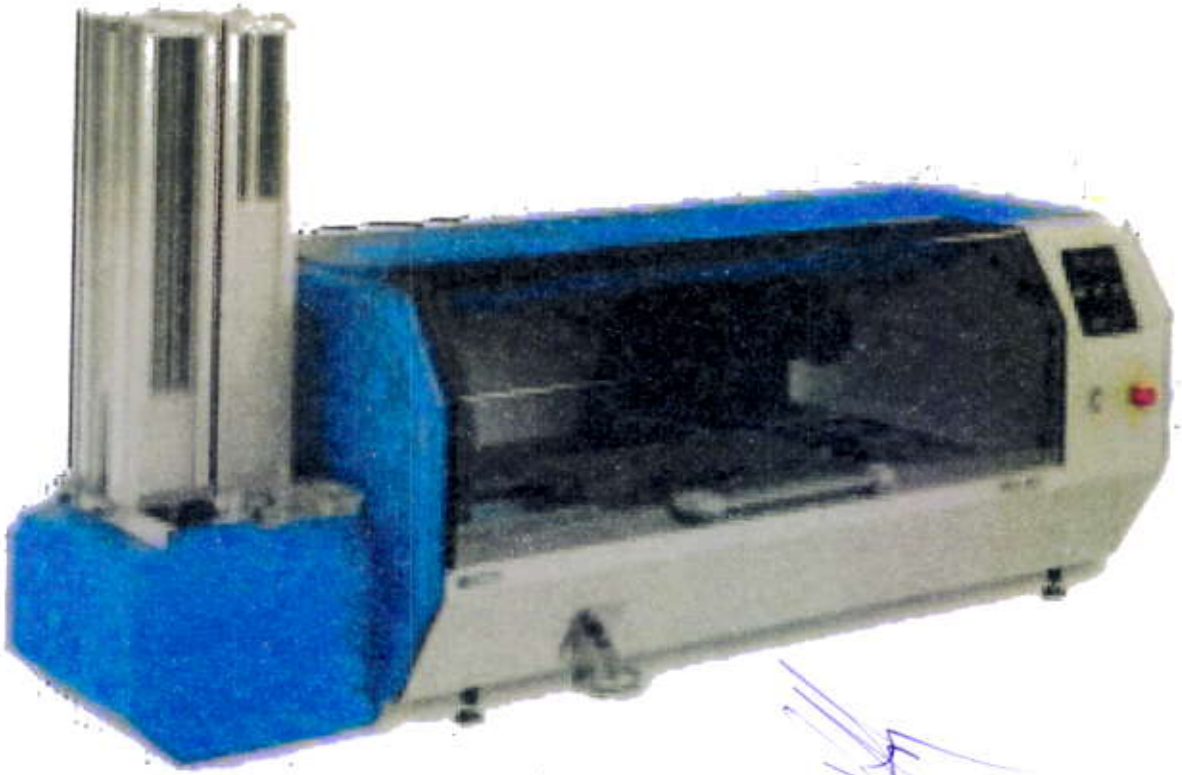
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MOLECULAR DEVICES

Документ 6

QPix 400 Series Microbial Colony Pickers



Automated microbial screening system capable of picking up to 3000 colonies per hour

1.14

Microbial screening colony picker with sample tracking and plate handling

The QPix™ 400 Series Microbial Colony Pickers combine intelligent image analysis with precise automation for fast and efficient screening of large libraries. Capable of picking up to 3000 colonies per hour, it will streamline your workflow. In addition to microbial screening, the system automates several sample preparation and plate handling processes such as transfer of bacterial liquid culture and plating on agar. With a variety of data tracking and assay tools, the QPix Software streamlines the control and management of complex and iterative processes.

Identify colonies with a desired phenotype

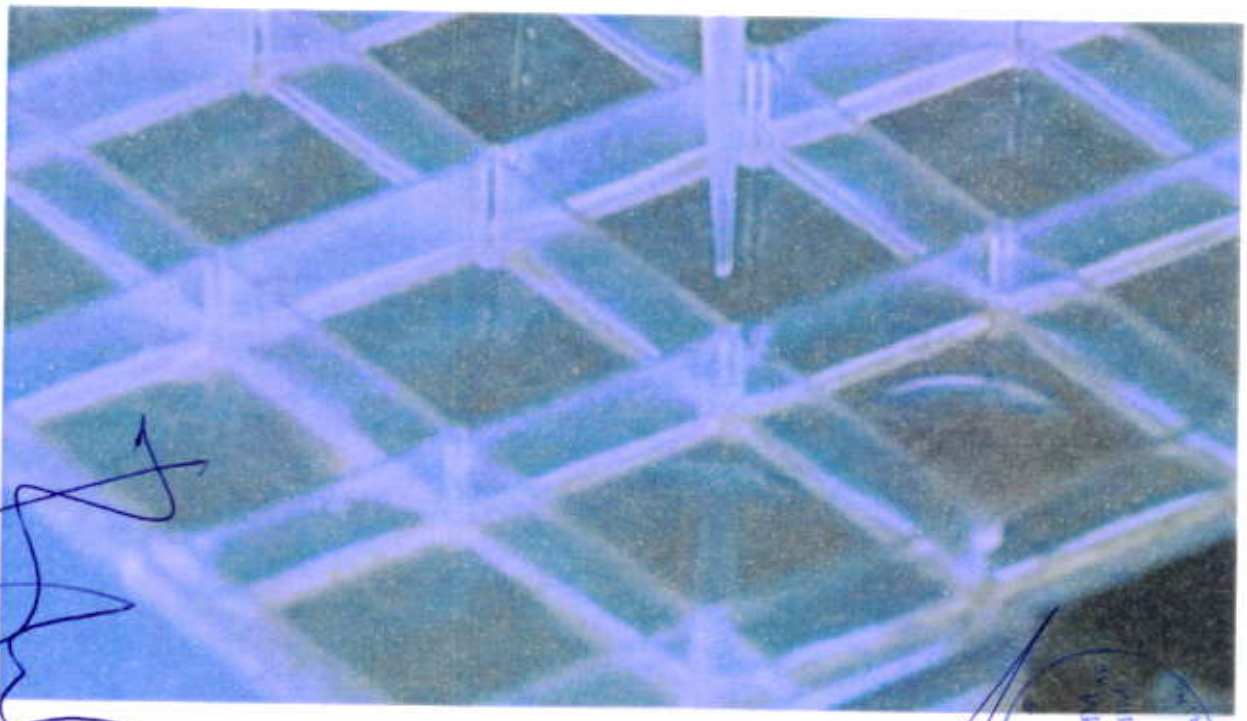
The QPix colony pickers support a wide variety of microorganisms and multiple selection modalities, including fluorescence intensity, blue/white selection, size and proximity, and zone of inhibition.

Select colonies efficiently

A suite of organism-specific pin and agar sensor ensure efficient picking. The system delivers a picking efficiency of >98%, allowing you to walkaway with confidence.

Maintain Sterility

A host of sterility features are available including a UV light for sanitizing the interior of the instrument, as well as pin washing, and halogen drying of pins.



QPix Overview

ВЯРНО С ОРИГИНАЛА

Документ 7.

Стр.10.

1.12.2

Петрита и държатели за петрита

Регулируеми държатели на петрита и микроплаки

Държателите са с пружини, което позволява автоматично нагласяване на периметъра и сигурно захващане на пластмасовото петри или плака, дори и при големи вариации на размера. Черното покритие усилва оптичното изображение и намалява разсейването на светлината.

Продукт		Диаметър на петри	
Регулируем държател за петри		138-141	
Регулируем държател за петри		Всички видове микроплаки	
Регулируем държател за петри		97-100,5	
Регулируем държател за петри		87-90,5	

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Документ 7

Reagents and supplies



Advance your bioproduct research and development

ВЯРНО С ОРИГИНАЛА

MOLECULAR DEVICES

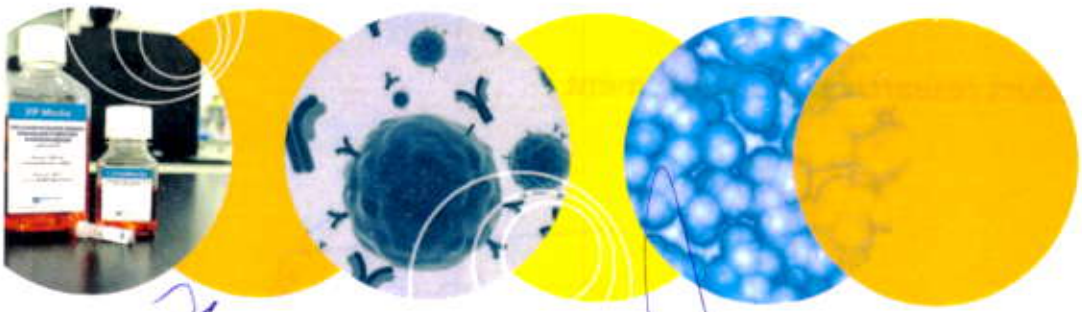




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Introduction

Unrivalled automation solutions for imaging and picking of cells

Products from Molecular Devices® offer scientists unrivalled solutions that utilize imaging and intelligent image analysis to support basic research, pharmaceutical and biotherapeutic development. The company's systems continue to establish industry standards in areas such as picking microbial colonies for genomic studies or screening and selection of mammalian cell lines.

Other systems use imaging platforms to monitor cell growth, evaluate cellular responses and quantify protein production. Through its expertise in robotics, cell and molecular biology, image analysis and interpretation, supported by a strong IP portfolio, the company is committed to the continual development of innovative solutions for life science applications. For more information, visit www.moleculardevices.com/genetix.



ClonePix™ systems

Screening and selection of mammalian clones



CloneSelect™ Imager

Objective, quantitative assessment of cell growth



QPix systems

Sets the industry standard in accurate colony picking

Cell biology reagents

01



XP Media and CloneMedia Complete Kit for Mouse Hybridoma Generation

Product name and description	Quantity/pack size	Part number	Compatibility
Component			
XP Media Pre-Fusion Myeloma Growth Medium and Hybridoma Expansion Medium (without HT)	1 x 500 mL	K8862	ClonePix or other platforms
XP Media Hybridoma Fusion Medium	1 x 500 mL	K8863	
XP Media Hybridoma Fusion Recovery Medium	1 x 100 mL	K8864	
CloneMedia Hybridoma Semi-Solid Selection and Cloning Medium (with HAT)	1 x 90 mL	K8865	
XP Media Hybridoma Growth Medium (with HT)	1 x 500 mL	K8866	
CloneMedia Hybridoma Semi-Solid Selection and Cloning Medium (without HAT)	1 x 90 mL	K8867	
Hybridoma Polyethylene Glycol (PEG) for Cell Fusion	1 x 1.5 mL	K8868	
Kit information			
XP Media and CloneMedia Complete Kit for Mouse Hybridoma Generation	1 Kit containing 1 each of the following part numbers: K8862, K8863, K8864, K8865, K8866, K8868	K8861	

CloneMedia

Complete semi-solid media for growth and isolation of mammalian cell colonies. CloneMedia ensures formation of discrete, clonal colonies with hybridoma, CHO and other cell lines. No material of animal origin is used in the manufacture of K8680-K8775. CloneMedia for hybridomas contain calf serum. Final volume 100 mL.

Product name and description	Quantity/pack size	Part number	Compatibility
CloneMedia-HEK (semi-solid media for HEK cells)	6 × 90 mL	K8680	ClonePix
CloneMedia-HEK (semi-solid media for HEK cells)	1 × 90 mL	K8685	
CloneMedia-CHOK1SV (semi-solid media for CHOK1SV cells, glutamine free)	6 × 90 mL	K8720	
CloneMedia-CHOK1SV (semi-solid media for CHOK1SV cells, glutamine free)	1 × 90 mL	K8725	

ВЯРНО С ОРИГИНАЛА

01 Cell biology reagents

CHO Growth A

The CHO Growth A liquid and semi-solid media portfolio provides a fast, simple, and comprehensive solution for CHO cell line development. Optimized for recombinant protein production. Chemically defined and free of animal components.

Product name and description	Quantity/pack size	Part number	Compatibility
CloneMedia CHO Growth A with L-Gln	6 × 90 mL	K8800	ClonePix
CloneMedia CHO Growth A with L-Gln	1 × 90 mL	K8810	
CloneMedia CHO Growth A without L-Gln	6 × 90 mL	K8830	
CloneMedia CHO Growth A without L-Gln	1 × 90 mL	K8840	
XP Media CHO Growth A without L-Gln	1000 mL	K8860	

CloneMatrix

A 2.5x concentrate that serves as a matrix to produce semi-solid media. Proven for hybridoma, myeloma, CHO, HEK and mESC. Supplied ready to dilute in 100 mL bottles for convenience.

Product name and description	Quantity/pack size	Part number	Compatibility
CloneMatrix, makes 6 × 100 mL final media volume	6 × 40 mL	K8500	ClonePix
CloneMatrix, makes 100 mL final media volume	1 × 40 mL	K8510	
CloneMatrix: optimized for CHO cells, makes 6 × 100 mL final media volume	6 × 40 mL	K8520	
CloneXL reagent: converts CloneMatrix to CloneMatrix-CHO	5 × 2 mL	K8525	
CloneMatrix: optimized for CHO cells, makes 100 mL final media volume	1 × 40 mL	K8530	

Recombinant CloneDetect

Newest detection agent free of raw materials of animal origin for visualizing secreted antibodies.

Product name and description	Quantity/pack size	Part number	Compatibility
CloneDetect Human IgG (Fc) Specific, Recombinant, Fluorescein	10,000U / 1 mL	K8295	ClonePix

CloneDetect

Detection agents for visualizing secreted antibodies. All products are animal-derived, sterile, and azide free.

Product name and description	Quantity/pack size	Part number	Compatibility
Human			
CloneDetect Human IgG (H+L) Specific, Fluorescein	10,000U / 1 mL	K8200	ClonePix
CloneDetect Human IgG (H+L) Specific, Fluorescein. In atomizer applicator	10,000U / 5 mL	K8201	
CloneDetect Human IgG (H+L) Specific, Fluorescein, BSA Free	10,000U / 1 mL	K8202	
CloneDetect Human IgG (Fc) Specific, Fluorescein	10,000U / 1 mL	K8205	
CloneDetect Human IgG (Fc) Specific, Fluorescein. In atomizer applicator	10,000U / 5 mL	K8206	
CloneDetect Human IgG Specific, 550 Labeled	10,000U / 1 mL	K8210	
CloneDetect Human IgG Specific, 550 Labeled. In atomizer applicator	10,000U / 5 mL	K8211	
CloneDetect Human IgG Specific, 650 Labeled	10,000U / 1 mL	K8212	
CloneDetect Human IgG Specific, 650 Labeled. In atomizer applicator	10,000U / 5 mL	K8213	
CloneDetect Human IgG (H+L) Specific Complex Initiation Factor (CIF)	10,000U / 1 mL	K8215	
CloneDetect Human IgG (Kappa Chain) Specific, 550 Labeled	10,000U / 1 mL	K8250	
CloneDetect Human IgG (Kappa Chain) Specific, 650 Labeled	10,000U / 1 mL	K8251	
CloneDetect Human IgG (Kappa Chain) Specific, Fluorescein	10,000U / 1 mL	K8252	
CloneDetect Human IgM Specific, 550 Labeled	10,000U / 1 mL	K8253	
CloneDetect Human IgM Specific, 650 Labeled	10,000U / 1 mL	K8254	
CloneDetect Human IgM Specific, Fluorescein	10,000U / 1 mL	K8255	
Mouse			
CloneDetect Mouse IgG (H+L) Specific, Fluorescein	10,000U / 1 mL	K8220	ClonePix
CloneDetect Mouse IgG (H+L) Specific, Fluorescein. In atomizer applicator	10,000U / 5 mL	K8221	
CloneDetect Mouse IgG (Fc) Specific, Fluorescein	10,000U / 1 mL	K8225	
CloneDetect Mouse IgG (Fc) Specific, Fluorescein. In atomizer applicator	10,000U / 5 mL	K8226	
CloneDetect Mouse IgG Specific, 550 Labeled	10,000U / 1 mL	K8230	
CloneDetect Mouse IgG Specific, 550 Labeled. In atomizer applicator	10,000U / 5 mL	K8231	
CloneDetect Mouse IgG Specific, 650 Labeled	10,000U / 1 mL	K8232	
CloneDetect Mouse IgG Specific, 650 Labeled. In atomizer applicator	10,000U / 5 mL	K8233	
CloneDetect Mouse IgG (H+L) Specific Complex Initiation Factor (CIF)	10,000U / 1 mL	K8235	
Rat			
CloneDetect Rat IgG (H+L) Specific, Fluorescein	10,000U / 1 mL	K8240	ClonePix
Sheep			
CloneDetect Anti-Sheep IgG (H+L) Specific, sterile, azide-free, fluorescein	10,000U / 1 mL	K8246	ClonePix
CloneDetect Anti-Sheep IgG (H+L) Specific, Complex Initiation Factor (CIF) sterile, azide-free, fluorescein	10,000U / 1 mL	K8247	

01 Cell biology reagents

Adherent cell picking reagent

Sterile reagents optimized for picking adherent colonies without loss of viability.

Product name and description	Quantity/pack size	Part number	Compatibility
Adherent Cell Picking Reagent. Test Kit. 250 mL each of Types A-D	4 × 250 mL	K8005	ClonePix
Adherent Cell Picking Reagent – Type A (Very Low Stringency)	500 mL	K8010	
Adherent Cell Picking Reagent – Type B (Low Stringency)	500 mL	K8020	
Adherent Cell Picking Reagent – Type C (Medium Stringency)	500 mL	K8030	
Adherent Cell Picking Reagent – Type D (High Stringency)	500 mL	K8040	

Cell-based assay kits

Cell-based assays assess the viability of cells following compound treatment. Optimized for the high sensitivity of CellReporter, the kits can reduce the assay cost per well for toxicity screening.

Product name and description	Quantity/pack size	Part number	Compatibility
Viability Assay Kit. Dual-dye assay utilizing a cytoplasmic, FITC-detectable, live-cell dye to reveal living cells and a DAPI-detectable, all-cell nuclear dye to normalize for cell number	2000 reactions	K7010	CellReporter
Viability Assay Kit. Dual-dye assay utilizing a cytoplasmic, FITC-detectable, live-cell dye to reveal living cells and a DAPI-detectable, all-cell nuclear dye to normalize for cell number	10000 reactions	K7011	
Cytotoxicity Assay Kit. Dual-nuclear dye assay utilizing a TxRED / Cy3-detectable, dead-cell dye to reveal dead cells and a DAPI-detectable, all-cell nuclear dye to normalize for cell number	2000 reactions	K7020	
Cytotoxicity Assay Kit. Dual-nuclear dye assay utilizing a TxRED / Cy3-detectable, dead-cell dye to reveal dead cells and a DAPI-detectable, all-cell nuclear dye to normalize for cell number	10000 reactions	K7021	
Cytotoxicity Assay (mono) Kit. Single-dye assay to determine number of dead cells	2000 reactions	K7030	
Cytotoxicity Assay (mono) Kit. Single-dye assay to determine number of dead cells	10000 reactions	K7031	

Cleaning and sterilizing solutions

Ideally suited to clean instruments and accessories.

Product name and description	Quantity/pack size	Part number	Compatibility
aQu Clean pin cleaning solution, anionic and non-ionic detergent based cleaning solution	1 L	K2505	ClonePix

Calibeads

Fluorescent microspheres for the verification of imaging and picking functions on ClonePix systems. Microspheres fluoresce at four distinct wavelengths corresponding to the CFP, FITC / GFP, Rhodamine / PE and Cy5™ filter sets of ClonePix systems.

Product name and description	Quantity/pack size	Part number	Compatibility
Calibeads. Fluorescent calibration beads for ClonePix. 200 µm diameter. Pan wavelength. Provided ready-to-plate (in 100 mL of semi-solid substrate, ca. 15-25 beads / mL)	100 mL	K8150	ClonePix

QPix Chroma Filter

02



QPix™ Chroma Filters

Thin film optical filters for selection of bacterial colonies with multiple ranges of color intensities. Interchangeable filters last up to 10 uses and improve recognition of colored colonies for accurate picking of desired clones. Compatible with QPix Software Version 2.0 and higher.

Product name and description	Quantity/pack size	Part number	Compatibility
QPix™ Chroma Filter; Thin film optical filter for Blue/White colony selection	1 filter	X1101	QPix 400 Series
QPix™ Chroma Filter; Thin film optical filters for Blue/White colony selection	25 filters	X1102	
QPix™ Chroma Colorimetric Colony Selection Software Kit; Blue/White Colony Selection Software Kit for QPix 400 Series. Includes software license and 2 QPix™ Chroma Filters (X1101)	1 license, 25 filters	X1103	

03 Petri dishes and plate holders

1.12.2

Adjustable petri dish and microplate holders

Spring-loaded holders automatically adjust to the perimeter of the plates to ensure secure fit of the plastic ware with a greater size variations. Black finish enhances optical imaging and reduces light scattering. Compatible with QPix Software Version 2.0 and higher.

Product name and description	Plate diameter	Part number	Compatibility
1-Way Adjustable Petri Dish Holder	138–141 mm	X9401	QPix 400 Series
2-Way Adjustable Petri Dish Holder	Any ANSI/SLAS 1-2004 microplates	X9402	
3-Way Adjustable Petri Dish Holder	97–100.5 mm	X9403	
4-Way Adjustable Petri Dish Holder	87– 90.5 mm	X9404	



АКВАХИМ
AQUACHIM
75 години

Док. 7.

Стр.10.

1.12.2

Петрита и държатели за петрита

Регулируеми държатели на петрита и микроплаки

Държателите са с пружини, което позволява автоматично нагласяване на периметъра и сигурно захващане на пластмасовото петри или плака, дори и при големи вариации на размера. Черното покритие усилва оптичното изображение и намалява разсейването на светлината.

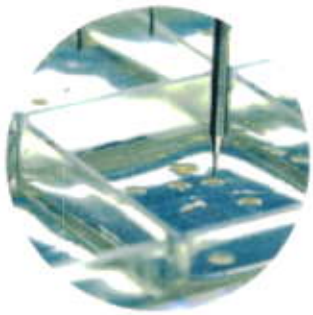
Продукт		Диаметър на петри	
Регулеруем държател за петри		138-141	
Регулеруем държател за петри		Всички видове микроплаки	
Регулеруем държател за петри		97-100,5	
Регулеруем държател за петри		87-90,5	

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Bioassay trays 04



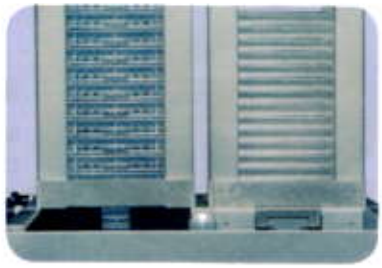
Bioassay trays

Ideal for large scale culture and screening of bacterial colonies, regional picking and high throughput protein expression. The vented lid aids removal of condensation. Can be supplied with a 48-well divider to provide a cost effective alternative to petri dishes.

Product name and description	Quantity/pack size	Part number	Compatibility
Vented QTray with cover, polystyrene, 240 x 240 x 20 mm, sterile, packaged in resealable bags of 5	20 per case	X6023	QPix 400 Series
Vented QTray with Lid, polystyrene, magenta, surface area 500 cm^2, sterile, packaged in resealable bags of 10	20 per case	X6025	
48-Well Dividers for QTray, polystyrene, sterile, individually wrapped	20 per case	X6026	
Vented Qtray with cover & 48-Well Divider, polystyrene, 242 x 240 x 20 mm, sterile, packaged in resealable bags of 5	20 per case	X6029	

05 Microplates

A comprehensive range of 96- and 384-well microplates in a variety of profiles and materials.



Low profile microplates

Low profile design maximizes robotic plate stacker volume and storage. Dimensions: 128 x 86 x 10 mm.

Product name and description	Quantity/pack size	Part number	Compatibility
384-Well Low Profile Microplate, round well, flat bottom, sterile, with cover, working volume 50 µL, packaged in sleeves of 10	160 per case	X6001	QPIx 400 Series
384-Well Low Profile Microplate, round well, V-bottom, sterile, with cover. Individually wrapped	160 per case	X6004	
96-Well Low Profile Microplate, polystyrene, round well, flat bottom, sterile, with cover, working volume 180 µL, packaged in sleeves of 10	160 per case	X6011	
384-Well Low Profile, Large Volume Microplate, round well, flat bottom, sterile, with cover, working volume 60 µL, packaged in sleeves of 10	160 per case	X7001	

Standard profile microplates

Polystyrene plates. Dimensions 128 x 86 x 14.5 mm.

Product name and description	Quantity/pack size	Part number	Compatibility
96-Well Standard Profile Microplate, Polystyrene, U-bottom, sterile, working volume 280 µL, packed in sleeves of 2	100 per case	650 161	QPIx 400 Series
96-Well Standard Profile Microplate, Polystyrene, Flat bottom, sterile, working volume 340 µL, packed in sleeves of 2	100 per case	655 161	

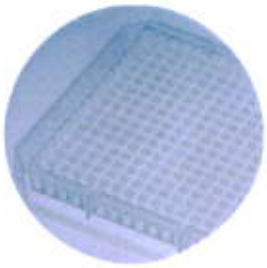
384-well high sample recovery plate

Microplates for applications that require high sample recovery rates. Made from polypropylene with conical well profiles to maximize recovery and allow working with sample volumes as low as 5 µL. The low profile increases robotic stack capacity and storage. Dimensions: 128 x 86 x 10 mm. Working volume: 5-65 µL.

Product name and description	Quantity/pack size	Part number	Compatibility
384-Well High Sample Recovery Plate, polypropylene, without cover, working volume 5-65 µL, packaged in sleeves of 10	200 per case	X7020	QPIx 400 Series
384-Well High Sample Recovery Plate Plate, polypropylene, with cover, working volume 5-65 µL, packaged in sleeves of 10	200 per case	X7022	

Deep well plates and lids

06



Deep well plates

Polypropylene deep well plates with elevated well walls for easier sealing. Conform to SBS standards.

Product name and description	Quantity/pack size	Part number	Compatibility
96 Deep Round Well Plate, round bottom, working volume 600 µL, packed in sleeves of 6	24 plates per case	S1201	QPix 400 Series
96 Deep Square Well Plate, round bottom, working volume 2000 µL, packed in sleeves of 6	24 plates per case	S1205	
384 Deep Square Well Plate, round bottom, working volume 400 µL, packed in sleeves of 6	24 plates per case	S1207	
384 Deep Square Well Plate, flat bottom, working volume 120 µL, packed in sleeves of 6	24 plates per case	S1209	
384 Deep Square Well Plate, round bottom, working volume 200 µL, packed in sleeves of 6	24 plates per case	S1210	
24 Deep Well plate, polypropylene, square well, conical bottom, working volume 10 mL	25 plates per case	X7060	

Cap mats and lids

QLid is a rigid polystyrene, close fitting lid. Cap mats are made from specially formulated plastic to ensure flexibility.

Product name and description	Quantity/pack size	Part number	Compatibility
QLid, sterile, packed in sleeves of 10: fits S1205, S1207, S1210, S1209, X7020, X1535 and X1537	240 lids per case	X5101	QPix 400 Series
Cap Mats for 1.2 mL 96-Well Plates (S1203)	24 mats per case	S1211	
Cap Mats for 2.0 mL 96-Well Plates (S1205)	24 mats per case	S1212	

07 Adhesive and heat seals



Breathe Seal

Porous film for sealing culture plates where air and gas exchange is necessary. The 114 µm thick film is easily pierced by pipette tips. Recommended for temperatures between -20 to +80°C.

Product name and description	Quantity/pack size	Part number
Breathe Seal for cell and tissue culture, non-sterile	100 seals per pack	E1004
Breathe Seal for cell and tissue culture, sterile, packed in tamper proof bags of 25	50 seals per pack	E1005

Foil Seal for microplates

Soft, non-permeable aluminum foil film. Easily pierced by pipette tips or robotic probes. Certified DNase- RNase- and nucleic acid free. Recommended for temperatures between -80 to +120°C.

Product name and description	Quantity/pack size	Part number
Foil Seal for cold storage and PCR, non-sterile	100 seals per pack	E1006
Foil Seal for cold storage and PCR, sterile, packed in bags of 25	50 seals per pack	E1007

Heat sealing film and rolls

Clear seals to allow observation of samples. Available in precut sheets or as rolls for automatic sealers.

Product name and description	Quantity/pack size	Part number
Heat Seal Roll Adhesive, non-sterile, 130 mm width, 250 m length	1 roll	X5150
Heat Seal Roll, non-sterile, 140 mm width, 450 m length	1 roll	X5152
Heat Seal Roll, non-sterile, 116 mm width, 450 m length	1 roll	X5153

ELISA Seal

Securely seals wells to eliminate ridge effects in ELISA assays. Only 1 mm thick to allow peircing with single channel pipettes. Recommended for temperatures between -40 to +120°C.

Product name and description	Quantity/pack size	Part number
ELISA Seal, 2 mm thick, non-sterile	1100 seals per pack	E1008

Replicators and filters

08



QReps polypropylene replicators

Increase processing speed by eliminating flaming and washing using these chemically resistant replicators.

Product name and description	Quantity/pack size	Part number	Compatibility
QRep 384 Pin Replicators: polypropylene, 10 mm length (low profile plates), 1 mm diameter	2 × 64	X5050	QPix 400 Series
QRep 96 Pin Replicators: polypropylene, 10 mm length (low profile plates), 1 mm diameter	2 × 64	X5051	
QRep 96 Pin Replicators: polypropylene, 10 mm length (low profile plates), 2 mm diameter	2 × 64	X5052	
QRep 384 Pin Replicators: polypropylene, 15 mm length (standard profile plates), 1 mm diameter	2 × 56	X5053	
QRep 96 Pin Replicators: polypropylene, 15 mm length (standard profile plates), 1 mm diameter	2 × 56	X5054	



Filters and filter paper

Performa II nylon filters are sensitive down to 0.25 pg of DNA with low intrinsic fluorescence for high signal to noise ratio and can be successfully stripped and reprobed without loss of signal intensity. Promotes well-defined colony growth on high density arrays that can reduce incubation time by 4-5 hours.

Product name and description	Quantity/pack size	Part number	Compatibility
Performa II Nylon Filters: 222 × 222 mm for use with Qtray	60 filters	N3010	QPix 400 Series
Performa II Nylon Filters: 128 x 86 mm for use with OmniTray	100 filters	N3020	

09 DNA sequencers and reagents

*Half*SEQ DNA sequencing dilution reagents

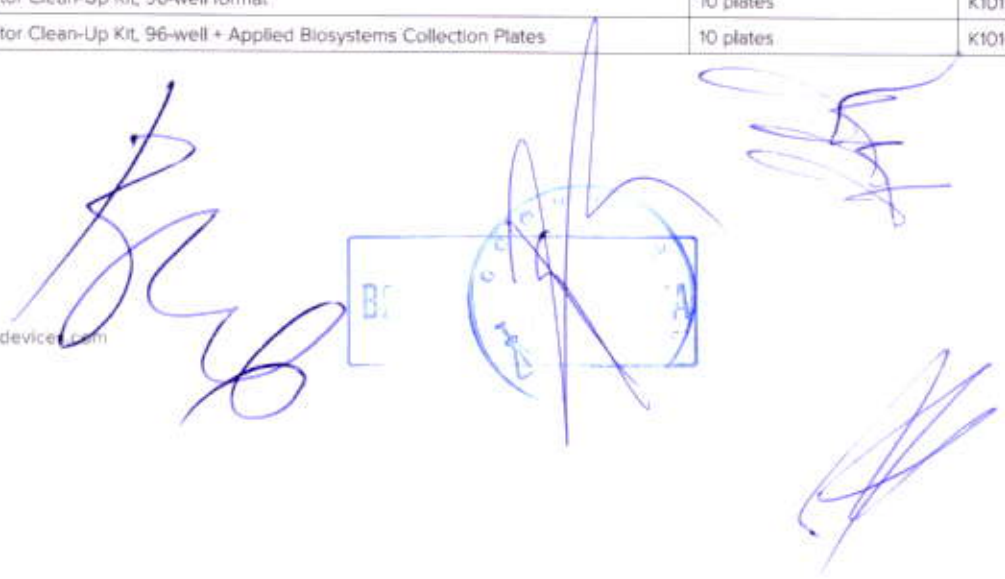
Save up to 90% on sequencing costs by replacing expensive sequencing mix with *Half*SEQ reagents. Mix in a ratio of 1:1 or higher. Stabilizing ingredients allow pre-aliquoting and batch storage.

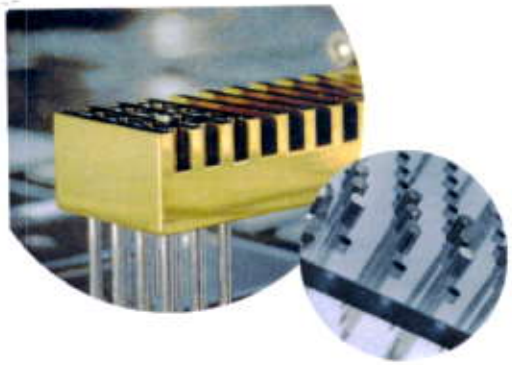
Product name and description	Quantity/pack size	Part number
*Half*BD™, ABI BigDye®	0.8 mL	K1102
*Half*BD™, ABI BigDye®	2 × 0.8. mL	K1104
HalfBD™, ABI BigDye®	5 × 0.8 mL	K1110
HalfBD™, ABI BigDye®	1 × 20 mL	K1115
*Half*TSII, Amersham DYEnamic™, ET-Thermosequenase™(GE)	0.8 mL	K1162
*Half*TSII, Amersham DYEnamic™, ET-Thermosequenase™(GE)	2 × 0.8. mL	K1164
*Half*TSII, Amersham DYEnamic™, ET-Thermosequenase™(GE)	5 × 0.8 mL	K1170
*Half*TSII, Amersham DYEnamic™, ET-Thermosequenase™(GE)	1 × 20 mL	K1175
*Half*CEQ, Beckman CEQ DTCS	0.8 mL	K1182
*Half*CEQ, Beckman CEQ DTCS	2 × 0.8. mL	K1184
*Half*CEQ, Beckman CEQ DTCS	5 × 0.8 mL	K1190
*Half*CEQ, Beckman CEQ DTCS	1 × 20 mL	K1195
*Half*BD™ v3.1, ABI BigDye® v3.1	0.8 mL	K1500
*Half*BD™ v3.1, ABI BigDye® v3.1	2 × 0.8. mL	K1502
*Half*BD™ v3.1, ABI BigDye® v3.1	5 × 0.8 mL	K1504
*Half*BD™ v3.1, ABI BigDye® v3.1	1 × 20 mL	K1506

genCLEAN dye terminator clean-up kits

Fast removal of excess dye terminator before DNA sequencing with increased read-length and better accuracy. Easy to use and 4-5 times faster than EtOH precipitation method.

Product name and description	Quantity/pack size	Part number
genCLEAN Dye Terminator Clean-Up Kit, individual columns	50 columns	K1000
genCLEAN Dye Terminator Clean-Up Kit, individual columns	250 columns	K1005
genCLEAN Dye Terminator Clean-Up Kit, 96-well format	1 plate	K1010
genCLEAN Dye Terminator Clean-Up Kit, 96-well format	10 plates	K1015
genCLEAN Dye Terminator Clean-Up Kit, 96-well + Applied Biosystems Collection Plates	10 plates	K1016





Microarraying 10

TeleChem Arrayit® Stealth pins and accessories

A range of solid and split pins Compatibility TeleChem Arrayit® Stealth print heads. The Stealth print head holds up to 48 stainless steel pins.

Product name and description	Quantity/pack size	Part number
Stand for Microarray Pins	1 stand	X2760
TeleChem Arrayit® 946 Pin, Split-946 pin type, tip diameter 50 µm	1 pin	X946MP2
TeleChem Arrayit® 946 Pin, Split-946 pin type, tip diameter 65 µm	1 pin	X946MP2.5
TeleChem Arrayit® 946 Pin, Split-946 pin type, tip diameter 75 µm	1 pin	X946MP3
TeleChem Arrayit® 946 Pin, Split-946 pin type, tip diameter 100 µm	1 pin	X946MP4
TeleChem Arrayit® 946 Pin, Split-946 pin type, tip diameter 125 µm	1 pin	X946MP5
TeleChem Arrayit® 946 Pin, Split-946 pin type, tip diameter 150 µm	1 pin	X946MP6
TeleChem Arrayit® Stealth Pin, Split-Stealth pin type, tip diameter 250 µm	1 pin	XSMP10
TeleChem Arrayit® Stealth Pin, Split-Stealth pin type, tip diameter 50 µm	1 pin	XSMP2
TeleChem Arrayit® Stealth Pin, Split-Stealth pin type, tip diameter 65 µm	1 pin	XSMP2.5
TeleChem Arrayit® Stealth Pin, Split-Stealth pin type, tip diameter 75 µm	1 pin	XSMP3
TeleChem Arrayit® Stealth Pin, Split-Stealth pin type, tip diameter 100 µm	1 pin	XSMP4
TeleChem Arrayit® Stealth Pin, Split-Stealth pin type, tip diameter 125 µm	1 pin	XSMP5
TeleChem Arrayit® Stealth Pin, Split-Stealth pin type, tip diameter 150 µm	1 pin	XSMP6
TeleChem Arrayit® Stealth Pin, Split-Stealth pin type, tip diameter 175 µm	1 pin	XSMP7
TeleChem Arrayit® Stealth Pin, Split-Stealth pin type, tip diameter 200 µm	1 pin	XSMP8
TeleChem Arrayit® Stealth Pin, Solid pin type, tip diameter 250 µm	1 pin	XSNS10
TeleChem Arrayit® Stealth Pin, Solid pin type, tip diameter 300 µm	1 pin	XSNS12
TeleChem Arrayit® Stealth Pin, Solid pin type, tip diameter 375 µm	1 pin	XSNS15
TeleChem Arrayit® Stealth Pin, Solid pin type, tip diameter 75 µm	1 pin	XSNS3
TeleChem Arrayit® Stealth Pin, Solid pin type, tip diameter 100 µm	1 pin	XSNS4
TeleChem Arrayit® Stealth Pin, Solid pin type, tip diameter 150 µm	1 pin	XSNS6
TeleChem Arrayit® Stealth Pin, Solid pin type, tip diameter 200 µm	1 pin	XSNS8
TeleChem 48-pin head for QArray2	1 head	GSPH48QA2
TeleChem 48-pin head for QArrayMini	1 head	GSPH48QAM

10 Microarraying

Glass slides

A range of glass slides for microarraying

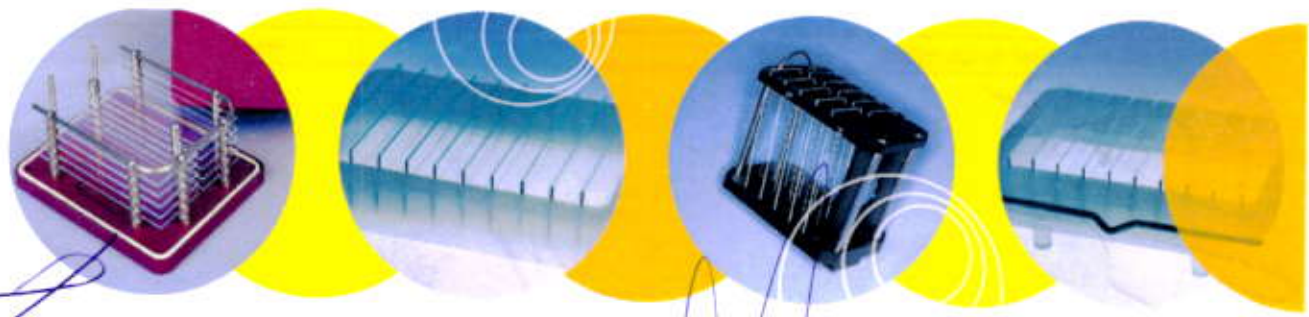
- Amine coated for non-modified DNA spotting
- Aldehyde coated for modified DNA spotting
- Aldehyde Plus for higher signal to noise ratio
- Epoxy coated for DNA and protein spotting.

Product name and description	Quantity/pack size	Part number
Aldehyde plus slides	1 × 25 slides	K2080
Amine coated slides	1 × 25 slides	K2615
Aldehyde coated slides	1 × 25 slides	K2625
Epoxy Slides	1 × 25 slides	K2652
Aldehyde coated slides, clear (non-frosted end)	1 x 25 slides	K2625C

Microarraying accessories

A range of products for cleaning, drying, storing, transporting and hybridizing slides.

Product name and description	Quantity/pack size	Part number
aQu Clean – pin cleaning solution	1 L	K2505
Microarray Slide Dryer, 10 slide capacity	2 slide dryers	X2510
Blotting Paper for Microarray Slide Dryer	Pack of 25	X2515
Microarray Slide Washer, 10 slide capacity, fits into 1 L beaker (not supplied)	1 slide washer	X2520
Hybridization Chamber, 10 slide capacity	1 chamber	X2530
Hybridization Chamber, 20 slide capacity	1 chamber	X2531
Slide Processing Rack, 10 slide capacity	1 rack	X2540



Accesories 11

Product name and description	Quantity/pack size	Part number	Compatibility
130 µL ART pipette tips	10 packs	T0130	QPix 400 Series
Glass plating beads, 6 mm	500 3 bags	X5200	



Contact Us

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Check our website for a current listing of worldwide distributors.

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5/16 2050A

MOLECULAR DEVICES

Док. 8.

Стр.1.

1.24.1

Системата за подбор на колонии QPIX 400 дава възможност за за работа с различни микроорганизми и различни методи за селекция включително: интензитет на флуоресценцията, бяла / синя селекция, размер, близост на осите, зони на инхибиране – вие задавате критериите за селекция и инструмента свършва работата.

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Док. 8.

Стр. 2

1.24.2.1.

Селекция на колонии чрез скрининг по бял / син цвят

1.24.3.

Чрез нагласяване на прага на хистограмата и дефиниране на критериите на селекция като цялост на ръба, отношение на осите, диаметър и близост, вие можете допълнително да оптимизирате вашия подбор.

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Документ 8.

Стр.1.

1.24.1

Системата за подбор на колонии QPIX 400 дава възможност за за работа с различни микроорганизми и различни методи за селекция включително: интензитет на флуоресценцията, бяла / синя селекция, размер, близост на осите, зони на инхибиране – вие задавате критериите за селекция и инструмента свършва работата.

Стр. 2

1.24.2.1.

Селекция на колонии чрез скрининг по бял / син цвят

1.24.3.

Чрез нагласяване на прага на хистограмата и дефиниране на критериите на селекция като цялост на ръба, отношение на осите, диаметър и близост, вие можете допълнително да оптимизирате вашия подбор.

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Документ 8

MOLECULAR DEVICES

APPLICATION NOTE

Easy picking with the QPix 400: multiple selection modalities, wide range of microorganisms

Whether you're trying to discover the next generation of antibiotics, selecting clones for sequencing, or turning micro algae into biofuel production factories, chances are you'll need to screen thousands, maybe even millions of colonies to find the best ones. Again and again. And not just screen, but plate and replicate.

Automated colony pickers can simplify and speed these laborious processes, but what if you need to screen instead of select, choosing colonies based on morphology instead of just the ability to grow on restrictive media? What if you're working with a microbe other than *E. coli*? With the QPix™ 400 series of microbial colony pickers, you can do all that—morphology-based colony picking, plating, and plate replication of bacteria, fungi, algae, phage, and yeast cells.

The QPix 400 colony pickers support a wide variety of microorganisms and multiple selection modalities, including fluorescence intensity, blue/white selection, size and proximity, zone of inhibition—you set the selection parameters and the instrument does the work.

1.24.1

Colony selection workflow

Whatever your selection modality, setting selection parameters for any QPix 400 colony picker follows the same general workflow—open the QPix software and define your colony selection parameters, such as size, compactness, and other morphological features. For Zone of Inhibition detection, set your parameters in the Zone of Inhibition Detection Module. Colonies are detected by white light and, if desired, further selected using fluorescence intensity.

Colony selection in white light

Selection of colonies visualized in white light is a typical first step for most studies using the QPix colony picker. In this example, *Streptomyces venezuelae* was plated, incubated at 37°C overnight, and colonies selected in white light. The intelligent software module analyzes the images, and colonies that meet the user-defined selection criteria are outlined in yellow and then picked (Figure 1). Colonies that do not meet the selection criteria are highlighted in red.

Colony selection by fluorescence

With fluorescence-based selection downstream processing time can be significantly reduced through earlier selection of high-value targets (Figure 2). Through the use of appropriate fluorescent markers, morphological and functional screens can be combined in the automated selection phase, saving time and resources by requiring fewer colonies to be further screened and characterized in a downstream functional assay.

Benefits

- Fast—up to 30,000 colonies/day, >98% efficiency
- Efficient transfer—agar level sensor for automated picking pin height adjustment
- Optimized—organism-specific pins
- Targeted—quantitative, user-defined selection criteria
- Smart—intelligent colony selection software

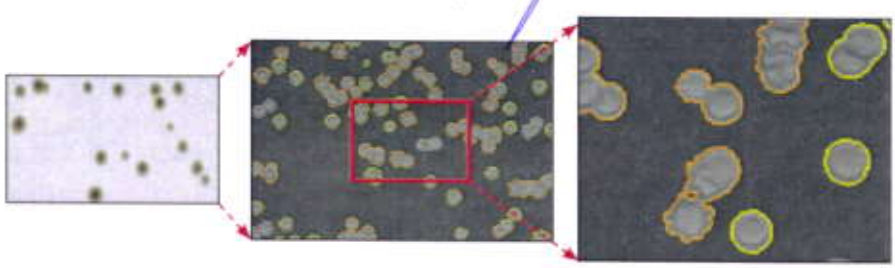


Figure 1: *S. venezuelae* plated (left panel). The intelligent software module detects desired colonies based on user-defined criteria (middle and right panels, yellow-outlined colonies), and rejects colonies that do not meet the selection metrics (middle and right panels, red-outlined colonies).

ВЕРНО С ОРИГИНАЛА

An example of fluorescence-based functional selection can be seen in this experiment where Nile Red, a lipophilic fluorescent dye, was used to select high lipid-producing strains of *Rhodococcus opacus* PD630 for biofuel production. Colonies with higher lipid content show correspondingly higher fluorescence intensities. For this experiment parameters such as size, diameter, and compactness were tuned for optimal colony selection, and a mean fluorescence intensity threshold of greater than 50,000 was set to select (*i.e.* gate) colonies demonstrating high fluorescence as a result of high lipid accumulation (Figure 3).

Lipid accumulation levels were further confirmed post picking. Following overnight growth in liquid media, cultures were stained with a lipophilic bright green fluorescent dye, BODIPY 505/515 (Life Technologies), at a concentration of 0.5 µg/mL, and fluorescence measurements were recorded on SpectraMax® M5 Multi- Mode Microplate Reader. A high degree of fluorescence was confirmed in high lipid-accumulating colonies that were originally selected and picked using the QPix 420 System, while background levels of fluorescence were exhibited by the negative control *E. coli* colonies (Figure 4, red curve).

Colony selection by blue/white color screening

Selecting colonies by blue or white color enables the use of the widely-used *LacZ* reporter system for selecting recombinant/ non-recombinant clones. For this example white light images taken on the QPix 420 System were analyzed using the easy-to-use QPix™ Software 2.0. Blue (Figure 5A) or white (Figure 5B) colonies were automatically identified and selected separately using the built-in Auto Select feature (Figure 5C). By adjusting the histogram threshold and defining colony selection criteria such as compactness, axis ratio, diameter, and proximity, you can further optimize your selection.

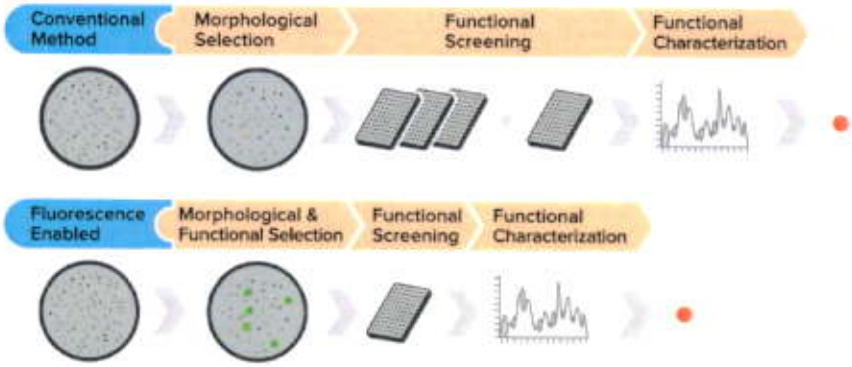


Figure 2: Fluorescent selection saves screening time by focusing downstream assays and screening on high-value targets.

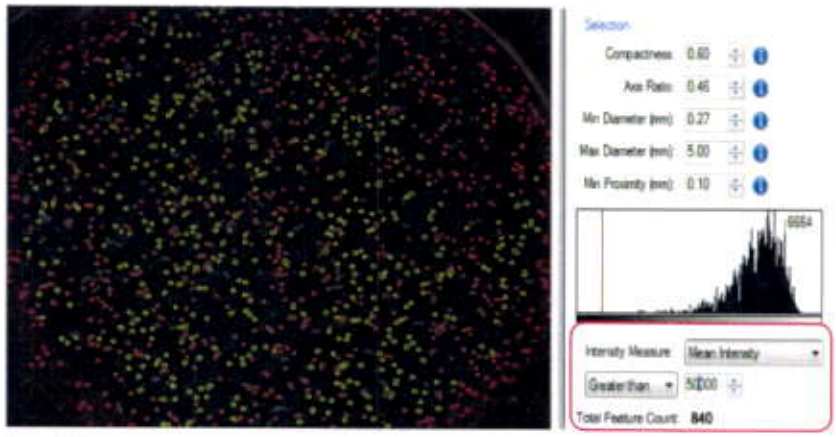


Figure 3: Fluorescence-based quantification that is reflective of lipid accumulation enables objective colony selection on QPix 400 Series.

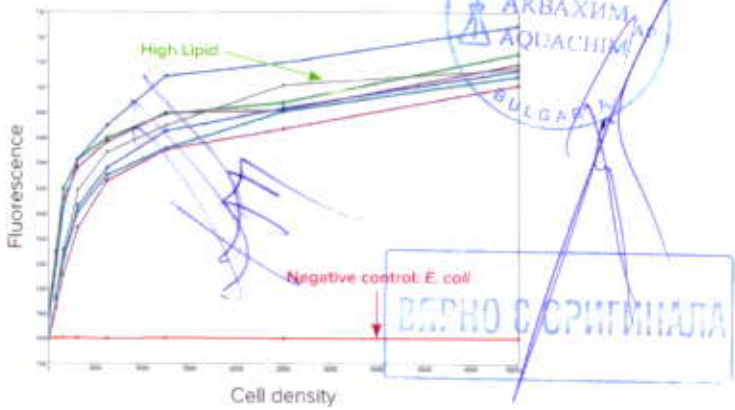


Figure 4: Fluorescence reading of high lipid producing colonies and negative control group stained with BODIPY 505/515 lipophilic fluorescent dye on the SpectraMax M5 Multi-Mode Microplate Reader. High lipid producing colonies exhibited high fluorescence (RFU) values and in contrast the negative colonies exhibited a flat-line signal as depicted in red.

Selection of colonies secreting zones of inhibition

For a library-based approach to screening and selection of antibiotic producing organisms, the agar plate-based zone of inhibition or clearing zone detection assay is the method of choice. Colonies providing antimicrobial activity are distinguished from the rest of the population by secreting clearing zones where bacterial growth is inhibited due to secretion of antimicrobial compounds. The diameter of the clearing zone is typically proportional to the amount of antimicrobial compound produced. Thus, high value strains are those that generate the largest clearing zones.

With the Zone of Inhibition Detection module in QPix Software 2.0 or higher, the size of each antimicrobial-producing colony and the size of the clearing zone produced by that colony can both be reliable quantified. You can select colonies that produce the largest clearing zones (Figure 6).

To demonstrate the utility of automated zone of inhibition detection for library-based screening or adaptive evolution studies, QTrays spotted with a library of microbial cultures were screened and selected. From the 48 colonies grown on QTrays, three colonies producing zones of inhibition were reliably detected by the QPix Software Zone of Inhibition Detection module (Figure 7), selected, and picked.

This approach is amenable to high-throughput implementation aimed to screen, identify, and pick colonies producing clearing zones from a large microbial library.

Picking more than *E. coli*

Repetitive failure of colony transfer can result in project delays, wasted biomaterials, or the loss of valuable clones. To ensure optimal colony transfer for a diverse range of microorganisms, Molecular Devices offers a unique portfolio of picking pins that come in a variety of shapes, sizes, and textures. Each organism-specific pin is designed to meet the designated microbial colony's shape, stickiness, viscosity, or other characteristic that can impact picking efficiency.

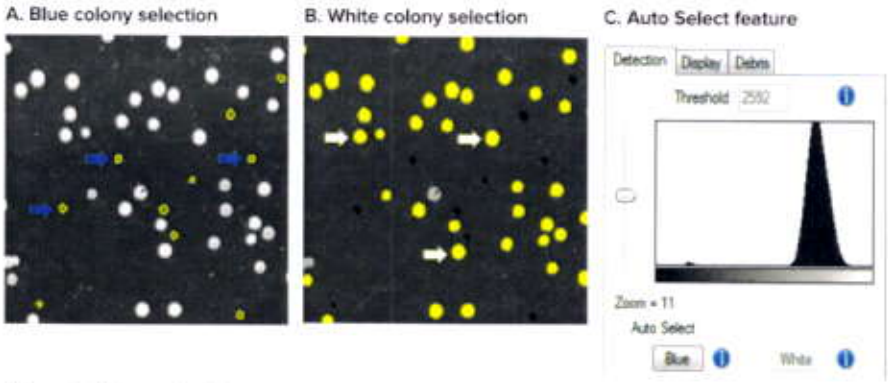


Figure 5: (A) Example of blue colonies selected with Auto Select Blue are indicated with blue arrows. (B) Example of white colonies selected with Auto Select White are indicated with white arrows. (C) Flexibility of the software allows manual adjustment of the intensity threshold to optimize results, such as to select for powered blue colonies.



Figure 6: The Zone of Inhibition Detection module in QPix Software 2.0 or higher can identify the size of each colony and corresponding clearing zones. Colonies producing clearing zones are selected based on user-defined selection criteria.

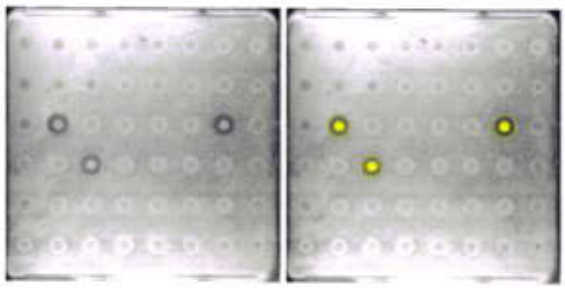


Figure 7: Library based high-throughput colony screening of zone of inhibition producers for antibiotics discovery. The Zone of Inhibition Detection module in QPix Software 2.0 or higher enables reliable detection and selection of colonies producing clearing zones. Selected colonies producing corresponding clearing zones are highlighted in yellow.

In addition, a proprietary agar height sensor automatically determines the optimal picking height on-the-fly, thus enabling optimal transfer and outgrowth of biological materials.

Together, proper pin selection and automated agar height sensing enhance microbial colony transfer efficiency by as much as 40% as shown in an example dataset (Figure 8).

The QPix software is also designed to support selection of a wide range of microbial species, as a colony detection algorithm optimized for *E. coli* may not work optimally when applied to yeast, algae, or other microorganisms with different phenotypic attributes. The QPix Software offers experimental flexibility by automatically identifying and selecting colonies produced from a wide range of microorganisms (Figure 9). Furthermore, the ability to custom define parameters such as shape, size, and proximity to neighboring objects ensures efficient and tailored selection of any colony forming microorganism, and microorganism-specific pins ensure efficient colony transfer.

Summary

Through sophisticated algorithms, easy-to-use software with customizable selection criteria, and organism-specific algorithms and accessories, the QPix 400 series of colony pickers is a unique solution where automation is in synergy with life science needs. Colony picking precision and speed, hardware solutions optimized for different organisms, and robust software algorithms offer the flexibility and power to handle any number of screening projects. With the QPix 400, selecting the right colony is easy pickings.

The Molecular Devices QPix team continues to add new application notes to our library www.moleculardevices.com/qpix-resources

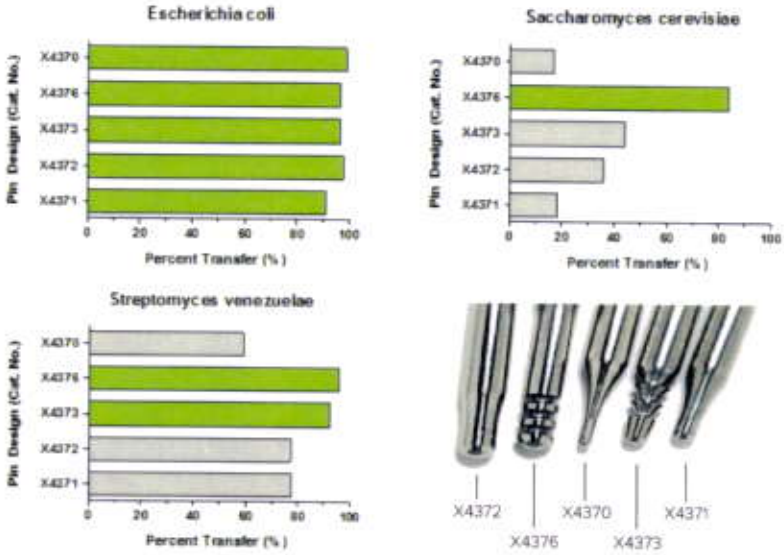


Figure 8: Colony transfer efficiencies can vary widely according to the pairings between microorganisms and colony-picking pins. A representative dataset is shown for *E. coli*, Saccharomyces cerevisiae, and *S. venezuelae*.

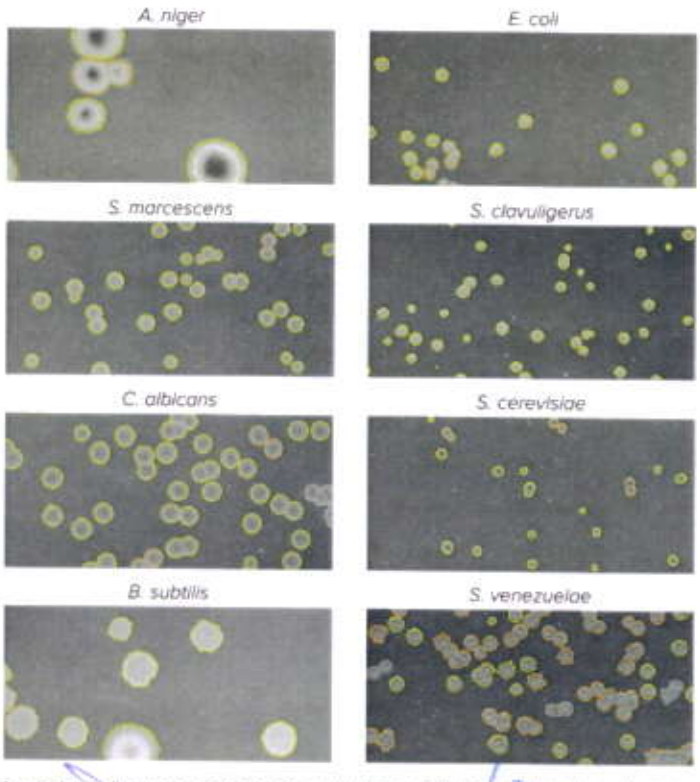


Figure 9: Morphologically distinct colonies are identified by QPix colony detection algorithms based on user-defined parameters: compactness, axis ratio, size, and proximity. Colonies surrounded by yellow border are selected for picking based on the user criteria, while colonies bordered with red fail to meet user-defined criteria and are excluded from picking.

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MOLECULAR DEVICES

Док. 9.

Стр.1.

1.1.2

Роботите от серията QPIX400 с модул за флуоресцентна детекция значително намаляват времето за обработка на пробите чрез възможностите за фенотипна селекция на уникални колонии на основата на нивата на флуоресценция отразяващи експресията на даден белтък.

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Документ 9

MOLECULAR DEVICES

APPLICATION NOTE

Fluorescent Bacterial Colony Selection Using QPix 400 Systems

Introduction

Screening bacterial transformants that harbor a plasmid ligated with the gene of interest has become convenient by the use of vectors with fluorescent reporter genes. Fluorescence imaging and screening reveal unique information about individual colonies when studying protein folding or secretion, enzyme evolution or protein localization. In addition, it is a direct method of choice to screen for mutations or to identify transformation markers.

Traditional manual picking of microbial colonies is time-consuming and tedious. The QPix™ 400 Series of microbial colony pickers can pick more than 3,000 colonies in an hour, whereas a skilled technician can manually pick 600 colonies in an hour. Thus, in comparison to manual colony picking which can be slow and error-prone, automated colony picking is at least 5 times faster and is more precise with >98% picking efficiency. The QPix 400 Series with fluorescence imaging module significantly reduces downstream processing time by enabling phenotypic selection of unique colonies based on the levels of fluorescent protein expression. It is a leading microbial colony picker in the market that offers multiple fluorescent filters compatible with a broad range of fluorescent cloning vectors. Fluorescence-based recombinant colony screening method facilitates selection for a gene fusion product by detecting intrinsic levels of fluorescence expression that offers higher screening fidelity for selecting recombinant colonies.

Here, we demonstrate fluorescence-based detection and colony selection capabilities of the QPix 400 Series using a model organism, *Escherichia coli*, harboring recombinant plasmids expressing either Green Fluorescent Protein (GFP) or Cyan Fluorescent Protein (CFP).

Materials and methods

The pFluoroGreen plasmid carrying ampicillin resistance and GFP gene was used to transform chemically competent *E. coli*. The transformed *E. coli* cultures were plated on LB media containing ampicillin and cultured overnight at 37 degrees.

The pCyanFP plasmid carrying the kanamycin resistance and CYP gene was used to transform chemically competent *E. coli*. The transformed *E. coli* cultures were plated on plates containing LB media with kanamycin plus IPTG and cultured overnight at 37°C. The pFluroGreen plasmid vector map is illustrated in Figure 1A and pCyanFP vector map in Figure 1B.

Benefits

- **Quantitative fluorescent screening enables efficient and objective selection of unique clones**
- **A variety of fluorescent filter sets increases experimental flexibility**
- **Easy-to-use software ensures the right colony is picked every time based on the defined experimental parameters**

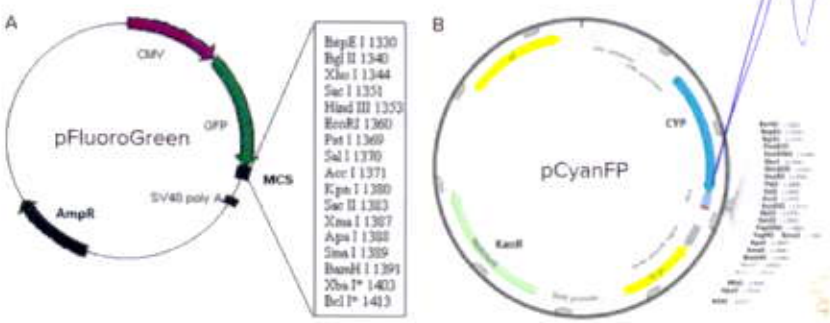


Figure 1. (A) pFluoroGreen plasmid vector map with ampicillin resistance and GFP gene. (B) pCyanFP plasmid with kanamycin resistance and CYP gene.

Colony selection utilizing white light and fluorescent imaging

GFP-transformed bacterial colonies were imaged and screened under white light (Figure 2A) and fluorescence (Figure 2B) on the QPix™ 420 System. Fluorescence-based selection of GFP-expressing bacteria was performed using the blue filter pair (Ex/Em filter: 457/536 nm) option.

Colony detection using white light and fluorescence imaging on the QPix 400 Series enables objective identification and selection of colonies expressing the fluorescent reporter gene of interest. Once images are captured, the QPix Software detects, analyzes feature properties and identifies the location of individual colonies on the culture plate. Flexible software allows the user to define colony selection parameters such as size, compactness and morphology. Quantitative, tunable fluorescence intensity threshold specifies the level of gene or protein expression, recorded as fluorescence intensity measure. Once colonies are selected based on user-defined criteria, they are picked with a high precision, fully pneumatic, 96 pin picking head. For this experiment, colonies expressing GFP with an interior mean fluorescent intensity (MFI) value greater than 40,000 were selected. Colonies included or excluded based on selection criteria are depicted in Figure 3A and 3B respectively.

Similarly, CFP-expressing bacterial colonies were identified and selected using white light (Figure 2C) and fluorescence imaging (Figure 2D) using the blue filter pair (Ex/Em filter: 457/536 nm) option. Fluorescent colonies exhibiting an interior mean fluorescent intensity value greater than 20,000 were selected. The colony selection features are displayed, wherein colonies included (Figure 3C) or excluded (Figure 3D) based on user-defined criteria are highlighted. The ability to manually adjust fluorescent selection criteria within the QPix Software provides the user additional flexibility and control in objective and quantitative pre-screening of bacterial colonies.

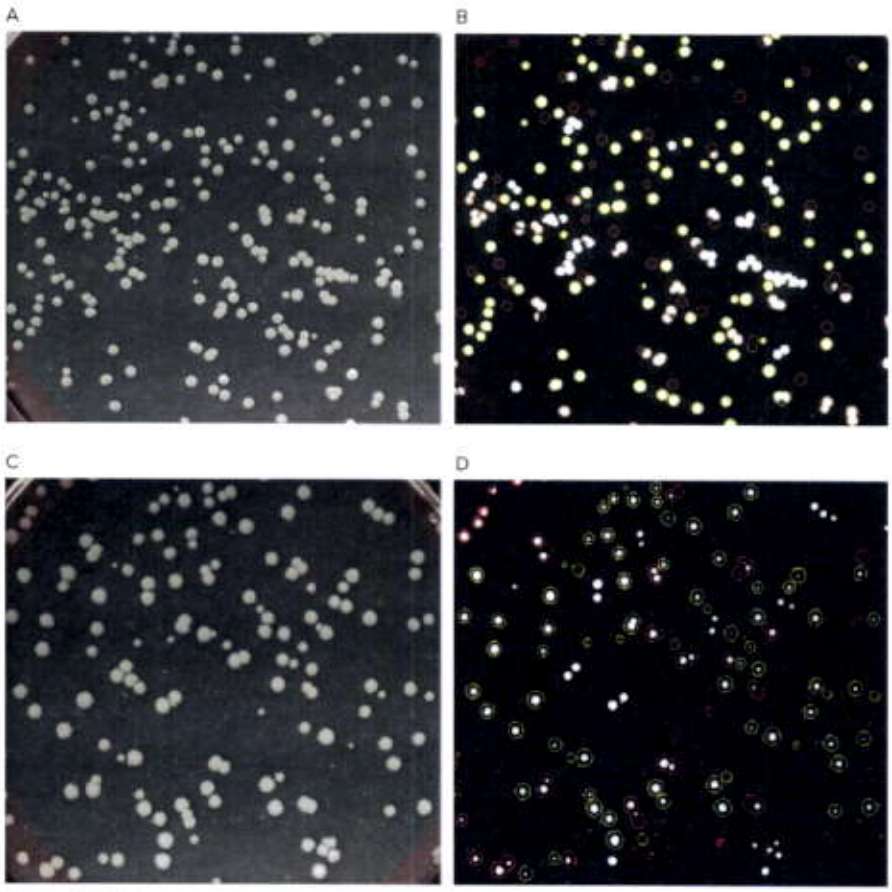


Figure 2. (A) All bacterial colonies that are transformed with pFluoroGreen vector are detected in white light. (B) Colonies that are transformed with pFluoroGreen vector and only those colonies expressing GFP fluorescent gene of interest are identified in fluorescence channel. (C) All bacterial colonies transformed with pCyanFP vector are detected in white light. (D) Colonies that are transformed with pCyanFP vector and only those colonies expressing CFP fluorescent gene of interest are identified in fluorescence channel. This demonstrates the versatility of available fluorescence filter sets that are compatible with multiple fluorescent cloning vectors as demonstrated with GFP and CFP.

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Summary

Fluorescent screening using reporters such as GFP and CFP offers significant advantages over conventional screening methods. This efficient technique has many potential applications, including tracking of protein folding, monitoring protein secretion *in vitro*, and enabling library mutational screening for enzyme evolution. With the aid of fluorescence capabilities on the QPix 400 Series, high-throughput screening and selection of recombinant colonies is straightforward. Various fluorescent reporters are supported by a variety of fluorescent filter sets available. The simple user interface enables researchers to customize and define analysis and colony selection criteria tailored to their unique biology. QPix 400 Series of microbial colony picking systems thus provides a highly productive, reliable alternative to conventional manual approaches that significantly shortens time to obtain recombinant protein expressing colonies of choice.



Figure 3. Colonies identified in the GFP (A) and CFP (C) fluorescent channels based on user-defined selection criteria are highlighted in yellow. Those colonies that do not meet user defined selection criteria are excluded from the total population as shown in red (expressing GFP; B and expressing CFP; D).

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MOLECULAR DEVICES

АКВАХИМ AQUACHIM AD BULGARIA
ВЯРНО С ОРИГИНАЛА

Док. 10.

Стр.1.

1.24.2.2.

Чрез възможността за скрининг на различни флуоресцентни дължини на вълните, роботът за подбор на колонии QPIX 400 увеличава възможните комбинации на флуоресцентнаи детекции при бактериални анализи.

Док. 10.

Стр.3.

1.24.2.3.

Бакреиалните колонии са скринирани при бяла светлина и впоследствие е проведен скрининг с различни комбинации филтри, както е показано в таблица 1 – скрининг по бяла светлина и флуоресценция със системата QPIX 420. Потребителите могат да подбират клонове на основата на размер, морфология на колониите и интензитет на флуоресценцията, като по този начин, се увеличават възможностите при сизбор на желани колонии.

Таблица 1

Флуоресцентен белтък	Филтри	Възбуждане / Излъчване
BFP	DAPI/DAPI	377/477
GFP	FITC/FITC	457/546
RFP	TxRed/TxRed	531/624

1.24.

Има увеличаваща се необходимост от възможност за едновременен скрининг на бактерии по няколко флуоресцентни белега в една култура.Чрез използването на различни филтри на системата QPIX 420, изследователите могат да запълнят тази необходимост чрез използването на комплексни анализи с флуоресцентен скрининг. Допълнително, софтуерът позволява на потребителите да подбират бактерии по критерий най-висока експресия (най-силно флуоресциращи колонии) за бъдещи процеси и експерименти.

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Документ 10.

Стр. 1.
1.24.22.
С възможността да извършва скрининг при различни флуоресцентни дължини на вълни, апаратите от серията QPix400 за изолиране на колонии, увеличават възможните ккомбинации за флуоресцентна детекция при бактериални анализи.

Стр. 3.
1.24.2.3., 1.24.2.4.
Бактериалните колонии бяха детектирани при бяла светлина и впоследствие скринирани използвайки различни флуоресцентни филтърни комбинации, показани в таблица 1 и „изображението от бяла светлина и флуоресценции" при система QPix 420. Потребителите имат възможност да селекционират клонове на основата на размер, морфология и интензитет на флуоресценцията, като по този начин се увеличават възможностите на изследователите да селекционират желаните клонове.

1.24.
Има нарастваща необходимост за възможност за скрининг на бактерии с различни видове флуоресценции в една култура. Чрез използването на различните филтри на системата QPix420 да задоволят тази необходимост чрез използването на сложни тестове за флуоресцентен скрининг.
В допълнение, софтуерът позволява на потребителите да избират най-силно експресираните (най-силно флуоресциращи) бактерии за последващи експерименти.

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Документ 10

MOLECULAR DEVICES

APPLICATION NOTE

Expanded fluorescence screening using QPix 400 series

Introduction

Bacterial screening is a popular method used for detecting recombinant bacteria in vector-based molecular cloning. It can also be used to measure specific protein expression and activity. By being able to screen a variety of fluorescence wavelengths, the QPix™ 400 series of microbial colony pickers increase the possible fluorescent detection combinations in bacterial assays.

1.24.22

Manual picking of microbial colonies is time-consuming and tedious, but with the QPix 400 series, more than 3,000 colonies can be picked in an hour. Additionally, the QPix 400 series imaging module is able to select for colonies based on their fluorescence intensities, thereby ensuring high fluorescence selection and optimizing downstream applications.

In this application note, we demonstrate how to create filter-pairings in order to screen for various fluorescent bacteria using the QPix system.

Materials and methods

The pFluoroGreen and pFluoroBlue plasmids carrying the ampicillin resistance gene from Edvotek were used to transform chemically competent *E. coli* and grown on LB-amp plates. *E. coli* expressing RFP and the ampicillin resistance gene were acquired from the Keasling Lab of Lawrence Berkley National Lab (Figure 1). Different combinations of the fluorescence bacteria were plated onto LB-amp plates and incubated at 37°C overnight.

Benefits

- **Allows researchers to screen bacteria using different fluorescent markers**
- **Large combination of fluorescent markers allow for adaptive/ creative screening experiments**

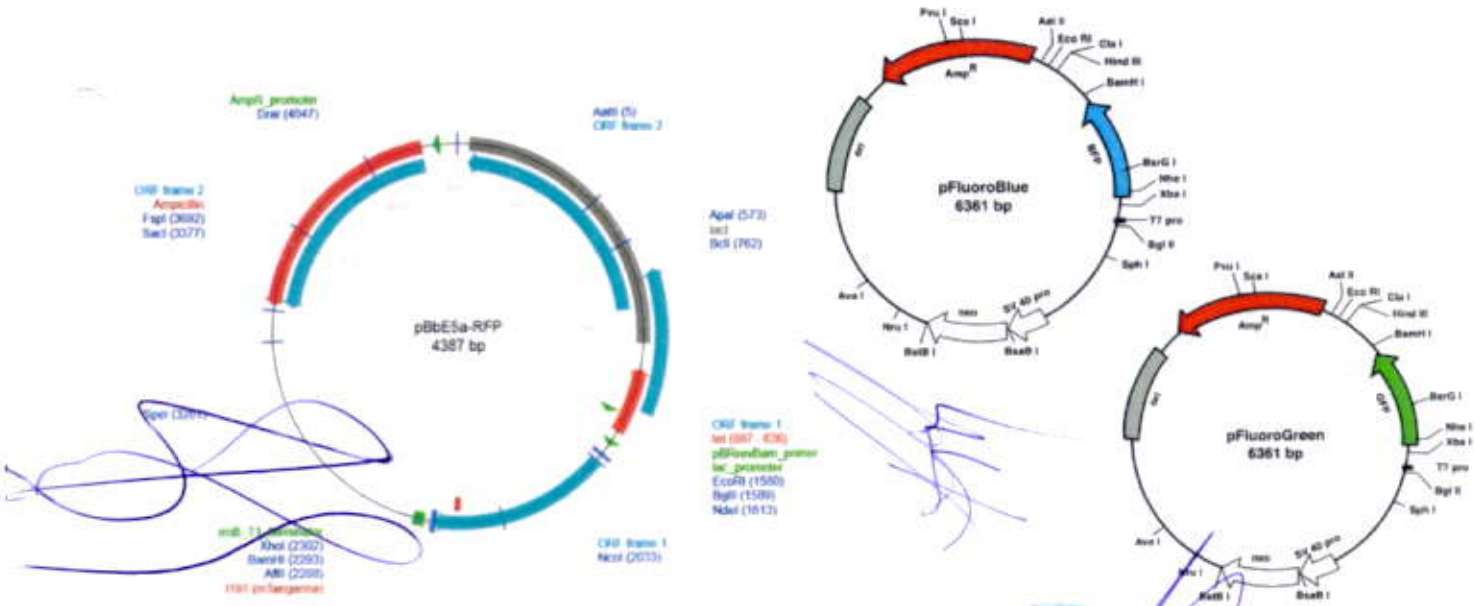


Figure 1. Plasmid maps of for the fluorescent screening. The pBbE5a-RFP was obtained from the Keasling Lab at the Lawrence Berkeley National labs. The pFluoroBlue and pFluoroGreen plasmids were obtained from the EdvoTek Biotechnology Education Company. Plasmid maps courtesy of Keasling Lab at Lawrence Berkeley National Lab and EdvoTek, www.edvotek.com).

ВЯРНО С ОРИГИНАЛА

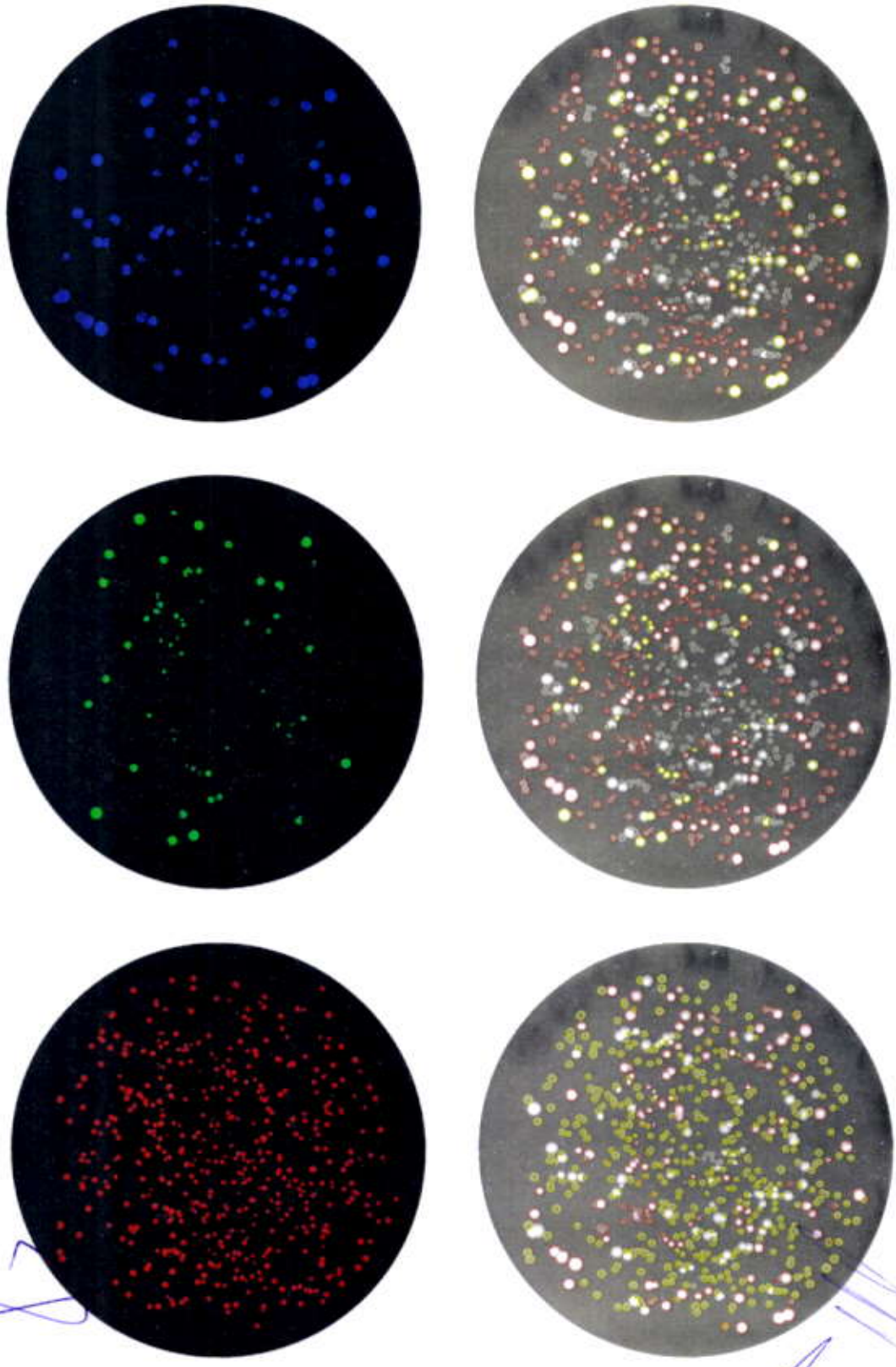


Figure 2. Identification of fluorescent bacterial colonies on the QPix 420 system. Top panel: Fluorescence images of bacterial colonies expressing pFluorBlue, pFluorGreen, and RFP respectively. **Bottom Panel:** Initial colony selection performed on white-light images on QPix software and then subsequently selected based on fluorescence intensity. Yellow outlines indicate colonies identified for picking on the basis of fluorescence readout, red outlines are ignored.

ВЯРНО С ОРИГИНАЛА

Bacterial colonies were imaged in white light and subsequently screened using various filter combinations shown in Table 1 and the "white light and fluorescent imaging feature" on the QPix 420 system. Users have options to select clones based on their size, morphology, and fluorescence intensity, thereby allowing researchers to enhance their ability to select desirable clones.

Fluorescent images of the bacteria were pseudo-colored and overlayed using MetaMorph® Microscopy Automation & Image Analysis Software (Molecular Devices) to create Figure 3.

Conclusion

There is an increasing need for the ability to screen for multiple fluorescent bacteria in a single culture. By utilizing the QPix 420 system's different filters, one can fulfill this need through the use of intricate fluorescent screening assays. Additionally, the software allows users to select for the highest-expressing (most fluorescent) bacteria for future downstream experiments.

Reference

Lee T, Krupa R, Zhang F, Hajimorad M, Holtz W, Prasad N, Lee SK, Keasling J. BglBrick vectors and datasheets: A synthetic biology platform for gene expression. *Journal of Biological Engineering* 2011, 5:12.10.1186/1754-1611-5-12.

Fluorescent Protein	Filter Pairs	Ex/Em
BFP	DAPI/DAPI	377/477
GFP	FITC/FITC	457/546
RFP	TxRed/TxRed	531/624

Table 1. Different filter combinations used to screen bacteria.

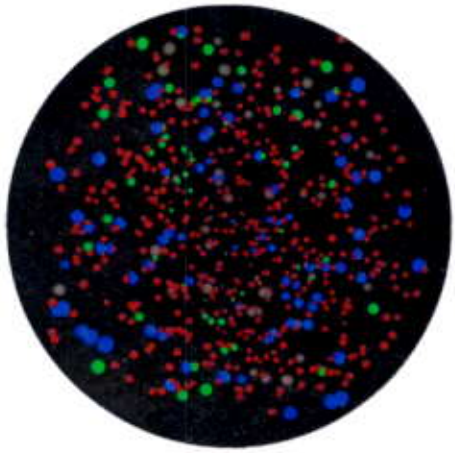


Figure 3. Pseudocolored image of fluorescent, transformed *E. Coli* and imaged using the QPix 420 system created using MetaMorph® software available from Molecular Devices.

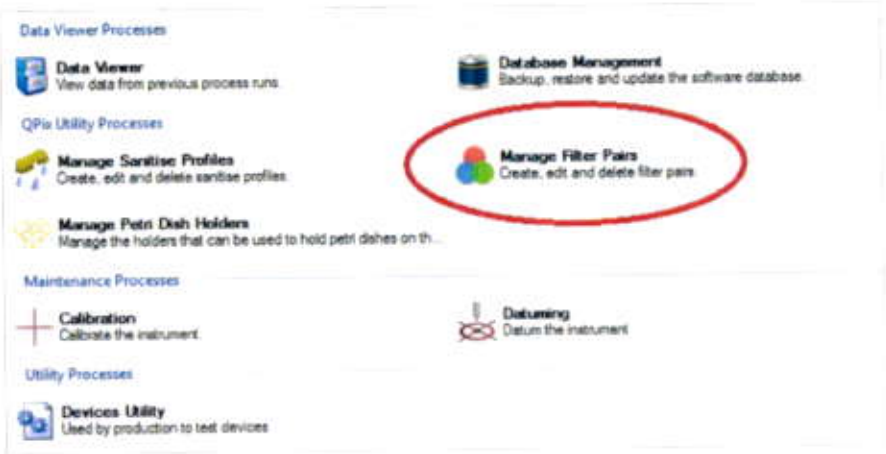


Figure 4. Instructions on how to set up the fluorescent filter.

Contact Us

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Check our website for a current listing of worldwide distributors.

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Стр.10.

1.4

Инструментът е оборудван с автоматично затваряща се врата, която се затваря веднага след като стартирате процес. Врата е направена от акрилен полимер, ккоето предотвратява преминаването на UV лъчи по време на работа.

Като мярка за безопасност, когато вратата е отворена, електромагнитен ключ предотвратява стартирането на инструмента. Този ключ винаги трябва да е в изправност.

Стр.15.

1.

Със системата QPix 420 за изолиране на колонии от фирма Молекюлър Дивайсис, вие можете да контролирате селективно изолиране на микробни колонии. Много на брой потребители могат да селекционират и изолират колонии от различни източници използвайки инструмента QPix420 и софтуера QPix 420.

Системата QPix 420 е част от серията роботи QPix 400. Системата QPix 420 предлага голям набор характеристики които да обслужват различни изисквания, включително получаване на изображения от бяла светлина и флуоресценция и отбиране на избраните колонии. Други функции включват пренасочване/преразпределяне, копиране и създаване на матрица.

Стр.16.

1.12. 1.16. Поставката (леглото) на плаките в които се накапва е универсална и позволява използване на плитки, стандартни и дълбоки микротитърни плаки в различни комбинации и от различни производители. Всяка глава е със специфични игли а не специфична за пласите, ето защо може да се използва за различни приложения. Една глава обслужва всички стандартни плаки. Една глава обслужва всички дълбоки плаки.

Софтуерът ви позволява да маркирате с Таг важни проби с цел да се улесни историята, местоположението и допълнителни данни, специфични за пробата.

1.15. Системата QPIX 420 може да подбере 3000 колонии на час. Това се осъществява с интегрирана хардуерна и софтуерна система за наблюдение, откриване и анализ и с използването на Глава с 96 игли, специфично проектирана от Молекюлър Дивайсис.

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Стр.23.

1.35.

Възможности за задаване на нови процеси

Иконата „Нови процеси“ от прозореца „Навигация“ ви дава пълен комплект възможности за създаване и управление на процесите и системна поддръжка.

Стр.24.

1.27., 1.33.

Процес на разглеждане на данните

Иконата „разглеждане на данни“ ви позволява да разгледате процес или рутинен метод, които преди това са прилагани на инструмента.

Стр.25.

1.20., 1.36.

Инструментът се инсталира от одобрен персонал. Инструментът се доставя с маса и интегриран компресор, компютър с мониторна станция с фабрично инсталиран софтуер и принтер. За повече информация към изискванията към помещението за инсталиране вижте стр. 253.

Стр.28.

1.8

Структуриране на ваните за почистване

Инструментът съдържа три бани за измиване на иглите, разположени в дясната страна на инструмента.

Водна баня 1 (най-далечната от предната врата): 70 % етанол

Водна баня 2 (в средата): стерилна вода

Водна баня 3 (най-близката до предната врата): 1 % разтвор на натриев хипохлорит (белина)

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Стр.33.

1.6

Провеждане на процес по стерилизиране с UV

Процесът на UV стерилизация използва ултравиолетова светлина за стерилизация на вътрешните повърхности и части на инструмента. Преди да извършите процеса на стерилизация, Молекюлър Дивайсис препоръчва първо ръчно да почистите вътрешната част на инструмента.

Стр. 39.

1.31.

Глава 6. Процес на отбор

Стр.102.

1.24.3

Дефинирайте критериите за избор на колонии

- цялост на ръба
- разстояние между осите
- минимален диаметър
- максимален диаметър
- минимална близост
- зони на инхибиране – колонии (среден радиус в mm)

Стр. 149.

1.31.

В таблиците за Диапазон на Интензитет, изберете гранични стойности за Нисък и Висок интензитет.

Стр.224.

1.33

Намиране на данни в базата данни чрез

- баркод
- Дата
- източника на посявка
- местоположение
- Таг – иденитификатор
- потребител

Стр.227.

1.34. Експорт на данни или настройки

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Стр.231.

1.35.

Глава 17: поддръжка и технически проблеми

Извършвайте само поддръжката на апарата, описана в тази инструкция за употреба. Всички други процедури по подръжка, които не са специфицирани в тази инструкция за употреба могат да бъдат извършвани само от обучени от Molecular Devices инженери.

Вижте Получаване на техническа помощ стр. 248

Процедурите по подръжка и отстраняване на проблеми, които могат да бъдат извършени от потребителите, за да гарантират оптимална работа на инструмента са:

- Провеждане на превантивна поддръжка, стр. 232
- Почистване на инструмента, стр. 233
- Тестване на иглите, стр. 236
- Позициониране на камерата, стр. 238
- Замяна на бушони, стр 241
- Преместване на инструмента, стр. 242
- Добавяне на нов потребител към SQL сървъра, стр. 243
- Стартиране на софтуера като администратор, стр. 243
- Презадаване на пътеката към SQL сървъра, стр. 244
- Отстраняване на проблеми, стр. 245

Стр.243.

Влезте в SQL сървъра с паролата, използвайте Microsoft SQL Server Management Studio с акаунт, които има администраторски права.

В SQL Server Management Studio разширете папката за сигурност (Security)

Стр.253.

1.3

тегло	Инструмент: 184 kg (405.7 lbs) Маса с компресор: 165 kg (363.8 lbs) Общо тегло на сглобената система: 349 kg (769.5 lbs)

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Документ 11

QPix™ 420 Colony Picking System

User Guide

5031496 C
December 2014

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www.moleculardevices.com

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АКВАХИМ AD
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ВЯРНО С ОРИГИНАЛА

Safety Information

The safety information section provides information on the safe use of the instrument, including the use of user-attention statements in this guide, a key to understanding the safety labels on the instrument, precautions to follow before operating the instrument, and precautions to follow while operating the instrument.

Please read and observe all warnings, cautions, and instructions. Remember, the most important key to safety is to operate the instrument with care.

WARNING! If the instrument is used in a manner not specified by Molecular Devices, the protection provided by the equipment might be impaired.

Warnings, Cautions, Notes, and Tips

All warning symbols in the user guide are framed within a yellow triangle. An exclamation mark is used for most warnings. Other symbols can warn of other types of hazards such as biohazard, electrical, or laser safety warnings as are described in the text of the warning.

When warnings and cautions are displayed in this guide, be careful to follow the specific safety information related to them.

The following user-attention statements can be displayed in the text of Molecular Devices user documentation. Each statement implies a particular level of observation or recommended procedure as described:

WARNING! A warning indicates a situation or operation that could cause personal injury if precautions are not followed.

CAUTION! A caution indicates a situation or operation that could cause damage to the instrument or loss of data if correct procedures are not followed.

Note: A note calls attention to significant information.

Tip: A tip provides useful information or a shortcut, but is not essential to the completion of a procedure.

Symbols on Instrument Labels

Each safety label located on the instrument contains an alert symbol that indicates the type of potential safety hazard related to the label. The following table lists the alert symbols that can be found on Molecular Devices instruments.

Table S-1: Instrument Label Alert Symbols

Symbol	Indication
	This warning symbol indicates that the product documentation needs to be consulted.
	This warning symbol indicates a potential biohazard.
	This symbol indicates a potential electrical-shock hazard from a high-voltage source, and that all safety instructions should be read and understood before proceeding with the installation, maintenance, and servicing of all modules. Always turn the power switch off and disconnect the power cord from the main power source before performing a maintenance procedure that requires removal of a panel or cover or disassembly of an interior instrument component.
	This symbol indicates a potential heat hazard.
	This symbol indicates alternating current.
	This symbol indicates direct current.
	This symbol indicates the location of the Protective Earth Ground Terminal.
	This symbol indicates the location of a fuse.

ВЕРНО С ОРИГИНАЛА

Table S-1: Instrument Label Alert Symbols (continued)

Symbol	Indication
	This symbol on the product is required in accordance with the Waste Electrical and Electronic Equipment (WEEE) Directive of the European Union. It indicates that you must not discard this electrical or electronic product or its components in domestic household waste or in the municipal waste collection system. For products under the requirement of the WEEE directive, please contact your dealer or local Molecular Devices office for the procedures to facilitate the proper collection, treatment, recovery, recycling, and safe disposal of the device.

Before Operating the Instrument

Make sure that everyone involved with the operation of the instrument has:

- Received instruction in general safety practices for laboratories.
- Received instruction in specific safety practices for the instrument.
- Read and understood all Safety Data Sheets (SDS) for all materials being used.

Electrical Safety

To prevent electrically related injuries and property damage, properly inspect all electrical equipment before use and immediately report all electrical deficiencies. Contact Molecular Devices technical support for servicing of equipment that requires the removal of covers or panels.

WARNING! HIGH VOLTAGE. Within the instrument is the potential of an electrical shock hazard existing from a high voltage source. All safety instructions should be read and understood before proceeding with the installation, maintenance, and servicing of all modules.

Do not remove the instrument covers. To prevent electrical shock, use the supplied power cords only and connect to a properly grounded wall outlet.

The instrument must be connected to a properly grounded power outlet to protect from the risk of electric shock. The main chassis of the instrument is grounded together with all related electrical components.

Do not remove the fixed covers, as there are no user serviceable parts inside. All electrical work should be referred to Molecular Devices approved service personnel.

In the event of a liquid spillage into the main cavity of the instrument, disconnect the mains power supply before trying to clean up.

If the external covers on the instrument are removed, the power supply does not automatically stop.

WARNING! HIGH VOLTAGE Always turn the power switch off and disconnect the power cord from the main power source before performing a maintenance procedure that requires removal of a panel or cover or disassembly of an interior instrument component.

Do not try to use the instrument until all covers are replaced.

To provide access for disconnecting power from the instrument, maintain a 66 cm (26 in.) minimum clearance area on the right side of the instrument.

To provide access for disconnecting power from the compressor, maintain a 66 cm (26 in.) minimum clearance area at the rear of the instrument table.

To protect against fire hazard, replace the fuses only with the same type and rating as the original factory-installed fuses.

Ultraviolet (UV) Light Safety

1.4

The instrument is equipped with an automatically locking door that locks whenever you run a process. The door is made from acrylic, and so prevents UV light from passing through during operation.

As a safety measure, if the door is open, an electromagnetic switch prevents the instrument from running. This switch should never be tampered with, as it serves two purposes:

- It prevents the motors from running to reduce the potential of physical damage.
- It disables the UV light to prevent the risk of damage from UV radiation.

External or Implanted Medical Device Safety

Motors and their related drives and cabling are sources of electromagnetic fields.

Persons with external or implanted medical devices need to evaluate the risks related to these devices before entering an area where the instrument is in use. Keep magnetic storage devices or strips, such as hard drives and credit cards, away from the instrument.

WARNING! Due to the presence of electromagnetic fields, if you wear an external or implanted medical device, keep 300 mm away from the drive magnets.

Heat and Burn Safety

The instrument is fitted with a high-temperature halogen dryer. The casing can become hot during the drying cycle.

Chemical and Biological Safety

Normal operation of the instrument can involve the use of materials that are toxic, flammable, or otherwise biologically harmful. When using such materials, observe the following precautions:

- Handle infectious samples based on good laboratory procedures and methods to prevent the spread of disease.
- Observe all cautionary information printed on the original containers of solutions before their use.
- Dispose of all waste solutions based on the waste disposal procedures of your facility.
- Operate the instrument in accordance with the instructions outlined in this guide, and take all the necessary precautions when using pathological, toxic, or radioactive materials.
- Splashing of liquids can occur. Therefore, take applicable safety precautions, such as using safety glasses and wearing protective clothing, when working with potentially hazardous liquids.
- Use a correctly contained environment when using hazardous materials.
- Observe the applicable cautionary procedures as defined by your safety officer when using flammable solvents in or near a powered-up instrument.
- Observe the applicable cautionary procedures as defined by your safety officer when using toxic, pathological, or radioactive materials.

WARNING! BIOHAZARD. If a biohazard is used with the instrument, the area needs to be clearly marked with an applicable biohazard sign.

WARNING! Never use the instrument in an environment where potentially damaging liquids or gases are present.

Moving Parts Safety

To prevent injury due to moving parts, observe the following:

- Never try to exchange labware, reagents, or tools while the instrument is operating.
- Never try to physically restrict the moving components of the instrument.
- Keep the interior of the instrument clear to prevent obstruction of the movement.

The motors use high-powered magnets. The linear drive units and encoders are delicate, so be very careful with them. To prevent serious damage to the instrument or its auxiliary parts, follow the preparation instructions in this guide before every process.

The instrument is equipped with an automatically locking door that locks whenever you run a process. The door is made from acrylic, and so prevents UV light from passing through during operation.

As a safety measure, if the door is open, an electromagnetic switch prevents the instrument from running. This switch should never be tampered with, as it serves two purposes:

- It prevents the motors from running to reduce the potential of physical damage.
- It disables the UV light to prevent the risk of damage from UV radiation.

In an emergency, press the **Emergency Stop** button on the front of the instrument to immediately stop all motion and turn off the instrument. Before you can restart the instrument, you must pull out the **Emergency Stop** button and then press the **Start** button.

WARNING! Do not obstruct or otherwise prevent access to the Emergency Stop button.

Motors and their related drives and cabling are sources of electromagnetic fields. Keep magnetic storage devices or strips, such as hard drives and credit cards, away from the instrument covers.

Note: Observe all warnings and cautions listed for all external devices attached to or in use during the operation of the instrument. See the applicable user guide for the operating and safety procedures of that device.

Cleaning and Maintenance Safety

Observe the cleaning procedures outlined in this user guide for the instrument.

Note: Molecular Devices recommends that you always use ethanol for cleaning, because autoclaving is not compatible with anodized parts.

Do the following before cleaning equipment that has been exposed to hazardous material:

- Contact the applicable Chemical and Biological Safety personnel.
- Review the Chemical and Biological Safety information contained in this user guide.

Do only the maintenance described in this guide. Maintenance procedures other than those specified in this guide can be done only by Molecular Devices qualified personnel. See Obtaining Support on page 248.

WARNING! BIOHAZARD. It is your responsibility to decontaminate components of the instrument before returning parts to Molecular Devices for repair. Molecular Devices will not accept items that have not been decontaminated where it is applicable to do so. If parts are returned, they must be enclosed in a sealed plastic bag stating that the contents are safe to handle and are not contaminated.

For approved cleaning and maintenance procedures, see Maintenance and Troubleshooting on page 231see Maintenance and Troubleshootingsee Maintenance and Troubleshootingsee Maintenance and Troubleshooting.

ВЯРНО С ОРИГИНАЛА

Chapter 1: Introduction

1

With the QPix™ 420 Colony Picking System from Molecular Devices®, you can control selective microbial colony picking. Multiple users can select and collect microbial colonies from various receptacles using the QPix 420 Instrument with the QPix™ 420 Colony Picking Software.

The following chapters give you more information about using this instrument:

- QPix 420 Instrument Overview on page 17
- QPix 420 Software Overview on page 21
- Starting and Setting Up the Instrument on page 25
- Sanitizing the Instrument Interior on page 31
- Picking Processes on page 39
- Regional Picking Processes on page 107
- Control Plate Creation Processes on page 157
- Replication Processes on page 181
- Rearraying Processes on page 193
- Gridding Processes on page 207
- Data Viewer Processes on page 223
- Maintenance and Troubleshooting on page 231

Before operating the instrument or performing maintenance operations, make sure that you are familiar with the safety information in this guide. See Safety Information on page 7.

For research use only. Not for use in diagnostic procedures.

Functionality of the QPix 420 System

The QPix 420 System is part of the QPix 400 series. The QPix 420 System offers a range of features to suit various requirements including white light and fluorescent imaging, and picking of bacterial colonies. Other functions include rearraying, replication, and gridding.

The QPix 420 System is useful for working with applications such as protein engineering, protein evolution, directed or enzyme evolution, protein expression, transformation, and sub-clone management.

The QPix 420 System is available with transmitted White Light only or with both transmitted White Light and Fluorescent functionality.

Multiple fluorescent filters ensure compatibility with a wide range of fluorescent cloning dyes and proteins, and enable the system to reveal unique information about individual colonies. Fluorescent imaging is available as an option.

After colonies are located using a CCD camera, they are picked at high speed from source receptacles and then inoculated into pre-filled 96-well or 384-well microplates. Selected colonies of interest can then be rearrayed from a library into new microplates.

To optimize these systems, Molecular Devices has developed a range of plastic consumables for use with the instrument. The destination microplate bed permits versatile use of shallow, standard, and deep-well microplates from various manufacturers in various combinations. Each head is pin specific and not plate specific, thus it can be used for various applications. One head can be used for all standard plates. One head can be used for all deep well plates.

You can log all your processes such as picking, replicating, and re-arraying with the QPix 420 Colony Picking Software. The software lets you tag important samples to enhance the history, location, and extra details of sample-specific data.

Picking Microbial Colonies

The QPix 420 System can automatically pick in excess of 3000 colonies per hour. This is done with an integrated vision, detection, and analysis hardware and software system and a 96-pin head assembly, all custom designed by Molecular Devices.

After you have identified potential colonies, the source plate is then imaged in multiple frames using a CCD camera. These images are processed to produce a single, large image of the colonies on the source receptacle. Specific colonies are then selected for picking using feature-selection parameters, such as size, shape, and proximity.

The instrument picks from a range of source receptacles including large QTrays, Omni Trays, and standard Petri dishes using the optional source receptacle holders.

A fluorescent imaging head is also available. This head uses an LED-based light source and preset filter pairs for selecting fluorescence excitation and emission wavelengths, and a sensitive monochrome CCD camera for image acquisition. The fluorescence head can also be used for white light imaging using the transmitted light source below the source plate holder.

The fluorescent imaging system lets you to add fluorescent intensity parameters in the selection criteria.

WARNING! If the instrument is used in a manner not specified by Molecular Devices, the protection provided by the equipment might be impaired.

Chapter 2: QPix 420 Instrument Overview

2

The QPix™ 420 Colony Picking System is constructed within a welded steel framework.

Before operating the instrument or performing maintenance operations, make sure that you are familiar with the safety information in this guide. See Safety Information on page 7.

The instrument is equipped with an automatically locking door that locks whenever you run a process. The door is made from acrylic, and so prevents UV light from passing through during operation.

The bed of the instrument contains source and destination receptacle positions.

The bed also contains wash baths which clean the pins before and during a process. See Setting Up Wash Baths on page 28.

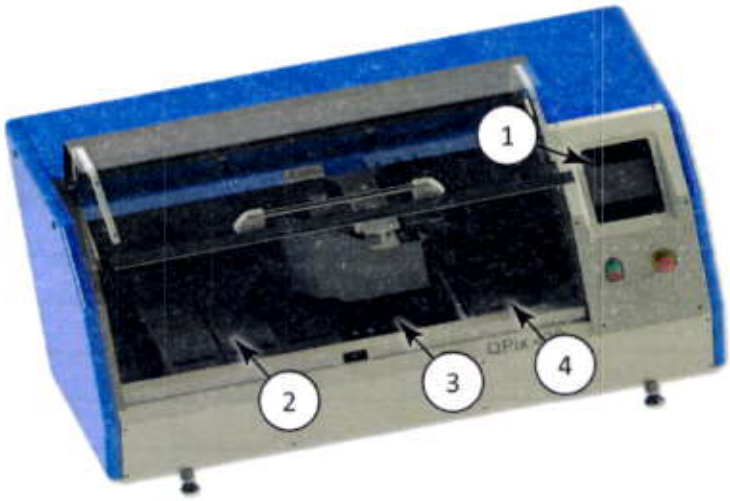


Figure 2-1: The QPix 420 Colony Picking System

Item	Description
1	Front panel
2	Microplate holder
3	Imaging table
4	Wash bath

For information on cleaning and preparing the instrument, see Sanitizing the Instrument Interior on page 31.

For more information on regular instrument maintenance, see Maintenance and Troubleshooting on page 231.

Front Panel Controls and Display

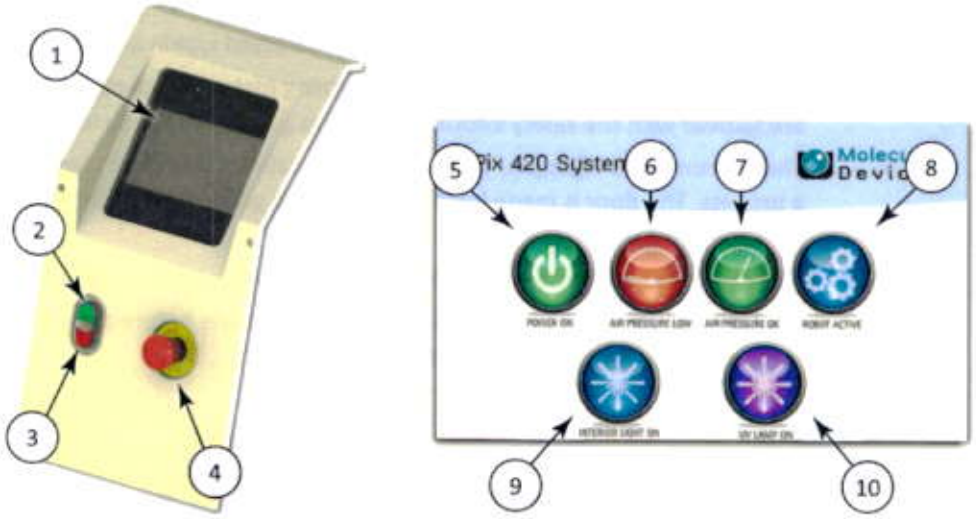


Table 2-1: Front Panel Controls and Display

Item	Description
1	LCD indicator panel
2	START button
3	STOP button
4	Emergency Stop button
5	Power is on
6	Air pressure is low
7	Air pressure is correct
8	The instrument is running a process (not applicable for Instrument Utilities)
9	The interior light is on
10	The UV light is on

Instrument Connections

The power, data, and compressed air connections are on the right side of the instrument.

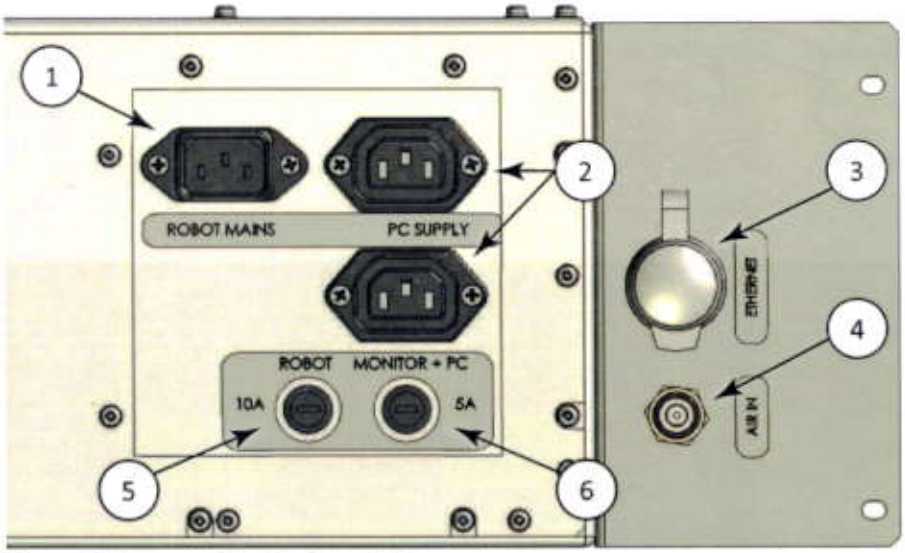


Figure 2-2: Connection Ports and Fuses

Item	Description
1	Power Inlet: Instrument Mains
2	Power Outlets: Computer and Monitor
3	Ethernet port
4	Compressed air inlet
5	Fuse carrier: Instrument Mains
6	Fuse carrier: Computer and Monitor

The mains power inlet and the computer and monitor power outlets are separately fused.

Compressed Air Supply

Compressed air is required for the picking movement of the picking pins. The oil-free compressed air unit draws air from the local environment and delivers it to the instrument through the regulator set to 100 psi (689 kPa).

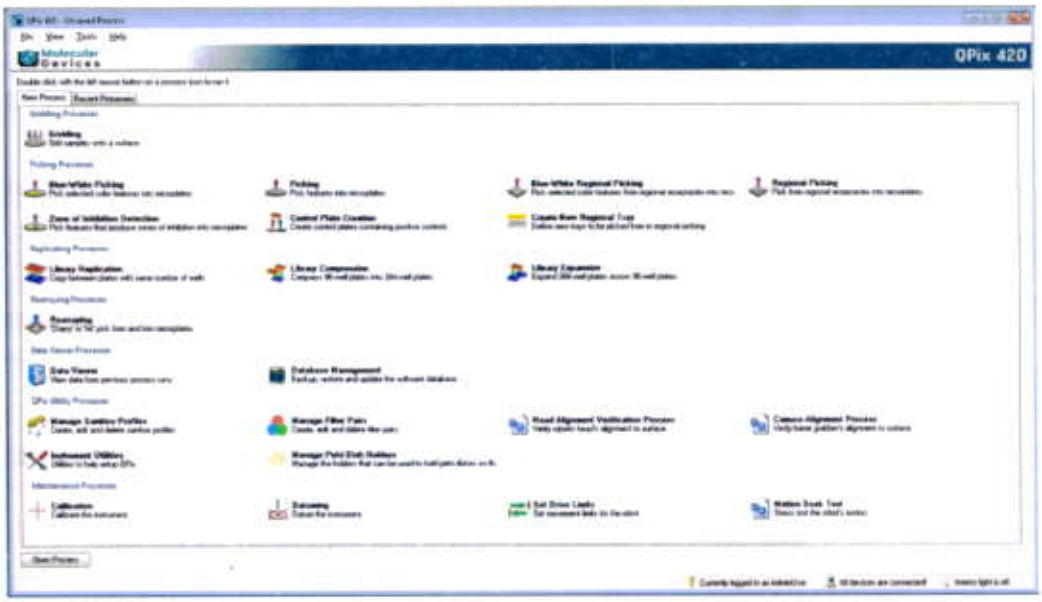
Chapter 3: QPix 420 Software Overview

3

The QPix™ 420 Colony Picking Software controls the QPix™ 420 Colony Picking System.

To start the software, from the Windows desktop, double-click the **QPix 420** icon.

When the software first starts, the **Navigation** window displays the **New Process** tab.



To change the view and available options, click the tabs near the top of the window below the menus.

- **New Process** gives you a full set of options for creating and managing processes and system maintenance. See New Process Options on page 23.
- **Templates** displays a list of saved templates that can be used for creating new processes.
- **Recent Processes** displays a list of recently opened processes.

Click the **Open Process** button at the bottom of the window to display the **Open** dialog where you can select and open a saved process file.

To turn the interior light on and off, double click the interior light status in the bottom-right corner of the window. The interior light is not used for imaging and automatically turns off during imaging.

Menu Options

The available options in the menus at the top of the **Navigation** window change depending on the view and selections in the window.

File Menu

- **Open Process** displays the **Open** dialog where you can select and open a saved process file.
- **Save Process** saves the settings for the current process. If the process has not been save before, then the **Save As** dialog is displayed where you can select the location and name the file.
- **Save Process As** opens the **Save As** dialog where you can select the location and name the file. You can use this option to save a copy of the current process.
- **Close Process** closes the current process.
- **Save As Template** opens the **Save As** dialog where you can save the settings from the current process as a template that can be used for creating new processes.
- **Recent Processes** displays a list of recently opened processes.
- **Switch User** can be used in a multiple user environment to log off the current user so that a different user can log on.
- **Exit** closes the **Navigation** window and shuts down the software.

View Menu

- **Properties** displays the properties of the routine that is being set before starting the routine.
- **Progress** displays the progress of a running routine.
- **Administrate Properties** lets you change the Properties view and default values.

Tools Menu

- **Configuration** displays the **Edit Configuration** dialog.

  Note: Molecular Devices recommends that only trained personnel configure these settings.

- **Hardware Model View** displays an interactive 3-D model of the instrument.
- **Prepare Error Report** starts the **Error Reporting Wizard** to create a data file containing the configuration and recent log files to help troubleshoot your problem.

Help Menu

- **About** displays the version numbers of the software modules.
- **Online Support** displays the support web page. This option requires an active internet connection.

New Process Options

The **New Process** tab of the **Navigation** window gives you a full set of options for creating and managing processes and system maintenance.

Gridding Processes

- **Gridding** deposits liquid samples from one or more source microplates to one or more destination surfaces using either agar filled QTrays or filters. See Gridding Processes on page 207.

Picking Processes

- **Picking** picks colonies from receptacles using the standard process. See Picking Processes on page 39.
- **Blue-White Picking** picks blue or white colonies from receptacles using the standard process. See Blue-White Picking Processes on page 63.
- **Zone of Inhibition Detection Picking** picks colonies with detectable zones of inhibition from receptacles using the standard process. See Zone of Inhibition Detection Picking Processes on page 85.
- **Regional Picking** picks colonies from receptacles using the regional process. See Regional Picking Processes on page 107.
- **Blue-White Regional Picking** picks blue or white colonies from receptacles using the regional process. See Blue-White Regional Picking Processes on page 133.
- **Control Plate Creation** creates a batch of microplates containing specified control samples. These can be created by picking colonies from specified source receptacles into specified destination wells. See Control Plate Creation Processes on page 157.
- **Create New Regional Tray** adds new microplate definitions to the regional picking plate type database, which can then be selected for use in the regional picking process. See Create New Regional Tray Processes on page 177.

Replication Processes

- **Library Replication** duplicates samples from one microplate to a different microplate of the same format. See Replication Processes on page 181.
- **Library Compression** replicates samples from 96-well microplates to 384-well microplates.
- **Library Expansion** replicates samples from 384-well microplates to 96-well microplates.

Rearraying Processes

- **Rearraying** re-deposits liquid samples between one or more source and destination microplates to consolidate selected wells into microplates in an ordered fashion. See Rearraying Processes on page 193.

Data Viewer Processes

1.33

- **Data Viewer** lets you search and view a process or routine that was previously run on the instrument. See Data Viewer Processes on page 223.
- **Database Management** lets engineers or trained customers only update the database or do an automatic backup of the database.

QPix Utility Processes

- **Manage Sanitise Profiles** sets up various **Sanitise** profiles as required by various experimental needs. You need to have a minimum of one **Sanitise** profile created before you can successfully do a picking routine. See Creating and Editing Sanitise Profiles on page 34.
- **Camera Alignment Process** calibrates and correctly aligns the camera to get pin-to-spot precision, relating the image pixel co-ordinates with the instrument x and y coordinates. Do this process whenever the head is returned to the actuator or whenever the actuator is hit, as this can have a negative effect on picking precision. See Aligning the Camera on page 238.
- **Instrument Utilities** lets you do several maintenance and cleaning activities.
- **Manage Petri Dish Holders** allows you to set either an original source holder tray or a new spring-loaded adjustable holder tray as a default source holder tray per source holder tray type, such as OmniTray, 1-way, 4-way or 5-way petri dish holders. Only one style per holder type can be set as the default, either the original style, or the adjustable style.

Maintenance Processes

Note: Molecular Devices recommends that only trained personnel configure these settings.

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Chapter 4: Starting and Setting Up the Instrument

4

The QPix™ 420 Colony Picking System must be located in a well-ventilated area. The instrument is installed by approved personnel. The instrument is supplied with table and integrated compressor, computer with monitor station with factory installed software and printer. For more information about the installation requirements, see Technical Specifications on page 253.

Before operating the instrument or performing maintenance operations, make sure that you are familiar with the safety information in this guide. See Safety Information on page 7.

The following topics guide you through starting and setting up the instrument for running a process:

- Start-Up and Shutdown Procedures on page 25
- Preparing to Run a Process on page 27
- Setting Up Wash Baths on page 28
- Installing or Removing the Head on page 28

Start-Up and Shutdown Procedures

Before using the instrument, confirm all the tasks listed in Pre-Power-Up Check List on page 25. To start the instrument and the software, follow the procedure in Powering Up the System on page 26.

To properly shutdown the system, follow the procedure in Shutting Down the System on page 26. In an emergency, press the **Emergency Stop** button on the front of the instrument to immediately stop all motion and turn off the instrument. See Emergency Stop on page 26.

Pre-Power-Up Check List

- Confirm that the **Emergency Stop** button on the front of the instrument is pulled out. The instrument will not start if the button is pushed in.
- Confirm the instrument bed is clear of obstructions and loose items.
- Confirm that all motor tracks are free of obstructions.
- Confirm there are no obstructions to the movement of the head.
- Confirm that the acrylic door is properly closed.
- Confirm that the power cord for the instrument is properly connected and that power to the power outlet is functioning properly.
- Confirm that the power cord for the compressor is properly connected and that power to the power outlet is functioning properly.

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Powering Up the System

1. Confirm all the tasks listed in Pre-Power-Up Check List on page 25.
2. Switch on the compressor.
3. Push the **Start** button on the front panel.

   The **Power On** icon is displayed on the front panel. If the power to the system does not turn on, it is likely that the door is open or the **Emergency Stop** button is pushed in.

   The instrument cycles through the various startup processes indicated on the front panel. For more information about display icons, see Front Panel Controls and Display on page 18.
4. Check that the **Air** icon on the front panel is displayed indicating that the air pressure from the compressor is sufficient for operating the instrument.
5. Switch on the computer and wait for it to initialize the operating system and to discover the local network that connects the instrument to the computer.

   Note: If you start the software before the network has been discovered, an error message is displayed notifying you that it cannot find the instrument.
6. After the computer has finished its initialization, from the Windows desktop, double-click the **QPix 420** icon.

Every time the instrument is used, the three axes sequentially run through their "Initialize drives" routine. This enables the drives to find their respective home positions. The System must complete this routine without interference to ensure that there is no damage to the instrument or its auxiliary equipment.

Shutting Down the System

1. In the **Navigation** window of the QPix 420 Colony Picking Software, click **File > Exit**.

   The Software closes down.
2. From the computer desktop, click **Start > Shut Down** and wait for the computer to switch off completely.
3. Push the **STOP** button on the front panel to switch off the instrument.
4. Switch off the power at the mains or disconnect the power cord to the instrument.
5. Switch off the power to the compressor or disconnect the power cord.

Emergency Stop

In an emergency, press the **Emergency Stop** button on the front of the instrument to immediately stop all motion and turn off the instrument. The location of the **Emergency Stop** button is shown in Front Panel Controls and Display on page 18.

Before you can restart the instrument, you must pull out the **Emergency Stop** button and then press the **Start** button.

Preparing to Run a Process

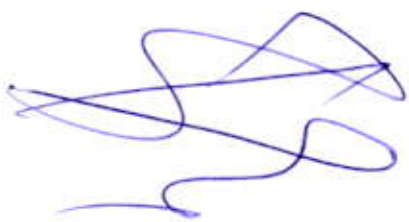
Molecular Devices recommends regular and thorough cleaning and maintenance of the QPix 420 Instrument to ensure that it continues to function correctly. See Maintenance and Troubleshooting on page 231.

Before running a process, do the following procedures.

1. Manually clean the instrument interior using 70% ethanol. See Cleaning the Instrument on page 233.
2. Install and fill the wash baths with a suitable quantity of the defined solutions. See Setting Up Wash Baths on page 28.

   Note: Before running a process that uses the wash baths, make sure that you verify the locations and solutions of the wash baths and also the wash cycles that are required for their use. Always top off your wash baths with their defined cleaning fluids and then wipe down the surfaces of the instrument interior.

3. Start the instrument and the software. See Pre-Power-Up Check List on page 25 and Powering Up the System on page 26.
4. Install the correct picking head for your application. See Installing or Removing the Head on page 28.
5. Do a **Sanitise** process. See Running a Sanitise Process on page 31.
6. Do a **UV Sanitise** process. See Running a UV Sanitise Process on page 33.
7. Prepare microplates, QTrays, Omni Trays, or Petri dishes based on the requirements for your application.
8. Select and run the desired process. For information about selecting, defining, and running processes, see the following topics:
   - Picking Processes on page 39
   - Regional Picking Processes on page 107
   - Control Plate Creation Processes on page 157
   - Replication Processes on page 181
   - Rearraying Processes on page 193
   - Gridding Processes on page 207







Setting Up Wash Baths

The Instrument contains three wash baths on the right side of the instrument bed. The wash baths are used for the **Sanitise** process and the **Sanitise** profiles used with most other processes. See Sanitizing the Instrument Interior on page 31.

It is important that these baths are filled with a suitable quantity of solutions and that they are configured correctly.

Note: Before running a process that uses the wash baths, make sure that you verify the locations and solutions of the wash baths and also the wash cycles that are required for their use. Always top off your wash baths with their defined cleaning fluids and then wipe down the surfaces of the instrument interior.

For a typical picking process, recommends that you put the following solutions in the indicated wash baths:

- Wash Bath 1 (furthest from front): 70% ethanol
- Wash Bath 2 (middle wash bath): Sterile water
- Wash Bath 3 (closest to the front): 1% sodium hypochlorite (bleach)

CAUTION! Bleach can cause corrosion if left in the instrument for too long. It should be removed from the instrument immediately after use. In general, bleach is required only for difficult-to-sterilize organisms.

Installing or Removing the Head

The head is housed in a unique actuator system that permits easy exchange and set-up of the head.

Although it is possible to manually move the actuator assembly, Molecular Devices recommends using the software to safely move the actuator into position to remove or install the head.

WARNING! PINCH HAZARD. The actuator assembly has moving parts that can cause pinch injuries if it is moved manually. To prevent pinch injuries, use the software Change Head process to safely move the actuator.

1. From the **Navigation** window under **Utility Processes**, double-click the **Instrument Utilities** icon.
2. In the **Instrument Utilities** window, double-click the **Change Head** icon.
3. In the **Change Head** window, click **Move to Load Position**.
4. When the warning message is displayed, make sure that the bed is clear of obstructions and that the door is closed, and then click **OK** to move the actuator into position near the front of the instrument.

5. Open the door.
6. Install or remove the head being careful not to touch the camera or other electronics on the underside of the actuator assembly.
   - To remove the head, unscrew and remove the thumbscrew and washer on the left that secures the head to the actuator assembly. Then, grab the handle on the right and slide the head out of the actuator.

     Before storing the head, or whenever it needs cleaning, wipe the exterior of the head with a cloth using 70% ethanol. To store the head, slide it into its metal cover with the pins facing inward and then secure it in place with the thumbscrew and washer.
   - To install the head, hold the head by its handle with the pins pointing down and then slide the head into the actuator assembly from the right. Then, attach the thumbscrew and washer on the left and hand tighten the thumbscrew to secure the head to the actuator.
7. Close the door.
8. In the **Change Head** window, click **Move to Park Position**.
9. When the warning message is displayed, make sure that the bed is clear of obstructions and that the door is closed, and then click **OK** to home the actuator to its starting position.
10. Click **Next**.
11. In the **Instrument Utilities** window, click **Next**.

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Chapter 5: Sanitizing the Instrument Interior

5

Before you start a new process, Molecular Devices® recommends that you manually clean the QPix™ 420 Colony Picking System interior using 70% ethanol, and then do a **Sanitise** process and a **UV Sanitise** process. See Running a Sanitise Process on page 31 and Running a UV Sanitise Process on page 33.

For information on manually cleaning the instrument, see Cleaning the Instrument on page 233.

The **Sanitise** process uses a pre-defined **Sanitise** profile. You can create new **Sanitise** profiles and edit existing profiles to meet the needs of your applications. See Creating and Editing Sanitise Profiles on page 34.

Note: Molecular Devices recommends regular and thorough preparation and cleaning of the instrument to ensure that it continues to function correctly.

Running a Sanitise Process

The **Sanitise** process cleans and sanitizes the picking pins on the installed picking head. Before running a **Sanitise** process, Molecular Devices recommends that you manually clean the instrument interior. See Cleaning the Instrument on page 233.

1. From the **Navigation** window under **Utility Processes**, double-click the **Instrument Utilities** icon.
2. In the **Instrument Utilities** window, double-click the **Sanitise** icon.







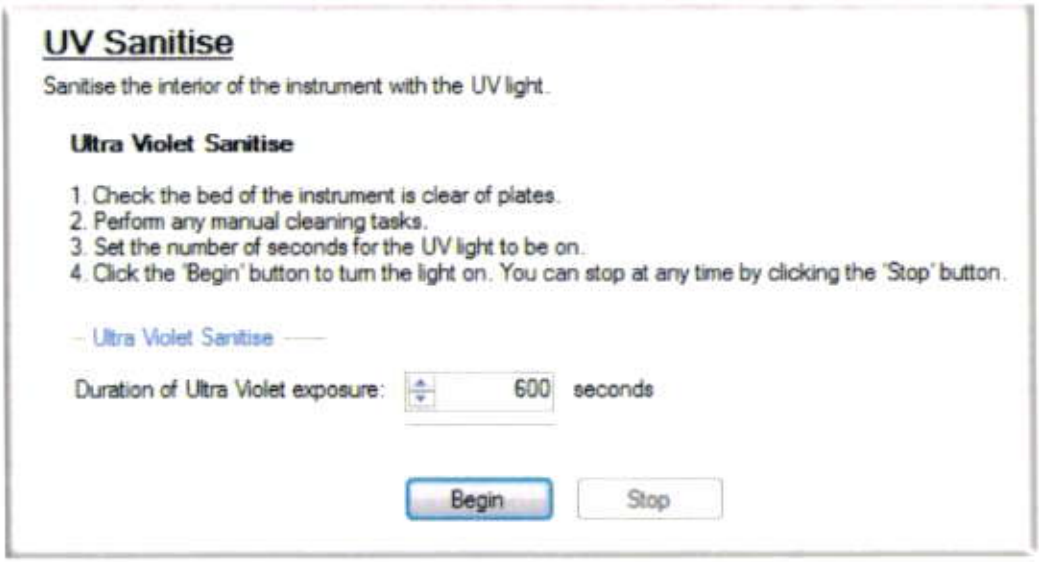

3. In the **Sanitise** window, select the head you are sanitizing from the **Select Head** list.
4. From the **Sanitise Profile**, select a pre-defined profile.
   If you want a different **Sanitise** profile than what is available in the list, close this process and create a new **Sanitise** profile. See Creating and Editing Sanitise Profiles on page 34.
5. Confirm the information provided for the **Sanitise** profile, that the locations and solutions of the wash baths match the wash cycles, and that the wash baths are filled with a suitable quantity of the required solutions. See Setting Up Wash Baths on page 28.
6. Confirm that the bed is clear and that the door is closed.
7. For the **Wash Speed**, click **Fast** or **Slow**.
8. Click **Wash** and wait for the wash cycles to complete.
9. Click **Next**.
10. In the **Instrument Utilities** window, click **Next**.

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Running a UV Sanitise Process

1.6. The **UV Sanitise** process uses ultra-violet light to sanitize the instrument interior. Before running a **UV Sanitise** process, Molecular Devices recommends that you manually clean the instrument interior. See Cleaning the Instrument on page 233.

1. From the **Navigation** window under **Utility Processes**, double-click the **Instrument Utilities** icon.
2. In the **Instrument Utilities** window, double-click the **UV Sanitise** icon.

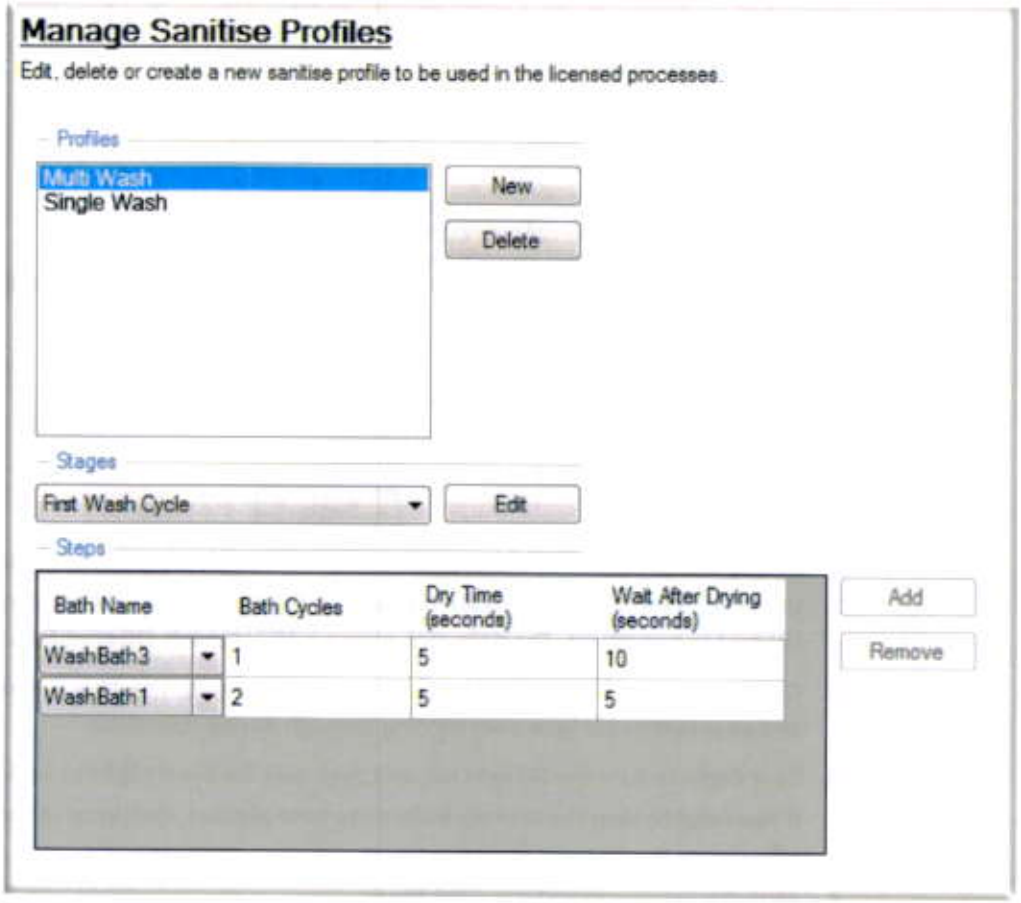


3. In the **UV Sanitise** window, select a **Sanitise Profile** type the duration in seconds for the UV light to remain on. The default duration is 600 seconds (10 minutes).
4. Confirm that the bed is clear and that the door is closed. The door is made from acrylic, and so prevents UV light from passing through during operation.
5. Click **Begin** to turn the UV light on, and then wait for the UV light to turn off.
   If you need to stop the process before the time allotted, click **Stop** to turn the UV light off.
6. After the process completes, click **Next**.
7. In the **Instrument Utilities** window, click **Next**.

Creating and Editing Sanitise Profiles

The QPix 420 Software comes with one default **Sanitise** profile. If this is the first time performing a routine, recommends that you open **Manage Sanitise Profiles** to edit the supplied default profile to suit your specific needs.

Sanitise profiles consists of two types of wash cycles: **Multi Stage** and **Single Stage**. Wash cycles can contain one or more wash-bath steps that can be created in the **Manage Sanitise Profiles** window.



Tip: You cannot edit **Sanitise** profiles when setting up a routine for a process, so while you are working in the **Manage Sanitise Profiles** window, it is worth creating a set of various profiles that you think you might need for future routines.

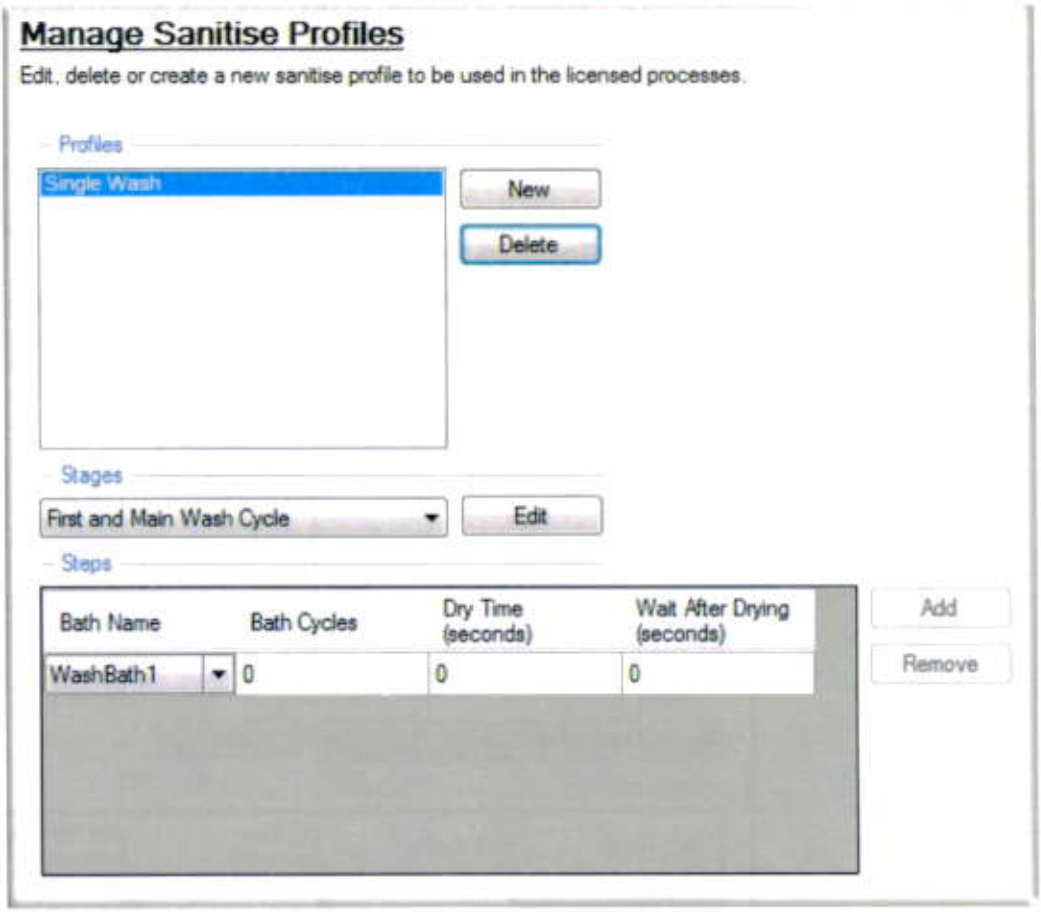
Creating a Sanitise Profile

In the **Manage Sanitise Profiles** window, you can create, edit, or delete a **Sanitise** profile.

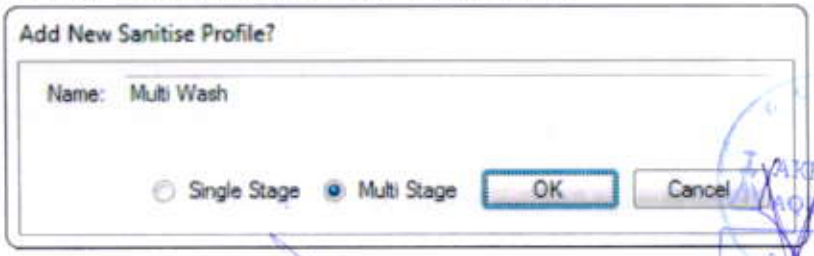
- To edit an existing profile, see Editing a Sanitise Profile on page 36.
- To delete a profile, see Deleting a Sanitise Profile on page 38.

To create a new **Sanitise** profile:

1. From the **Navigation** window under **Utility Processes**, double-click the **Manage Sanitise Profiles** icon.



2. In the **Manage Sanitise Profiles** window, click **New**.



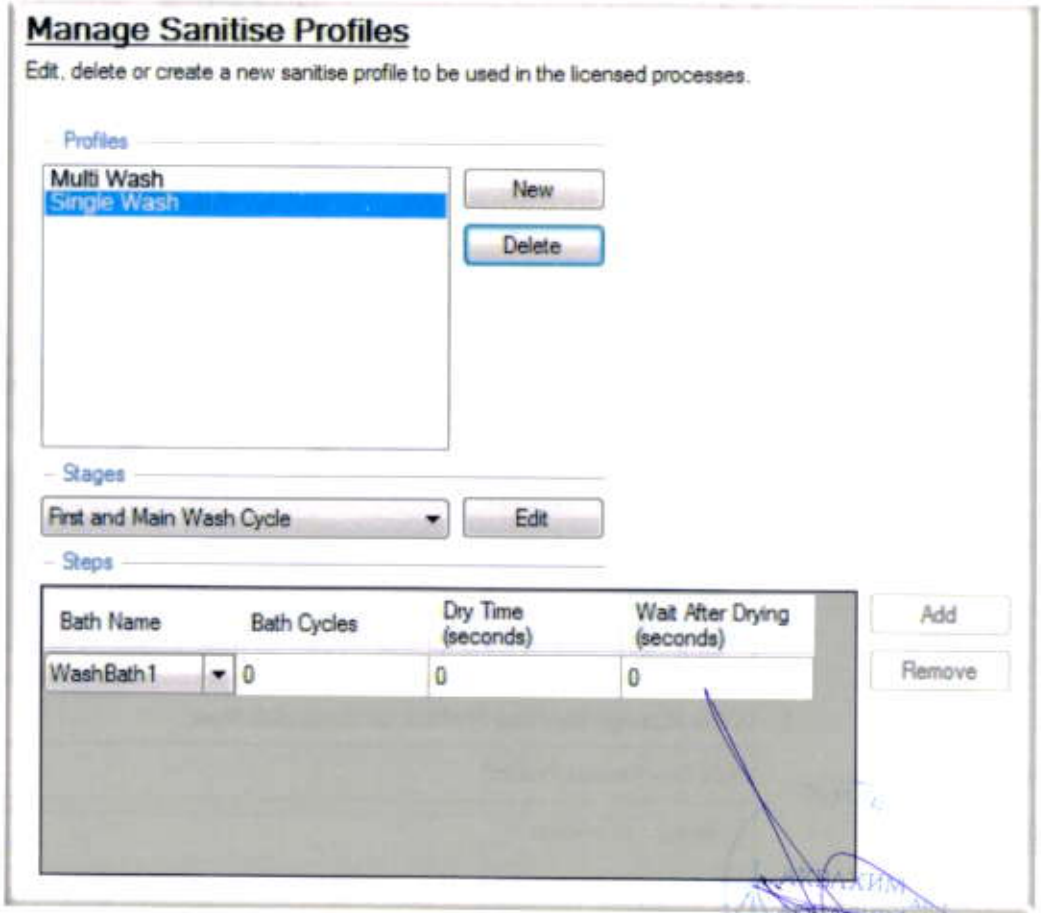
3. In the **Add Profile** dialog, in the **Name** field, type a short-descriptive name for the profile.
4. Select one of the following options for your wash profile.
   - Select **Single Stage** to use the same wash cycle before and during a routine.
   - Select **Multi Stage** to use different wash cycles before and during a routine.
5. Click **OK**.

The **Sanitise** profile is displayed in the **Profiles** table along with all other **Sanitise** profiles.

Although you have created a **Sanitise** profile, it needs a minimum of one wash-bath step to make it useful in a process or routine. To add wash-bath steps to the **Sanitise** profile, click **Edit**. See Editing a Sanitise Profile on page 36.

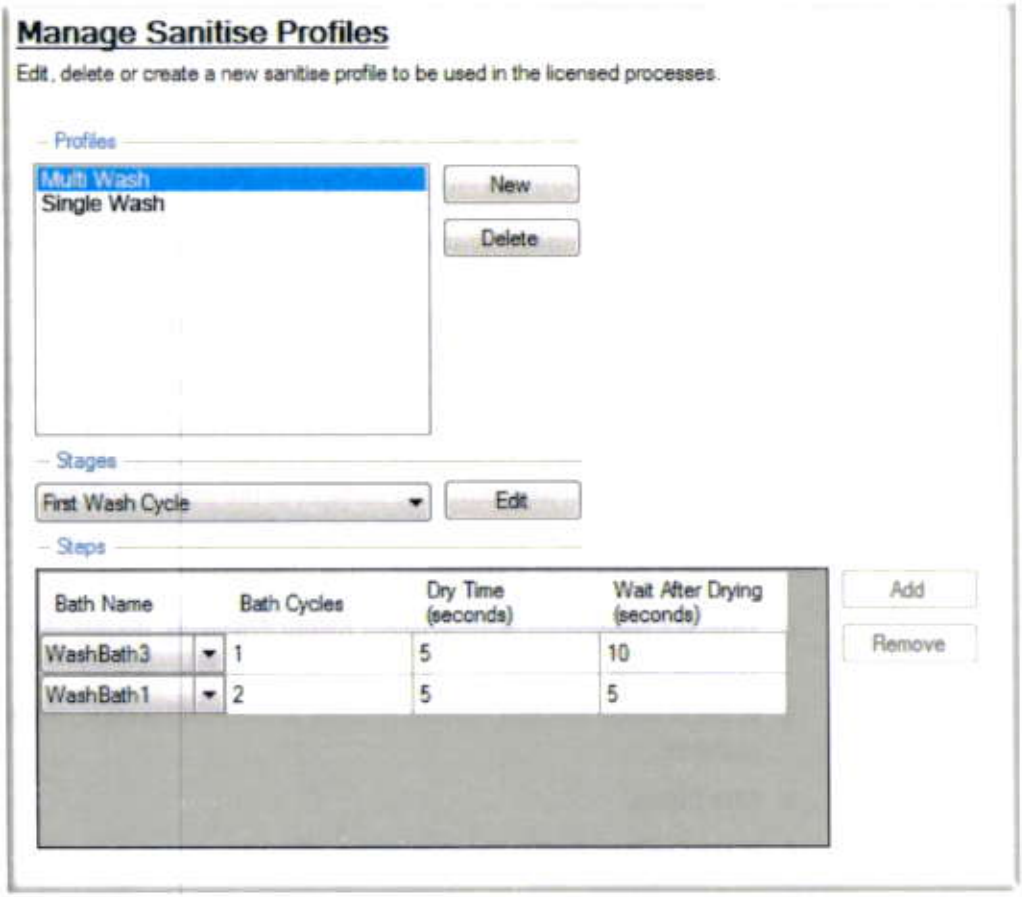
Editing a Sanitise Profile

1. From the **Navigation** window under **Utility Processes**, double-click the **Manage Sanitise Profiles** icon.



2. In the **Manage Sanitise Profiles** window, in the **Profiles** table, click the profile you want to edit.

- If the selected profile is a **Single Stage** profile, the **Stages** list displays **First and Main Wash Cycle**.
- If the selected profile is a **Multi Stage** profile, the **Stages** list includes **First Wash Cycle** and **Main Wash Cycle**.



3. From the **Stages** list, select the wash stage that you want to edit (if applicable), and then click **Edit**.

   In the **Steps** area, the **Add** and **Remove** button are available in **Edit** mode.

   - To add a new wash-bath step, click **Add** to add the new step to the end of the list.
   - To delete a wash-bath step, select the step and then click **Remove**.

4. From the **Bath Name** list, select the wash bath to be used for the step.
   - **WashBath1**: furthest from front
   - **WashBath2**: middle wash bath
   - **WashBath3**: closest to the front
5. From the **Bath Cycles** list, type the number of times to wash the picking pins for that step.

6. From the **Dry Time (seconds)** list, type the number of seconds to dry the pins with the halogen dryer.
7. From the **Wait After Drying (seconds)** list, type the number of seconds to wait before moving on to the next step, or ending the wash routine if this is the last step.
8. Continue to add or remove steps as required until you are satisfied with the wash stage.
9. Click **Save**.

> **Note:** If you are editing a **Multi Stage** profile, make sure that you define wash steps for both the **First Wash Cycle** and the **Main Wash Cycle**.

10. After you have finished editing and saving the wash-bath steps, click **Next** to return to the **Navigation** window.

The edited **Sanitise** profiles are available for all processes.

> **Note:** Before running a process that uses the wash baths, make sure that you verify the locations and solutions of the wash baths and also the wash cycles that are required for their use. Always top off your wash baths with their defined cleaning fluids and then wipe down the surfaces of the instrument interior.

Deleting a Sanitise Profile

1. From the **Navigation** window under **Utility Processes**, double-click the **Manage Sanitise Profiles** icon.
2. In the **Manage Sanitise Profiles** window, in the **Profiles** table, click the profile you want to delete.
3. Click **Delete**.
4. In the **Confirm Profile Deletion** dialog, click **Yes**.
5. Click **Next** to return to the **Navigation** window.

Chapter 6: Picking Processes

6

The QPix™ 420 Colony Picking System is capable of picking colonies from receptacles using either standard picking or regional picking. You can also set up control wells for the destination microplates before running a picking process.

The following options are available in the **Navigation** window under **Picking Processes**:

- **Picking** picks colonies from receptacles using the standard process described in this chapter.
- **Blue-White Picking** picks blue or white colonies from receptacles using the standard process. See Blue-White Picking Processes on page 63.
- **Zone of Inhibition Detection Picking** picks colonies with detectable zones of inhibition from receptacles using the standard process. See Zone of Inhibition Detection Picking Processes on page 85.
- **Regional Picking** picks colonies from receptacles using the regional process. See Regional Picking Processes on page 107.
- **Blue-White Regional Picking** picks blue or white colonies from receptacles using the regional process. See Blue-White Regional Picking Processes on page 133.
- **Control Plate Creation** creates a batch of microplates containing specified control samples. These can be created by picking colonies from specified source receptacles into specified destination wells. See Control Plate Creation Processes on page 157.
- **Create New Regional Tray** adds new microplate source definitions to the regional picking plate type database, which can then be selected for use in the regional picking process. See Create New Regional Tray Processes on page 177.

Note: Before running a picking process, it is important that you do the cleaning and set up procedures in Preparing to Run a Process on page 27.

If this is your first picking process, you must edit or create a **Sanitise** profile to use with the picking process. See Creating and Editing Sanitise Profiles on page 34.

Depending on the features of your system, you can use either white light or fluorescence imaging for the picking processes. If you have a white light only system and would like to add fluorescence capability, contact your Molecular Devices representative or technical support. See Obtaining Support on page 248.

Note: If you have a fluorescence imaging module on your system and run a picking process that uses white light only, the process takes longer than a white light picking process on a white light only system, since the fluorescence imaging module captures more images during the process.

Creating and Editing a Picking Process

The procedures for creating and editing standard or regional picking processes are very similar. The regional picking process has more options available for defining the regions for picking.

If this is your first picking process, you must edit or create a **Sanitise** profile to use with the picking process. See Creating and Editing Sanitise Profiles on page 34.

Creating and editing a picking process involves the following procedures:

- Opening the Picking Window on page 40
- Selecting a Picking Routine on page 41
- Selecting Barcode Options and Filter Pairs for Fluorescent Imaging on page 42
- Setting Destination Microplate Options on page 44
- Selecting the Head and Sanitizing Options on page 45
- Setting Source Receptacle Options on page 46
- Viewing the Settings Summary on page 46
- Changing the Picking Head on page 46

After creating the routine, you can close the process and run it at a later time, or you can run it immediately.

Note: Some steps that are included in these procedures might not be available to you, depending on the features included with your instrument and license. Optional features are identified within the procedures when applicable.

Opening the Picking Window

1. From the **Navigation** window under **Picking Processes**, double-click the **Picking** icon.
2. In the **Picking** window, click **Picking Type** to view the picking type options, if applicable.
   - Select **White Light** to use only white light to illuminate and identify the colonies to pick.
   - Select **White Light And Fluorescent** to use white light to illuminate and identify colonies, and fluorescent light for determining the desired colonies to pick. This option is available only for instruments with a fluorescence imaging module.
3. Click **Apply**.
4. Click **Start**.

The system "homes" the drives, and then displays the **Routines** window. See Selecting a Picking Routine on page 41.

Selecting a Picking Routine

1. In the **Routines** window, select to create a new routine from scratch or to edit an existing routine.
   - To create a new routine from scratch, click **New Routine**.
   - To edit an existing routine, click **Run Existing Routine** and then select the name of the routine from the **Select Routine** list.

     If you want to run the selected routine without making changes, select the **Skip Steps** check box.
2. Click **Next** to go to the next step.
   - If you selected to create a new routine from scratch or to edit an existing routine, see Selecting Barcode Options and Filter Pairs for Fluorescent Imaging on page 42.
   - If you selected the **Skip Steps** check box to run the selected routine without making changes, see Viewing the Settings Summary on page 46.

Note: You can import, export, and delete routines in the **Routines** window. See Adding and Removing Picking Routines on page 41.

Adding and Removing Picking Routines

The **Select Routine** list contains the related routines that are in the database. Only routines that match the type of routine that you are creating are included in the list. For example, a white light and fluorescent imaging routine is not included in the **Select Routine** list if you are creating a White Light only routine.

If you have a saved routine from a different computer, you can import the routine. You can also export a routine from the database so that it can be imported into the database on a different computer. If you no longer need a routine, you can permanently delete it from the database.

Importing a Routine

Before you can import a routine, you need to export the routine from the other computer in .xml format and then save the export file on the system computer.

To import the .xml file, click **Import** and then locate and select the file. Click **Import** to add the routine to the database. If the routine is of the same type as the one you are creating, then the imported routine is displayed in the **Select Routine** list.

Exporting a Routine

To export a routine, click **Export** and then navigate to the location that you want to save the .xml file. You can change the name of the file, if desired. Click **Export** to save the routine in .xml format.

Deleting a Routine

Molecular Devices recommends that you export the routine before deleting it. This lets you import the routine at a later time if desired.

To delete a routine, select the routine in the **Select Routine** list and then click **Delete**. In the **Delete Routine** dialog, click **OK** to permanently remove the routine from the database.

Selecting Barcode Options and Filter Pairs for Fluorescent Imaging

If you are creating or editing a routine for white light only, the **Barcodes** window is displayed.

If you are creating or editing a routine for white light and fluorescent imaging, the **Barcodes And Filter Pair** window is displayed. This option is available only for instruments with a fluorescence imaging module.

Selecting a Filter Pair

Select a fluorescent excitation and emission pair from the **Filter Pair** list. This option is available only for instruments with a fluorescence imaging module.

Using a Barcode Reader

Note: Molecular Devices recommends that you always use barcodes for accurate data tracking.

1. Select the **Use Barcode Reader** check box to scan source and destination receptacles for barcodes.

   To define unique identifiers for source receptacles without scanning for barcodes, see Defining Unique Identifiers Without Barcodes on page 43.

2. Click a **Read Failure Option** to define the system response when a barcode cannot be read correctly.

   - Click **Manual Prompt** to open a dialog where you can type a barcode or name for the receptacle.
   - Click **Skip Receptacle** to ignore the receptacle and scan the next receptacle for a barcode.

     Note: If the system fails to identify a barcode for the source receptacle, the routine ends, since the source requires a valid barcode.

   - Click **Auto Generate** to allow the system to automatically assign a valid random barcode and continue the routine.

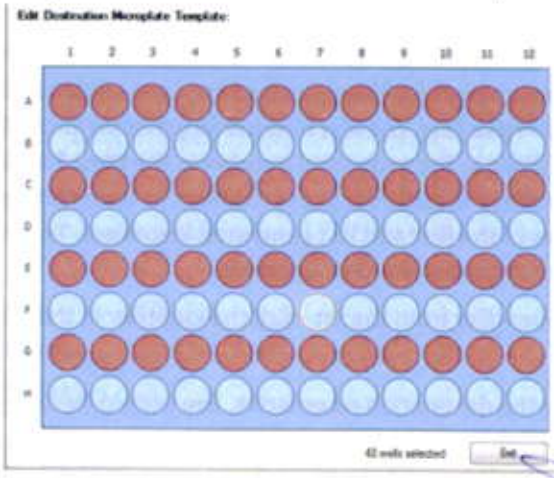
3. Optionally, use the **Validation Barcode** list to define all the valid barcodes for source receptacles. If the scanned barcode on a source receptacle cannot be found in the list, an error message is displayed.
   - To manually enter valid barcodes, type each barcode in the field below the list and then click **Insert**.
   - To import valid barcodes from a text or .csv file, click **Import** and then select the file from which to import the barcodes.
   - To use the valid barcodes in the database, click **From Database**.
   - To remove a barcode from the list, click the barcode in the list and then click **Remove**.
4. Click **Next** to define the destination receptacles. See Setting Destination Microplate Options on page 44.

Defining Unique Identifiers Without Barcodes

1. Clear the **Use Barcode Reader** check box to define unique identifiers for source receptacles without scanning for barcodes.
   To scan source and destination receptacles for barcodes, see Using a Barcode Reader on page 42.
2. Select the method for defining the unique identifiers.
   - To have the software generate random identifiers with the prefix **Auto** for the source receptacles, select the **Generate Random Barcodes** check box . No other parameters are required for this option.
   - To manually define identifiers for the source receptacles, type each identifier in the field below the **Barcode** list and then click **Insert**.
   - To import identifiers for the source receptacles from a text or .csv file, click **Import** and then select the file from which to import the identifiers.
   - To generate a defined list of identifiers for the source receptacles, click **Generate List**.
     To define the parameters for the generated list, type static text for the start of the identifier in the **Prefix** field, the first number to generate in the **Start Number** field, the number of digits in the generated number in the **Digit Padding** field, and the number of identifiers to generate in the **Number to Generate** field. The **Preview** area shows examples of the first and last generated identifiers. To view the generated identifiers in the **Barcodes** list, click **Generate**.
   - To remove an identifier from the list, click the identifier in the list and then click **Remove**.
3. Click **Next** to define the destination receptacles. See Setting Destination Microplate Options on page 44.

Setting Destination Microplate Options

1. In the **Destination Options** window, from the **Select Destination Microplate** list, select the microplate type to be inoculated with the picked colonies. If the microplate type that you need is not listed, contact Molecular Devices to add a new microplate type to the list. See Obtaining Support on page 248.
2. Select either to dip the pins a specified number of times or to stir the wells of the destination microplate during inoculation.
   - To dip the pins a specified number of times, click **Multi Dip** and in the **Number of Dips** field, type the number of times to dip the pins (maximum 5 dips).
   - To stir the wells, click **Stir Destination**.
3. Optionally, select the **Make Copy** check box and from the **Select Copy Microplate** list select the microplate type to use for a duplicate copy of the destination microplate.
4. Select the **Deposit Order** to deposit the picked colonies **By Columns** or **By Rows**.
5. Define the **Deposit Strategy**.
   - Click **Fill All Microplates** to fill every selected well of a destination microplate before starting a new destination microplate.
   - Click **New Microplate For Each Position** to start a new destination microplate whenever the instrument starts picking from a different source QTray or Petri dish.
   - Click **New Microplate For Each Batch** to start a new destination microplate whenever the instrument deck is loaded with new QTrays, OmniTrays, or other source microplates.
6. Optionally, under **Destination Microplate Template**, click **Edit** to define the wells to dip or skip. You can skip wells that you want to use as blank or control wells. The defined template is used for all the destination microplates during the picking routine.



- To skip a well, click the well. Wells to be skipped show in light blue.
- To skip multiple contiguous wells, right-click and drag across the wells.
- To dip a well that you selected to skip, click the well again. Wells to be dipped show in light red.

After defining the wells to dip or skip, click **Exit**.

7. Click **Next** to define the picking head and the **Sanitise** profile. See Selecting the Head and Sanitizing Options on page 45.

Selecting the Head and Sanitizing Options

1. In the **Head** and **Sanitise** window, from the **Picking Head** list, select the head to use for the picking routine.
2. From the **Pin Columns (Rows) Before Inoculation** list, select the number of pins to use for picking in each column or row before transferring the picked colonies to the destination microplate.

   For the fastest transfer rate, select **All** to use all available picking pins to pick colonies before inoculating the destination microplate.

   For smaller picking groups, the available selections depends on the **Deposit Order** selection made in the **Destination Options** window.

   - If you selected **By Columns**, you can pick colonies using from **1** to **11** columns.
   - If you selected **By Rows**, you can pick colonies using from **1** to **7** rows.

   To run the wash routine from the **Sanitise** profile after each partial pick and inoculation, select the **Wash between Partial Inoculation** check box. Deselect this check box to wait until all pins have been used for picking and inoculation before running the wash routine.
3. In the **Destination** field, type a value for the distance in millimeters above the bottom of the destination microplate wells to dip the pins for the inoculation.

   If you selected **Make Copy** for the destination microplate, type a value for the copy.
4. From the **Sanitise Profile** list, select the **Sanitise** profile to use for the picking routine.

   If the available profiles are not suitable for the picking routine, exit the picking process and create a new **Sanitise** profile. See Creating and Editing Sanitise Profiles on page 34.
5. Click **Next** to define options for the source receptacle. See Setting Source Receptacle Options on page 46.

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Setting Source Receptacle Options

1. In the **Source** window, from the **Holder** list, select the type of holder used to hold the source receptacles on the instrument deck.
2. From the **Receptacle** list select the type of receptacle used for the source. Only the receptacles applicable for the selected holder are displayed in this list.
   The preview image displays a representation of the selected holder and receptacle.
3. In the **Positions** field, type the number of receptacles to use for picking.
4. In the **Offset** field, type the position of the first receptacle to be used for picking.
   The preview image displays the defined locations of the receptacles.

   Note: If you are using Validation barcodes, only one source receptacle shows, and the **Positions** and **Offset** fields are not available.

5. In the **Picking Depth Into Agar (mm)** field, type a value in millimeters to define the depth that the pins are to be inserted in the agar for picking.
6. Optionally, select the **Limit Max. Number Of Features Per Position** check box and then in the **Max. Number Of Features Per Position** field, type a value for the maximum number of colonies that can be picked from a single QTray or Petri dish.

   Note: Setting a limit for the maximum number of colonies in the **Source** window prevents selecting a maximum number in the **Feature Selection** window when running the picking routine. See Selecting Colonies for Picking on page 54.

7. Click **Next** to view a summary of the settings. See Viewing the Settings Summary on page 46.

Viewing the Settings Summary

The **Settings Summary** window contains a full summary of the picking routine settings you just configured.

Review the summary details to make sure that the settings and options are configured correctly for the picking routine. If you need to make changes, click **Back** until you return to the window where the changes can be made.

To print the summary, click **Print**.

Click **Next** to change the head, as needed. See Changing the Picking Head on page 46.

Changing the Picking Head

The **Change Head** window reminds you which picking head should be loaded, based on the **Setting Summary** routine you just configured, and provides you an opportunity to change the head if needed.

The head is housed in a unique actuator system that permits easy exchange and set-up of the head.

Although it is possible to manually move the actuator assembly, Molecular Devices recommends using the software to safely move the actuator into position to remove or install the head.

WARNING! PINCH HAZARD. The actuator assembly has moving parts that can cause pinch injuries if it is moved manually. To prevent pinch injuries, use the software Change Head process to safely move the actuator.

To change the picking head:

1. Click **Move to Load Position** to move the picking head arm to the loading position.
2. When the warning message is displayed, make sure that the bed is clear of obstructions and that the door is closed, and then click **OK** to move the actuator into position near the front of the instrument.
3. Open the front door.
4. Install the specified picking head.
   - To remove an installed head, unscrew and remove the thumbscrew and washer on the left that secures the head to the actuator assembly. Then, grab the handle on the right and slide the head out of the actuator.

     Before storing the head, or whenever it needs cleaning, wipe the exterior of the head with a cloth using 70% ethanol. To store the head, slide it into its metal cover with the pins facing inward and then secure it in place with the thumbscrew and washer.
   - To install a head, hold the head by its handle with the pins pointing down and then slide the head into the actuator assembly from the right. Then, attach the thumbscrew and washer on the left and hand tighten the thumbscrew to secure the head to the actuator.
5. Close the front door.
6. Click **Move to Park Position** to move the picking head arm to the run ready park position.
7. When the warning message is displayed, make sure that the bed is clear of obstructions and that the door is closed, and then click **OK** to home the actuator to its starting position.
8. To run the picking routine, click **Next**. See Running a Picking Process on page 48.

Running a Picking Process

After a picking routine has been configured, you can run the process on the instrument. If you have not configured the picking routine you want to run, you must create a new picking routine or edit an existing routine. See Creating and Editing a Picking Process on page 40.

Note: Before running a picking process, it is important that you do the cleaning and set up procedures in Preparing to Run a Process on page 27.

Some steps that are included in these procedures might not be available to you, depending on the features included with your instrument and license. Optional features are identified within the procedures when applicable.

To run a configured picking routine:

1. Open the **Picking** window. See Opening the Picking Window on page 40.
2. Select the picking routine you want to run. See Selecting a Picking Routine on page 41. If you do not need to make changes to the selected routine, select the **Skip Steps** check box before clicking **Next**.
3. Review the configured settings for the routine. See Viewing the Settings Summary on page 46.
4. In the **Settings Summary** window, click **Next** to arrange the source microplates in the instrument. See Arranging the Microplate Layout on page 49.

Arranging the Microplate Layout

1. Open the instrument door.
2. In the **Holder Layout Summary** window, follow the instructions to correctly arrange the microplate holders in the instrument. The layout is defined by the selections you made in earlier steps.
3. Select the **Checked?** check box to confirm the microplate holder layout.
4. Click **Next**.
5. Remove all microplate lids.
6. In the **Load Plates** window, follow the instructions to correctly place the destination microplates.
7. Select the **Checked?** check box to confirm the destination microplate layout.
8. Click **Next**.
9. After the **Please Load Source** window is displayed, load the source receptacles in the correct locations on the instrument deck.
10. Close the instrument door.
11. Click **Next** to take a white light test image of the source receptacles. See Adjusting the White Light Test Image on page 50.

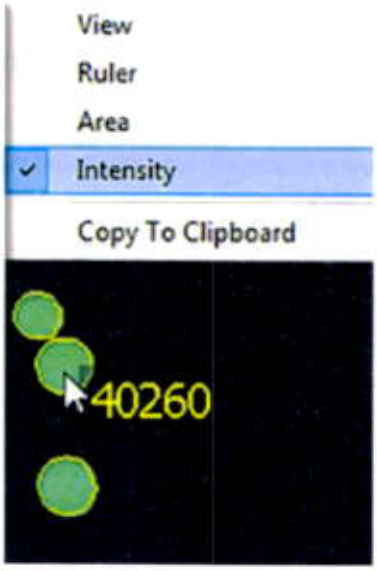


Adjusting the White Light Test Image

In the **Test Image** window, all detected features are viewed as potential colonies to pick. To make sure that only colonies are detected, adjust the test image in this window using the **Exposure** and **Gain** settings, the **Detection** settings, the **Display** settings, the **Debris** settings, and the **Depth** settings. Each detected feature is displayed within a yellow ring.

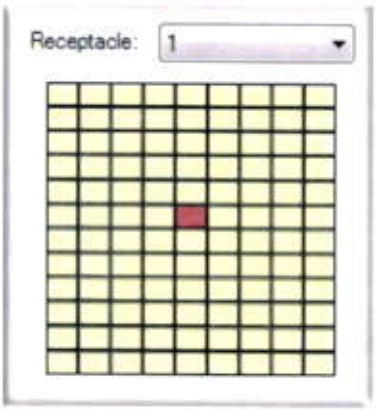
To view the pixel intensity values in the image map to manually set a detection threshold or detect areas of saturation within the image:

1. Right-click over the image map and select **Intensity**.
2. Move the cursor over the area of interest in the image map. The pixel intensity value automatically is displayed.



To adjust the test image:

1. From the **Receptacle** list, select the number of the receptacle to view and then click the frame that you want view in the receptacle image below the list. The selected frame is in red.



2. Under **Acquisition** adjust the **Exposure** and **Gain** settings.
   - In the **Exposure (ms)** field, type the number of milliseconds (from 10 to 1000) to expose the sample to light when acquiring the image.
   - Adjust the **Gain** to increase the image signal without changing the light exposure.

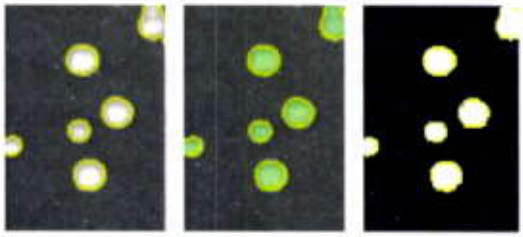
   After making adjustments to the **Exposure** or **Gain** settings, click **Grab Image** to apply the new settings to the test image.
3. Click the **Detection** tab.
4. Select the **Use Auto Thresholding** check box to have the software automatically detect the colonies in the image.

   To manually detect the colonies, clear this check box and drag the slider until all the desired colonies are detected and the background is not.
5. Select the **Auto Threshold Each Frame** check box to process each frame with its own uniquely calculated value.

   To process the frames using an average value calculated from the entire image, deselect this check box.
6. With the **Auto Threshold Each Frame** check box selected, optionally type threshold values in the **Low Limit** and **High Limit** fields.
   - To determine the **Low Limit** value, clear the **Use Auto Thresholding** check box and then drag the slider to the left until some background is clearly detected. Select the **Use Auto Thresholding** check box and the **Auto Threshold Each Frame** check box again and then type the value from the **Threshold** field into the **Low Limit** field.
   - To determine the **High Limit** value, clear the **Use Auto Thresholding** check box and then drag the slider to the right until some colonies start to become undetected. Select the **Use Auto Thresholding** check box and the **Auto Threshold Each Frame** check box again and then type the value from the **Threshold** field into the **High Limit** field.
7. Select the **Invert Image** check box to make dark areas bright and bright areas dark.

   Tip: This is most useful when imaging plaques.
8. Select the **Subtract Background** check box to have the background become nearly black.
9. Click the **Display** tab.
10. Select the method for viewing the detected colonies in the image.
    - Click **Image Only** to display the detected colonies in white with yellow rings and a gray background. The yellow ring shows the colony detection.
    - Click **Image and Overlay** to display the detected colonies in green with yellow rings and a gray background. The green shows the threshold overlay.

- Click **Overlay only** to display the detected colonies in white with yellow rings and a black background.



To remove the yellow ring from the detected colonies, deselect the **Outline Detected Features** check box.

11. Click the **Debris** tab.
12. Adjust the **Diameter** and **Axis Ratio** to exclude objects that are smaller than the desired colonies. Each detected feature is displayed within a yellow ring while excluded features do not have a yellow ring.
    - In the **Diameter (mm)** field type a value in millimeters for the minimum diameter of the desired colonies.
    - In the **Axis Ratio** field, define the minimum roundness ratio of the desire colonies.
13. Click the **Depth** tab.
14. Adjust the Agar **Depth** manually, as needed.
    - In the **Agar Depth (mm)** field, type a value in millimeters for the depth that the picking head descends into the source agar.
    - The **Agar Height (mm)** field is read only and displays the height, or thickness, of the detected agar within the source tray.
    - The **Max. Agar Height (mm)** field is read only and displays the .maximum agar height for a long pin head to descend into the source agar

> **Note:** Further refinement for colony detection can be done on a higher-resolution image in the **Feature Selection** window. See Selecting Colonies for Picking on page 54.

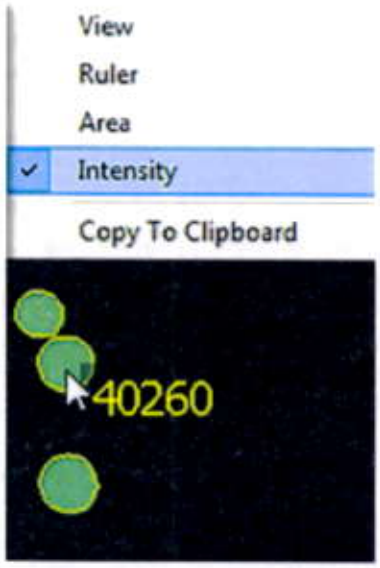
15. Click **Next** to go to the next step.
    - If you are running a routine for white light only, the system captures and processes a higher-resolution image and then displays the **Feature Selection** window. See Selecting Colonies for Picking on page 54.
    - If you are running a routine for white light and fluorescent imaging, the **Fluorescent Test Image** window is displayed. See Adjusting the Fluorescent Test Image on page 53.

Adjusting the Fluorescent Test Image

If you are running a routine for white light and fluorescent imaging, the **Fluorescent Test Image** window is displayed after making adjustments for the white light test image. This option is available only for instruments with a fluorescence imaging module.

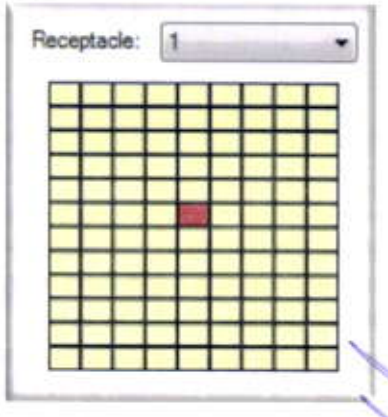
To view the pixel intensity values in the image map to manually set a detection threshold or detect areas of saturation within the image:

1. Right-click over the image map and select **Intensity**.
2. Move the cursor over the area of interest in the image map. The pixel intensity value automatically is displayed.



To adjust the test image:

1. From the **Receptacle** list, select the number of the receptacle to view and then click the frame that you want view in the receptacle image below the list. The selected frame is in red.

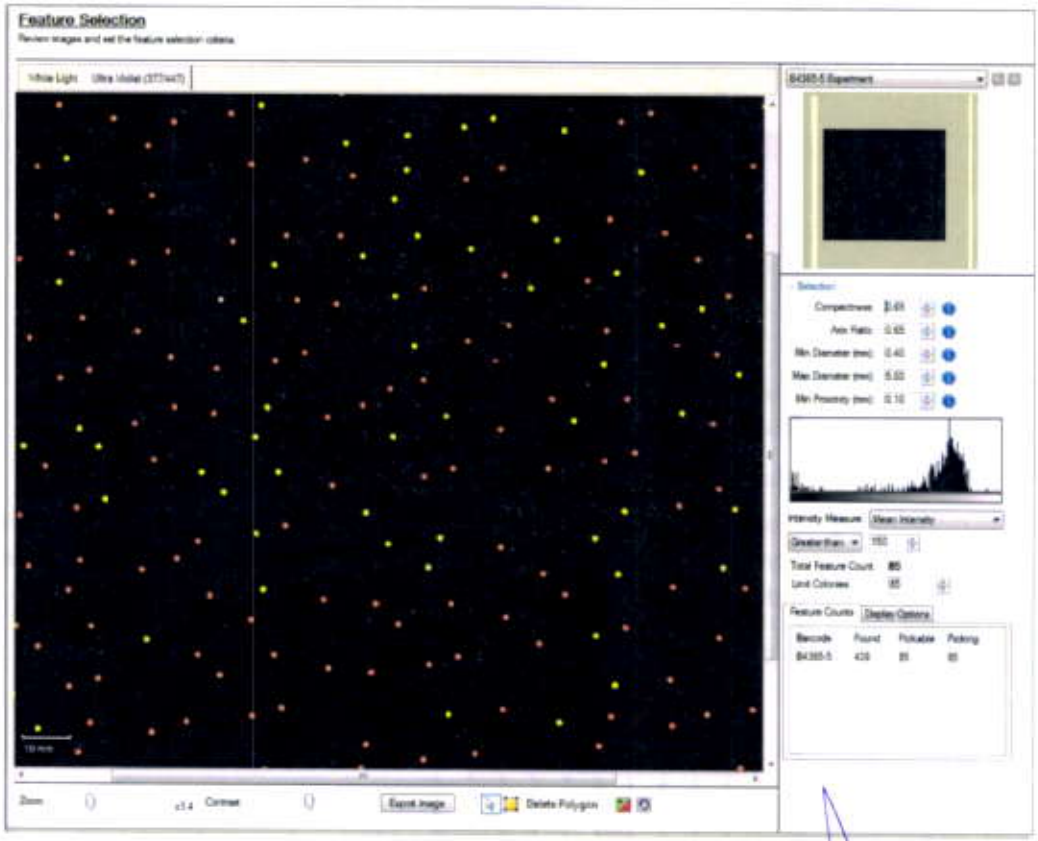


2. Under **Acquisition** adjust the **Exposure** and **Gain** settings.
   - In the **Exposure (ms)** field, type the number of milliseconds (from 10 to 1000) to expose the sample to light when acquiring the image.
   - Adjust the **Gain** to increase the image signal without changing the light exposure.

   After making adjustments to the **Exposure** or **Gain** settings, click **Grab Image** to take a new test image with the new settings.
3. Click **Next** to capture and process a higher-resolution image and then open the **Feature Selection** window. See Selecting Colonies for Picking on page 54.

Selecting Colonies for Picking

After adjusting and refining test images, the system captures and processes a higher-resolution image using the test-image adjustments and then displays the **Feature Selection** window.



In the **Feature Selection** window, pickable objects show in yellow and unpickable object show in red. A colony can be considered unpickable if it is too close to the edge of the receptacle or it does not match the selection criteria.

To view the details of a displayed colony, hold the mouse pointer over that colony to display the properties of that colony. If a colony has not been selected as pickable, the reason for the exclusion shows in red text.



Note: During image processing, each object without a yellow ring in the test image is automatically excluded from becoming a pickable object.

Drag the **Zoom** slider below the image to get a closer look at the image, and drag the **Contrast** slider to change the contrast between the objects and the background.

To save the image in .bmp, .jpg, or .png format, click **Export Image**.

To select a smaller region of interest (ROI) in the image, draw a polygon around the region.

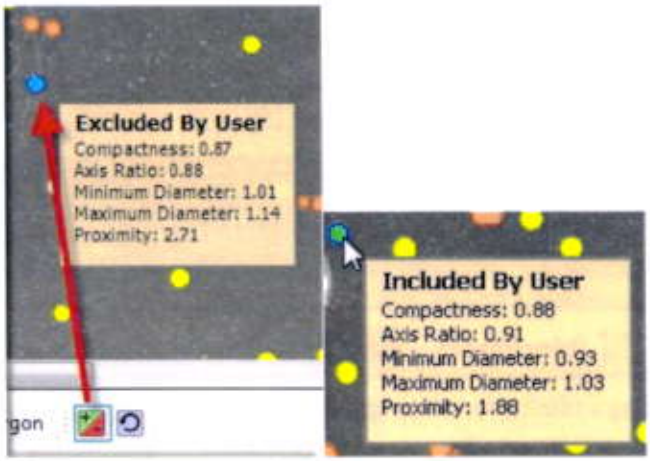


- To draw a polygon, click the **Draw Polygon** icon and then click on the image to define the corners of the polygon.
- To resize the polygon, drag the blue boxes on its corners.
- To remove the polygon, click **Delete Polygon**.

When you draw a polygon on the image, the system detects and picks colonies only from within the defined region of interest.

To change the selection of the system-chosen pickable objects that are displayed in the image map:

1. Click the **+/-** user selection button to override the system-chosen and unchosen objects.
2. Click the objects in the image map that you want to change.



- When clicked on as an override, the yellow-marked pickable objects change to blue and become unpickable.

  To undo your individual selection, right-click over the image map and select **Pick Item**. The object changes to green and becomes pickable.

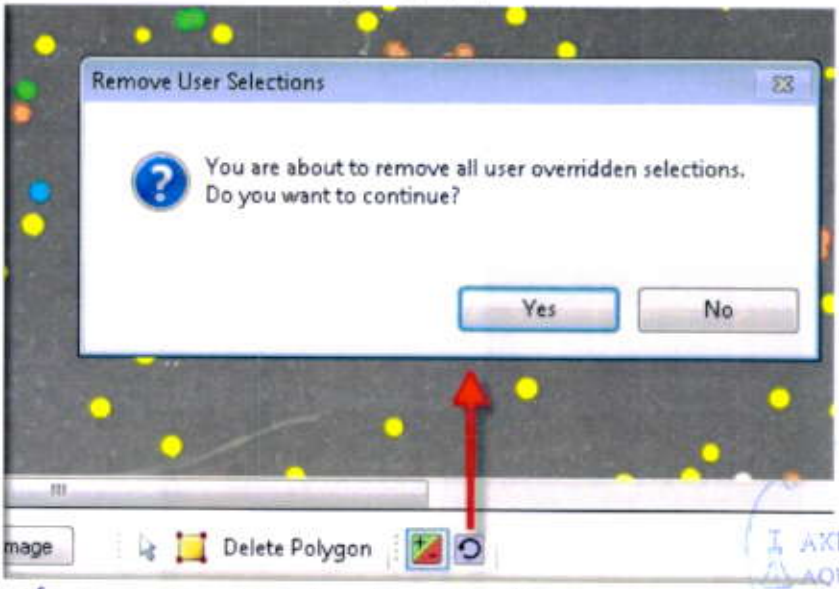


- When clicked on as an override, the red-marked unpickable objects change to green and become pickable.

  To undo your individual selection, right-click over the image map and select **Discard Item**. The object changes to blue and becomes unpickable.



To undo all of your user selections, click the remove user selections button, and when the **Remove User Selections** dialog is displayed, click **Yes**.



If you are running a routine for white light and fluorescent imaging, two tabs are available.

- The **White Light** tab displays the image taken with white light.
- The other tab is labeled with the selected fluorescent filter pair and displays the image taken with fluorescent light.

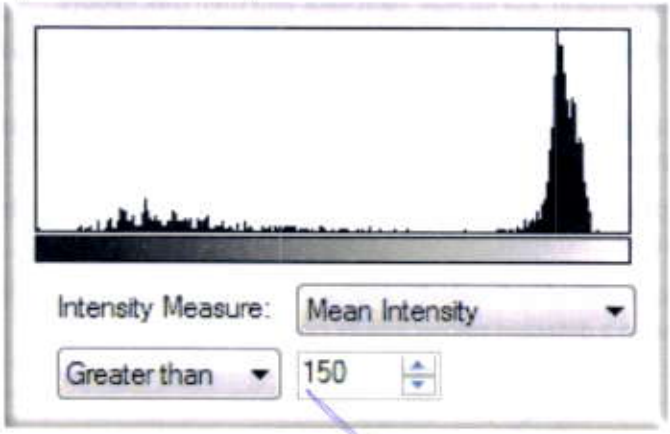
Switch between the two images to define the pickable colonies. This option is available only for instruments with a fluorescence imaging module.

To select the colonies for picking:

1. From the list in the upper-right, select the barcode or identifier of the receptacle to view.
2. Refine the colony **Selection** criteria.
   - **Compactness** sets the level of irregularity for picking colonies. The value is a ratio of the perimeter divided by the area of the colony, so that irregular shaped colonies are closer to 0 and colonies that are more of a perfect circle are closer to 1. A colony equal to or less than 0.65 is not picked by default.
   - **Axis Ratio** measures how oval the colony is. The value is a ratio of the longest diameter divided by the shortest diameter, so oval shaped colonies is closer to 0 and round colonies is closer to 1. A colony equal to or less than 0.65 is not picked by default.
   - **Min Diameter (mm)** sets the minimum diameter of colonies for picking. A colony equal to or less than the value in this field is not picked.

     Note: The **Min Diameter (mm)** cannot be lower than the **Diameter** value set in the **Debris Discard** section of the test image.

   - **Max Diameter (mm)** sets the maximum diameter of colonies for picking. A colony equal to or greater than the value in this field is not picked.
   - **Min Proximity (mm)** sets the distance between colonies to be picked, so that when picking one colony, a different adjacent colony is not picked. The system default value is 0.45 mm.
3. For a fluorescent image, adjust the **Intensity Measure** as shown in the histogram. This option is available only for instruments with a fluorescence imaging module.



- **Mean Intensity** is the average fluorescence of the detected colony (the fluorescence of all the pixels within the colony perimeter divided by the number of pixels within the colony perimeter).
- **Median Intensity** is the middle fluorescence value of all the pixels within the detected colony perimeter.
- **Geometric Intensity** is the geometric intensity of the detected colony or the fluorescence of all the pixels within the colony perimeter.
- **Centre Mean Intensity** is the average fluorescence value of the middle 9 pixels within the detected colony perimeter.

Select **Greater than**, **Less than**, or **Between** and then type a value in the field to define the fluorescence intensity threshold. For **Between**, type two values to define the range.

4. As required, manually change the pickable property of individual objects.
   - To define an object as pickable, right click the object and then click **Pick Item** to display the object in green.
   - To define an object as unpickable, right click the object and then click **Discard Item** to display the object in blue.
5. Optionally, in the **Limit Colonies** field, type the maximum number of colonies to pick from each receptacle.

   Note: If a limit was previously set for the maximum number of colonies in the **Source** window, the Limit Colonies option is not available in the **Feature Selection** window. See Setting Source Receptacle Options on page 46.

   The **Total Feature Count** field displays the total number of pickable objects in the receptacle.
6. Click the **Feature Counts** tab to view the number of found features in a source receptacle. The barcode or identifier for the source receptacle is displayed, along with the number of found colonies and the number of colonies to pick as determined by the selection criteria.

   To save the data in .csv format, right-click and then click **Export**.
7. Click the **Display Options** tab to change the display options of the source receptacle image.

   Select the **Display Detected Features** check box to display all detected features with a yellow circle.
   - Select the **Shade Features** check box to give the detected colonies some shading for clearer visualization.
   - Select the **Display Proximity Indicators** check box to display connecting red lines between a detected colony and its closest neighbor.

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Select the **Shade Exclusion Zone** check box to display a red-shaded exclusion zone where the system cannot pick.

8. After you are satisfied with the feature selection criteria, click **Next**.
9. In the **Continue Or Save New Routine** dialog or the **Save Changes To Routine** dialog, select whether or not to save the routine before continuing with the picking process.

   If you are creating a new routine from scratch, the **Continue Or Save New Routine** dialog is displayed.

   - To save the settings for the routine before continuing, click **Save Routine**, type a **Name** and a short **Description** for the routine, and then click **Save**.
   - To continue without saving the settings for the routine, click **Routine Without Saving** and then click **OK**.

   If you are editing an existing routine, the **Save Changes To Routine** dialog is displayed.

   - To save the settings for the routine before continuing, click **Save**.
   - To save the settings as a new routine without changing the existing routine, click **Save As**, type a **Name** and a short **Description** for the routine, and then click **Save**.
   - To continue without saving the settings for the routine, click **No**.
10. Make sure that the instrument door is closed.
11. Click **OK** to start the picking process. See Viewing the Picking Progress on page 60.





Viewing the Picking Progress

While the picking routine is running, the **Picking Progress** window displays a summary of the routine.

- **Start Time** shows the time the picking of the colonies began.
- **Source Barcode** shows the barcode or identifier of the source receptacle being picked from.
- **Pin** is the picking pin being used for the current picking operation.
- **Copy Plate No** is the barcode of the copy receptacle that is being inoculated, if **Make Copy** was selected for the routine.
- **Destination Barcode** is the barcode of the destination receptacle that is currently being inoculated.
- **Destination Offset** is the reference well for where the pins are lowered. This value changes for 384-well microplates.
- **Colonies Picked** is the number of colonies picked so far.
- **Colonies To Pick** is the total number of colonies to be picked.
- **Estimated Time Remaining** indicates remaining time in the routine.
- **Current Action** displays what the system is currently doing, such as **Pick** when the system is picking.

To turn the light table on or off, click **Light Table On** or **Light Table Off**.

To safely pause the routine, click **Pause**.

After all the colonies have been picked from the source receptacles and delivered to the destination microplates, the **Finished Picking Current Batch** dialog is displayed. See Continuing or Ending the Picking Routine on page 61.

Continuing or Ending the Picking Routine

After all the colonies have been picked from the source receptacles and delivered to the destination microplates, the **Finished Picking Current Batch** dialog is displayed.

If there are no more source receptacles to be picked, click **Finish Picking** and then click **OK**. See Viewing the Picking Summary on page 61.

To continue picking more source receptacles:

1. Select whether or not to review images of the new receptacles.
   - To review images and select colonies for the new source receptacles, click **Continue With Image Review**.
   - To use the current image settings for the next batch of source receptacles, click **Continue Without Image Review**.
2. From the **Select Number Of Positions To Use**, select the number of receptacle holders to load on the instrument deck.
3. Click **OK**.
4. After the **Please Load Source** window is displayed, replace the picked receptacles with the new receptacles on the instrument deck.
5. Close the instrument door.
6. Click **Next** to continue running the picking routine.
   - If you clicked **Continue With Image Review**, the system takes a white light test image of the source receptacles and then displays the **Test Image** window. See Adjusting the White Light Test Image on page 50.
   - If you click **Continue Without Image Review**, the system captures and processes a higher-resolution image and then displays the **Feature Selection** window. See Selecting Colonies for Picking on page 54.

Viewing the Picking Summary

After all picking routines are completed, the **Picking Summary** window is displayed, showing the number of source colonies picked, the number of destination microplates used, and missing source receptacles.

To save this information in .csv format, click **Export**.

To view details of all activities related to the source and destination receptacles, click **Details**.

- To save the detailed information in .csv format, click **Export**.
- To close the picking details and return to the Picking Summary window, click **Close**.

In the **Picking Summary** window, click **Next** and then click **Finish** to return to the **Picking** window.

ВЯРНО С ОРИГИНАЛА

Chapter 7: Blue-White Picking Processes

7

The QPix™ 420 Colony Picking System is capable of picking colonies from receptacles using either standard picking or regional picking. You can also set up control wells for the destination microplates before running a picking process.

The following options are available in the **Navigation** window under **Picking Processes**:

- **Picking** picks colonies from receptacles using the standard process. See Picking Processes on page 39.
- **Blue-White Picking** picks blue or white colonies from receptacles using the standard process described in this chapter.
- **Zone of Inhibition Detection Picking** picks colonies with detectable zones of inhibition from receptacles using the standard process. See Zone of Inhibition Detection Picking Processes on page 85.
- **Regional Picking** picks colonies from receptacles using the regional process. See Regional Picking Processes on page 107.
- **Blue-White Regional Picking** picks blue or white colonies from receptacles using the regional process. See Blue-White Regional Picking Processes on page 133.
- **Control Plate Creation** creates a batch of microplates containing specified control samples. These can be created by picking colonies from specified source receptacles into specified destination wells. See Control Plate Creation Processes on page 157.
- **Create New Regional Tray** adds new microplate source definitions to the regional picking plate type database, which can then be selected for use in the regional picking process. See Create New Regional Tray Processes on page 177.

Note: Before running a picking process, it is important that you do the cleaning and set up procedures in Preparing to Run a Process on page 27.

If this is your first picking process, you must edit or create a **Sanitise** profile to use with the picking process. See Creating and Editing Sanitise Profiles on page 34.

Blue-White Colony Detection is a technique that uses the E. Coli LacZ gene to permit visual detection of colonies that contain plasmids with DNA inserts. The **Blue-White Picking** function must be used with a QPix™ Chroma Filter. This filter is placed on the light bed of the instrument under a QTray or a petri dish holder containing the blue and white colonies to be detected. QPix™ Chroma Filters are consumables that can be purchased individually and in packs of 25. See Replacement Parts and Optional Extras on page 249. Each QPix™ Chroma Filter works for approximately ten uses.

This is a white light imaging picking processes only that requires the purchase of *QPix™ Chroma Colorimetric Colony Selection Software License Blue/White Colony Selection Software License* to function. If you would like to add this special license-enabled capability, contact your Molecular Devices representative or technical support. See Obtaining Support on page 248.

Note: Due to inherent biological variations, some picked white colonies lose their insertions and might later be viewed to be blue. These effects are inherent to the biology and are not due to the picking or selection processes. When selecting the insertion methodology, take care to make sure that the desired results are achieved.

Creating and Editing a Blue-White Picking Process

The procedures for creating and editing picking processes are very similar. The regional picking process has more options available for defining the regions for picking. Blue-White picking can be run as either a standard picking process or a regional picking process.

To run a Blue-White regional picking process, see Blue-White Regional Picking Processes on page 133.

If this is your first picking process, you must edit or create a **Sanitise** profile to use with the picking process. See Creating and Editing Sanitise Profiles on page 34.

Creating and editing a blue-white picking process involves the following procedures:

- Opening the Blue-White Picking Window on page 65
- Selecting a Blue-White Picking Routine on page 65
- Selecting Barcode Options on page 66
- Setting Destination Microplate Options on page 68
- Selecting the Head and Sanitizing Options on page 70
- Setting Source Receptacle Options on page 70
- Viewing the Settings Summary on page 71
- Changing the Picking Head on page 71

After creating the routine, you can close the process and run it at a later time, or you can run it immediately.

Note: Some steps that are included in these procedures might not be available to you, depending on the features included with your instrument and license. Optional features are identified within the procedures when applicable.

Opening the Blue-White Picking Window

To open the blue-white picking window:

1. From the **Navigation** window under **Picking Processes**, double-click the **Blue-White Picking** icon.
2. Click **Start**.

The system "homes" the drives, and then displays the **Routines** window. See Selecting a Picking Routine on page 41.

Selecting a Blue-White Picking Routine

1. In the **Routines** window, select to create a new routine from scratch or to edit an existing routine.
   - To create a new routine from scratch, click **New Routine**.
   - To edit an existing routine, click **Run Existing Routine** and then select the name of the routine from the **Select Routine** list.

     If you want to run the selected routine without making changes, select the **Skip Steps** check box.
2. Click **Next** to go to the next step.
   - If you selected to create a new routine from scratch or to edit an existing routine, see Selecting Barcode Options on page 66.
   - If you selected the **Skip Steps** check box to run the selected routine without making changes, see Viewing the Settings Summary on page 71.

Note: You can import, export, and delete routines in the **Routines** window. See Adding and Removing Blue-White Picking Routines on page 65 .

Adding and Removing Blue-White Picking Routines

The **Select Routine** list contains the related routines that are in the database. Only routines that match the type of routine that you are creating are included in the list. For example, a white light and fluorescent imaging routine is not included in the **Select Routine** list if you are creating a White Light only routine.

If you have a saved routine from a different computer, you can import the routine. You can also export a routine from the database so that it can be imported into the database on a different computer. If you no longer need a routine, you can permanently delete it from the database.

Importing a Routine

Before you can import a routine, you need to export the routine from the other computer in .xml format and then save the export file on the system computer.

To import the .xml file, click **Import** and then locate and select the file. Click **Import** to add the routine to the database. If the routine is of the same type as the one you are creating, then the imported routine is displayed in the **Select Routine** list.

Exporting a Routine

To export a routine, click **Export** and then navigate to the location that you want to save the .xml file. You can change the name of the file, if desired. Click **Export** to save the routine in .xml format.

Deleting a Routine

Molecular Devices recommends that you export the routine before deleting it. This lets you import the routine at a later time if desired.

To delete a routine, select the routine in the **Select Routine** list and then click **Delete**. In the **Delete Routine** dialog, click **OK** to permanently remove the routine from the database.

Selecting Barcode Options

When you are creating or editing a routine for white light only, the **Barcodes** window is displayed.

Using a Barcode Reader

Note: Molecular Devices recommends that you always use barcodes for accurate data tracking.

1. Select the **Use Barcode Reader** check box to scan source and destination receptacles for barcodes.

   To define unique identifiers for source receptacles without scanning for barcodes, see Defining Unique Identifiers Without Barcodes on page 67.

2. Click a **Read Failure Option** to define the system response when a barcode cannot be read correctly.
   - Click **Manual Prompt** to open a dialog where you can type a barcode or name for the receptacle.
   - Click **Skip Receptacle** to ignore the receptacle and scan the next receptacle for a barcode.

     Note: If the system fails to identify a barcode for the source receptacle, the routine ends, since the source requires a valid barcode.

   - Click **Auto Generate** to allow the system to automatically assign a valid random barcode and continue the routine.
3. Optionally, use the **Validation Barcode** list to define all the valid barcodes for source receptacles. If the scanned barcode on a source receptacle cannot be found in the list, an error message is displayed.

- To manually enter valid barcodes, type each barcode in the field below the list and then click **Insert**.
- To import valid barcodes from a text or .csv file, click **Import** and then select the file from which to import the barcodes.
- To use the valid barcodes in the database, click **From Database**.
- To remove a barcode from the list, click the barcode in the list and then click **Remove**.

4. Click **Next** to define the destination receptacles. See Setting Destination Microplate Options on page 68.

Defining Unique Identifiers Without Barcodes

1. Clear the **Use Barcode Reader** check box to define unique identifiers for source receptacles without scanning for barcodes.

   To scan source and destination receptacles for barcodes, see Using a Barcode Reader on page 66.

2. Select the method for defining the unique identifiers.
   - To have the software generate random identifiers with the prefix **Auto** for the source receptacles, select the **Generate Random Barcodes** check box . No other parameters are required for this option.
   - To manually define identifiers for the source receptacles, type each identifier in the field below the **Barcode** list and then click **Insert**.
   - To import identifiers for the source receptacles from a text or .csv file, click **Import** and then select the file from which to import the identifiers.
   - To generate a defined list of identifiers for the source receptacles, click **Generate List**.

     To define the parameters for the generated list, type static text for the start of the identifier in the **Prefix** field, the first number to generate in the **Start Number** field, the number of digits in the generated number in the **Digit Padding** field, and the number of identifiers to generate in the **Number to Generate** field. The **Preview** area shows examples of the first and last generated identifiers. To view the generated identifiers in the **Barcodes** list, click **Generate**.
   - To remove an identifier from the list, click the identifier in the list and then click **Remove**.

3. Click **Next** to define the destination receptacles. See Setting Destination Microplate Options on page 68.

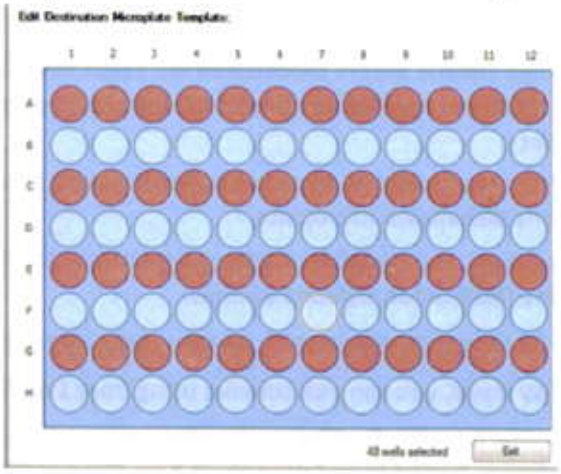
Setting Destination Microplate Options

1. In the **Destination Options** window, from the **Select Destination Microplate** list, select the microplate type to be inoculated with the picked colonies. If the microplate type that you need is not listed, contact Molecular Devices to add a new microplate type to the list. See Obtaining Support on page 248.
2. Select either to dip the pins a specified number of times or to stir the wells of the destination microplate during inoculation.
   - To dip the pins a specified number of times, click **Multi Dip** and in the **Number of Dips** field, type the number of times to dip the pins.
   - To stir the wells, click **Stir Destination**.
3. Optionally, select the **Make Copy** check box and from the **Select Copy Microplate** list select the microplate type to use for a duplicate copy of the destination microplate.
4. Select the **Deposit Order** to deposit the picked colonies **By Columns** or **By Rows**.
5. Define the **Deposit Strategy**.
   - Click **Fill All Microplates** to fill every selected well of a destination microplate before starting a new destination microplate.
   - Click **New Microplate For Each Position** to start a new destination microplate whenever the instrument starts picking from a different source QTray or Petri dish.
   - Click **New Microplate For Each Batch** to start a new destination microplate whenever the instrument deck is loaded with new OmniTrays of source microplates.





6. Optionally, under **Destination Microplate Template**, click **Edit** to define the wells to dip or skip. You can skip wells that you want to use as blank or control wells. The defined template is used for all the destination microplates during the picking routine.



   - To skip a well, click the well. Wells to be skipped show in light blue.
   - To skip multiple contiguous wells, right-click and drag across the wells.
   - To dip a well that you selected to skip, click the well again. Wells to be dipped show in light red.

   After defining the wells to dip or skip, click **Exit**.

7. Click **Next** to define the picking head and the **Sanitise** profile. See Selecting the Head and Sanitizing Options on page 70.

Selecting the Head and Sanitizing Options

1. In the **Head** and **Sanitise** window, from the **Picking Head** list, select the head to use for the picking routine.
2. From the **Pin Columns (Rows) Before Inoculation** list, select the number of pins to use for picking in each column or row before transferring the picked colonies to the destination microplate.

   For the fastest transfer rate, select **All** to use all available picking pins to pick colonies before inoculating the destination microplate.

   For smaller picking groups, the available selections depends on the **Deposit Order** selection made in the **Destination Options** window.

   - If you selected **By Columns**, you can pick colonies using from **1** to **11** columns.
   - If you selected **By Rows**, you can pick colonies using from **1** to **7** rows.

   To run the wash routine from the **Sanitise** profile after each partial pick and inoculation, select the **Wash between Partial Inoculation** check box. Clearing this check box waits until all pins have been used for picking and inoculation before running the wash routine.
3. In the **Destination** field, type a value for the distance in millimeters above the bottom of the destination microplate wells to dip the pins for the inoculation.

   If you selected **Make Copy** for the destination microplate, type a value for the copy.
4. From the **Sanitise Profile** list, select the **Sanitise** profile to use for the picking routine.

   If the available profiles are not suitable for the picking routine, exit the picking process and create a new **Sanitise** profile. See Creating and Editing Sanitise Profiles on page 34.
5. Click **Next** to define options for the source receptacle. See Setting Source Receptacle Options on page 70.

Setting Source Receptacle Options

1. In the **Source** window, from the **Holder** list, select the type of holder used to hold the source receptacles on the instrument deck.
2. From the **Receptacle** list select the type of receptacle used for the source. Only the receptacles applicable for the selected holder are displayed in this list.

   The preview image displays a representation of the selected holder and receptacle.
3. In the **Positions** field, type the number of receptacles to use for picking.
4. In the **Offset** field, type the position of the first receptacle to be used for picking.

   The preview image displays the defined locations of the receptacles.

Note: If you are using Validation barcodes, only one source receptacle shows, and the **Positions** and **Offset** fields are not available.

5. In the **Picking Depth Into Agar (mm)** field, type a value in millimeters to define the depth that the pins are to be inserted in the agar for picking.
6. Optionally, select the **Limit Max. Number Of Features Per Position** check box and then in the **Max. Number Of Features Per Position** field, type a value for the maximum number of colonies that can be picked from a single QTray or Petri dish.

> **Note:** Setting a limit for the maximum number of colonies in the **Source** window prevents selecting a maximum number in the **Feature Selection** window when running the picking routine. See Selecting Colonies for Picking on page 54.

7. Click **Next** to view a summary of the settings. See Viewing the Settings Summary on page 71.

Viewing the Settings Summary

The **Settings Summary** window contains a full summary of the picking routine settings you just configured.

Review the summary details to make sure that the settings and options are configured correctly for the picking routine. If you need to make changes, click **Back** until you return to the window where the changes can be made.

To print the summary, click **Print**.

To run the picking routine, click **Next**. See Running a Blue-White Picking Process on page 72.

Changing the Picking Head

The **Change Head** window reminds you which picking head should be loaded, based on the **Setting Summary** routine you just configured, and provides you an opportunity to change the head if needed.

The head is housed in a unique actuator system that permits easy exchange and set-up of the head.

Although it is possible to manually move the actuator assembly, Molecular Devices recommends using the software to safely move the actuator into position to remove or install the head.

> **WARNING! PINCH HAZARD. The actuator assembly has moving parts that can cause pinch injuries if it is moved manually. To prevent pinch injuries, use the software Change Head process to safely move the actuator.**

To change the picking head:

1. Click **Move to Load Position** to move the picking head arm to the loading position.
2. When the warning message is displayed, make sure that the bed is clear of obstructions and that the door is closed, and then click **OK** to move the actuator into position near the front of the instrument.
3. Open the front door.

4. Install the specified picking head.
   - To remove an installed head, unscrew and remove the thumbscrew and washer on the left that secures the head to the actuator assembly. Then, grab the handle on the right and slide the head out of the actuator.

     Before storing the head, or whenever it needs cleaning, wipe the exterior of the head with a cloth using 70% ethanol. To store the head, slide it into its metal cover with the pins facing inward and then secure it in place with the thumbscrew and washer.
   - To install a head, hold the head by its handle with the pins pointing down and then slide the head into the actuator assembly from the right. Then, attach the thumbscrew and washer on the left and hand tighten the thumbscrew to secure the head to the actuator.
5. Close the front door.
6. Click **Move to Park Position** to move the picking head arm to the run ready park position.
7. When the warning message is displayed, make sure that the bed is clear of obstructions and that the door is closed, and then click **OK** to home the actuator to its starting position.
8. To run the picking routine, click **Next**. See Running a Blue-White Picking Process on page 72.

Running a Blue-White Picking Process

After a blue-white picking routine has been configured, you can run the process on the instrument. If you have not configured the blue-white picking routine you want to run, you must create a new picking routine or edit an existing routine. See Creating and Editing a Picking Process on page 40.

Note: Before running a picking process, it is important that you do the cleaning and set up procedures in Preparing to Run a Process on page 27.

Some steps that are included in these procedures might not be available to you, depending on the features included with your instrument and license. Optional features are identified within the procedures when applicable.

To run a configured blue-white picking routine:

1. Open the **Blue White Picking** window. See Opening the Blue-White Picking Window on page 65.
2. Select the picking routine you want to run. See Selecting a Blue-White Picking Routine on page 65.

   If you do not need to make changes to the selected routine, select the **Skip Steps** check box before clicking **Next**.

3. Review the configured settings for the routine. See Viewing the Settings Summary on page 71.
4. In the **Settings Summary** window, click **Next** to arrange the source microplates in the instrument. See Arranging the Microplate Layout on page 73.

> **Note:** The QPix Chroma Filter must be placed on the light-bed before placing any tray over it on the instrument deck. For purchasing details, see Replacement Parts and Optional Extras on page 249.

Arranging the Microplate Layout

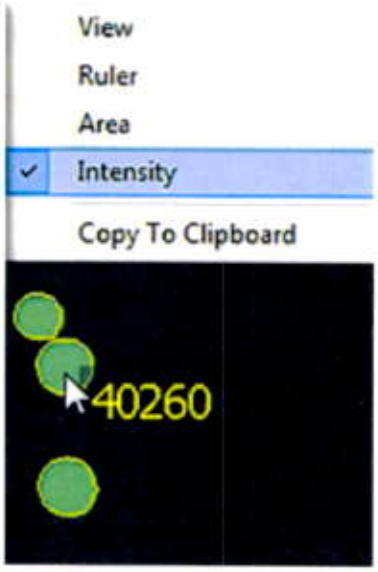
1. Open the instrument door.
2. In the **Holder Layout Summary** window, follow the instructions to correctly arrange the microplate holders in the instrument. The layout is defined by the selections you made in earlier steps.
3. Select the **Checked?** check box to confirm the microplate holder layout.
4. Click **Next**.
5. Remove all microplate lids.
6. In the **Load Plates** window, follow the instructions to correctly place the destination microplates.
7. Select the **Checked?** check box to confirm the destination microplate layout.
8. Click **Next**.
9. After the **Please Load Source** window is displayed, load the source receptacles in the correct locations on the instrument deck.
10. Close the instrument door.
11. Click **Next** to take a white light test image of the source receptacles. See Adjusting the Blue-White White Light Test Image on page 73.

Adjusting the Blue-White White Light Test Image

In the **Test Image** window, all detected features are viewed as potential colonies to pick for inoculation of the destination microplates. To make sure that only blue or white colonies are detected, adjust the test image in this window using the **Exposure** and **Gain** settings, the **Detection** settings, the **Display** settings, and the **Debris** settings. Each detected feature is displayed within a yellow ring.

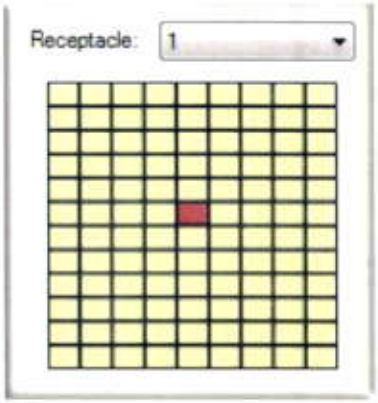
To view the pixel intensity values in the image map to manually set a detection threshold or detect areas of saturation within the image:

1. Right-click over the image map and select **Intensity**.
2. Move the cursor over the area of interest in the image map. The pixel intensity value automatically is displayed.



To adjust the test image:

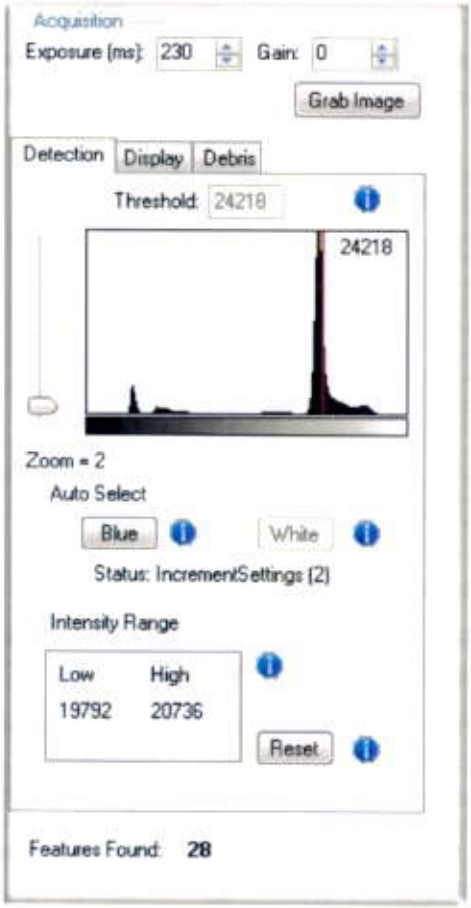
1. From the **Receptacle** list, select the number of the receptacle to view and then click the frame that you want view in the receptacle image below the list. The selected frame is in red.



2. Under **Acquisition** adjust the **Exposure** and **Gain** settings.
   - In the **Exposure (ms)** field, type the number of milliseconds (from 1 to 2000) to expose the sample to light when acquiring the image.
   - Adjust the **Gain** to increase the image signal without changing the light exposure.

> **Tip:** Molecular Devices recommends not changing the default **Gain** setting.

   After making adjustments to the **Exposure** or **Gain** settings, click **Grab Image** to apply the new settings to the test image.
3. Click the **Detection** tab.



4. In the **Threshold** intensity histogram, click and drag the red slider line to the right of the large spike to view the **White** colonies as green spots. Click and drag the red slider to the left of the large spike to view the **Blue** colonies as dark black spots against the background. The X-axis represents the intensity and the Y-axis represents the relative area at that intensity. Manually selecting blue or white colonies requires setting an **Intensity Range**.

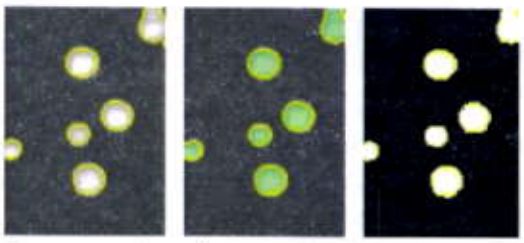
In the **Intensity Range** table, select the **Low** and **High** Threshold values.

- To select the **Low** intensity value, move the histogram red slider line left to the lowest preferred value, and click **Control+left mouse button**. The value is displayed in the table cell.
- To select the **High** intensity value, move the histogram red slider line right to the highest preferred value, and click **Control+left mouse button**. The value is displayed in the table cell.

To manually select blue or white colonies:

- To manually select **Blue Colonies**,select an **Intensity Range** that starts near the left side of the histogram and ends to the left of the large spike that represents the largest area, which is the agar. See Step 6 for **Intensity Range** setting procedures.
- To manually select **White Colonies**, increase the minimum detectable threshold by moving the histogram red slider line to the right. This allows the exclusion of the agar, which is predominantly the large black area in the background, and the colonies that are less intense than the threshold value.

5. To use **Auto Select**, click either **Blue** or **White**. Click the button as many times as needed to intensify the target colonies. Typically, two or three clicks gets you the optimal value. Click **Reset** to restore the previous intensity settings.
6. Click the **Display** tab.
7. Select the method for viewing the detected colonies in the image.
   - Click **Image Only** to display the detected colonies in white with yellow rings and a gray background.
   - Click **Image and Overlay** to display the detected colonies in green with yellow rings and a gray background.
   - Click **Overlay only** to display the detected colonies in white with yellow rings and a black background.



To remove the yellow ring from the detected colonies, clear the **Outline Detected Features** check box.

8. Click the **Debris** tab.
9. Adjust the **Diameter** and **Axis Ratio** to exclude objects that are smaller than the desired colonies. Each detected feature is displayed within a yellow ring while excluded features do not have a yellow ring.

- In the **Diameter (mm)** field type a value in millimeters for the minimum diameter of the desired colonies.
- In the **Axis Ratio** field, define the minimum roundness ratio of the desire colonies.

The **Features Found** field displays the number of objects detected as colonies. The value changes as you make adjustments.

Note: Further refinement for colony detection can be done on a higher-resolution image in the **Feature Selection** window. See Selecting Blue-White Colonies for Picking on page 78.

10. Click **Next** to go to the next step.

Selecting Blue-White Colonies for Picking

After adjusting and refining test images, the system captures and processes a higher-resolution image using the test-image adjustments and then displays the **Feature Selection** window.



In the **Feature Selection** window, pickable objects show in yellow and unpickable object show in red. A colony can be considered unpickable if it is too close to the edge of the receptacle or it does not match the selection criteria.

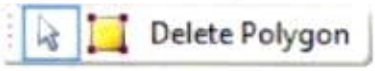
To view the details of a displayed colony, hold the mouse pointer over that colony to display the properties of that colony. If a colony has not been selected as pickable, the reason for the exclusion shows in red text.

Note: During image processing, each object with no yellow ring in the test image is automatically excluded from becoming a pickable object.

Drag the **Zoom** slider below the image to get a closer look at the image, and drag the **Contrast** slider to change the contrast between the objects and the background.

To save the image in .bmp, .jpg, or .png format, click **Export Image**.

To select a smaller region of interest (ROI) in the image, draw a polygon around the region.

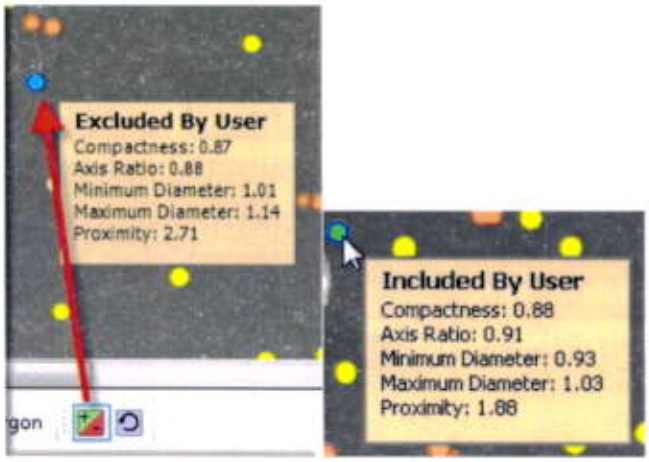


- To draw a polygon, click the **Draw Polygon** icon and then click on the image to define the corners of the polygon.
- To resize the polygon, drag the blue boxes on its corners.
- To remove the polygon, click **Delete Polygon**.

When you draw a polygon on the image, the system detects and picks colonies only from within the defined region of interest.

To change the selection of the system-chosen pickable objects that are displayed in the image map:

1. Click the **+/-** user selection button to override the system-chosen and unchosen objects.
2. Click the objects in the image map that you want to change.



- When clicked on as an override, the yellow-marked pickable objects change to blue and become unpickable.

  To undo your individual selection, right-click over the image map and select **Pick Item**. The object changes to green and becomes pickable.

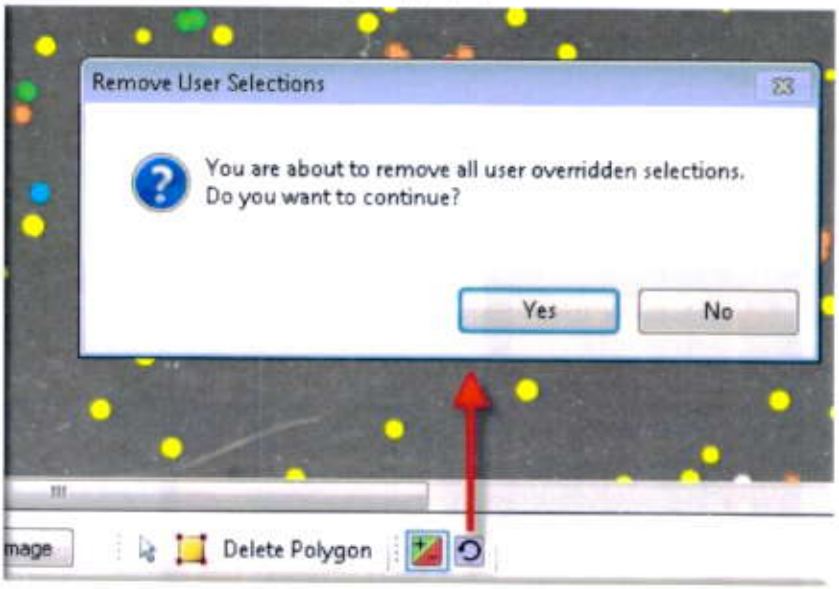


- When clicked on as an override, the red-marked unpickable objects change to green and become pickable.

  To undo your individual selection, right-click over the image map and select **Discard Item**. The object changes to blue and becomes unpickable.



To undo all of your user selections, click the remove user selections button, and when the **Remove User Selections** dialog is displayed, click **Yes**.



To select the colonies for picking:

1. From the list in the upper-right, select the barcode or identifier of the receptacle to view.
2. Refine the colony **Selection** criteria.
   - **Compactness** sets the level of irregularity for picking colonies. The value is a ratio of the perimeter divided by the area of the colony, so that irregular shaped colonies are closer to 0 and colonies that are more of a perfect circle are closer to 1. The system default value is that a colony equal to or less than 0.65 and is not picked.
   - **Axis Ratio** measures how oval the colony is. The value is a ratio of the longest diameter divided by the shortest diameter, so oval shaped colonies will be closer to 0 and round colonies will be closer to 1. The system default value is that a colony equal to or less than 0.65 is not picked.
   - **Min Diameter (mm)** sets the minimum diameter of colonies for picking. A colony equal to or smaller than the value in this field is not picked.

     Note: The **Min Diameter (mm)** cannot be lower than the **Diameter** value set in the **Debris Discard** section of the test image.

   - **Max Diameter (mm)** sets the maximum diameter of colonies for picking. A colony equal to or greater than the value in this field is not picked.
   - **Min Proximity (mm)** sets the distance between colonies to be picked, so that when picking one colony, a different adjacent colony is not picked. The system default value is 0.45 mm.
3. Optionally, in the **Limit Colonies** field, type the maximum number of colonies to pick from each receptacle.

   Note: If a limit was previously set for the maximum number of colonies in the **Source** window, the Limit Colonies option is not available in the **Feature Selection** window. See Setting Source Receptacle Options on page 46.

   The **Total Feature Count** field displays the total number of pickable objects in the receptacle.
4. Click the **Feature Counts** tab to view the number of found features in a source receptacle. The barcode or identifier for the source receptacle is displayed, along with the number of found colonies and the number of colonies to pick as determined by the selection criteria.

   To save the data in .csv format, right-click and then click **Export**.
5. Click the **Display Options** tab to change the display options of the source receptacle image.

   Select the **Display Detected Features** check box to display all detected features with a yellow circle.

- Select the **Shade Features** check box to give the detected colonies some shading for clearer visualization.
- Select the **Display Proximity Indicators** check box to display connecting red lines between a detected colony and its closest neighbor.

Select the **Shade Exclusion Zone** check box to display a red-shaded exclusion zone where the system cannot pick.

6. After you are satisfied with the feature selection criteria, click **Next**.
7. In the **Continue Or Save New Routine** dialog or the **Save Changes To Routine** dialog, select whether or not to save the routine before continuing with the picking process.

   If you are creating a new routine from scratch, the **Continue Or Save New Routine** dialog is displayed.

   - To save the settings for the routine before continuing, click **Save Routine**, type a **Name** and a short **Description** for the routine, and then click **Save**.
   - To continue without saving the settings for the routine, click **Routine Without Saving** and then click **OK**.

   If you are editing an existing routine, the **Save Changes To Routine** dialog is displayed.

   - To save the settings for the routine before continuing, click **Save**.
   - To save the settings as a new routine without changing the existing routine, click **Save As**, type a **Name** and a short **Description** for the routine, and then click **Save**.
   - To continue without saving the settings for the routine, click **No**.
8. Make sure that the instrument door is closed.
9. Click **OK** to start the picking process. See Viewing the Picking Progress on page 83.

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Viewing the Picking Progress

While the picking routine is running, the **Picking Progress** window displays a summary of the routine.

- **Start Time** shows the time the picking of the colonies began.
- **Source Barcode** shows the barcode or identifier of the source receptacle being picked from.
- **Pin** is the picking pin being used for the current picking operation.
- **Copy Plate No** is the barcode of the copy receptacle that is being inoculated, if **Make Copy** was selected for the routine.
- **Destination Barcode** is the barcode of the destination receptacle that is currently being inoculated.
- **Destination Offset** is the reference well for where the pins are lowered. This value changes for 384-well microplates.
- **Colonies Picked** is the number of colonies picked so far.
- **Colonies To Pick** is the total number of colonies to be picked.
- **Estimated Time Remaining** indicates remaining time in the routine.
- **Current Action** displays what the system is currently doing, such as **Pick** when the system is picking.

To turn the light table on or off, click **Light Table On** or **Light Table Off**.

To safely pause the routine, click **Pause**.

After all the colonies have been picked from the source receptacles and delivered to the destination microplates, the **Finished Picking Current Batch** dialog is displayed. See Continuing or Ending the Picking Routine on page 84.

Continuing or Ending the Picking Routine

After all the colonies have been picked from the source receptacles and delivered to the destination microplates, the **Finished Picking Current Batch** dialog is displayed.

If there are no more source receptacles to be picked, click **Finish Picking** and then click **OK**. See Viewing the Picking Summary on page 84.

To continue picking more source receptacles:

1. Select whether or not to review images of the new receptacles.
   - To review images and select colonies for the new source receptacles, click **Continue With Image Review**.
   - To use the current image settings for the next batch of source receptacles, click **Continue Without Image Review**.
2. From the **Select Number Of Positions To Use**, select the number of receptacle holders to load on the instrument deck.
3. Click **OK**.
4. After the **Please Load Source** window is displayed, replace the picked receptacles with the new receptacles on the instrument deck.
5. Close the instrument door.
6. Click **Next** to continue running the picking routine.
   - If you clicked **Continue With Image Review**, the system takes a white light test image of the source receptacles and then displays the **Test Image** window. See Adjusting the Blue-White White Light Test Image on page 73.
   - If you click **Continue Without Image Review**, the system captures and processes a higher-resolution image and then displays the **Feature Selection** window. See Selecting Blue-White Colonies for Picking on page 78.

Viewing the Picking Summary

After all picking routines are completed, the **Picking Summary** window is displayed, showing the number of source colonies picked, the number of destination microplates used, and missing source receptacles.

To save this information in .csv format, click **Export**.

To view details of all activities related to the source and destination receptacles, click **Details**.

- To save the detailed information in .csv format, click **Export**.
- To close the picking details and return to the Picking Summary window, click **Close**.

In the **Picking Summary** window, click **Next** and then click **Finish** to return to the **Blue-White Picking** window.

Chapter 8: Zone of Inhibition Detection Picking Processes

8

The QPix™ 420 Colony Picking System is capable of picking colonies from receptacles using either standard picking or regional picking. You can also set up control wells for the destination microplates before running a picking process.

The following options are available in the **Navigation** window under **Picking Processes**:

- **Picking** picks colonies from receptacles using the standard process. See Picking Processes on page 39.
- **Blue-White Picking** picks blue or white colonies from receptacles using the standard process.See Blue-White Picking Processes on page 63.
- **Zone of Inhibition Detection Picking** picks colonies with detectable zones of inhibition from receptacles using the standard process described in this chapter.
- **Regional Picking** picks colonies from receptacles using the regional process. See Regional Picking Processes on page 107.
- **Blue-White Regional Picking** picks blue or white colonies from receptacles using the regional process. See Blue-White Regional Picking Processes on page 133.
- **Control Plate Creation** creates a batch of microplates containing specified control samples. These can be created by picking colonies from specified source receptacles into specified destination wells. See Control Plate Creation Processes on page 157.
- **Create New Regional Tray** adds new microplate source definitions to the regional picking plate type database, which can then be selected for use in the regional picking process. See Create New Regional Tray Processes on page 177.

Note: Before running a picking process, it is important that you do the cleaning and set up procedures in Preparing to Run a Process on page 27.

If this is your first picking process, you must edit or create a **Sanitise** profile to use with the picking process. See Creating and Editing Sanitise Profiles on page 34.

Colonies can be picked with the standard picking processes based on the detected zones of inhibition that contain certain properties, for the purposes of:

- Clearance Zone of Inhibition Detection, which can be used for antibiotic resistance screening, bacteria-killing drugs grown on a lawn of drugs.

The **Zone of Inhibition Detection Picking** processes is a white light only picking process that requires the purchase of the *Zone of Inhibition Detection Software License* to function. If you would like to add this special license-enabled capability, contact your Molecular Devices representative or Molecular Devices Technical Support. See Obtaining Support on page 248.

Creating and Editing a Zone of Inhibition Detection Picking Process

The procedures for creating and editing picking processes are very similar. The regional picking process has more options available for defining the regions for picking. Zone of Inhibition Detection picking is similar to the standard picking process.

If this is your first picking process, you must edit or create a **Sanitise** profile to use with the picking process. See Creating and Editing Sanitise Profiles on page 34.

Creating and editing a Zone of Inhibition Detection picking process involves the following procedures:

- Opening the Zone of Inhibition Detection Picking Window on page 86
- Selecting a Zone of Inhibition Detection Picking Routine on page 87
- Selecting Barcode Options on page 88
- Setting Destination Microplate Options on page 90
- Selecting the Head and Sanitizing Options on page 91
- Setting Source Receptacle Options on page 92
- Viewing the Settings Summary on page 93
- Changing the Picking Head on page 93

After creating the routine, you can close the process and run it at a later time, or you can run it immediately.

Note: Some steps that are included in these procedures might not be available to you, depending on the features included with your instrument and license. Optional features are identified within the procedures when applicable.

Opening the Zone of Inhibition Detection Picking Window

1. From the **Navigation** window under **Picking Processes**, double-click the **Zone of Inhibition Detection Picking** icon.
2. In the **Zone of Inhibition Detection Picking** window, click **Start**.

The system "homes" the drives, and then displays the **Routines** window. See Selecting a Zone of Inhibition Detection Picking Routine on page 87.

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Selecting a Zone of Inhibition Detection Picking Routine

1. In the **Routines** window, select to create a new routine from scratch or to edit an existing routine.
   - To create a new routine from scratch, click **New Routine**.
   - To edit an existing routine, click **Run Existing Routine** and then select the name of the routine from the **Select Routine** list.

     If you want to run the selected routine without making changes, select the **Skip Steps** check box.
2. Click **Next** to go to the next step.
   - If you selected to create a new routine from scratch or to edit an existing routine, see Selecting Barcode Options on page 88.
   - If you selected the **Skip Steps** check box to run the selected routine without making changes, see Viewing the Settings Summary on page 93.

Note: You can import, export, and delete routines in the **Routines** window. See Adding and Removing Zone of Inhibition Detection Picking Routines on page 87 .

Adding and Removing Zone of Inhibition Detection Picking Routines

The **Select Routine** list contains the related routines that are in the database. Only routines that match the type of routine that you are creating are included in the list. For example, a white light and fluorescent imaging routine is not included in the **Select Routine** list if you are creating a White Light only routine.

If you have a saved routine from a different computer, you can import the routine. You can also export a routine from the database so that it can be imported into the database on a different computer. If you no longer need a routine, you can permanently delete it from the database.

Importing a Routine

Before you can import a routine, you need to export the routine from the other computer in .xml format and then save the export file on the system computer.

To import the .xml file, click **Import** and then locate and select the file. Click **Import** to add the routine to the database. If the routine is of the same type as the one you are creating, then the imported routine is displayed in the **Select Routine** list.

Exporting a Routine

To export a routine, click **Export** and then navigate to the location that you want to save the .xml file. You can change the name of the file, if desired. Click **Export** to save the routine in .xml format.

Deleting a Routine

Molecular Devices recommends that you export the routine before deleting it. This lets you import the routine at a later time if desired.

To delete a routine, select the routine in the **Select Routine** list and then click **Delete**. In the **Delete Routine** dialog, click **OK** to permanently remove the routine from the database.

Selecting Barcode Options

When you are creating or editing a routine for white light only, the **Barcodes** window is displayed.

Using a Barcode Reader

Note: Molecular Devices recommends that you always use barcodes for accurate data tracking.

1. Select the **Use Barcode Reader** check box to scan source and destination receptacles for barcodes.

   To define unique identifiers for source receptacles without scanning for barcodes, see Defining Unique Identifiers Without Barcodes on page 89.

2. Click a **Read Failure Option** to define the system response when a barcode cannot be read correctly.

   - Click **Manual Prompt** to open a dialog where you can type a barcode or name for the receptacle.
   - Click **Skip Receptacle** to ignore the receptacle and scan the next receptacle for a barcode.

     Note: If the system fails to identify a barcode for the source receptacle, the routine ends, since the source requires a valid barcode.

   - Click **Auto Generate** to allow the system to automatically assign a valid random barcode and continue the routine.

3. Optionally, use the **Validation Barcode** list to define all the valid barcodes for source receptacles. If the scanned barcode on a source receptacle cannot be found in the list, an error message is displayed.

   - To manually enter valid barcodes, type each barcode in the field below the list and then click **Insert**.
   - To import valid barcodes from a text or .csv file, click **Import** and then select the file from which to import the barcodes.
   - To use the valid barcodes in the database, click **From Database**.
   - To remove a barcode from the list, click the barcode in the list and then click **Remove**.

4. Click **Next** to define the destination receptacles. See Setting Destination Microplate Options on page 90.

Defining Unique Identifiers Without Barcodes

1. Clear the **Use Barcode Reader** check box to define unique identifiers for source receptacles without scanning for barcodes.

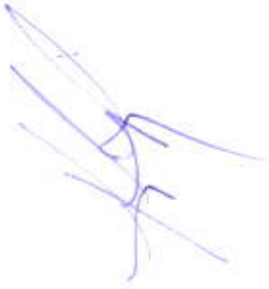
   To scan source and destination receptacles for barcodes, see Using a Barcode Reader on page 88.

2. Select the method for defining the unique identifiers.

   - To have the software generate random identifiers with the prefix **Auto** for the source receptacles, select the **Generate Random Barcodes** check box . No other parameters are required for this option.
   - To manually define identifiers for the source receptacles, type each identifier in the field below the **Barcode** list and then click **Insert**.
   - To import identifiers for the source receptacles from a text or .csv file, click **Import** and then select the file from which to import the identifiers.
   - To generate a defined list of identifiers for the source receptacles, click **Generate List**.

     To define the parameters for the generated list, type static text for the start of the identifier in the **Prefix** field, the first number to generate in the **Start Number** field, the number of digits in the generated number in the **Digit Padding** field, and the number of identifiers to generate in the **Number to Generate** field. The **Preview** area shows examples of the first and last generated identifiers. To view the generated identifiers in the **Barcodes** list, click **Generate**.
   - To remove an identifier from the list, click the identifier in the list and then click **Remove**.

3. Click **Next** to define the destination receptacles. See Setting Destination Microplate Options on page 90.

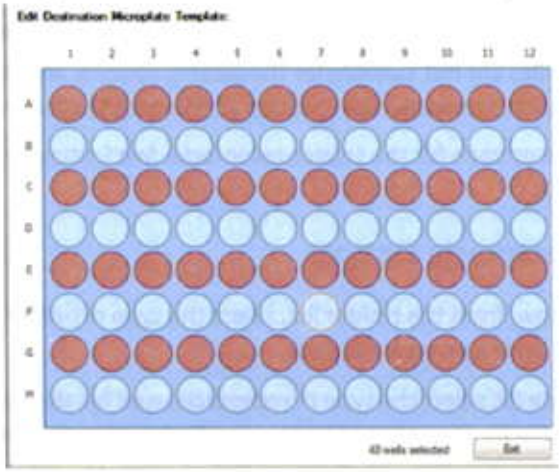


Setting Destination Microplate Options

1. In the **Destination Options** window, from the **Select Destination Microplate** list, select the microplate type to be inoculated with the picked colonies. If the microplate type that you need is not listed, contact Molecular Devices to add a new microplate type to the list. See Obtaining Support on page 248.
2. Select either to dip the pins a specified number of times or to stir the wells of the destination microplate during inoculation.
   - To dip the pins a specified number of times, click **Multi Dip** and in the **Number of Dips** field, type the number of times to dip the pins.
   - To stir the wells, click **Stir Destination**.
3. Optionally, select the **Make Copy** check box and from the **Select Copy Microplate** list select the microplate type to use for a duplicate copy of the destination microplate.
4. Select the **Deposit Order** to deposit the picked colonies **By Columns** or **By Rows**.
5. Define the **Deposit Strategy**.
   - Click **Fill All Microplates** to fill every selected well of a destination microplate before starting a new destination microplate.
   - Click **New Microplate For Each Position** to start a new destination microplate whenever the instrument starts picking from a different source QTray or Petri dish.
   - Click **New Microplate For Each Batch** to start a new destination microplate whenever the instrument deck is loaded with new OmniTrays of source microplates.

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6. Optionally, under **Destination Microplate Template**, click **Edit** to define the wells to dip or skip. You can skip wells that you want to use as blank or control wells. The defined template is used for all the destination microplates during the picking routine.



   - To skip a well, click the well. Wells to be skipped show in light blue.
   - To skip multiple contiguous wells, right-click and drag across the wells.
   - To dip a well that you selected to skip, click the well again. Wells to be dipped show in light red.

   After defining the wells to dip or skip, click **Exit**.

7. Click **Next** to define the picking head and the **Sanitise** profile. See Selecting the Head and Sanitizing Options on page 91.

Selecting the Head and Sanitizing Options

1. In the **Head** and **Sanitise** window, from the **Picking Head** list, select the head to use for the picking routine.
2. From the **Pin Columns (Rows) Before Inoculation** list, select the number of pins to use for picking in each column or row before transferring the picked colonies to the destination microplate.

   For the fastest transfer rate, select **All** to use all available picking pins to pick colonies before inoculating the destination microplate.

   For smaller picking groups, the available selections depends on the **Deposit Order** selection made in the **Destination Options** window.

   - If you selected **By Columns**, you can pick colonies using from **1** to **11** columns.
   - If you selected **By Rows**, you can pick colonies using from **1** to **7** rows.

   To run the wash routine from the **Sanitise** profile after each partial pick and inoculation, select the **Wash between Partial Inoculation** check box. Clearing this check box waits until all pins have been used for picking and inoculation before running the wash routine.

3. In the **Destination** field, type a value for the distance in millimeters above the bottom of the destination microplate wells to dip the pins for the inoculation.
   If you selected **Make Copy** for the destination microplate, type a value for the copy.
4. From the **Sanitise Profile** list, select the **Sanitise** profile to use for the picking routine.
   If the available profiles are not suitable for the picking routine, exit the picking process and create a new **Sanitise** profile. See Creating and Editing Sanitise Profiles on page 34.
5. Click **Next** to define options for the source receptacle. See Setting Source Receptacle Options on page 92.

Setting Source Receptacle Options

1. In the **Source** window, from the **Holder** list, select the type of holder used to hold the source receptacles on the instrument deck.
2. From the **Receptacle** list select the type of receptacle used for the source. Only the receptacles applicable for the selected holder are displayed in this list.
   The preview image displays a representation of the selected holder and receptacle.
3. In the **Positions** field, type the number of receptacles to use for picking.
4. In the **Offset** field, type the position of the first receptacle to be used for picking.
   The preview image displays the defined locations of the receptacles.

   Note: If you are using Validation barcodes, only one source receptacle shows, and the **Positions** and **Offset** fields are not available.

5. In the **Picking Depth Into Agar (mm)** field, type a value in millimeters to define the depth that the pins are to be inserted in the agar for picking.
6. Optionally, select the **Limit Max. Number Of Features Per Position** check box and then in the **Max. Number Of Features Per Position** field, type a value for the maximum number of colonies that can be picked from a single QTray or Petri dish.

   Note: Setting a limit for the maximum number of colonies in the **Source** window prevents selecting a maximum number in the **Feature Selection** window when running the picking routine. See Selecting Zone of Inhibition Detection Colonies for Picking on page 99.

7. Click **Next** to view a summary of the settings. See Viewing the Settings Summary on page 93.

Viewing the Settings Summary

The **Settings Summary** window contains a full summary of the picking routine settings you just configured.

Review the summary details to make sure that the settings and options are configured correctly for the picking routine. If you need to make changes, click **Back** until you return to the window where the changes can be made.

To print the summary, click **Print**.

To run the picking routine, click **Next**. See Running a Zone of Inhibition Detection Picking Process on page 94.

Changing the Picking Head

The **Change Head** window reminds you which picking head should be loaded, based on the **Setting Summary** routine you just configured, and provides you an opportunity to change the head if needed.

The head is housed in a unique actuator system that permits easy exchange and set-up of the head.

Although it is possible to manually move the actuator assembly, Molecular Devices recommends using the software to safely move the actuator into position to remove or install the head.

WARNING! PINCH HAZARD. The actuator assembly has moving parts that can cause pinch injuries if it is moved manually. To prevent pinch injuries, use the software Change Head process to safely move the actuator.

To change the picking head:

1. Click **Move to Load Position** to move the picking head arm to the loading position.
2. When the warning message is displayed, make sure that the bed is clear of obstructions and that the door is closed, and then click **OK** to move the actuator into position near the front of the instrument.
3. Open the front door.
4. Install the specified picking head.

- To remove an installed head, unscrew and remove the thumbscrew and washer on the left that secures the head to the actuator assembly. Then, grab the handle on the right and slide the head out of the actuator.

  Before storing the head, or whenever it needs cleaning, wipe the exterior of the head with a cloth using 70% ethanol. To store the head, slide it into its metal cover with the pins facing inward and then secure it in place with the thumbscrew and washer.
- To install a head, hold the head by its handle with the pins pointing down and then slide the head into the actuator assembly from the right. Then, attach the thumbscrew and washer on the left and hand tighten the thumbscrew to secure the head to the actuator.

5. Close the front door.
6. Click **Move to Park Position** to move the picking head arm to the run ready park position.
7. When the warning message is displayed, make sure that the bed is clear of obstructions and that the door is closed, and then click **OK** to home the actuator to its starting position.
8. To run the picking routine, click **Next**. See Running a Zone of Inhibition Detection Picking Process on page 94.

Running a Zone of Inhibition Detection Picking Process

After a Zone of Inhibition Detection picking routine has been configured, you can run the process on the instrument. If you have not configured the Zone of Inhibition Detection picking routine you want to run, you must create a new Zone of Inhibition Detection picking routine or edit an existing routine. See Creating and Editing a Picking Process on page 40.

Note: Before running a picking process, it is important that you do the cleaning and set up procedures in Preparing to Run a Process on page 27.

Some steps that are included in these procedures might not be available to you, depending on the features included with your instrument and license. Optional features are identified within the procedures when applicable.

To run a configured Zone of Inhibition Detection picking routine:

1. Open the **Zone of Inhibition Detection Picking** window. See Opening the Zone of Inhibition Detection Picking Window on page 86.
2. Select the picking routine you want to run. See Selecting a Zone of Inhibition Detection Picking Routine on page 87.

   If you do not need to make changes to the selected routine, select the **Skip Steps** check box before clicking **Next**.
3. Review the configured settings for the routine. See Viewing the Settings Summary on page 93.
4. In the **Settings Summary** window, click **Next** to arrange the source microplates in the instrument. See Arranging the Microplate Layout on page 96.

Note: Zone of Inhibition Detection Picking is a white light only process.

Arranging the Microplate Layout

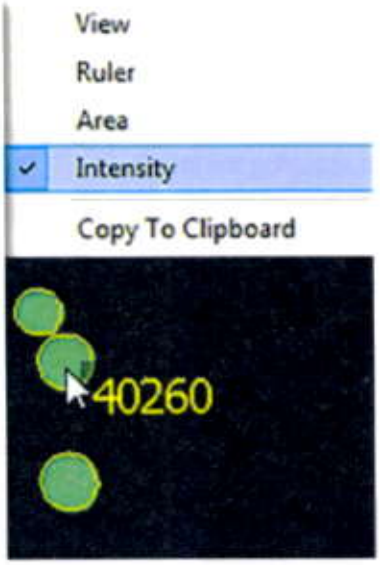
1. Open the instrument door.
2. In the **Holder Layout Summary** window, follow the instructions to correctly arrange the microplate holders in the instrument. The layout is defined by the selections you made in earlier steps.
3. Select the **Checked?** check box to confirm the microplate holder layout.
4. Click **Next**.
5. Remove all microplate lids.
6. In the **Load Plates** window, follow the instructions to correctly place the destination microplates.
7. Select the **Checked?** check box to confirm the destination microplate layout.
8. Click **Next**.
9. After the **Please Load Source** window is displayed, load the source receptacles in the correct locations on the instrument deck.
10. Close the instrument door.
11. Click **Next** to take a white light test image of the source receptacles. See Adjusting the Zone of Inhibition Detection White Light Test Image on page 97.

Adjusting the Zone of Inhibition Detection White Light Test Image

In the **Test Image** window, adjust the necessary exposure level to best view the foreground image from the background using the **Exposure** and **Gain** settings.

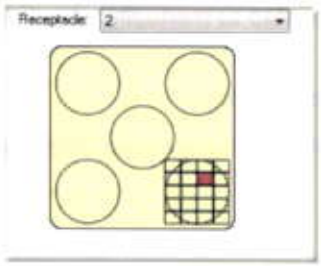
To view the pixel intensity values in the image map to manually set a detection threshold or detect areas of saturation within the image:

1. Right-click over the image map and select **Intensity**.
2. Move the cursor over the area of interest in the image map. The pixel intensity value automatically is displayed.



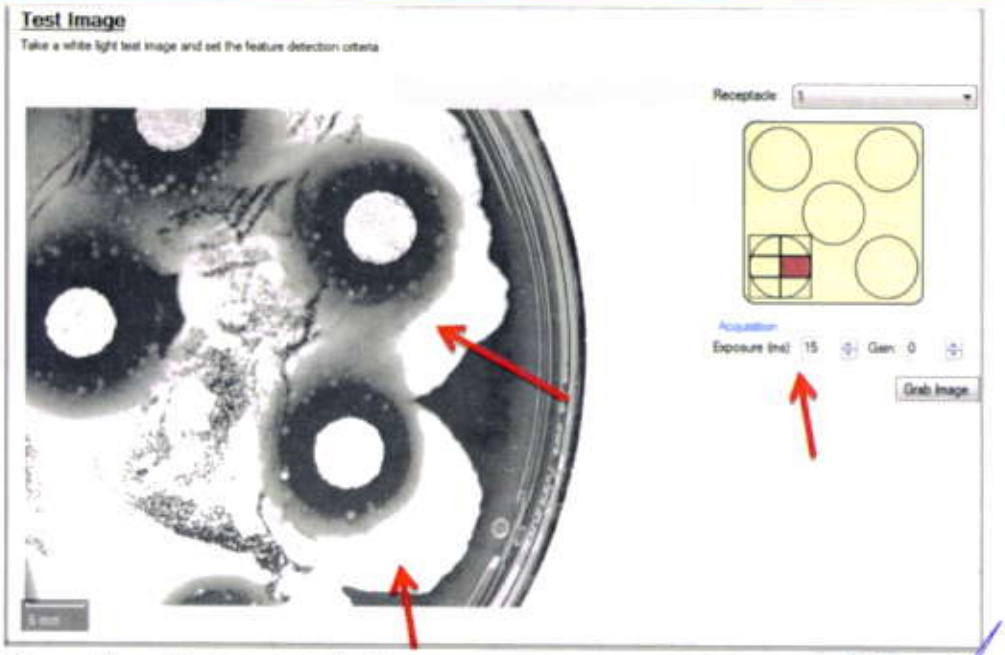
To adjust the test image:

1. From the **Receptacle** list, select the number of the receptacle to view and then click the frame that you want view in the receptacle image below the list. The selected frame is in red.



2. Under **Acquisition** adjust the **Exposure** and **Gain** settings.
   - In the **Exposure (ms)** field, type the number of milliseconds (from 10 to 1000) to expose the sample to light when acquiring the image.
   - Adjust the **Gain** to increase the image signal without changing the light exposure.

Tip: Increase the **Exposure** until the secondary layer is highly exposed and appears quite white.



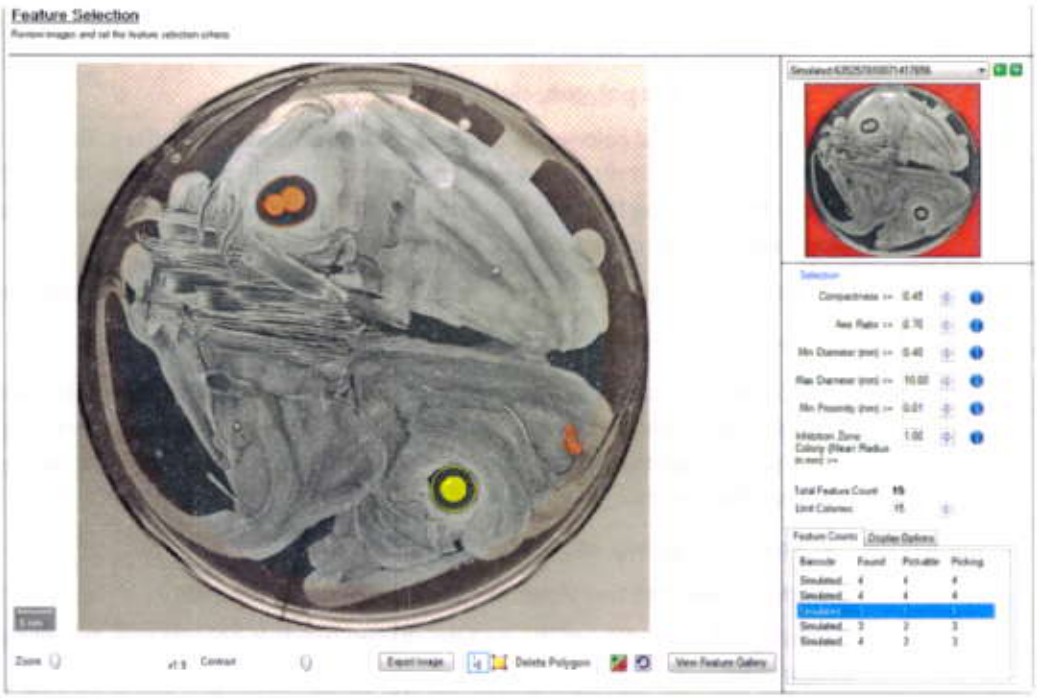
After making adjustments to the **Exposure** or **Gain** settings, click **Grab Image** to apply the new settings to the test image.

3. Click **Next** to go to the next step.

Zone of Inhibition Detection picking runs a routine for white light only, the system captures and processes a higher-resolution image and then displays the **Feature Selection** window. See Selecting Zone of Inhibition Detection Colonies for Picking on page 99.

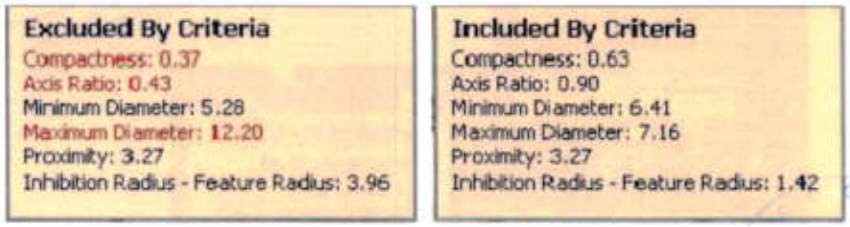
Selecting Zone of Inhibition Detection Colonies for Picking

After adjusting and refining test images, the system captures and processes a higher-resolution image using the test-image adjustments and then displays the **Feature Selection** window.



In the **Feature Selection** window, pickable objects show in yellow and unpickable object show in red. A colony can be considered unpickable if it is too close to the edge of the receptacle or it does not match the selection criteria.

To view the details of a displayed colony, hold the mouse pointer over that colony to display the properties of that colony. If a colony has not been selected as pickable, the reason for the exclusion shows in red text.



Drag the **Zoom** slider below the image to get a closer look at the image, and drag the **Contrast** slider to change the contrast between the objects and the background.

To save the image in .bmp, .jpg, or .png format, click **Export Image**.

To select a smaller region of interest (ROI) in the image, draw a polygon around the region. When you draw a polygon on the image, the system detects and picks colonies only from within the defined region of interest.



- To draw a polygon, click the **Draw Polygon** icon and then click on the image to define the corners of the polygon.
- To resize the polygon, drag the blue boxes on its corners.
- To remove the polygon, click **Delete Polygon**.

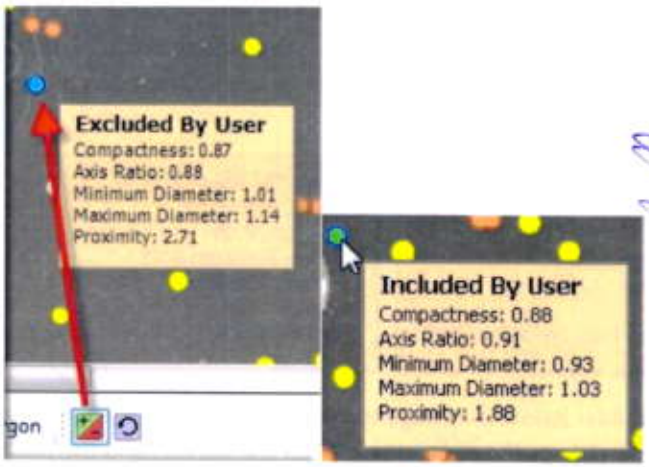
To display all found colonies in a gallery, click **View Feature Gallery**. The first time the gallery opens, a message is displayed while the gallery thumbnails generate. This is only displayed on the first opening for each run. The gallery displays an image for each detected colony along with specific colony **Selection** details.

- To outline the colony inhibition area, click the **Outline Inhibition** check box.
- To outline the colony, click the **Outline Colony** check box.
- To view the images in a different order, from the **Order By** field, select a different **Selection** criteria. Changes made in the **Selection** criteria section are displayed in real-time through the gallery images to show the colonies that meet or fail to meet the specified criteria.
- To exit the gallery, click **Return to Image**.

Switch between the two views to define the pickable colonies.

To change the selection of the system-chosen pickable objects that are displayed in the image map:

1. Click the **+/-** user selection button to override the system-chosen and unchosen objects.
2. Click the objects in the image map that you want to change.



- When clicked on as an override, the yellow-marked pickable objects change to blue and become unpickable.

  To undo your individual selection, right-click over the image map and select **Pick Item**. The object changes to green and becomes pickable.

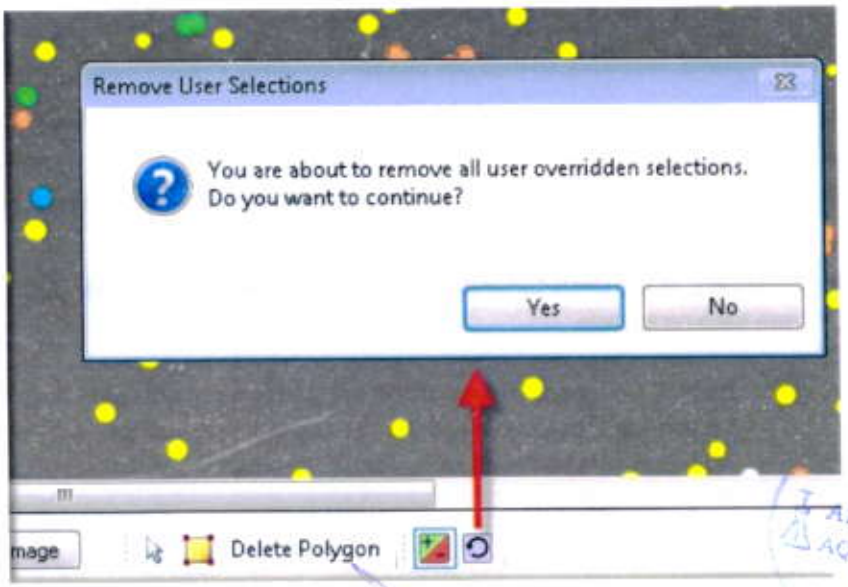


- When clicked on as an override, the red-marked unpickable objects change to green and become pickable.

  To undo your individual selection, right-click over the image map and select **Discard Item**. The object changes to blue and becomes unpickable.



To undo all of your user selections, click the remove user selections button, and when the **Remove User Selections** dialog is displayed, click **Yes**.



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To select the colonies for picking:

1. From the list in the upper-right, select the barcode or identifier of the receptacle to view.
2. Refine the colony **Selection** criteria.
   - **Compactness** sets the level of irregularity for picking colonies. The value is a ratio of the perimeter divided by the area of the colony, so that irregular shaped colonies are closer to 0 and colonies that are more of a perfect circle are closer to 1. The system default value is that a colony equal to or less than 0.65 and is not picked.
   - **Axis Ratio** measures how oval the colony is. The value is a ratio of the longest diameter divided by the shortest diameter, so oval shaped colonies will be closer to 0 and round colonies will be closer to 1. The system default value is that a colony equal to or less than 0.65 is not picked.
   - **Min Diameter (mm)** sets the minimum diameter of colonies for picking. A colony equal to or smaller than the value in this field is not picked.

     Note: The **Min Diameter (mm)** cannot be lower than the **Diameter** value set in the **Debris Discard** section of the test image.

   - **Max Diameter (mm)** sets the maximum diameter of colonies for picking. A colony equal to or greater than the value in this field is not picked.
   - **Min Proximity (mm)** sets the distance between colonies to be picked, so that when picking one colony, a different adjacent colony is not picked. The system default value is 0.45 mm.
   - **Inhibition Zone - Colony (Mean Radius in mm)** sets the criteria for picking colonies based on the size of the inhibition zone.
3. As required, manually change the pickable property of individual objects.
   - To define an object as pickable, right click the object and then click **Pick Item** to display the object in green.
   - To define an object as unpickable, right click the object and then click **Discard Item** to display the object in blue.
4. Optionally, in the **Limit Colonies** field, type the maximum number of colonies to pick from each receptacle.

   Note: If a limit was previously set for the maximum number of colonies in the **Source** window, the **Limit Colonies** option is not available in the **Feature Selection** window. See Setting Source Receptacle Options on page 46.

The **Total Feature Count** field displays the total number of pickable objects in the receptacle.

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5. Click the **Feature Counts** tab to view the number of found features in a source receptacle. The barcode or identifier for the source receptacle is displayed, along with the number of found colonies and the number of colonies to pick as determined by the selection criteria.
6. Click the **Display Options** tab to change the display options of the source receptacle image.

   Select the **Display Detected Features** check box to display all detected features with a yellow circle.

   - Select the **Shade Features** check box to give the detected colonies some shading for clearer visualization.
   - Select the **Display Proximity Indicators** check box to display connecting red lines between a detected colony and its closest neighbor.

   Select the **Shade Exclusion Zone** check box to display a red-shaded exclusion zone where the system cannot pick.
7. After you are satisfied with the feature selection criteria, click **Next**.
8. In the **Continue Or Save New Routine** dialog or the **Save Changes To Routine** dialog, select whether or not to save the routine before continuing with the picking process.

   If you are creating a new routine from scratch, the **Continue Or Save New Routine** dialog is displayed.

   - To save the settings for the routine before continuing, click **Save Routine**, type a **Name** and a short **Description** for the routine, and then click **Save**.
   - To continue without saving the settings for the routine, click **Routine Without Saving** and then click **OK**.

   If you are editing an existing routine, the **Save Changes To Routine** dialog is displayed.

   - To save the settings for the routine before continuing, click **Save**.
   - To save the settings as a new routine without changing the existing routine, click **Save As**, type a **Name** and a short **Description** for the routine, and then click **Save**.
   - To continue without saving the settings for the routine, click **No**.
9. If the Load Plates window is displayed, make sure that the destination microplates are loaded in the correct locations and follow the on-screen directions before selecting the **Checked?** check box.
10. Make sure that the instrument door is closed.
11. Click **Next** to start the picking process. See Viewing the Picking Progress on page 104.

Viewing the Picking Progress

While the picking routine is running, the **Picking Progress** window displays a summary of the routine.

- **Start Time** shows the time the picking of the colonies began.
- **Source Barcode** shows the barcode or identifier of the source receptacle being picked from.
- **Pin** is the picking pin being used for the current picking operation.
- **Copy Plate No** is the barcode of the copy receptacle that is being inoculated, if **Make Copy** was selected for the routine.
- **Destination Barcode** is the barcode of the destination receptacle that is currently being inoculated.
- **Destination Offset** is the reference well for where the pins are lowered. This value changes for 384-well microplates.
- **Colonies Picked** is the number of colonies picked so far.
- **Colonies To Pick** is the total number of colonies to be picked.
- **Estimated Time Remaining** indicates remaining time in the routine.
- **Current Action** displays what the system is currently doing, such as **Pick** when the system is picking.

To turn the light table on or off, click **Light Table On** or **Light Table Off**.

To safely pause the routine, click **Pause**.

After all the colonies have been picked from the source receptacles and delivered to the destination microplates, the **Finished Picking Current Batch** dialog is displayed. See Viewing the Zone of Inhibition Detection Picking Summary on page 105.

Viewing the Zone of Inhibition Detection Picking Summary

After all picking routines are completed, the **Zone of Inhibition Detection Picking Summary** window is displayed, showing the number of source colonies picked, the number of destination plates used, and missing source receptacles.

To save this information in .csv format, click **Export**.

To view details of all activities related to the source and destination receptacles, click **Details**.

- To save the detailed information in .csv format, click **Export**.
- To close the picking details and return to the **Zone of Inhibition Detection Picking Summary** window, click **Close**.

In the **Zone of Inhibition Detection Picking Summary** window, click **Next** and then click **Finish** to return to the **Zone of Inhibition Detection Picking** window.

In the **Zone of Inhibition Detection Picking** window, click **Close Process** to return to the **Navigation** window.

Chapter 9: Regional Picking Processes

9

The QPix™ 420 Colony Picking System is capable of picking colonies from receptacles using either standard picking or regional picking. You can also set up control wells for the destination microplates before running a picking process.

The following options are available in the **Navigation** window under **Picking Processes**:

- **Picking** picks colonies from receptacles using the standard process. See Picking Processes on page 39
- **Blue-White Picking** picks blue or white colonies from receptacles using the standard process. See Blue-White Picking Processes on page 63.
- **Zone of Inhibition Detection Picking** picks colonies with detectable zones of inhibition from receptacles using the standard process. See Zone of Inhibition Detection Picking Processes on page 85.
- **Regional Picking** picks colonies from receptacles using the regional process described in this chapter.
- **Blue-White Regional Picking** picks blue or white colonies from receptacles using the regional process.See Blue-White Regional Picking Processes on page 133.
- **Control Plate Creation** creates a batch of microplates containing specified control samples. These can be created by picking colonies from specified source receptacles into specified destination wells. See Control Plate Creation Processes on page 157.
- **Create New Regional Tray** adds new microplate source definitions to the regional picking plate type database, which can then be selected for use in the regional picking process. See Create New Regional Tray Processes on page 177.

Note: Before running a regional picking process, it is important that you do the cleaning and set up procedures in Preparing to Run a Process on page 27.

If this is your first regional picking process, you must edit or create a **Sanitise** profile to use with the regional picking process. See Creating and Editing Sanitise Profiles on page 34.

Depending on the features of your system, you can use either white light or fluorescence imaging for the regional picking processes. If you have a white light only system and would like to add fluorescence capability, contact your Molecular Devices representative or technical support. See Obtaining Support on page 248.

Note: If you have a fluorescence imaging module on your system and run a regional picking process that uses white light only, the process takes longer than a white light regional picking process on a white light only system, since the fluorescence imaging module captures more images during the process.

Creating and Editing a Regional Picking Process

The procedures for creating and editing standard or regional picking processes are very similar. The regional picking process has more options available for defining the regions for picking.

If this is your first regional picking process, you must edit or create a **Sanitise** profile to use with the regional picking process. See Creating and Editing Sanitise Profiles on page 34.

Creating and editing a regional picking process involves the following procedures:

- Opening the Regional Picking Window on page 109
- Selecting a Regional Picking Routine on page 109
- Selecting Barcode Options and Filter Pairs for Fluorescent Imaging on page 111
- Setting Destination Microplate Options on page 112
- Selecting the Regional Picking Source on page 113
- Setting Regional Picking Source and Destination Options on page 114
- Selecting the Head and Sanitizing Options on page 116
- Viewing the Settings Summary on page 116
- Changing the Picking Head on page 117

After creating the routine, you can close the process and run it at a later time, or you can run it immediately.

Note: Some steps that are included in these procedures might not be available to you, depending on the features included with your instrument and license. Optional features are identified within the procedures when applicable.

Opening the Regional Picking Window

1. From the **Navigation** window under **Picking Processes**, double-click the **Regional Picking** icon.
2. In the **Regional Picking** window, click **Picking Type** to view the picking type options, if applicable.
   - Select **White Light** to use only white light to illuminate and identify the colonies to pick.
   - Select **White Light And Fluorescent** to use white light to illuminate and identify colonies, and fluorescent light for determining the desired colonies to pick. This option is available only for instruments with a fluorescence imaging module.
3. Click **Apply**.
4. Click **Start**.

The system "homes" the drives, and then displays the **Routines** window. See Selecting a Regional Picking Routine on page 109.

Selecting a Regional Picking Routine

1. In the **Routines** window, select to create a new routine from scratch or to edit an existing routine.
   - To create a new routine from scratch, click **New Routine**.
   - To edit an existing routine, click **Run Existing Routine** and then select the name of the routine from the **Select Routine** list.

     If you want to run the selected routine without making changes, select the **Skip Steps** check box.
2. Click **Next** to go to the next step.
   - If you selected to create a new routine from scratch or to edit an existing routine, see Selecting Barcode Options and Filter Pairs for Fluorescent Imaging on page 111.
   - If you selected the **Skip Steps** check box to run the selected routine without making changes, see Viewing the Settings Summary on page 116.

Note: You can import, export, and delete routines in the **Routines** window. See Adding and Removing Regional Picking Routines on page 110.

Adding and Removing Regional Picking Routines

The **Select Routine** list contains the related routines that are in the database. Only routines that match the type of routine that you are creating are included in the list. For example, a white light and fluorescent imaging routine is not included in the **Select Routine** list if you are creating a White Light only routine.

If you have a saved routine from a different computer, you can import the routine. You can also export a routine from the database so that it can be imported into the database on a different computer. If you no longer need a routine, you can permanently delete it from the database.

Importing a Routine

Before you can import a routine, you need to export the routine from the other computer in .xml format and then save the export file on the system computer.

To import the .xml file, click **Import** and then locate and select the file. Click **Import** to add the routine to the database. If the routine is of the same type as the one you are creating, then the imported routine is displayed in the **Select Routine** list.

Exporting a Routine

To export a routine, click **Export** and then navigate to the location that you want to save the .xml file. You can change the name of the file, if desired. Click **Export** to save the routine in .xml format.

Deleting a Routine

Molecular Devices recommends that you export the routine before deleting it. This lets you import the routine at a later time if desired.

To delete a routine, select the routine in the **Select Routine** list and then click **Delete**. In the **Delete Routine** dialog, click **OK** to permanently remove the routine from the database.









Selecting Barcode Options and Filter Pairs for Fluorescent Imaging

If you are creating or editing a routine for white light only, the **Barcodes** window is displayed.

If you are creating or editing a routine for white light and fluorescent imaging, the **Filter Pair And Barcodes** window is displayed. This option is available only for instruments with a fluorescence imaging module.

Selecting a Filter Pair

Select a fluorescent excitation and emission pair from the **FilterPair** list. This option is available only for instruments with a fluorescence imaging module.

Using a Barcode Reader

Note: Molecular Devices recommends that you always use barcodes for accurate data tracking.

1. Select the **Use Barcode Reader** check box to scan source and destination receptacles for barcodes.

   To define unique identifiers for source receptacles without scanning for barcodes, see Defining Unique Identifiers Without Barcodes on page 112.

2. Click a **Read Failure Option** to define the system response when a barcode cannot be read correctly.

   - Click **Manual Prompt** to open a dialog where you can type a barcode or name for the receptacle.
   - Click **Skip Receptacle** to ignore the receptacle and scan the next receptacle for a barcode.

     Note: If the system fails to identify a barcode for the source receptacle, the routine ends, since the source requires a valid barcode.

   - Click **Auto Generate** to allow the system to automatically assign a valid random barcode and continue the routine.

3. Optionally, use the **Validation Barcode** list to define all the valid barcodes for source receptacles. If the scanned barcode on a source receptacle cannot be found in the list, an error message is displayed.

   - To manually enter valid barcodes, type each barcode in the field below the list and then click **Insert**.
   - To import valid barcodes from a text or .csv file, click **Import** and then select the file from which to import the barcodes.
   - To use the valid barcodes in the database, click **From Database**.
   - To remove a barcode from the list, click the barcode in the list and then click **Remove**.

4. Click **Next** to define the destination receptacles. See Setting Destination Microplate Options on page 112.

Defining Unique Identifiers Without Barcodes

1. Clear the **Use Barcode Reader** check box to define unique identifiers for source receptacles without scanning for barcodes.

   To scan source and destination receptacles for barcodes, see Using a Barcode Reader on page 111.

2. Select the method for defining the unique identifiers.

   - To have the software generate random identifiers with the prefix **Auto** for the source receptacles, select the **Generate Random Barcodes** check box . No other parameters are required for this option.
   - To manually define identifiers for the source receptacles, type each identifier in the field below the **Barcode** list and then click **Insert**.
   - To import identifiers for the source receptacles from a text or .csv file, click **Import** and then select the file from which to import the identifiers.
   - To generate a defined list of identifiers for the source receptacles, click **Generate List**.

     To define the parameters for the generated list, type static text for the start of the identifier in the **Prefix** field, the first number to generate in the **Start Number** field, the number of digits in the generated number in the **Digit Padding** field, and the number of identifiers to generate in the **Number to Generate** field. The **Preview** area shows examples of the first and last generated identifiers. To view the generated identifiers in the **Barcodes** list, click **Generate**.
   - To remove an identifier from the list, click the identifier in the list and then click **Remove**.

3. Click **Next** to define the destination receptacles. See Setting Destination Microplate Options on page 112.

Setting Destination Microplate Options

1. In the **Destination Plates** window, from the **Select Destination Microplate** list, select the microplate type to be inoculated with the picked colonies. If the microplate type that you need is not listed, contact Molecular Devices to add a new microplate type to the list. See Obtaining Support on page 248.
2. Select either to dip the pins a specified number of times or to stir the wells of the destination microplate during inoculation.

   - To dip the pins a specified number of times, click **Multi Dip** and in the **Number of Dips** field, type the number of times to dip the pins.
   - To stir the wells, click **Stir Destination**.

3. Optionally, select the **Make Copy** check box and from the **Select Copy Microplate** list select the microplate type to use for a duplicate copy of the destination microplate.
4. Click **Next** to define the regional picking source. See Selecting the Regional Picking Source on page 113.

For more destination settings, see Setting Regional Picking Source and Destination Options on page 114.

Selecting the Regional Picking Source

Note: The types of source receptacles used for regional picking are limited. Depending on the configuration of your system, you might have only one option in the **Holder** list, in which case the **Receptacle** option is preset and cannot be changed. If the type of source receptacle that you need is not listed, contact Molecular Devices to add a new source receptacle type to the list. See Obtaining Support on page 248.

1. In the **Source** window, from the **Holder** list, select the type of holder used to hold the source receptacles on the instrument deck.
2. From the **Receptacle** list, if available, select the type of receptacle used for the source. Only the receptacles applicable for the selected holder are displayed in this list.
   The preview image displays a representation of the selected holder and receptacle.
3. In the **Positions** field, type the number of receptacles to use for picking.
4. In the **Offset** field, type the position of the first receptacle to be used for picking.
   The preview image displays the defined locations of the receptacles.

   Note: If you are using Validation barcodes, only one source receptacle is displayed, and the **Positions** and **Offset** fields are not available.
5. In the **Picking Depth Into Agar (mm)** field, type a value in millimeters to define the depth that the pins are to be inserted in the agar for picking.
6. Click **Next** to the source and destination options. See Setting Regional Picking Source and Destination Options on page 114.

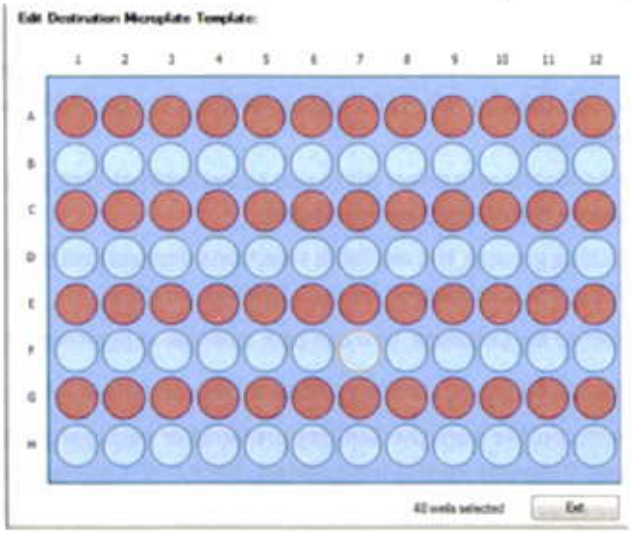
Setting Regional Picking Source and Destination Options

1. In the **Destination/Source Options** window, optionally select the **Limit Max. Number Of Features Per Region** check box and then in the **Number Of Features Per Region** field, type a value for the maximum number of colonies that can be picked from a single source receptacle. The following options are also available.

   Note: Setting a limit for the maximum number of colonies in the **Destination/Source Options** window prevents selecting a maximum number in the **Feature Selection** window when running the picking routine. See Selecting Colonies for Regional Picking on page 125.

   - Select the **Reserve Wells For Regions** check box to leave wells empty if the number of colonies per region is not reached. For example, if you had selected to pick 8 colonies per region, but only 6 colonies were eligible for picking, then wells 7 and 8 would be left blank.
   - Select the **Skip Region If Number of Features Not Found** check box to ignore the region if the target number of features set in **Number of Features Per Region** is not met.
   - Select the **Keep Picked Regions Together** check box to have colonies that are picked from the same region delivered to the same destination plate.
   - With the **Reserve Wells For Region** check box selected, select the **Skip Region If Picking Count is Zero** check box to skip regions that have a picking count of zero.
2. Select the **Deposit Order** to deposit the picked colonies in the destination microplates **By Columns** or **By Rows**.
3. Define the **Deposit Strategy**.
   - Click **Fill All Microplates** to fill every selected well of a destination microplate before starting a new destination microplate.
   - Click **New Microplate For Each Position** to start a new destination microplate whenever the instrument starts picking from a different source QTray or Petri dish.
4. Select a **Pick Order** option.
   - Click **Standard** to pick from regions in straight columns from the source receptacle, such as A1 to A8, B1 to B8, and so on.
   - Click **Plating Order** to pick from square blocks of eight regions, such as A1 to B4, A5 to B8, and so on.

5. Optionally, under **Destination Microplate Template**, click **Edit** to define the wells to dip or skip. You can skip wells that you want to use as blank or control wells. The defined template is used for all the destination microplates during the picking routine.



   - To skip a well, click the well. Wells to be skipped are displayed in light blue.
   - To skip multiple contiguous wells, right-click and drag across the wells.
   - To dip a well that you selected to skip, click the well again. Wells to be dipped are displayed in light red.

   After defining the wells to dip or skip, click **Exit**.

6. Click **Next** to define the picking head and the **Sanitise** profile. See Selecting the Head and Sanitizing Options on page 116.

Selecting the Head and Sanitizing Options

1. In the **Head** and **Sanitise** window, from the **Picking Head** list, select the head to use for the picking routine.
2. From the **Pin Columns (Rows) Before Inoculation** list, select the number of pins to use for picking in each column or row before transferring the picked colonies to the destination microplate.

   For the fastest transfer rate select **All** to use all available picking pins to pick colonies before inoculating the destination microplate.

   For smaller picking groups, the available selections depends on the **Deposit Order** selection made in the **Destination/Source Options** window.

   - If you selected **By Columns**, you can pick colonies using from **1** to **11** columns.
   - If you selected **By Rows**, you can pick colonies using from **1** to **7** rows.

   To run the wash routine from the **Sanitise** profile after each partial pick and inoculation, select the **Wash Between Partial Inoculation** check box. Clearing this check box waits until all pins have been used for picking and inoculation before running the wash routine.
3. In the **Destination** field, type a value for the distance in millimeters above the bottom of the destination microplate wells to dip the pins for the inoculation.

   If you selected **Make Copy** for the destination microplate, type a value for the copy.
4. From the **Sanitise Profile** list, select the **Sanitise** profile to use for the picking routine.

   If the available profiles are not suitable for the regional picking routine, exit the regional picking process and create a new **Sanitise** profile. See Creating and Editing Sanitise Profiles on page 34.
5. Click **Next** to view a summary of the settings. See Viewing the Settings Summary on page 116.

Viewing the Settings Summary

The **Settings Summary** window contains a full summary of the picking routine settings you just configured.

Review the summary details to make sure that the settings and options are configured correctly for the regional picking routine. If you need to make changes, click **Back** until you return to the window where the changes can be made.

To print the summary, click **Print**.

To run the regional picking routine, click **Next**. See Running a Regional Picking Process on page 118.

Changing the Picking Head

The **Change Head** window reminds you which picking head should be loaded, based on the **Setting Summary** routine you just configured, and provides you an opportunity to change the head if needed.

The head is housed in a unique actuator system that permits easy exchange and set-up of the head.

Although it is possible to manually move the actuator assembly, Molecular Devices recommends using the software to safely move the actuator into position to remove or install the head.

WARNING! PINCH HAZARD. The actuator assembly has moving parts that can cause pinch injuries if it is moved manually. To prevent pinch injuries, use the software Change Head process to safely move the actuator.

To change the picking head:

1. Click **Move to Load Position** to move the picking head arm to the loading position.
2. When the warning message is displayed, make sure that the bed is clear of obstructions and that the door is closed, and then click **OK** to move the actuator into position near the front of the instrument.
3. Open the front door.
4. Install the specified picking head.
   - To remove an installed head, unscrew and remove the thumbscrew and washer on the left that secures the head to the actuator assembly. Then, grab the handle on the right and slide the head out of the actuator.

     Before storing the head, or whenever it needs cleaning, wipe the exterior of the head with a cloth using 70% ethanol. To store the head, slide it into its metal cover with the pins facing inward and then secure it in place with the thumbscrew and washer.
   - To install a head, hold the head by its handle with the pins pointing down and then slide the head into the actuator assembly from the right. Then, attach the thumbscrew and washer on the left and hand tighten the thumbscrew to secure the head to the actuator.
5. Close the front door.
6. Click **Move to Park Position** to move the picking head arm to the run ready park position.
7. When the warning message is displayed, make sure that the bed is clear of obstructions and that the door is closed, and then click **OK** to home the actuator to its starting position.
8. To run the picking routine, click **Next**. See Running a Regional Picking Process on page 118.

Running a Regional Picking Process

After a regional picking routine has been configured, you can run the process on the instrument. If you have not configured the regional picking routine you want to run, you must create a new regional picking routine or edit an existing routine. See Creating and Editing a Regional Picking Process on page 108.

Note: Before running a regional picking process, it is important that you do the cleaning and set up procedures in Preparing to Run a Process on page 27.

Some steps that are included in these procedures might not be available to you, depending on the features included with your instrument and license. Optional features are identified within the procedures when applicable.

To run a configured regional picking routine:

1. Open the **Regional Picking** window. See Opening the Regional Picking Window on page 109.
2. Select the picking routine you want to run. See Selecting a Regional Picking Routine on page 109.

   If you do not need to make changes to the selected routine, select the **Skip Steps** check box before clicking **Next**.
3. Review the configured settings for the routine. See Viewing the Settings Summary on page 116.
4. In the **Settings Summary** window, click **Next** to arrange the source microplates in the instrument. See Arranging the Microplate Layout on page 119.

Arranging the Microplate Layout

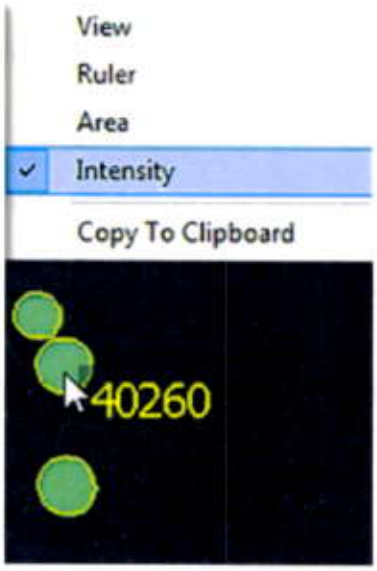
1. Open the instrument door.
2. In the **Holder Layout Summary** window, follow the instructions to correctly arrange the microplate holders in the instrument. The layout is defined by the selections you made in earlier steps.
3. Select the **Checked?** check box to confirm the microplate holder layout.
4. Click **Next**.
5. Remove all microplate lids.
6. In the **Load Plates** window, follow the instructions to correctly place the destination microplates.
7. Select the **Checked?** check box to confirm the destination microplate layout.
8. Click **Next**.
9. After the **Please Load Source** window is displayed, load the source receptacles in the correct locations on the instrument deck.
10. Close the instrument door.
11. Click **Next** to take a white light test image of the source receptacles. See Adjusting the White Light Test Image on page 119.

Adjusting the White Light Test Image

In the **Test Image** window, all detected features are viewed as potential colonies to pick for inoculation of the destination microplates. To make sure that only colonies are detected, adjust the test image in this window using the **Exposure** and **Gain** settings, the **Detection** settings, the **Display** settings, the **Debris** settings, and the **Depth** settings. Each detected feature is displayed within a yellow ring.

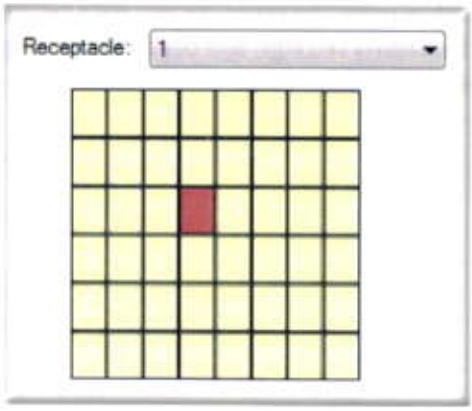
To view the pixel intensity values in the image map to manually set a detection threshold or detect areas of saturation within the image:

1. Right-click over the image map and select **Intensity**.
2. Move the cursor over the area of interest in the image map. The pixel intensity value automatically is displayed.



To adjust the test image:

1. From the **Receptacle** list, select the number of the receptacle to view and then click the region that you want view in the receptacle image below the list. The selected region is in red.



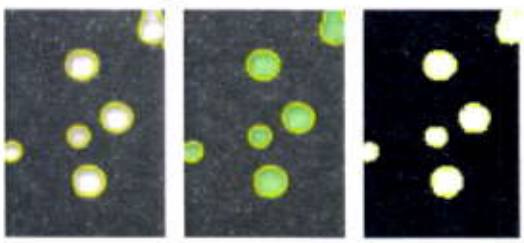
2. Under **Acquisition** adjust the **Exposure** and **Gain** settings.
   - In the **Exposure (ms)** field, type the number of milliseconds (from 10 to 1000) to expose the sample to light when acquiring the image.
   - Adjust the **Gain** to increase the image signal without changing the light exposure.

After making adjustments to the **Exposure** or **Gain** settings, click **Grab Image** to apply the new settings to the test image.

3. Click the **Detection** tab.
4. Select the **Use Auto Thresholding** check box to have the software automatically detect the colonies in the image.

   To manually detect the colonies, clear this check box and drag the slider until all the desired colonies are detected and the background is not.
5. With the **Use Auto Thresholding** check box selected , select the **Auto Threshold Each Region** check box to process each region with its own uniquely calculated value.

   To process the regions using a value calculated of the entire image, clear this check box.
6. With the **Auto Threshold Each Region** check box selected, type threshold values in the **Low Limit** and **High Limit** fields.
   - To determine the **Low Limit** value, clear the **Use Auto Thresholding** check box and then drag the slider to the left until some background is clearly detected. Select the **Use Auto Thresholding** check box and the **Auto Threshold Each Region** check box again and then type the value from the **Threshold** field into the **Low Limit** field.
   - To determine the **High Limit** value, clear the **Use Auto Thresholding** check box and then drag the slider to the right until some colonies start to become undetected. Select the **Use Auto Thresholding** check box and the **Auto Threshold Each Region** check box again and then type the value from the **Threshold** field into the **High Limit** field.
7. Select the **Invert Image** check box to make dark areas bright and bright areas dark.
8. Select the **Subtract Background** check box to have the background become nearly black.
9. Click the **Display** tab.
10. Select the method for viewing the detected colonies in the image.
    - Click **Image Only** to display the detected colonies in white with yellow rings and a gray background.
    - Click **Image and Overlay** to display the detected colonies in green with yellow rings and a gray background.
    - Click **Overlay only** to display the detected colonies in white with yellow rings and a black background.



To remove the yellow ring from the detected colonies, clear the **Outline Detected Features** check box.

11. Click the **Debris** tab.
12. Adjust the **Diameter** and **Axis Ratio** to exclude objects that are smaller than the desired colonies. Each detected feature is displayed within a yellow ring while excluded features do not have a yellow ring.
    - In the **Diameter (mm)** field type a value in millimeters for the minimum diameter of the desired colonies.
    - In the **Axis Ratio (%)** field, define the minimum roundness ratio of the desire colonies.
13. Click the **Depth** tab.
14. Adjust the Agar **Depth**, **Height**, and **Maximum Height** manually, as needed.
    - In the **Agar Depth (mm)** field type a value in millimeters for the depth that the picking head descends into the source agar.
    - The **Agar Height (mm)** field is read only and displays the height, or thickness, of the detected agar within the source tray.
    - The **Max. Agar Height (mm)** field is read only and displays the .maximum agar height for a long pin head to descend into the source agar

> **Note:** Further refinement for colony detection can be done on a higher-resolution image in the **Feature Selection** window. See Selecting Colonies for Regional Picking on page 125.

15. Click **Next** to go to the next step.
    - If you are running a routine for white light only, the system captures and processes a higher-resolution image and then displays the **Feature Selection** window. See Selecting Colonies for Picking on page 54.
    - If you are running a routine for white light and fluorescent imaging, the **Fluorescent Test Image** window is displayed. See Adjusting the Fluorescent Test Image on page 123.

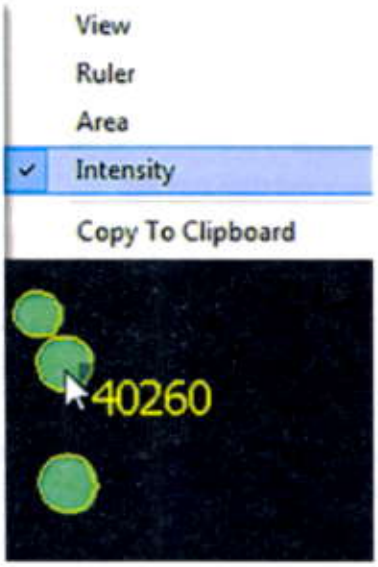
АКВАХИМ
AQUACHIM
BULGARIA

Adjusting the Fluorescent Test Image

If you are running a routine for white light and fluorescent imaging, the **Fluorescent Test Image** window is displayed after making adjustments for the white light test image. This option is available only for instruments with a fluorescence imaging module.

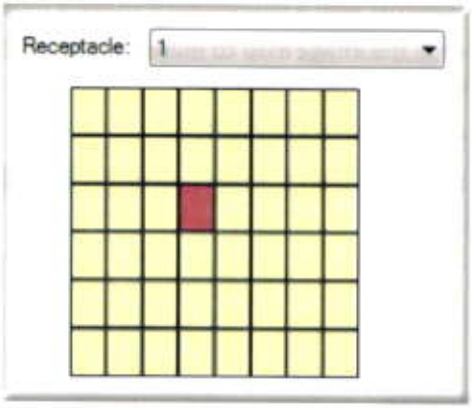
To view the pixel intensity values in the image map to manually set a detection threshold or detect areas of saturation within the image:

1. Right-click over the image map and select **Intensity**.
2. Move the cursor over the area of interest in the image map. The pixel intensity value automatically is displayed.



To adjust the test image:

1. From the **Receptacle** list, select the number of the receptacle to view and then click the region that you want view in the receptacle image below the list. The selected region is in red.

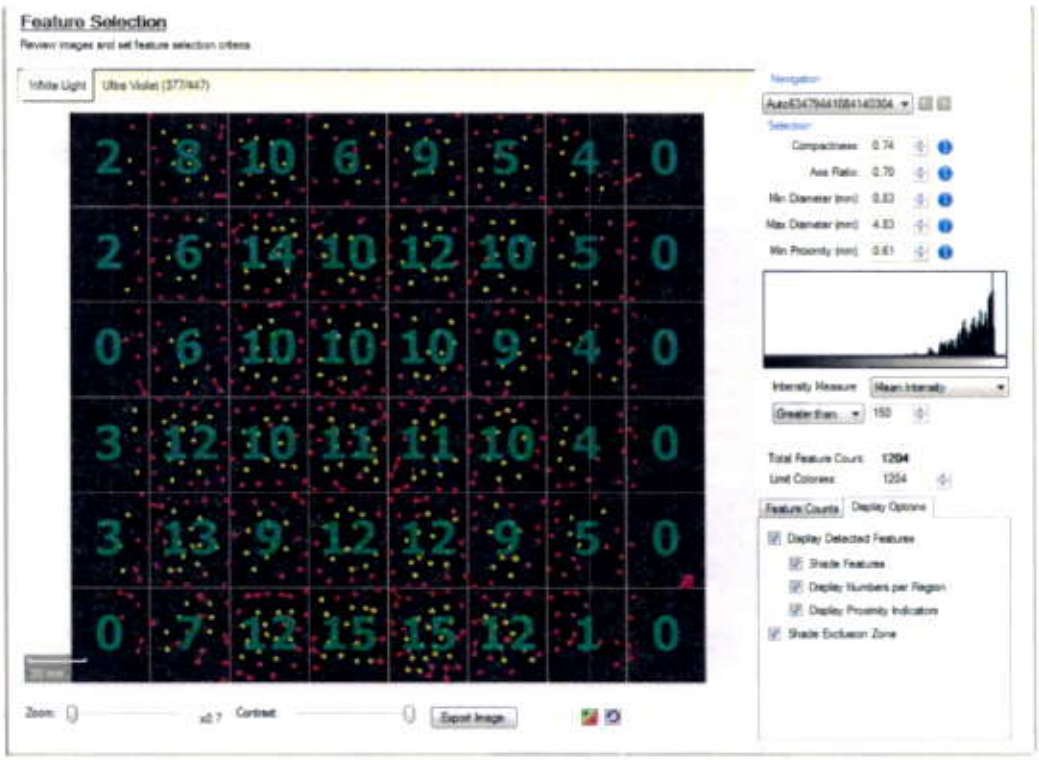


2. Under **Acquisition** adjust the **Exposure** and **Gain** settings.
   - In the **Exposure (ms)** field, type the number of milliseconds (from 10 to 1000) to expose the sample to light when acquiring the image.
   - Adjust the **Gain** to increase the image signal without changing the light exposure.

   After making adjustments to the **Exposure** or **Gain** settings, click **Grab Image** to take a new test image with the new settings.
3. Click **Next** to capture and process a higher-resolution image and then open the **Feature Selection** window. See Selecting Colonies for Regional Picking on page 125.

Selecting Colonies for Regional Picking

After adjusting and refining test images, the system captures and processes a higher-resolution image using the test-image adjustments and then displays the **Feature Selection** window.



In the **Feature Selection** window, pickable objects are displayed in yellow and unpickable object are displayed in red. The number of pickable colonies in each region is displayed in green. A colony can be considered unpickable if it is too close to the edge of the receptacle or it does not match the selection criteria.

To view the details of a displayed colony, hold the mouse pointer over that colony to display the properties of that colony. If a colony has not been selected as pickable, the reason for the exclusion is displayed in red text.

Excluded By Criteria
Compactness: 0.73
Axis Ratio: 0.43
Minimum Diameter: 0.76
Maximum Diameter: 1.78
Proximity: 0.49
Mean Intensity: 61274.33
Median Intensity: 65520.00
Geometric Mean Intensity: 35403.95
Centre Mean Intensity: 65520.00

Included By Criteria
Compactness: 0.83
Axis Ratio: 0.86
Minimum Diameter: 0.82
Maximum Diameter: 0.96
Proximity: 0.74
Mean Intensity: 59714.24
Median Intensity: 65520.00
Geometric Mean Intensity: 29550.89
Centre Mean Intensity: 65520.00

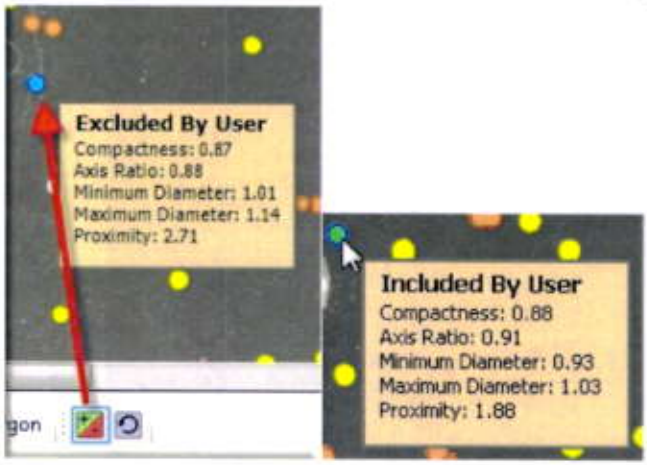
Note: During image processing, each object with no yellow ring in the test image is automatically excluded from becoming a pickable object.

Drag the **Zoom** slider below the image to get a closer look at the image, and drag the **Contrast** slider to change the contrast between the objects and the background.

To save the image in .bmp, .jpg, or .png format, click **Export Image**.

To change the selection of the system-chosen pickable objects that are displayed in the image map:

1. Click the **+/-** user selection button to override the system-chosen and unchosen objects.
2. Click the objects in the image map that you want to change.



- When clicked on as an override, the yellow-marked pickable objects change to blue and become unpickable.

  To undo your individual selection, right-click over the image map and select **Pick Item**. The object changes to green and becomes pickable.



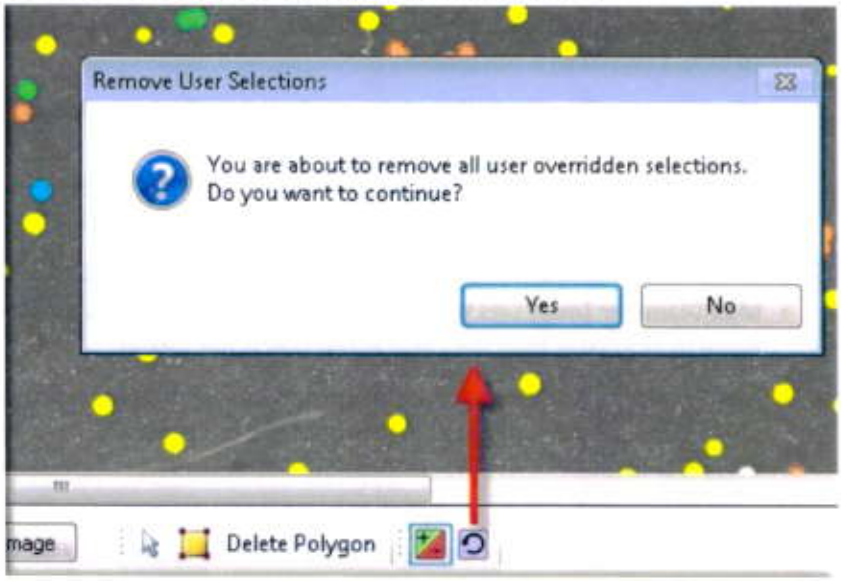
- When clicked on as an override, the red-marked unpickable objects change to green and become pickable.

  To undo your individual selection, right-click over the image map and select **Discard**

Item. The object changes to blue and becomes unpickable.



To undo all of your user selections, click the remove user selections button, and when the **Remove User Selections** dialog is displayed, click **Yes**.



If you are running a routine for white light and fluorescent imaging, two tabs are available.

- The **White Light** tab displays the image taken with white light.
- The other tab is labeled with the selected fluorescent filter pair and displays the image taken with fluorescent light.

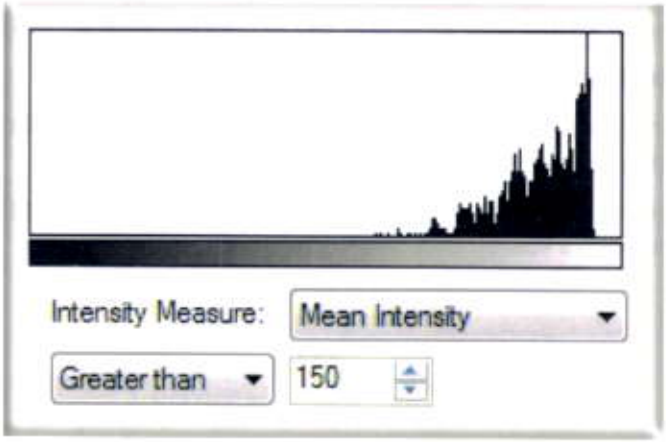
Switch between the two images to define the pickable colonies. This option is available only for instruments with a fluorescence imaging module.

To select the colonies for regional picking:

1. From the list in the upper-right, select the barcode or identifier of the receptacle to view.
2. Refine the colony **Selection** criteria.
   - **Compactness** sets the level of irregularity for picking colonies. The value is a ratio of the perimeter divided by the area of the colony, so that irregular shaped colonies are closer to 0 and colonies that are more of a perfect circle are closer to 1. The system default value is that a colony equal to or less than 0.65 and is not picked.
   - **Axis Ratio** measures how oval the colony is. The value is a ratio of the longest diameter divided by the shortest diameter, so oval shaped colonies will be closer to 0 and round colonies will be closer to 1. The system default value is that a colony equal to or less than 0.65 is not picked.
   - **Min Diameter (mm)** sets the minimum diameter of colonies for picking. A colony equal to or smaller than the value in this field is not picked.

     Note: The **Min Diameter (mm)** cannot be lower than the **Diameter** value set in the **Debris Discard** section of the test image.

   - **Max Diameter (mm)** sets the maximum diameter of colonies for picking. A colony equal to or greater than the value in this field is not picked.
   - **Min Proximity (mm)** sets the distance between colonies to be picked, so that when picking one colony, a different adjacent colony is not picked. The system default value is 0.45 mm.
3. For a fluorescent image, adjust the **Intensity Measure** as shown in the histogram. This option is available only for instruments with a fluorescence imaging module.



- **Mean Intensity** is the average fluorescence of the detected colony (the fluorescence of all the pixels within the colony perimeter divided by the number of pixels within the colony perimeter).
- **Median Intensity** is the middle fluorescence value of all the pixels within the detected colony perimeter.
- **Geometric Intensity** is the geometric intensity of the detect colony or the fluorescence of all the pixels within the colony perimeter.
- **Centre Mean Intensity** is the average fluorescence value of the middle 9 pixels within the detected colony perimeter.

Select **Greater than**, **Less than**, or **Between** and then type a value in the field to define the fluorescence intensity threshold. For **Between**, type two values to define the range.

4. As required, manually change the pickable property of individual objects.
   - To define an object as pickable, right click the object and then click **Pick Item** to display the object in green.
   - To define an object as unpickable, right click the object and then click **Discard Item** to display the object in blue.
5. Optionally, in the **Limit Colonies** field, type the maximum number of colonies to pick from each region.



Note: If a limit was previously set for the maximum number of colonies in the **Destination/Source Options** window, the **Limit Colonies** option is not available in the **Feature Selection** window. See Setting Source Receptacle Options on page 46.

The **Total Feature Count** field displays the total number of pickable objects in the receptacle.

6. Click the **Feature Counts** tab to view the number of found features in the regions of the source receptacle configured in columns.
   - The **Well** column identifies the region of the source receptacle.
   - The **Found** column gives the number of colonies found in that region.
   - The **Pickable** column gives the number of pickable colonies in that region, based on the selection criteria.
   - The **Picking** column gives the number of colonies that are to be picked in that region, based on the selection criteria

   To save the data in .csv format, right-click and then click **Export**.
7. Click the **Display Options** tab to change the display options of the source receptacle image.

   Select the **Display Detected Features** check box to display all detected features with a yellow circle.

- Select the **Shade Features** check box to give the detected colonies some shading for clearer visualization.
- Select the **Display Numbers per Region** check box to display the number of pickable colonies for each region on the receptacle image. If you have not placed a limit on the number of colonies to pick for each region, all the numbers are displayed in green. If you have created a limit on detectable colonies, the number is displayed in green if the criteria are acceptable or red if they are not.
- Select the **Display Proximity Indicators** check box to display connecting red lines between a detected colony and its closest neighbor.

Select the **Shade Exclusion Zone** check box to display a red-shaded exclusion zone where the system cannot pick.

8. After you are satisfied with the feature selection criteria, click **Next**.
9. In the **Continue Or Save New Routine** dialog or the **Save Changes To Routine** dialog, select whether or not to save the routine before continuing with the regional picking process.

   If you are creating a new routine from scratch, the **Continue Or Save New Routine** dialog is displayed.

   - To save the settings for the routine before continuing, click **Save Routine**, type a **Name** and a short **Description** for the routine, and then click **Save**.
   - To continue without saving the settings for the routine, click **Routine Without Saving** and then click **OK**.

   If you are editing an existing routine, the **Save Changes To Routine** dialog is displayed.

   - To save the settings for the routine before continuing, click **Save**.
   - To save the settings as a new routine without changing the existing routine, click **Save As**, type a **Name** and a short **Description** for the routine, and then click **Save**.
   - To continue without saving the settings for the routine, click **No**.
10. Make sure that the instrument door is closed.
11. Click **OK** to start the regional picking process. See Viewing the Regional Picking Progress on page 131.

Viewing the Regional Picking Progress

While the regional picking routine is running, the **Regional Picking Progress** window displays a summary of the routine.

- **Start Time** shows the time the picking of the colonies began.
- **Source Barcode** shows the barcode or identifier of the source receptacle being picked from.
- **Pin** is the picking pin being used for the current picking operation.
- **Copy Plate No** is the barcode of the copy receptacle that is being inoculated, if **Make Copy** was selected for the routine.
- **Destination Barcode** is the barcode of the destination receptacle that is currently being inoculated.
- **Destination Offset** is the reference well for where the pins are lowered. This value changes for 384-well microplates.
- **Colonies Picked** is the number of colonies picked so far.
- **Colonies To Pick** is the total number of colonies to be picked.
- **Calculate Remaining Time** indicates remaining time in the routine.
- **Current Action** displays what the system is currently doing, such as **Pick** when the system is picking.

To turn the light table on or off, click **Light Table On** or **Light Table Off**.

To safely pause the routine, click **Pause**.

After all the colonies have been picked from the source receptacles and delivered to the destination microplates, the **Finished Picking Current Batch** dialog is displayed. See Continuing or Ending the Regional Picking Routine on page 132.

Continuing or Ending the Regional Picking Routine

After all the colonies have been picked from the source receptacles and delivered to the destination microplates, the **Finished Picking Current Batch** dialog is displayed.

If there are no more source receptacles to be picked, click **Finish Picking** and then click **OK**. See Viewing the Regional Picking Summary on page 132.

To continue picking more source receptacles:

1. Select whether or not to review images of the new receptacles.
   - To review images and select colonies for the new source receptacles, click **Continue With Image Review**.
   - To use the current image settings for the next batch of source receptacles, click **Continue Without Image Review**.
2. From the **Select Number Of Positions To Use**, select the number of receptacle holders to load on the instrument deck.
3. Click **OK**.
4. After the **Please Load Source** window is displayed, replace the picked receptacles with the new receptacles on the instrument deck.
5. Close the instrument door.
6. Click **Next** to continue running the picking routine.
   - If you clicked **Continue With Image Review**, the system takes a white light test image of the source receptacles and then displays the **Test Image** window. See Adjusting the White Light Test Image on page 119.
   - If you click **Continue Without Image Review**, the system captures and processes a higher-resolution image and then displays the **Feature Selection** window. See Selecting Colonies for Regional Picking on page 125.

Viewing the Regional Picking Summary

After all regional picking routines are completed, the **Regional Picking Summary** window is displayed, showing the number of source colonies picked, the number of destination microplates used, and missing source receptacles.

To save this information in .csv format, click **Export**.

To view details of all activities related to the source and destination receptacles, click **Details**.

- To save the detailed information in .csv format, click **Export**.
- To close the picking details and return to the **Regional Picking Summary** window, click **Close**.

In the **Regional Picking Summary** window, click **Next** and then click **Finish** to return to the **Regional Picking** window.

Chapter 10: Blue-White Regional Picking Processes

10

The QPix™ 420 Colony Picking System is capable of picking colonies from receptacles using either standard picking or regional picking. You can also set up control wells for the destination microplates before running a picking process.

The following options are available in the **Navigation** window under **Picking Processes**:

- **Picking** picks colonies from receptacles using the standard process. See Picking Processes on page 39.
- **Blue-White Picking** picks blue or white colonies from receptacles using the standard process. See Blue-White Picking Processes on page 63.
- **Zone of Inhibition Detection Picking** picks colonies with detectable zones of inhibition from receptacles using the standard process. See Zone of Inhibition Detection Picking Processes on page 85.
- **Regional Picking** picks colonies from receptacles using the regional process. See Regional Picking Processes on page 107.
- **Blue-White Regional Picking** picks blue or white colonies from receptacles using the regional process described in this chapter.
- **Control Plate Creation** creates a batch of microplates containing specified control samples. These can be created by picking colonies from specified source receptacles into specified destination wells. See Control Plate Creation Processes on page 157.
- **Create New Regional Tray** adds new microplate source definitions to the regional picking plate type database, which can then be selected for use in the regional picking process. See Create New Regional Tray Processes on page 177.

Note: Before running a picking process, it is important that you do the cleaning and set up procedures in Preparing to Run a Process on page 27.

If this is your first picking process, you must edit or create a **Sanitise** profile to use with the picking process. See Creating and Editing Sanitise Profiles on page 34.

Blue-White Colony Detection is a technique that utilizes the E. Coli LacZ gene to permit visual detection of colonies that contain plasmids with DNA inserts. The **Blue-White Picking** function must be used with a QPix™ Chroma Filter. This filter is placed on the light bed of the instrument under a QTray or a petri dish holder containing the blue and white colonies to be detected. QPix Chroma Filters are consumables that can be purchased individually and in packs of 25.See Replacement Parts and Optional Extras on page 249. Each QPix Chroma Filter works for approximately ten uses.

This is a white light imaging picking processes only that requires the purchase of *QPix™ Chroma Colorimetric Colony Selection Software License Blue/White Colony Selection Software License* to function. If you would like to add this special license-enabled capability, contact your Molecular Devices representative or technical support. See Obtaining Support on page 248.

Note: Due to inherent biological variations, some picked white colonies lose their insertions and might later be viewed to be blue. These effects are inherent to the biology and are not due to the picking or selection processes. When selecting the insertion methodology, take care to make sure that the desired results are achieved.

Creating and Editing a Blue-White Regional Picking Process

The procedures for creating and editing standard or regional picking processes are very similar. The regional picking process has more options available for defining the regions for picking.

To run a Blue-White standard picking process, see Blue-White Picking Processes on page 63.

If this is your first regional picking process, you must edit or create a **Sanitise** profile to use with the regional picking process. See Creating and Editing Sanitise Profiles on page 34.

Creating and editing a regional picking process involves the following procedures:

- Opening the Blue-White Regional Picking Window on page 135
- Selecting a Blue-White Regional Picking Routine on page 135
- Selecting Barcode Options on page 137
- Setting Destination Microplate Options on page 139
- Selecting the Regional Picking Source on page 140
- Setting Regional Picking Source and Destination Options on page 141
- Selecting the Head and Sanitizing Options on page 143
- Viewing the Settings Summary on page 143

After creating the routine, you can close the process and run it at a later time, or you can run it immediately.

Note: Some steps that are included in these procedures might not be available to you, depending on the features included with your instrument and license. Optional features are identified within the procedures when applicable.

Opening the Blue-White Regional Picking Window

To open the blue-white picking window:

1. From the **Navigation** window under **Picking Processes**, double-click the **Blue-White Regional Picking** icon.
2. In the **Blue-White Picking** window, click **Picking Type** to view the picking type options.
   - Select **Blue/White Picking** (default setting) to use white light to illuminate and identify blue and white colonies to pick.
   - Select **White Only Picking** to use white light to illuminate and identify only white colonies to pick.
3. Click **Apply**.
4. Click **Start**.

The system "homes" the drives, and then displays the **Routines** window. See Selecting a Blue-White Regional Picking Routine on page 135.

Selecting a Blue-White Regional Picking Routine

1. In the **Routines** window, select to create a new routine from scratch or to edit an existing routine.
   - To create a new routine from scratch, click **New Routine**.
   - To edit an existing routine, click **Run Existing Routine** and then select the name of the routine from the **Select Routine** list.

     If you want to run the selected routine without making changes, select the **Skip Steps** check box.
2. Click **Next** to go to the next step.
   - If you selected to create a new routine from scratch or to edit an existing routine, see Selecting Barcode Options on page 137.
   - If you selected the **Skip Steps** check box to run the selected routine without making changes, see Viewing the Settings Summary on page 116.

Note: You can import, export, and delete routines in the **Routines** window. See Adding and Removing Blue-White Regional Picking Routines on page 136.

Adding and Removing Blue-White Regional Picking Routines

The **Select Routine** list contains the related routines that are in the database. Only routines that match the type of routine that you are creating are included in the list. For example, a white light and fluorescent imaging routine is not included in the **Select Routine** list if you are creating a White Light only routine.

If you have a saved routine from a different computer, you can import the routine. You can also export a routine from the database so that it can be imported into the database on a different computer. If you no longer need a routine, you can permanently delete it from the database.

Importing a Routine

Before you can import a routine, you need to export the routine from the other computer in .xml format and then save the export file on the system computer.

To import the .xml file, click **Import** and then locate and select the file. Click **Import** to add the routine to the database. If the routine is of the same type as the one you are creating, then the imported routine is displayed in the **Select Routine** list.

Exporting a Routine

To export a routine, click **Export** and then navigate to the location that you want to save the .xml file. You can change the name of the file, if desired. Click **Export** to save the routine in .xml format.

Deleting a Routine

Molecular Devices recommends that you export the routine before deleting it. This lets you import the routine at a later time if desired.

To delete a routine, select the routine in the **Select Routine** list and then click **Delete**. In the **Delete Routine** dialog, click **OK** to permanently remove the routine from the database.

Selecting Barcode Options

When you are creating or editing a routine for white light only, the **Barcodes** window is displayed.

Using a Barcode Reader

Note: Molecular Devices recommends that you always use barcodes for accurate data tracking.

1. Select the **Use Barcode Reader** check box to scan source and destination receptacles for barcodes.

   To define unique identifiers for source receptacles without scanning for barcodes, see Defining Unique Identifiers Without Barcodes on page 138.

2. Click a **Read Failure Option** to define the system response when a barcode cannot be read correctly.
   - Click **Manual Prompt** to open a dialog where you can type a barcode or name for the receptacle.
   - Click **Skip Receptacle** to ignore the receptacle and scan the next receptacle for a barcode.

     Note: If the system fails to identify a barcode for the source receptacle, the routine ends, since the source requires a valid barcode.

   - Click **Auto Generate** to allow the system to automatically assign a valid random barcode and continue the routine.
3. Optionally, use the **Validation Barcode** list to define all the valid barcodes for source receptacles. If the scanned barcode on a source receptacle cannot be found in the list, an error message is displayed.
   - To manually enter valid barcodes, type each barcode in the field below the list and then click **Insert**.
   - To import valid barcodes from a text or .csv file, click **Import** and then select the file from which to import the barcodes.
   - To use the valid barcodes in the database, click **From Database**.
   - To remove a barcode from the list, click the barcode in the list and then click **Remove**.
4. Click **Next** to define the destination receptacles. See Setting Destination Microplate Options on page 139.

Defining Unique Identifiers Without Barcodes

1. Clear the **Use Barcode Reader** check box to define unique identifiers for source receptacles without scanning for barcodes.

   To scan source and destination receptacles for barcodes, see Using a Barcode Reader on page 137.

2. Select the method for defining the unique identifiers.

   - To have the software generate random identifiers with the prefix **Auto** for the source receptacles, select the **Generate Random Barcodes** check box . No other parameters are required for this option.
   - To manually define identifiers for the source receptacles, type each identifier in the field below the **Barcode** list and then click **Insert**.
   - To import identifiers for the source receptacles from a text or .csv file, click **Import** and then select the file from which to import the identifiers.
   - To generate a defined list of identifiers for the source receptacles, click **Generate List**. To define the parameters for the generated list, type static text for the start of the identifier in the **Prefix** field, the first number to generate in the **Start Number** field, the number of digits in the generated number in the **Digit Padding** field, and the number of identifiers to generate in the **Number to Generate** field. The **Preview** area shows examples of the first and last generated identifiers. To view the generated identifiers in the **Barcodes** list, click **Generate**.
   - To remove an identifier from the list, click the identifier in the list and then click **Remove**.

3. Click **Next** to define the destination receptacles. See Setting Destination Microplate Options on page 139.

Setting Destination Microplate Options

1. In the **Destination Plates** window, from the **Select Destination Microplate** list, select the microplate type to be inoculated with the picked colonies. If the microplate type that you need is not listed, contact Molecular Devices to add a new microplate type to the list. See Obtaining Support on page 248.
2. Select either to dip the pins a specified number of times or to stir the wells of the destination microplate during inoculation.
   - To dip the pins a specified number of times, click **Multi Dip** and in the **Number of Dips** field, type the number of times to dip the pins.
   - To stir the wells, click **Stir Destination**.
3. Optionally, select the **Make Copy** check box and from the **Select Copy Microplate** list select the microplate type to use for a duplicate copy of the destination microplate.
4. Click **Next** to define the regional picking source. See Selecting the Regional Picking Source on page 140.

For more destination settings, see Setting Regional Picking Source and Destination Options on page 141.

Selecting the Regional Picking Source

Note: The types of source receptacles used for regional picking are limited. Depending on the configuration of your system, you might have only one option in the **Holder** list, in which case the **Receptacle** option is preset and cannot be changed. If the type of source receptacle that you need is not listed, contact Molecular Devices to add a new source receptacle type to the list. See Obtaining Support on page 248.

1. In the **Source** window, from the **Holder** list, select the type of holder used to hold the source receptacles on the instrument deck.
2. From the **Receptacle** list, if available, select the type of receptacle used for the source. Only the receptacles applicable for the selected holder are displayed in this list.
   The preview image displays a representation of the selected holder and receptacle.
3. In the **Positions** field, type the number of receptacles to use for picking.
4. In the **Offset** field, type the position of the first receptacle to be used for picking.
   The preview image displays the defined locations of the receptacles.

   Note: If you are using Validation barcodes, only one source receptacle is displayed, and the **Positions** and **Offset** fields are not available.

5. In the **Picking Depth Into Agar (mm)** field, type a value in millimeters to define the depth that the pins are to be inserted in the agar for picking.
6. Click **Next** to the source and destination options. See Setting Regional Picking Source and Destination Options on page 141.

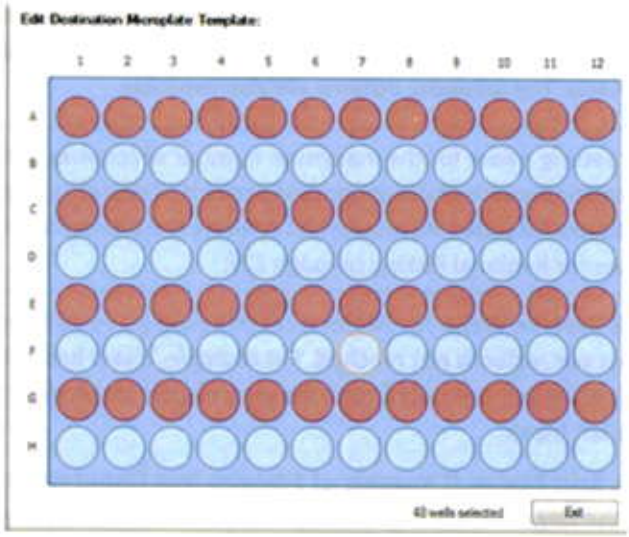
Setting Regional Picking Source and Destination Options

1. In the **Destination/Source Options** window, optionally select the **Limit Max. Number Of Features Per Region** check box and then in the **Number Of Features Per Region** field, type a value for the maximum number of colonies that can be picked from a single source receptacle. The following options are also available.

   Note: Setting a limit for the maximum number of colonies in the **Destination/Source Options** window prevents selecting a maximum number in the **Feature Selection** window when running the picking routine. See Selecting Colonies for Regional Picking on page 125.

   - Select the **Reserve Wells For Regions** check box to leave wells empty if the number of colonies per region is not reached. For example, if you had selected to pick 8 colonies per region, but only 6 colonies were eligible for picking, then wells 7 and 8 would be left blank.
   - Select the **Skip Region If Number of Features Not Found** check box to ignore the region if the target number of features set in **Number of Features Per Region** is not met.
   - Select the **Keep Picked Regions Together** check box to have colonies that are picked from the same region delivered to the same destination plate.
   - With the **Reserve Wells For Region** check box selected, select the **Skip Region If Picking Count is Zero** check box to skip regions that have a picking count of zero.
2. Select the **Deposit Order** to deposit the picked colonies in the destination microplates **By Columns** or **By Rows**.
3. Define the **Deposit Strategy**.
   - Click **Fill All Microplates** to fill every selected well of a destination microplate before starting a new destination microplate.
   - Click **New Microplate For Each Position** to start a new destination microplate whenever the instrument starts picking from a different source QTray or Petri dish.
4. Select a **Pick Order** option.
   - Click **Standard** to pick from regions in straight columns from the source receptacle, such as A1 to A8, B1 to B8, and so on.
   - Click **Plating Order** to pick from square blocks of eight regions, such as A1 to B4, A5 to B8, and so on.

5. Optionally, under **Destination Microplate Template**, click **Edit** to define the wells to dip or skip. You can skip wells that you want to use as blank or control wells. The defined template is used for all the destination microplates during the picking routine.



- To skip a well, click the well. Wells to be skipped are displayed in light blue.
- To skip multiple contiguous wells, right-click and drag across the wells.
- To dip a well that you selected to skip, click the well again. Wells to be dipped are displayed in light red.

After defining the wells to dip or skip, click **Exit**.

6. Click **Next** to define the picking head and the **Sanitise** profile. See Selecting the Head and Sanitizing Options on page 143.

Selecting the Head and Sanitizing Options

1. In the **Head** and **Sanitise** window, from the **Picking Head** list, select the head to use for the picking routine.
2. From the **Pin Columns (Rows) Before Inoculation** list, select the number of pins to use for picking in each column or row before transferring the picked colonies to the destination microplate.

   For the fastest transfer rate select **All** to use all available picking pins to pick colonies before inoculating the destination microplate.

   For smaller picking groups, the available selections depends on the **Deposit Order** selection made in the **Destination/Source Options** window.

   - If you selected **By Columns**, you can pick colonies using from **1** to **11** columns.
   - If you selected **By Rows**, you can pick colonies using from **1** to **7** rows.

   To run the wash routine from the **Sanitise** profile after each partial pick and inoculation, select the **Wash Between Partial Inoculation** check box. Clearing this check box waits until all pins have been used for picking and inoculation before running the wash routine.
3. In the **Destination** field, type a value for the distance in millimeters above the bottom of the destination microplate wells to dip the pins for the inoculation.

   If you selected **Make Copy** for the destination microplate, type a value for the copy.
4. From the **Sanitise Profile** list, select the **Sanitise** profile to use for the picking routine.

   If the available profiles are not suitable for the regional picking routine, exit the regional picking process and create a new **Sanitise** profile. See Creating and Editing Sanitise Profiles on page 34.
5. Click **Next** to view a summary of the settings. See Viewing the Settings Summary on page 116.

Viewing the Settings Summary

The **Settings Summary** window contains a full summary of the picking routine settings you just configured.

Review the summary details to make sure that the settings and options are configured correctly for the regional picking routine. If you need to make changes, click **Back** until you return to the window where the changes can be made.

To print the summary, click **Print**.

To run the blue-white regional picking routine, click **Next**. See Running a Blue-White Regional Picking Process on page 145.

Changing the Picking Head

The **Change Head** window reminds you which picking head should be loaded, based on the **Setting Summary** routine you just configured, and provides you an opportunity to change the head if needed.

The head is housed in a unique actuator system that permits easy exchange and set-up of the head.

Although it is possible to manually move the actuator assembly, Molecular Devices recommends using the software to safely move the actuator into position to remove or install the head.

WARNING! PINCH HAZARD. The actuator assembly has moving parts that can cause pinch injuries if it is moved manually. To prevent pinch injuries, use the software Change Head process to safely move the actuator.

To change the picking head:

1. Click **Move to Load Position** to move the picking head arm to the loading position.
2. When the warning message is displayed, make sure that the bed is clear of obstructions and that the door is closed, and then click **OK** to move the actuator into position near the front of the instrument.
3. Open the front door.
4. Install the specified picking head.
   - To remove an installed head, unscrew and remove the thumbscrew and washer on the left that secures the head to the actuator assembly. Then, grab the handle on the right and slide the head out of the actuator.

     Before storing the head, or whenever it needs cleaning, wipe the exterior of the head with a cloth using 70% ethanol. To store the head, slide it into its metal cover with the pins facing inward and then secure it in place with the thumbscrew and washer.
   - To install a head, hold the head by its handle with the pins pointing down and then slide the head into the actuator assembly from the right. Then, attach the thumbscrew and washer on the left and hand tighten the thumbscrew to secure the head to the actuator.
5. Close the front door.
6. Click **Move to Park Position** to move the picking head arm to the run ready park position.
7. When the warning message is displayed, make sure that the bed is clear of obstructions and that the door is closed, and then click **OK** to home the actuator to its starting position.
8. To run the picking routine, click **Next**. See Running a Blue-White Regional Picking Process on page 145.

Running a Blue-White Regional Picking Process

After a regional picking routine has been configured, you can run the process on the instrument. If you have not configured the regional picking routine you want to run, you must create a new blue-white regional picking routine or edit an existing routine. See Creating and Editing a Blue-White Regional Picking Process on page 134.

Note: Before running a regional picking process, it is important that you do the cleaning and set up procedures in Preparing to Run a Process on page 27.

Some steps that are included in these procedures might not be available to you, depending on the features included with your instrument and license. Optional features are identified within the procedures when applicable.

To run a configured regional picking routine:

1. Open the **Blue-White Regional Picking** window. See Opening the Blue-White Regional Picking Window on page 135.
2. Select the picking routine you want to run. See Selecting a Blue-White Regional Picking Routine on page 135.

   If you do not need to make changes to the selected routine, select the **Skip Steps** check box before clicking **Next**.
3. Review the configured settings for the routine. See Viewing the Settings Summary on page 143.
4. In the **Settings Summary** window, click **Next** to arrange the source microplates in the instrument. See Arranging the Microplate Layout on page 146.

   Note: The QPix Chroma Filter must be placed on the light-bed before placing any tray over it on the instrument deck. See Replacement Parts and Optional Extras on page 249 for purchasing details.

Arranging the Microplate Layout

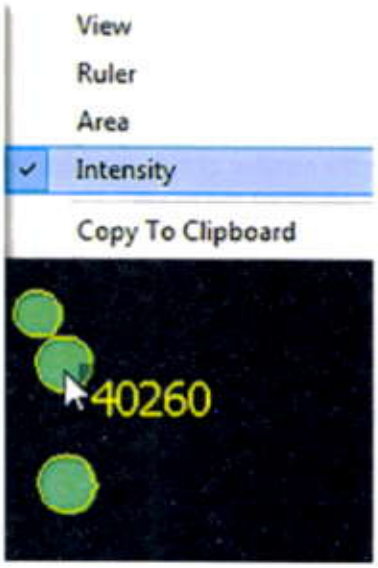
1. Open the instrument door.
2. In the **Holder Layout Summary** window, follow the instructions to correctly arrange the microplate holders in the instrument. The layout is defined by the selections you made in earlier steps.
3. Select the **Checked?** check box to confirm the microplate holder layout.
4. Click **Next**.
5. Remove all microplate lids.
6. In the **Load Plates** window, follow the instructions to correctly place the destination microplates.
7. Select the **Checked?** check box to confirm the destination microplate layout.
8. Click **Next**.
9. After the **Please Load Source** window is displayed, load the source receptacles in the correct locations on the instrument deck.
10. Close the instrument door.
11. Click **Next** to take a white light test image of the source receptacles. See Adjusting the Blue-White Regional White Light Test Image on page 147.

Adjusting the Blue-White Regional White Light Test Image

In the **Test Image** window, all detected features are viewed as potential colonies to pick for inoculation of the destination microplates. To make sure that only blue or white colonies are detected, adjust the test image in this window using the **Exposure** and **Gain** settings, the **Detection** settings, the **Display** settings, and the **Debris** settings. Each detected feature is displayed within a yellow ring.

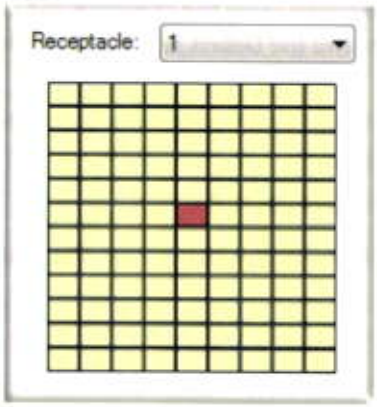
To view the pixel intensity values in the image map to manually set a detection threshold or detect areas of saturation within the image:

1. Right-click over the image map and select **Intensity**.
2. Move the cursor over the area of interest in the image map. The pixel intensity value automatically is displayed.



To adjust the test image:

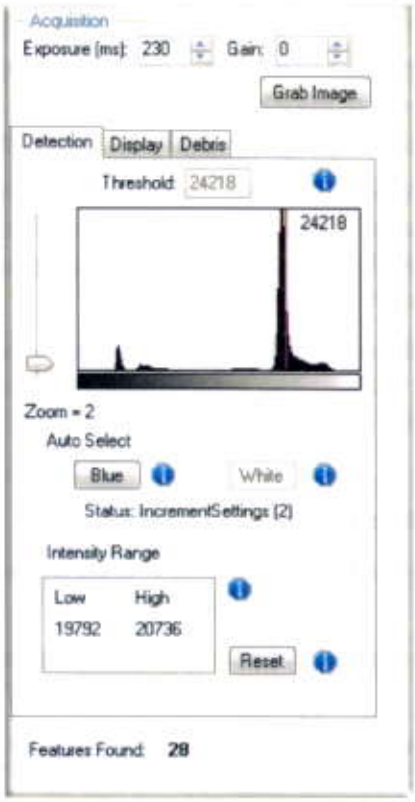
1. From the **Receptacle** list, select the number of the receptacle to view and then click the frame that you want view in the receptacle image below the list. The selected frame is in red.



2. Under **Acquisition** adjust the **Exposure** and **Gain** settings.
   - In the **Exposure (ms)** field, type the number of milliseconds (from 1 to 2000) to expose the sample to light when acquiring the image.
   - Adjust the **Gain** to increase the image signal without changing the light exposure.

   Tip: Molecular Devices recommends not changing the default **Gain** setting for Blue-White colony detection.

   After making adjustments to the **Exposure** or **Gain** settings, click **Grab Image** to apply the new settings to the test image.
3. Click the **Detection** tab.



4. In the **Threshold** intensity histogram, click and drag the red slider line to the right of the large spike to view the **White** colonies as green spots. Click and drag the red slider to the left of the large spike to view the **Blue** colonies as dark black spots against the background. The X-axis represents the intensity and the Y-axis represents the relative area at that intensity. Manually selecting blue or white colonies requires setting an **Intensity Range**.

1.31

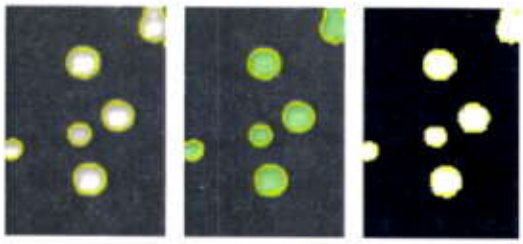
In the **Intensity Range** table, select the **Low** and **High** Threshold values.

- To select the **Low** intensity value, move the histogram red slider line left to the lowest preferred value, and click **Control+left mouse button**. The value is displayed in the table cell.
- To select the **High** intensity value, move the histogram red slider line right to the highest preferred value, and click **Control+left mouse button**. The value is displayed in the table cell.

To manually select blue or white colonies:

- To manually select **Blue Colonies**,select an **Intensity Range** that starts near the left side of the histogram and ends to the left of the large spike that represents the largest area, which is the agar. See Step 6 for **Intensity Range** setting procedures.
- To manually select **White Colonies**, increase the minimum detectable threshold by moving the histogram red slider line to the right. This allows the exclusion of the agar, which is predominantly the large black area in the background, and the colonies that are less intense than the threshold value.

5. To use **Auto Select**, click either **Blue** or **White**. Click the button as many times as needed to intensify the target colonies. Typically, two or three clicks gets you the optimal value. Click **Reset** to restore the previous intensity settings.
6. Click the **Display** tab.
7. Select the method for viewing the detected colonies in the image.
   - Click **Image Only** to display the detected colonies in white with yellow rings and a gray background.
   - Click **Image and Overlay** to display the detected colonies in green with yellow rings and a gray background.
   - Click **Overlay only** to display the detected colonies in white with yellow rings and a black background.



To remove the yellow ring from the detected colonies, clear the **Outline Detected Features** check box.

8. Click the **Debris** tab.
9. Adjust the **Diameter** and **Axis Ratio** to exclude objects that are smaller than the desired colonies. Each detected feature is displayed within a yellow ring while excluded features do not have a yellow ring.
   - In the **Diameter (mm)** field type a value in millimeters for the minimum diameter of the desired colonies.
   - In the **Axis Ratio** field, define the minimum roundness ratio of the desire colonies.

The **Features Found** field displays the number of objects detected as colonies. The value changes as you make adjustments.

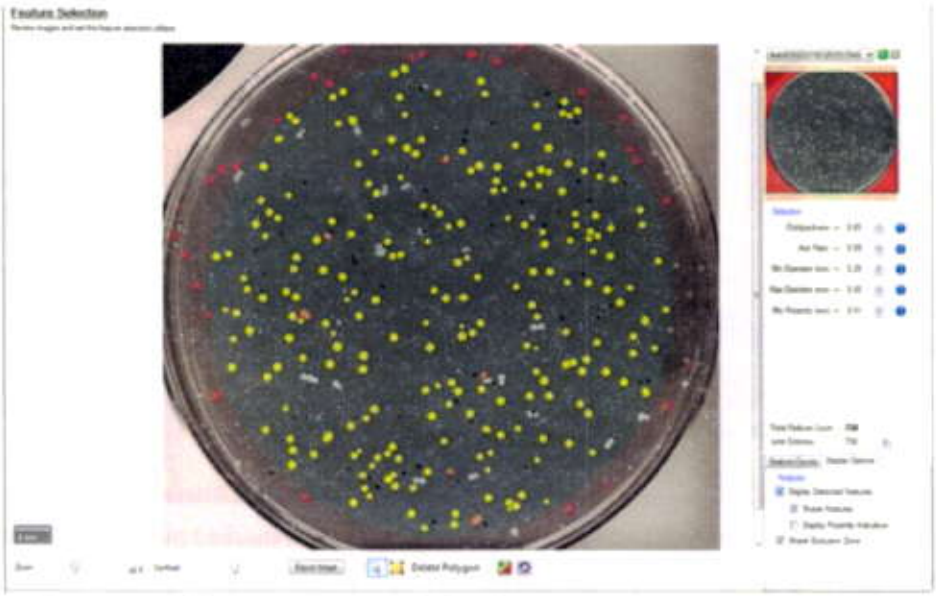
AQUACHIM
5031496 C

Note: Further refinement for colony detection can be done on a higher-resolution image in the **Feature Selection** window. See Selecting Blue-White Colonies for Regional Picking on page 151.

10. Click **Next** to go to the next step.

Selecting Blue-White Colonies for Regional Picking

After adjusting and refining test images, the system captures and processes a higher-resolution image using the test-image adjustments and then displays the **Feature Selection** window.



In the **Feature Selection** window, pickable objects show in yellow and unpickable object show in red. A colony can be considered unpickable if it is too close to the edge of the receptacle or it does not match the selection criteria.

To view the details of a displayed colony, hold the mouse pointer over that colony to display the properties of that colony. If a colony has not been selected as pickable, the reason for the exclusion shows in red text.

Note: During image processing, each object with no yellow ring in the test image is automatically excluded from becoming a pickable object.

Drag the **Zoom** slider below the image to get a closer look at the image, and drag the **Contrast** slider to change the contrast between the objects and the background.

To save the image in .bmp, .jpg, or .png format, click **Export Image**.

To select a smaller region of interest (ROI) in the image, draw a polygon around the region.

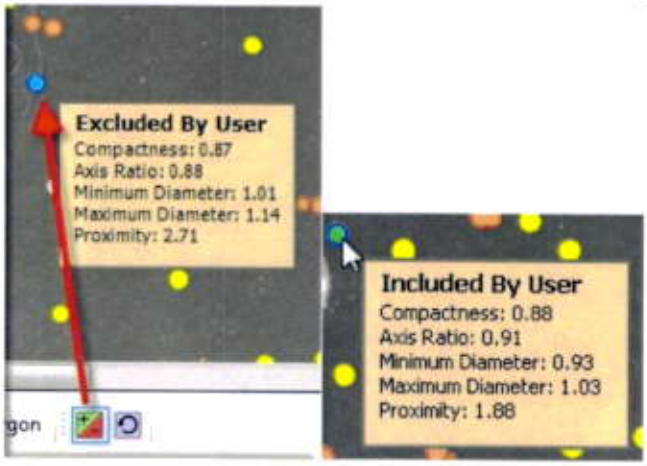


- To draw a polygon, click the **Draw Polygon** icon and then click on the image to define the corners of the polygon.
- To resize the polygon, drag the blue boxes on its corners.
- To remove the polygon, click **Delete Polygon**.

When you draw a polygon on the image, the system detects and picks colonies only from within the defined region of interest.

To change the selection of the system-chosen pickable objects that are displayed in the image map:

1. Click the **+/-** user selection button to override the system-chosen and unchosen objects.
2. Click the objects in the image map that you want to change.



- When clicked on as an override, the yellow-marked pickable objects change to blue and become unpickable.

  To undo your individual selection, right-click over the image map and select **Pick Item**. The object changes to green and becomes pickable.



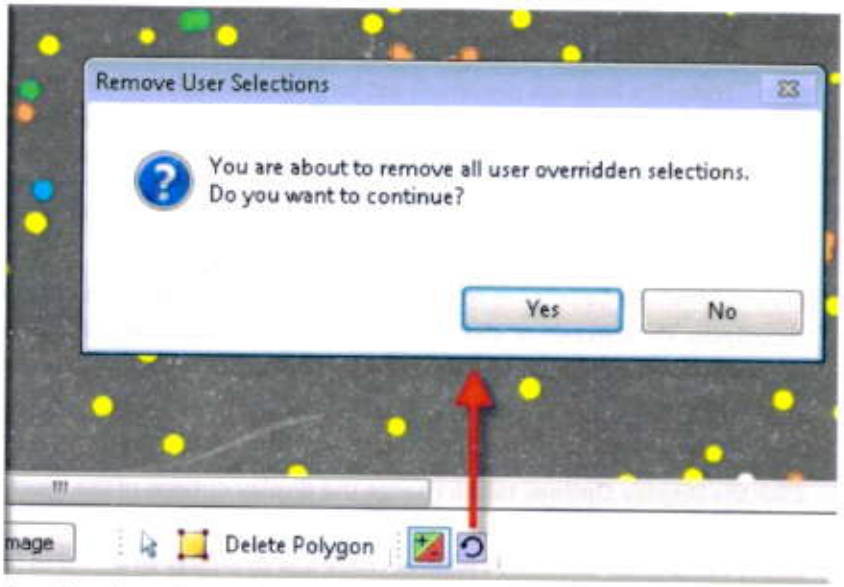
- When clicked on as an override, the red-marked unpickable objects change to green and become pickable.

  To undo your individual selection, right-click over the image map and select **Discard**

Item. The object changes to blue and becomes unpickable.



To undo all of your user selections, click the remove user selections button, and when the **Remove User Selections** dialog is displayed, click **Yes**.



To select the colonies for picking:

1. From the list in the upper-right, select the barcode or identifier of the receptacle to view.
2. Refine the colony **Selection** criteria.
    - **Compactness** sets the level of irregularity for picking colonies. The value is a ratio of the perimeter divided by the area of the colony, so that irregular shaped colonies are closer to 0 and colonies that are more of a perfect circle are closer to 1. The system default value is that a colony equal to or less than 0.65 and is not picked.
    - **Axis Ratio** measures how oval the colony is. The value is a ratio of the longest diameter divided by the shortest diameter, so oval shaped colonies will be closer to 0 and round colonies will be closer to 1. The system default value is that a colony equal to or less than 0.65 is not picked.
    - **Min Diameter (mm)** sets the minimum diameter of colonies for picking. A colony equal to or smaller than the value in this field is not picked.

> **Note:** The **Min Diameter (mm)** cannot be lower than the **Diameter** value set in the **Debris Discard** section of the test image.

- **Max Diameter (mm)** sets the maximum diameter of colonies for picking. A colony equal to or greater than the value in this field is not picked.
- **Min Proximity (mm)** sets the distance between colonies to be picked, so that when picking one colony, a different adjacent colony is not picked. The system default value is 0.45 mm.

3. Optionally, in the **Limit Colonies** field, type the maximum number of colonies to pick from each receptacle.

> **Note:** If a limit was previously set for the maximum number of colonies in the **Source** window, the Limit Colonies option is not available in the **Feature Selection** window. See Setting Source Receptacle Options on page 46.

The **Total Feature Count** field displays the total number of pickable objects in the receptacle.

4. Click the **Feature Counts** tab to view the number of found features in a source receptacle. The barcode or identifier for the source receptacle is displayed, along with the number of found colonies and the number of colonies to pick as determined by the selection criteria.

   To save the data in .csv format, right-click and then click **Export**.

5. Click the **Display Options** tab to change the display options of the source receptacle image.

   Select the **Display Detected Features** check box to display all detected features with a yellow circle.

   - Select the **Shade Features** check box to give the detected colonies some shading for clearer visualization.
   - Select the **Display Proximity Indicators** check box to display connecting red lines between a detected colony and its closest neighbor.

   Select the **Shade Exclusion Zone** check box to display a red-shaded exclusion zone where the system cannot pick.

6. After you are satisfied with the feature selection criteria, click **Next**.

7. In the **Continue Or Save New Routine** dialog or the **Save Changes To Routine** dialog, select whether or not to save the routine before continuing with the picking process.

   If you are creating a new routine from scratch, the **Continue Or Save New Routine** dialog is displayed.

   - To save the settings for the routine before continuing, click **Save Routine**, type a **Name** and a short **Description** for the routine, and then click **Save**.

- To continue without saving the settings for the routine, click **Routine Without Saving** and then click **OK**.

If you are editing an existing routine, the **Save Changes To Routine** dialog is displayed.

- To save the settings for the routine before continuing, click **Save**.
- To save the settings as a new routine without changing the existing routine, click **Save As**, type a **Name** and a short **Description** for the routine, and then click **Save**.
- To continue without saving the settings for the routine, click **No**.

8. Make sure that the instrument door is closed.
9. Click **OK** to start the picking process. See Viewing the Regional Picking Progress on page 155.

Viewing the Regional Picking Progress

While the regional picking routine is running, the **Regional Picking Progress** window displays a summary of the routine.

- **Start Time** shows the time the picking of the colonies began.
- **Source Barcode** shows the barcode or identifier of the source receptacle being picked from.
- **Pin** is the picking pin being used for the current picking operation.
- **Copy Plate No** is the barcode of the copy receptacle that is being inoculated, if **Make Copy** was selected for the routine.
- **Destination Barcode** is the barcode of the destination receptacle that is currently being inoculated.
- **Destination Offset** is the reference well for where the pins are lowered. This value changes for 384-well microplates.
- **Colonies Picked** is the number of colonies picked so far.
- **Colonies To Pick** is the total number of colonies to be picked.
- **Calculate Remaining Time** indicates remaining time in the routine.
- **Current Action** displays what the system is currently doing, such as **Pick** when the system is picking.

To turn the light table on or off, click **Light Table On** or **Light Table Off**.

To safely pause the routine, click **Pause**.

After all the colonies have been picked from the source receptacles and delivered to the destination microplates, the **Finished Picking Current Batch** dialog is displayed. See Continuing or Ending the Regional Picking Routine on page 156.

Continuing or Ending the Regional Picking Routine

After all the colonies have been picked from the source receptacles and delivered to the destination microplates, the **Finished Picking Current Batch** dialog is displayed.

If there are no more source receptacles to be picked, click **Finish Picking** and then click **OK**. See Viewing the Regional Picking Summary on page 156.

To continue picking more source receptacles:

1. Select whether or not to review images of the new receptacles.
   - To review images and select colonies for the new source receptacles, click **Continue With Image Review**.
   - To use the current image settings for the next batch of source receptacles, click **Continue Without Image Review**.
2. From the **Select Number Of Positions To Use**, select the number of receptacle holders to load on the instrument deck.
3. Click **OK**.
4. After the **Please Load Source** window is displayed, replace the picked receptacles with the new receptacles on the instrument deck.
5. Close the instrument door.
6. Click **Next** to continue running the picking routine.
   - If you clicked **Continue With Image Review**, the system takes a white light test image of the source receptacles and then displays the **Test Image** window. See Adjusting the Blue-White Regional White Light Test Image on page 147.
   - If you click **Continue Without Image Review**, the system captures and processes a higher-resolution image and then displays the **Feature Selection** window. See Selecting Blue-White Colonies for Regional Picking on page 151.

Viewing the Regional Picking Summary

After all regional picking routines are completed, the **Regional Picking Summary** window is displayed, showing the number of source colonies picked, the number of destination microplates used, and missing source receptacles.

To save this information in .csv format, click **Export**.

To view details of all activities related to the source and destination receptacles, click **Details**.

- To save the detailed information in .csv format, click **Export**.
- To close the picking details and return to the **Regional Picking Summary** window, click **Close**.

In the **Regional Picking Summary** window, click **Next** and then click **Finish** to return to the **Regional Picking** window.

Chapter 11: Control Plate Creation Processes

11

The QPix™ 420 Colony Picking System is capable of picking colonies from receptacles using either standard picking or regional picking. You can also set up control wells for the destination microplates before running a picking process.

The following options are available in the **Navigation** window under **Picking Processes**:

- **Picking** picks colonies from receptacles using the standard process. See Picking Processes on page 39
- **Blue-White Picking** picks blue or white colonies from receptacles using the standard process. See Blue-White Picking Processes on page 63.
- **Zone of Inhibition Detection Picking** picks colonies with detectable zones of inhibition from receptacles using the standard process. See Zone of Inhibition Detection Picking Processes on page 85.
- **Regional Picking** picks colonies from receptacles using the regional process. See Regional Picking Processes on page 107.
- **Blue-White Regional Picking** picks blue or white colonies from receptacles using the regional process. See Blue-White Regional Picking Processes on page 133.
- **Control Plate Creation** creates a batch of microplates containing specified control samples. These can be created by picking colonies from specified source receptacles into specified destination wells as described in this chapter.
- **Create New Regional Tray** adds new microplate definitions to the regional picking plate type database, which can then be selected for use in the regional picking process. See Create New Regional Tray Processes on page 177.

Note: Before running a control plate creation process, it is important that you do the cleaning and set up procedures in Preparing to Run a Process on page 27.

If this is your first control plate creation process, you must edit or create a **Sanitise** profile to use with the control plate creation process. See Creating and Editing Sanitise Profiles on page 34.

The control plate creation process uses only white light imaging.

Note: If you have a fluorescence imaging module on your system and run a control plate creation process that uses white light only, the process takes longer than a control plate creation process on a white light only system, since the fluorescence imaging module captures more images during the process.

Creating and Editing a Control Plate Creation Process

If this is your first control plate creation process, you must edit or create a **Sanitise** profile to use with the control plate creation process. See Creating and Editing Sanitise Profiles on page 34.

Creating and editing a control plate creation process involves the following procedures:

- Opening the Control Plate Creation Window on page 158
- Selecting a Control Plate Creation Routine on page 159
- Selecting Barcode Options on page 160
- Setting Destination Microplate Options on page 160
- Selecting the Head and Sanitizing Options on page 161
- Setting Source Receptacle Options on page 162
- Defining the Control Wells on page 163
- Viewing the Settings Summary on page 163
- Changing the Picking Head on page 164

After creating the routine, you can close the process and run it at a later time, or you can run it immediately.

Note: Some steps that are included in these procedures might not be available to you, depending on the features included with your instrument and license. Optional features are identified within the procedures when applicable.

Opening the Control Plate Creation Window

1. From the **Navigation** window under **Picking Processes**, double-click the **Control Plate Creation** icon.
2. In the **Control Plate Creation** window, click **Start**.

The system "homes" the drives, and then displays the **Routines** window. See Selecting a Control Plate Creation Routine on page 159.

Selecting a Control Plate Creation Routine

1. In the **Routines** window, select to create a new routine from scratch or to edit an existing routine.
   - To create a new routine from scratch, click **New Routine**.
   - To edit an existing routine, click **Run Existing Routine** and then select the name of the routine from the **Select Routine** list.

     If you want to run the selected routine without making changes, select the **Skip Steps** check box.
2. Click **Next** to go to the next step.
   - If you selected to create a new routine from scratch or to edit an existing routine, see Selecting Barcode Options on page 160.
   - If you selected the **Skip Steps** check box to run the selected routine without making changes, see Viewing the Settings Summary on page 163.

Note: You can import, export, and delete routines in the **Routines** window. See Adding and Removing Control Plate Creation Routines on page 159.

Adding and Removing Control Plate Creation Routines

The **Select Routine** list contains the related routines that are in the database. Only routines that match the type of routine that you are creating are included in the list. For example, a white light and fluorescent imaging routine is not included in the **Select Routine** list if you are creating a White Light only routine.

If you have a saved routine from a different computer, you can import the routine. You can also export a routine from the database so that it can be imported into the database on a different computer. If you no longer need a routine, you can permanently delete it from the database.

Importing a Routine

Before you can import a routine, you need to export the routine from the other computer in .xml format and then save the export file on the system computer.

To import the .xml file, click **Import** and then locate and select the file. Click **Import** to add the routine to the database. If the routine is of the same type as the one you are creating, then the imported routine is displayed in the **Select Routine** list.

Exporting a Routine

To export a routine, click **Export** and then navigate to the location that you want to save the .xml file. You can change the name of the file, if desired. Click **Export** to save the routine in .xml format.

Deleting a Routine

Molecular Devices recommends that you export the routine before deleting it. This lets you import the routine at a later time if desired.

To delete a routine, select the routine in the **Select Routine** list and then click **Delete**. In the **Delete Routine** dialog, click **OK** to permanently remove the routine from the database.

Selecting Barcode Options

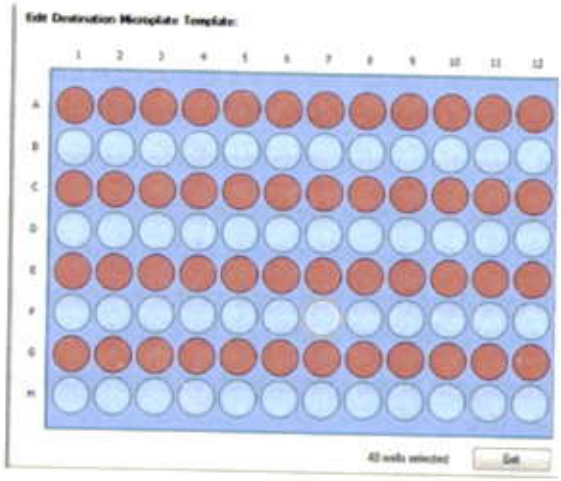
Note: Molecular Devices recommends that you always use barcodes for accurate data tracking.

1. In the **Barcodes** window, whether to scan source and destination receptacles for barcodes.
   - Select the **Use Barcode Reader** check box to scan source and destination receptacles for barcodes.
   - Select the **Generate Random Barcodes** check box to have the software generate random identifiers with the prefix **Auto** for the source and destination receptacles.
2. Click **Next** to define the destination receptacles. See Setting Destination Microplate Options on page 160.

Setting Destination Microplate Options

1. In the **Destination Options** window, from the **Select Destination Microplate** list, select the microplate type to be inoculated with the control colonies. If the microplate type that you need is not listed, contact Molecular Devices to add a new microplate type to the list. See Obtaining Support on page 248.
2. Select either to dip the pins a specified number of times or to stir the wells of the destination microplate during inoculation.
   - To dip the pins a specified number of times, click **Multi Dip** and in the **Number of Dips** field, type the number of times to dip the pins.
   - To stir the wells, click **Stir Destination**.
3. In the **Number of Control Microplates** field, type the number of duplicate microplates to create. You can create up to 70 duplicate copies.

4. Optionally, under **Destination Microplate Template**, click **Edit** to define the wells to dip or skip. You can skip wells that you want to use as blank or non-control wells. The defined template is used for all the destination microplates during the control plate creation routine.



   - To skip a well, click the well. Wells to be skipped show in light blue.
   - To skip multiple contiguous wells, right-click and drag across the wells.
   - To dip a well that you selected to skip, click the well again. Wells to be dipped show in light red.

   After defining the wells to dip or skip, click **Exit**.

5. Click **Next** to define the picking head and the **Sanitise** profile. See Selecting the Head and Sanitizing Options on page 161.

Selecting the Head and Sanitizing Options

1. In the **Head** and **Sanitise** window, from the **Picking Head** list, select the head to use for the control plate creation routine.
2. In the **Destination** field, type a value for the distance in millimeters above the bottom of the destination microplate wells to dip the pins for the inoculation.
3. From the **Sanitise Profile** list, select the **Sanitise** profile to use for the picking routine. If the available profiles are not suitable for the control plate creation routine, exit the control plate creation process and create a new **Sanitise** profile. See Creating and Editing Sanitise Profiles on page 34.
4. Click **Next** to define options for the source receptacle. See Setting Source Receptacle Options on page 162.

Setting Source Receptacle Options

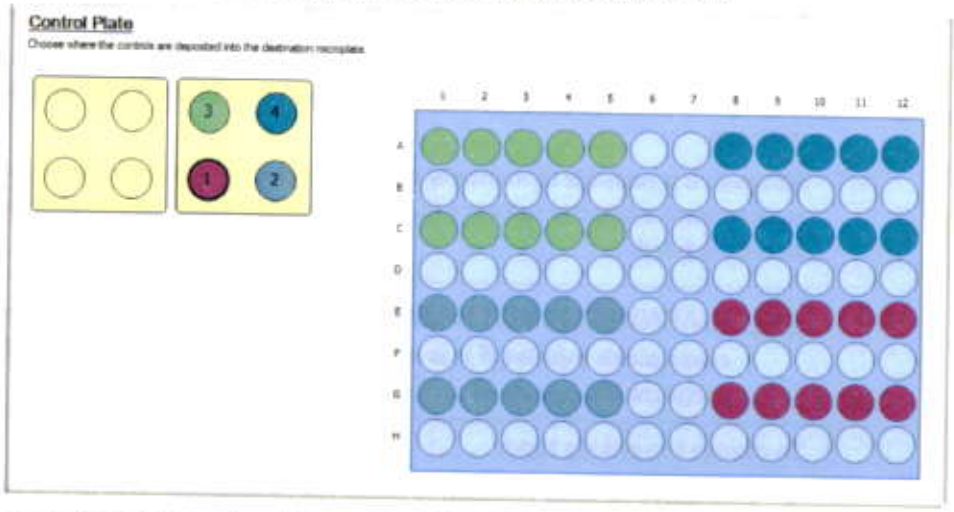
1. In the **Source** window, from the **Holder** list, select the type of holder used to hold the source receptacles on the instrument deck.
2. From the **Receptacle** list select the type of receptacle used for the source. Only the receptacles applicable for the selected holder are displayed in this list.
   The preview image displays a representation of the selected holder and receptacle.
3. In the **Positions** field, type the number of receptacles to use for picking.
4. In the **Offset** field, type the position of the first receptacle to be used for picking.
   The preview image displays the defined locations of the receptacles.
5. In the **Picking Depth Into Agar (mm)** field, type a value in millimeters to define the depth that the pins are to be inserted in the agar for picking.
6. Click **Next** to define the layout of the control wells on the microplate. See Defining the Control Wells on page 163.






Defining the Control Wells

1. In the **Control Plate** window, click a source receptacle on the left.



2. In the destination microplate on the right, click the well or wells where you want place the control colonies from the selected receptacle.
   - To select a well, click the well. Selected wells are color coded to match the selected source receptacle.
   - To select multiple contiguous wells, click and drag across the wells.
   - To deselect a well that you selected, click the well again. Wells that have not been selected show in light blue.
3. Continue clicking receptacles and wells until all the control wells have been defined.
4. Click **Next** to view a summary of the settings. See Viewing the Settings Summary on page 163.

Viewing the Settings Summary

The **Settings Summary** window contains a full summary of the control plate creation routine settings you just configured.

Review the summary details to make sure that the settings and options are configured correctly for the control plate creation routine. If you need to make changes, click **Back** until you return to the window where the changes can be made.

To print the summary, click **Print**.

To run the control plate creation routine, click **Next**. See Running a Control Plate Creation Process on page 165.

Changing the Picking Head

The **Change Head** window reminds you which picking head should be loaded, based on the **Setting Summary** routine you just configured, and provides you an opportunity to change the head if needed.

The head is housed in a unique actuator system that permits easy exchange and set-up of the head.

Although it is possible to manually move the actuator assembly, Molecular Devices recommends using the software to safely move the actuator into position to remove or install the head.

WARNING! PINCH HAZARD. The actuator assembly has moving parts that can cause pinch injuries if it is moved manually. To prevent pinch injuries, use the software Change Head process to safely move the actuator.

To change the picking head:

1. Click **Move to Load Position** to move the picking head arm to the loading position.
2. When the warning message is displayed, make sure that the bed is clear of obstructions and that the door is closed, and then click **OK** to move the actuator into position near the front of the instrument.
3. Open the front door.
4. Install the specified picking head.
   - To remove an installed head, unscrew and remove the thumbscrew and washer on the left that secures the head to the actuator assembly. Then, grab the handle on the right and slide the head out of the actuator.

     Before storing the head, or whenever it needs cleaning, wipe the exterior of the head with a cloth using 70% ethanol. To store the head, slide it into its metal cover with the pins facing inward and then secure it in place with the thumbscrew and washer.
   - To install a head, hold the head by its handle with the pins pointing down and then slide the head into the actuator assembly from the right. Then, attach the thumbscrew and washer on the left and hand tighten the thumbscrew to secure the head to the actuator.
5. Close the front door.
6. Click **Move to Park Position** to move the picking head arm to the run ready park position.
7. When the warning message is displayed, make sure that the bed is clear of obstructions and that the door is closed, and then click **OK** to home the actuator to its starting position.
8. To run the picking routine, click **Next**. See Running a Control Plate Creation Process on page 165.

Running a Control Plate Creation Process

After a control plate creation routine has been configured, you can run the process on the instrument. If you have not configured the control plate creation routine you want to run, you must create a new control plate creation routine or edit an existing routine. See Creating and Editing a Control Plate Creation Process on page 158.

Note: Before running a picking process, it is important that you do the cleaning and set up procedures in Preparing to Run a Process on page 27.

Some steps that are included in these procedures might not be available to you, depending on the features included with your instrument and license. Optional features are identified within the procedures when applicable.

To run a configured control plate creation routine:

1. Open the **Control Plate Creation** window. See Opening the Control Plate Creation Window on page 158.
2. Select the picking routine you want to run. See Selecting a Control Plate Creation Routine on page 159.

   If you do not need to make changes to the selected routine, select the **Skip Steps** check box before clicking **Next**.
3. Review the configured settings for the routine. See Viewing the Settings Summary on page 163.
4. In the **Settings Summary** window, click **Next** to arrange the source microplates in the instrument. See Arranging the Microplate Layout on page 166.

Arranging the Microplate Layout

1. Open the instrument door.
2. In the **Holder Layout Summary** window, follow the instructions to correctly arrange the microplate holders in the instrument. The layout is defined by the selections you made in earlier steps.
3. Select the **Checked?** check box to confirm the microplate holder layout.
4. Click **Next**.
5. Remove all microplate lids.
6. In the **Load Plates** window, follow the instructions to correctly place the destination microplates.
7. Select the **Checked?** check box to confirm the destination microplate layout.
8. Click **Next**.
9. After the **Please Load Source** window is displayed, load the source receptacles in the correct locations on the instrument deck.
10. Close the instrument door.
11. Click **Next** to take a white light test image of the source receptacles. See Adjusting the White Light Test Image on page 167.







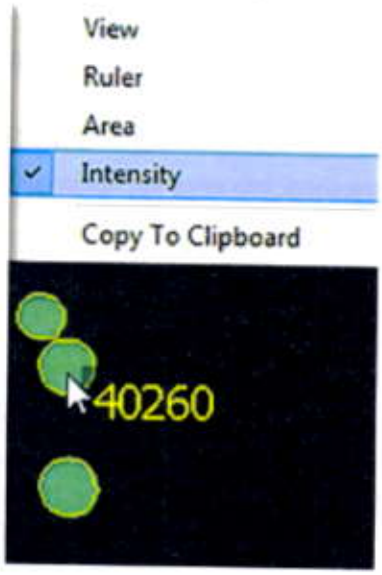


Adjusting the White Light Test Image

In the **Test Image** window, all detected features are viewed as potential colonies to pick for inoculation of the destination microplates. To make sure that only colonies are detected, adjust the test image in this window using the **Exposure** and **Gain** settings, the **Threshold** settings, and the **Debris** settings. Each detected feature is displayed within a yellow ring.

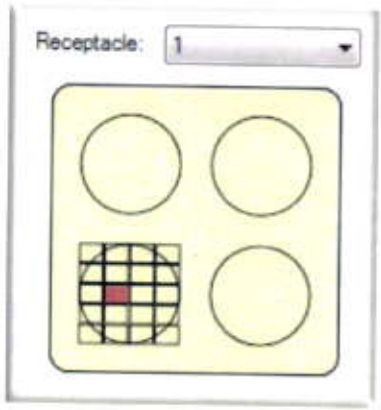
To view the pixel intensity values in the image map to manually set a detection threshold or detect areas of saturation within the image:

1. Right-click over the image map and select **Intensity**.
2. Move the cursor over the area of interest in the image map. The pixel intensity value automatically is displayed.



To adjust the test image:

1. From the **Receptacle** list, select the number of the receptacle to view and then click the frame that you want view in the receptacle image below the list. The selected frame is in red.



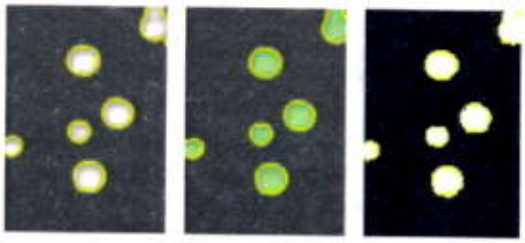
2. Under **Acquisition** adjust the **Exposure** and **Gain** settings.
   - In the **Exposure (ms)** field, type the number of milliseconds (from 10 to 1000) to expose the sample to light when acquiring the image.
   - Adjust the **Gain** to increase the image signal without changing the light exposure.

   After making adjustments to the **Exposure** or **Gain** settings, click **Grab Image** to apply the new settings to the test image.
3. Click the **Detection** tab.
4. Select the **Use Auto Thresholding** check box to have the software automatically detect the colonies in the image.

   To manually detect the colonies, clear this check box and drag the slider until all the desired colonies are detected and the background is not.
5. Select the **Auto Threshold Each Frame** check box to process each frame with its own uniquely calculated value.

   To process the frames using a value calculated of the entire image, clear this check box.
6. With the **Auto Threshold Each Frame** check box selected, optionally type threshold values in the **Low Limit** and **High Limit** fields.
   - To determine the **Low Limit** value, clear the **Use Auto Thresholding** check box and then drag the slider to the left until some background is clearly detected. Select the **Use Auto Thresholding** check box and the **Auto Threshold Each Frame** check box again and then type the value from the **Threshold** field into the **Low Limit** field.
   - To determine the **High Limit** value, clear the **Use Auto Thresholding** check box and then drag the slider to the right until some colonies start to become undetected. Select the **Use Auto Thresholding** check box and the **Auto Threshold Each Frame** check box again and then type the value from the **Threshold** field into the **High Limit** field.
7. Select the **Invert Image** check box to make dark areas bright and bright areas dark.
8. Select the **Subtract Background** check box to have the background become nearly black.
9. Click the **Display** tab.

10. Select the method for viewing the detected colonies in the image.
    - Click **Image Only** to display the detected colonies in white with yellow rings and a gray background.
    - Click **Image and Overlay** to display the detected colonies in green with yellow rings and a gray background.
    - Click **Overlay only** to display the detected colonies in white with yellow rings and a black background.

    To remove the yellow ring from the detected colonies, clear the **Outline Detected Features** check box.
11. Click the **Debris** tab.
12. Adjust the **Diameter** and **Axis Ratio** to exclude objects that are smaller than the desired colonies. Each detected feature is displayed within a yellow ring while excluded features do not have a yellow ring.
    - In the **Diameter (mm)** field type a value in millimeters for the minimum diameter of the desired colonies.
    - In the **Axis Ratio** field, define the minimum roundness ratio of the desire colonies.

    The **Features Found** field displays the number of objects detected as colonies. The value changes as you make adjustments.

    Note: Further refinement for colony detection can be done on a higher-resolution image in the **Feature Selection** window.
13. Click **Next** to process a higher-resolution image. See Selecting Colonies for Picking on page 169.

Selecting Colonies for Picking

After adjusting and refining test images, the system captures and processes a higher-resolution image using the test-image adjustments and then displays the **Feature Selection** window.

In the **Feature Selection** window, pickable objects show in yellow and unpickable object show in red. A colony can be considered unpickable if it is too close to the edge of the receptacle or it does not match the selection criteria.

To view the details of a displayed colony, hold the mouse pointer over that colony to display the properties of that colony. If a colony has not been selected as pickable, the reason for the exclusion shows in red text.



Note: During image processing, each object with no yellow ring in the test image is automatically excluded from becoming a pickable object.

Drag the **Zoom** slider below the image to get a closer look at the image, and drag the **Contrast** slider to change the contrast between the objects and the background.

To save the image in .bmp, .jpg, or .png format, click **Export Image**.

To select a smaller region of interest (ROI) in the image, draw a polygon around the region.



- To draw a polygon, click the **Draw Polygon** icon and then click on the image to define the corners of the polygon.
- To resize the polygon, drag the blue boxes on its corners.
- To remove the polygon, click **Delete Polygon**.

When you draw a polygon on the image, the system detects and picks colonies only from within the defined region of interest.

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To select the control colonies for picking:

1. From the list in the upper-right, select the barcode or identifier of the receptacle to view.
2. Refine the colony **Selection** criteria.
   - **Compactness** sets the level of irregularity for picking colonies. The value is a ratio of the perimeter divided by the area of the colony, so that irregular shaped colonies are closer to 0 and colonies that are more of a perfect circle are closer to 1. The system default value is that a colony equal to or less than 0.65 and is not picked.
   - **Axis Ratio** measures how oval the colony is. The value is a ratio of the longest diameter divided by the shortest diameter, so oval shaped colonies will be closer to 0 and round colonies will be closer to 1. The system default value is that a colony equal to or less than 0.65 is not picked.
   - **Min Diameter (mm)** sets the minimum diameter of colonies for picking. A colony equal to or smaller than the value in this field is not picked.

     Note: The **Min Diameter (mm)** cannot be lower than the **Diameter** value set in the **Debris Discard** section of the test image.

   - **Max Diameter (mm)** sets the maximum diameter of colonies for picking. A colony equal to or greater than the value in this field is not picked.
   - **Min Proximity (mm)** sets the distance between colonies to be picked, so that when picking one colony, a different adjacent colony is not picked. The system default value is 0.45 mm.
3. As required, manually change the pickable property of individual objects.
   - To define an object as pickable, right click the object and then click **Pick Item** to display the object in green.
   - To define an object as unpickable, right click the object and then click **Discard Item** to display the object in blue.
4. Optionally, in the **Limit Colonies** field, type the maximum number of colonies to pick from each receptacle.

   The **Total Feature Count** field displays the total number of pickable objects in the receptacle.
5. Click the **Feature Counts** tab to view the number of found features in a source receptacle. The barcode or identifier for the source receptacle is displayed, along with the number of found colonies and the number of colonies to pick as determined by the selection criteria.

   To save the data in .csv format, right-click and then click **Export**.
6. Click the **Display Options** tab to change the display options of the source receptacle image.

Select the **Display Detected Features** check box to display all detected features with a yellow circle.

- Select the **Shade Features** check box to give the detected colonies some shading for clearer visualization.
- Select the **Display Proximity Indicators** check box to display connecting red lines between a detected colony and its closest neighbor.

Select the **Shade Exclusion Zone** check box to display a red-shaded exclusion zone where the system cannot pick.

7. After you are satisfied with the feature selection criteria, click **Next**.
8. In the **Continue Or Save New Routine** dialog or the **Save Changes To Routine** dialog, select whether or not to save the routine before continuing with the control plate creation process.

   If you are creating a new routine from scratch, the **Continue Or Save New Routine** dialog is displayed.

   - To save the settings for the routine before continuing, click **Save Routine**, type a **Name** and a short **Description** for the routine, and then click **Save**.
   - To continue without saving the settings for the routine, click **Routine Without Saving** and then click **OK**.

   If you are editing an existing routine, the **Save Changes To Routine** dialog is displayed.

   - To save the settings for the routine before continuing, click **Save**.
   - To save the settings as a new routine without changing the existing routine, click **Save As**, type a **Name** and a short **Description** for the routine, and then click **Save**.
   - To continue without saving the settings for the routine, click **No**.
9. Make sure that the instrument door is closed.
10. Click **OK** to start the control plate creation process. See Viewing the Control Plate Creation Progress on page 173.

Viewing the Control Plate Creation Progress

While the control plate creation routine is running, the **Picking Progress** window displays a summary of the routine.

- **Start Time** shows the time the picking of the colonies began.
- **Source Barcode** shows the barcode or identifier of the source receptacle being picked from.
- **Pin** is the picking pin being used for the current picking operation.
- **Copy Plate No** is the barcode of the copy receptacle that is being inoculated, if **Make Copy**was selected for the routine.
- **Destination Barcode** is the barcode of the destination receptacle that is currently being inoculated.
- **Destination Offset** is the reference well for where the pins are lowered. This value changes for 384-well microplates.
- **Colonies Picked** is the number of colonies picked so far.
- **Colonies To Pick** is the total number of colonies to be picked.
- **Estimated Time Remaining** indicates remaining time in the routine.
- **Current Action** displays what the system is currently doing, such as **Pick** when the system is picking.

To turn the light table on or off, click **Light Table On** or **Light Table Off**.

To safely pause the routine, click **Pause**.

After all the colonies have been picked from the source receptacles and delivered to the destination microplates, the **Finished Picking Current Batch** dialog is displayed. See Continuing or Ending the Control Plate Creation Routine on page 174.

Continuing or Ending the Control Plate Creation Routine

After all the colonies have been picked from the source receptacles and delivered to the destination microplates, the **Finished Picking Current Batch** dialog is displayed.

If there are no more source receptacles to be picked, click **Finish Picking** and then click **OK**. See Viewing the Control Plate Creation Summary on page 175.

To continue picking more source receptacles:

1. Select whether to review images of the new receptacles.
   - To review images and select colonies for the new source receptacles, click **Continue With Image Review**.
   - To use the current image settings for the next batch of source receptacles, click **Continue Without Image Review**.
2. Select whether to replace all or only the fully picked receptacles.
   - To replace only source receptacles that have been fully picked from, click **Only Reload Exhausted Source**.
   - To replace the source receptacles with a completely new set of source receptacles, click **Reload All Source**.
3. Click **OK**.
4. After the **Please Load Source** window is displayed, replace the picked receptacles with the new receptacles on the instrument deck.

   Note: Make sure that the source receptacles are in the exact same tray locations so that the instrument can locate them.

5. Close the instrument door.
6. Click **Next** to continue running the picking routine.
   - If you clicked **Continue With Image Review**, the system takes a white light test image of the source receptacles and then displays the **Test Image** window. See Adjusting the White Light Test Image on page 167.
   - If you click **Continue Without Image Review**, the system captures and processes a higher-resolution image and then displays the **Feature Selection** window. See Selecting Colonies for Picking on page 169.

Viewing the Control Plate Creation Summary

After all control plate creation routines are completed, the **Picking Summary** window is displayed, showing the number of source colonies picked, the number of destination microplates used, and missing source receptacles.

To save this information in .csv format, click **Export**.

To view details of all activities related to the source and destination receptacles, click **Details**.

- To save the detailed information in .csv format, click **Export**.
- To close the picking details and return to the Picking Summary window, click **Close**.

In the **Picking Summary** window, click **Next** and then click **Finish** to return to the **Control Plate Creation** window.

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Chapter 12: Create New Regional Tray Processes

12

The QPix™ 420 Colony Picking System is capable of picking colonies from receptacles using either standard picking or regional picking. For the instruments licensed for **Regional Picking**, you can also define new custom microplate receptacles to be picked from using an OmniTray holder in a **Regional Picking** process.

The following options are available in the **Navigation** window under **Picking Processes**:

- **Picking** picks colonies from receptacles using the standard process. See Picking Processes on page 39.
- **Blue-White Picking** picks blue or white colonies from receptacles using the standard process. See Blue-White Picking Processes on page 63.
- **Zone of Inhibition Detection Picking** picks colonies with detectable zones of inhibition from receptacles using the standard process. See Zone of Inhibition Detection Picking Processes on page 85.
- **Regional Picking** picks colonies from receptacles using the regional process. See Regional Picking Processes on page 107.
- **Blue-White Regional Picking** picks blue or white colonies from receptacles using the regional process. Blue-White Regional Picking Processes on page 133.
- **Control Plate Creation** creates a batch of microplates containing specified control samples. These can be created by picking colonies from specified source receptacles into specified destination wells. See Control Plate Creation Processes on page 157.
- **Create New Regional Tray** adds new microplate source definitions to the regional picking microplate source type database, as described in this chapter, which can then be selected for use in the regional picking process.

Create New Regional Tray

Your instrument must be licensed for **Regional Picking** to use this feature.

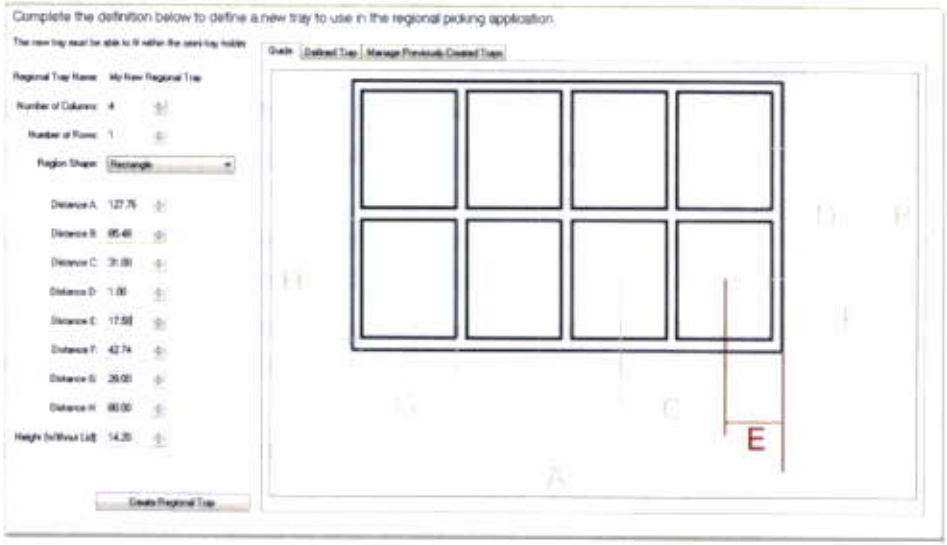
The new microplate source tray must be able to be loaded within an OmniTray holder that fits on the light table of the instrument. The OmniTray supports trays that conform to the external dimensions specified within the SBS specification for microplates with the following standard dimensions:

- Length: 127.76 mm ± 0.25 mm (5.0299 inches ± 0.0098 inches)
- Width: 85.48 mm ± 0.25 mm (3.3654 inches ± 0.0098 inches)

To create a new regional tray:

1. From the **Navigation** window under **Picking Processes**, double-click the **Create New Regional Tray** icon.

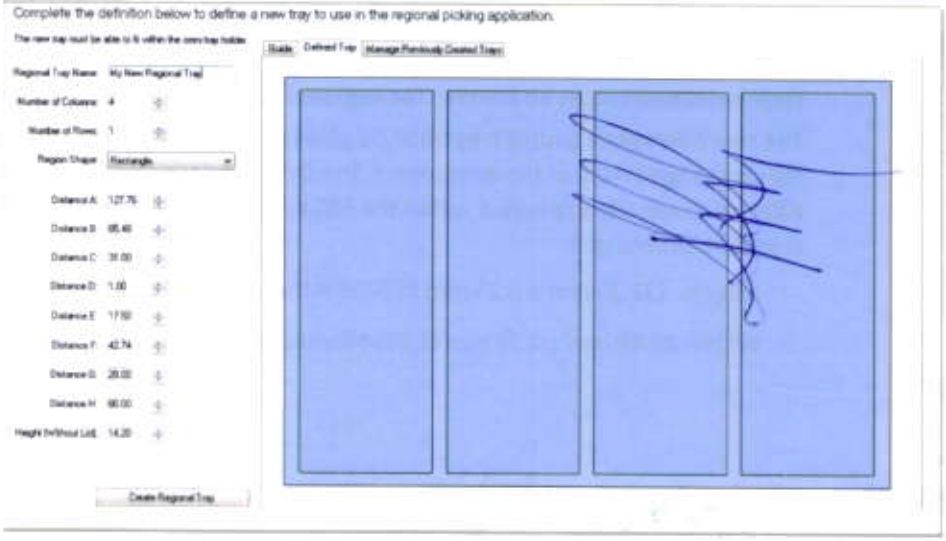
   The new plate definition screen is displayed along with parameter fields and a guide image.



2. Type a name for your new regional tray in the **Regional Tray Name** field.
3. Complete all of the parameter fields on the left side of the window using the manufacturer's specification document.

> **CAUTION:** Failure to input correct plate dimensions can result in damage to the picking head and pins.

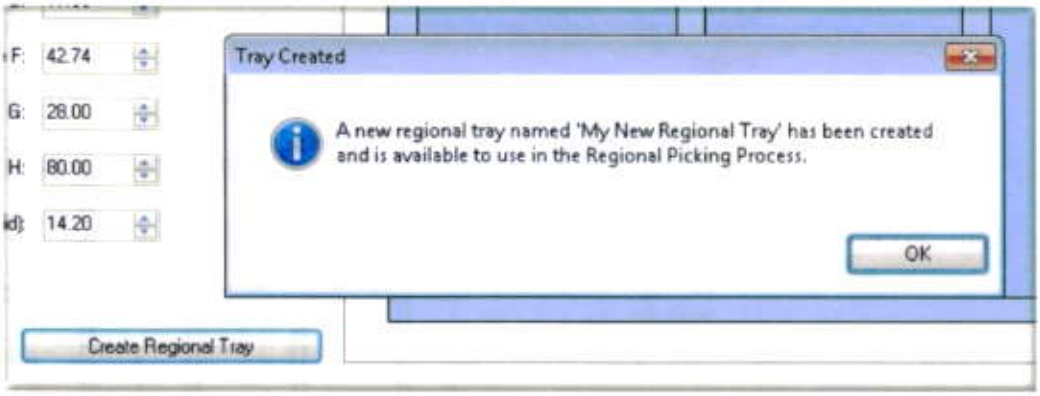
4. Click the **Defined Tray** tab to see a visual representation of the specified parameters.



5. When you finish entering the tray dimensions and confirm the new tray is ready to be saved, click **Create Regional Tray**.

> **Note:** After you click **Create Regional Tray**, you cannot go back and make changes. You will have to delete the unwanted saved tray and create a new tray. See Removing a Created Regional Tray on page 180.

6. In the **Tray Created** dialog, click **OK** to return to the **Navigation** window.



The new tray is now available for use in a **Regional Picking** process. See Regional Picking Processes on page 107.

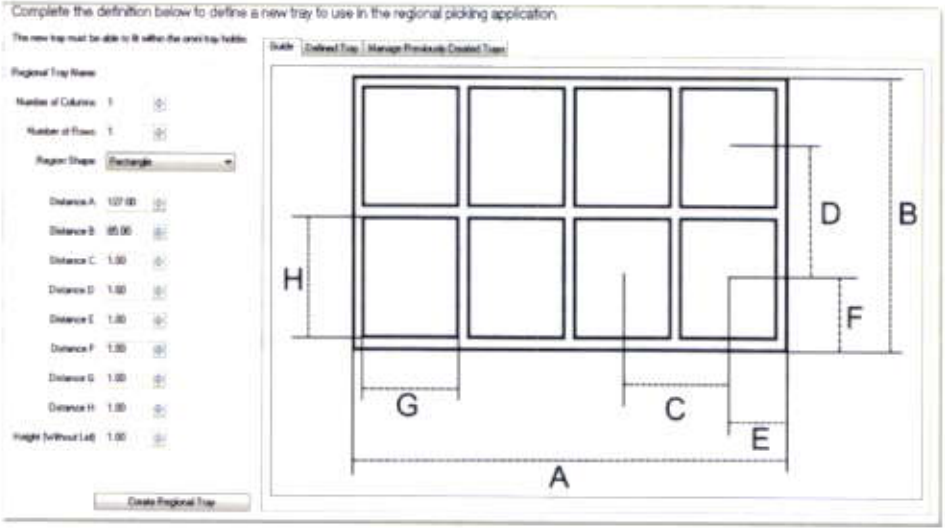
Removing a Created Regional Tray

Removing a previously created regional tray is also done from within the **Create New Regional Tray** screen.

To remove a created regional tray:

1. From the **Navigation** window under **Picking Processes**, double-click the **Create New Regional Tray** icon.

   The new plate definition screen is displayed along with parameter fields and a guide image.



2. Click the **Manage Previously Created Trays** tab.
3. From the **Defined Trays** field, select the name of the tray that you want to remove.
4. Click **Remove**.
5. In the **Confirm Delete** dialog, click **Yes**.
6. Click **Close** to return to the **Navigation** window.

Chapter 13: Replication Processes

13

The QPix™ 420 Colony Picking System is capable of replicating colonies between microplates.

The following options are available in the **Navigation** window under **Replication Processes**:

- **Library Replication** replicates between microplates that have the same number of wells.
- **Library Compression** replicates from 96-well microplates to 384-well microplates, compressing the samples.
- **Library Expansion** replicates from 384-well microplates to 96-well microplates, expanding the samples.

Note: Before running a replicating process, it is important that you do the cleaning and set up procedures in Preparing to Run a Process on page 27.

If this is your first replication process, you must edit or create a **Sanitise** profile to use with the replication process. See Creating and Editing Sanitise Profiles on page 34.

Creating and Editing a Replication Process

The procedures for creating and editing the different types of replicating processes are very similar. Differences and exceptions are identified within the instructions when applicable.

If this is your first replication process, you must edit or create a **Sanitise** profile to use with the replication process. See Creating and Editing Sanitise Profiles on page 34.

Creating and editing a replication process involves the following procedures:

- Opening the Replication Window on page 182
- Selecting a Replication Routine on page 182
- Selecting Barcode Options on page 184
- Selecting the Microplate and Sanitizing Options on page 186
- Selecting the Head Options on page 187
- Viewing the Settings Summary on page 187
- Changing the Picking Head on page 187
- Arranging the Microplate Layout on page 188

After creating the routine, you can close the process and run it at a later time, or you can run it immediately.

Note: Some steps that are included in these procedures might not be available to you, depending on the features included with your instrument and license. Optional features are identified within the procedures when applicable.

Opening the Replication Window

1. From the **Navigation** window under **Replication Processes**, double-click the icon for the type of replication process.
   - **Library Replication** replicates between microplates that have the same number of wells.
   - **Library Compression** replicates from 96-well microplates to 384-well microplates, compressing the samples.
   - **Library Expansion** replicates from 384-well microplates to 96-well microplates, expanding the samples.
2. In the **Library Replication**, **Library Compression**, or **Library Expansion** window, click **Start**.

The system "homes" the drives, and then displays the **Routines** window. See Selecting a Replication Routine on page 182.

Selecting a Replication Routine

1. In the **Routines** window, select to create a new routine from scratch or to edit an existing routine.
   - To create a new routine from scratch, click **New Routine**.
   - To edit an existing routine, click **Run Existing Routine** and then select the name of the routine from the **Select Routine** list.

     If you want to run the selected routine without making changes, select the **Skip Steps** check box.
2. Click **Next** to set the barcode options. See Selecting Barcode Options on page 184.

Note: You can import, export, and delete routines in the **Routines** window. See Adding and Removing Replication Routines on page 182.

Adding and Removing Replication Routines

The **Select Routine** list contains the related routines that are in the database. Only routines that match the type of routine that you are creating are included in the list.

If you have a saved routine from a different computer, you can import the routine. You can also export a routine from the database so that it can be imported into the database on a different computer. If you no longer need a routine, you can permanently delete it from the database.

Importing a Routine

Before you can import a routine, you need to export the routine from the other computer in .xml format and then save the export file on the system computer.

To import the .xml file, click **Import** and then locate and select the file. Click **Import** to add the routine to the database. If the routine is of the same type as the one you are creating, then the imported routine is displayed in the **Select Routine** list.

Exporting a Routine

To export a routine, click **Export** and then navigate to the location that you want to save the .xml file. You can change the name of the file, if desired. Click **Export** to save the routine in .xml format.

Deleting a Routine

Molecular Devices recommends that you export the routine before deleting it. This lets you import the routine at a later time if desired.

To delete a routine, select the routine in the **Select Routine** list and then click **Delete**. In the **Delete Routine** dialog, click **OK** to permanently remove the routine from the database.

Selecting Barcode Options

You can scan source and destination microplates for barcodes or define unique identifiers for source microplates without scanning for barcodes.

Note: Molecular Devices recommends that you always use barcodes for accurate data tracking.

Using a Barcode Reader

1. Select the **Use Barcode Reader** check box to scan source and destination receptacles for barcodes.

   To define unique identifiers for source receptacles without scanning for barcodes, see Defining Unique Identifiers Without Barcodes on page 185.

2. Click a **Read Failure Option** to define the system response when a barcode cannot be read correctly.

   - Click **Manual Prompt** to open a dialog where you can type a barcode or name for the receptacle.
   - Click **Skip Receptacle** to ignore the receptacle and scan the next receptacle for a barcode.

     Note: If the system fails to identify a barcode for the source receptacle, the routine ends, since the source requires a valid barcode.

   - Click **Auto Generate** to allow the system to automatically assign a valid random barcode and continue the routine.

3. Optionally, use the **Validation Barcode** list to define all the valid barcodes for source receptacles. If the scanned barcode on a source receptacle cannot be found in the list, an error message is displayed.

   - To manually enter valid barcodes, type each barcode in the field below the list and then click **Insert**.
   - To import valid barcodes from a text or .csv file, click **Import** and then select the file from which to import the barcodes.
   - To use the valid barcodes in the database, click **From Database**.
   - To remove a barcode from the list, click the barcode in the list and then click **Remove**.

4. Click **Next** to define the microplate options and select a **Sanitise** profile. See Selecting the Microplate and Sanitizing Options on page 186.

Defining Unique Identifiers Without Barcodes

1. Clear the **Use Barcode Reader** check box to define unique identifiers for source receptacles without scanning for barcodes.

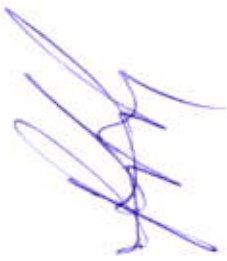
   To scan source and destination receptacles for barcodes, see Using a Barcode Reader on page 184.

2. Select the method for defining the unique identifiers.

   - To have the software generate random identifiers with the prefix **Auto** for the source receptacles, select the **Generate Random Barcodes** check box . No other parameters are required for this option.
   - To manually define identifiers for the source receptacles, type each identifier in the field below the **Barcode** list and then click **Insert**.
   - To import identifiers for the source receptacles from a text or .csv file, click **Import** and then select the file from which to import the identifiers.
   - To generate a defined list of identifiers for the source receptacles, click **Generate List**.

     To define the parameters for the generated list, type static text for the start of the identifier in the **Prefix** field, the first number to generate in the **Start Number** field, the number of digits in the generated number in the **Digit Padding** field, and the number of identifiers to generate in the **Number to Generate** field. The **Preview** area shows examples of the first and last generated identifiers. To view the generated identifiers in the **Barcodes** list, click **Generate**.
   - To remove an identifier from the list, click the identifier in the list and then click **Remove**.

3. Click **Next** to define the microplate options and select a **Sanitise** profile. See Selecting the Microplate and Sanitizing Options on page 186.



Selecting the Microplate and Sanitizing Options

1. In the **Microplates** and **Sanitise** window, from the **Source Microplate** list, select the source microplate type to hold the colonies to be replicated. If the microplate type that you need is not listed, contact Molecular Devices to add a new microplate type to the list. See Obtaining Support on page 248.
   - For **Library Replication**, you can select either 96-well or 384-well microplates.
   - For **Library Compression**, you can select 96-well microplates, only.
   - For **Library Expansion** you can select 384-well microplates only.
2. Select either to dip the pins a specified number of times or to stir the wells of the source microplate.
   - To dip the pins a specified number of times, click **Multi Dip** and in the **Number of Dips** field, type the number of times to dip the pins.
   - To stir the wells, click **Stir Source**.
3. From the **Destination Microplate** list, select the destination microplate type to hold the replicated colonies. If the microplate type that you need is not listed, contact to add a new microplate type to the list. See Obtaining Support on page 248.
   - For **Library Replication**, you can select only microplates with the same number of wells as the source microplate.
   - For **Library Compression**, you can select 384-well microplates, only.
   - For **Library Expansion** you can select 96-well microplates only.
4. Select either to dip the pins a specified number of times or to stir the wells of the destination microplate.
   - To dip the pins a specified number of times, click **Multi Dip** and in the **Number of Dips** field, type the number of times to dip the pins.
   - To stir the wells, click **Stir Source**.
5. If you want to make a second copy of the destination microplate, then in the **Copies** field, type **2**. If you want to clean the pins between copies of the destination microplates, select the **Sanitise Between Copies** check box.
6. From the **Sanitise Profile** list, select the **Sanitise** profile to use for the replication routine. If the available profiles are not suitable for the replication routine, exit the replication process and create a new **Sanitise** profile. See Creating and Editing Sanitise Profiles on page 34.
7. Click **Next** to set the head options. See Selecting the Head Options on page 187.

Selecting the Head Options

1. In the **Head** window, from the **Select Head** list, select the head to use for the replication routine
2. If you want to clean the pins between copies of the destination microplates, select the **Sanitise Between Copies** check box.
3. Under **Inoculation Heights (mm above well bottom)**, type a value for the distance in millimeters (mm) above the bottom of the microplate where the pins stop in the **Source** and **Destination** microplate wells.
4. Click **Next** to view the settings summary. See Viewing the Settings Summary on page 187.

Viewing the Settings Summary

The **Settings Summary** window contains a full summary of the replication routine settings you just configured.

Review the summary details to make sure that the settings and options are configured correctly for the replication routine. If you need to make changes, click **Back** until you return to the window where the changes can be made.

To print the summary, click **Print**.

Click **Next** to change the head, as needed. See Changing the Picking Head on page 187.

Changing the Picking Head

The **Change Head** window reminds you which picking head should be loaded, based on the **Setting Summary** routine you just configured, and provides you an opportunity to change the head if needed.

The head is housed in a unique actuator system that permits easy exchange and set-up of the head.

Although it is possible to manually move the actuator assembly, Molecular Devices recommends using the software to safely move the actuator into position to remove or install the head.

WARNING! PINCH HAZARD. The actuator assembly has moving parts that can cause pinch injuries if it is moved manually. To prevent pinch injuries, use the software Change Head process to safely move the actuator.

To change the picking head:

1. Click **Move to Load Position** to move the picking head arm to the loading position.
2. When the warning message is displayed, make sure that the bed is clear of obstructions and that the door is closed, and then click **OK** to move the actuator into position near the front of the instrument.

3. Open the front door.
4. Install the specified picking head.
   - To remove an installed head, unscrew and remove the thumbscrew and washer on the left that secures the head to the actuator assembly. Then, grab the handle on the right and slide the head out of the actuator.

     Before storing the head, or whenever it needs cleaning, wipe the exterior of the head with a cloth using 70% ethanol. To store the head, slide it into its metal cover with the pins facing inward and then secure it in place with the thumbscrew and washer.
   - To install a head, hold the head by its handle with the pins pointing down and then slide the head into the actuator assembly from the right. Then, attach the thumbscrew and washer on the left and hand tighten the thumbscrew to secure the head to the actuator.
5. Close the front door.
6. Click **Move to Park Position** to move the picking head arm to the run ready park position.
7. When the warning message is displayed, make sure that the bed is clear of obstructions and that the door is closed, and then click **OK** to home the actuator to its starting position.
8. Click **Next**.to arrange the source microplates in the instrument. See Arranging the Microplate Layout on page 188.

Arranging the Microplate Layout

1. Open the instrument door.
2. In the **Holder Layout Summary** window, follow the instructions to correctly arrange the microplate holders in the instrument. The layout is defined by the selections you made in earlier steps.
3. Select the **Checked?** check box to confirm the microplate holder layout.
4. Click **Next**.
5. Remove all microplate lids.
6. In the **Load Plates** window, follow the instructions to correctly place the microplates.
7. Select the **Checked?** check box to confirm the microplate layout.
8. Close the instrument door.
9. Click **Next** to start replicating. See Running a Replication Process on page 189.

Running a Replication Process

After a replication routine has been configured, you can run the process on the instrument. If you have not configured the replication routine you want to run, you must create a new replication routine or edit an existing routine. See Creating and Editing a Replication Process on page 181.

Note: Before running a picking process, it is important that you do the cleaning and set up procedures in Preparing to Run a Process on page 27.

Some steps that are included in these procedures might not be available to you, depending on the features included with your instrument and license. Optional features are identified within the procedures when applicable.

To run a configured replication routine:

1. Open the **Library Replication**, **Library Compression**, or **Library Expansion** window. See Opening the Replication Window on page 182.
2. Select the replication routine you want to run. See Selecting a Replication Routine on page 182.

   If you do not need to make changes to the selected routine, select the **Skip Steps** check box before clicking **Next**.
3. Review the configured settings for the routine. See Viewing the Settings Summary on page 187.
4. In the **Settings Summary** window, click **Next**.
5. In the **Continue Or Save New Routine** dialog or the **Save Changes To Routine** dialog, select whether or not to save the routine before continuing with the replication process.

   If you are creating a new routine from scratch, the **Continue Or Save New Routine** dialog is displayed.

   - To save the settings for the routine before continuing, click **Save Routine**, type a **Name** and a short **Description** for the routine, and then click **Save**.
   - To continue without saving the settings for the routine, click **Routine Without Saving** and then click **OK**.

   If you are editing an existing routine, the **Save Changes To Routine** dialog is displayed.

   - To save the settings for the routine before continuing, click **Save**.
   - To save the settings as a new routine without changing the existing routine, click **Save As**, type a **Name** and a short **Description** for the routine, and then click **Save**.
   - To continue without saving the settings for the routine, click **No**.

6. Make sure that the instrument door is closed.
7. Click **Next** to run the replication routine.
8. The **Library Replication Progress**, **Library Compression Progress**, or **Library Expansion Progress** window is displayed. See Viewing the Replication Progress on page 190.

Viewing the Replication Progress

While the replication routine is running, the **Library Replication Progress**, **Library Compression Progress**, or **Library Expansion Progress** window displays a summary of the routine.

- **Start Time** shows the time the replication process began.
- **Source Plate No** shows the number of the source microplate that is being replicated.
- **Source Barcode** shows the barcode or identifier of the source microplate that is being replicated.
- **Source Offset** shows the well in the source microplate into which the "A1" pin is being lowered. This value changes for 384-well microplates.
- **Depositing into** shows the well or microplate into which the sample is being deposited.
- **Destination Plate No** shows the number of the microplate into which the sample is being deposited.
- **Destination Barcode** shows the barcode of the microplate into which the sample is being deposited.
- **Destination Offset** shows the well in the destination microplate into which the "A1" pin is being lowered. This value changes for 384-well microplates.
- **Calculating Remaining Time** indicates remaining time in the routine.
- **Current Action** displays what the system is currently doing, such as **Wash head** when the system is running the **Sanitise** profile.

To safely pause the routine, click **Pause**.

After all the source microplates have been replicated to the destination microplates, the **Replicating Process** window is displayed. See Viewing the Replicating Summary on page 191.

Viewing the Replicating Summary

After the replication routine has completed, the **Replicating Process** window is displayed, showing the number of source wells that were replicated, how many destination plates were used, and how many source plates were missing.

To save this information in .csv format, click **Export**.

To view details of all activities related to the source and destination microplates, click **Details**.

- To save the detailed information in .csv format, click **Export**.
- To close the picking details and return to the **Replicating Process** window, click **Close**.

In the **Replicating Process** window, click **Next** and then click **Finish** to return to the **Library Replication**, **Library Compression**, or **Library Expansion** window.

Chapter 14: Rearraying Processes

14

The QPix™ 420 Colony Picking System is capable of rearraying, or redepositing, colonies between one or more source and destination microplates. Use the rearraying process to organize, or cherry-pick, your picked source colonies into destination subsets of a more specific and orderly layout.

Note: Before running a rearraying process, it is important that you do the cleaning and set up procedures in Preparing to Run a Process on page 27.

If this is your first rearraying process, you must edit or create a **Sanitise** profile to use with the rearraying process. See Creating and Editing Sanitise Profiles on page 34.

Creating and Editing a Rearraying Process

If this is your first rearraying process, you must edit or create a **Sanitise** profile to use with the rearraying process. See Creating and Editing Sanitise Profiles on page 34.

Creating and editing a rearraying process involves the following procedures:

- Opening the Rearraying Window on page 194
- Selecting a Rearraying Routine on page 194
- Selecting Barcode Options on page 195
- Selecting the Source Microplate Options on page 196
- Selecting the Destination Microplate Options on page 198
- Selecting the Head Options on page 200
- Selecting the Sanitizing Options on page 200
- Viewing the Settings Summary on page 200
- Changing the Picking Head on page 200
- Arranging the Microplate Layout on page 202

After creating the routine, you can close the process and run it at a later time, or you can run it immediately.

Note: Some steps that are included in these procedures might not be available to you, depending on the features included with your instrument and license. Optional features are identified within the procedures when applicable.

Opening the Rearraying Window

1. From the **Navigation** window under **Rearraying Processes**, double-click **Rearraying**.
2. In the **Rearraying** window, click **Start**.

The system "homes" the drives, and then displays the **Routines** window. See Selecting a Rearraying Routine on page 194.

Selecting a Rearraying Routine

1. In the **Routines** window, select to create a new routine from scratch or to edit an existing routine.
   - To create a new routine from scratch, click **New Routine**.
   - To edit an existing routine, click **Run Existing Routine** and then select the name of the routine from the **Select Routine** list.

     If you want to run the selected routine without making changes, select the **Skip Steps** check box.
2. Click **Next** to set the barcode options. See Selecting Barcode Options on page 195.

Note: You can import, export, and delete routines in the **Routines** window. See Removing Rearraying Routines on page 194.

Removing Rearraying Routines

The **Select Routine** list contains the related routines that are in the database. Only routines that match the type of routine that you are creating are included in the list.

If you no longer need a routine, you can permanently delete it from the database.

Deleting a Routine

To delete a routine, select the routine in the **Select Routine** list and then click **Delete**. In the **Delete Routine** dialog, click **OK** to permanently remove the routine from the database.

Selecting Barcode Options

You can scan source and destination microplates for barcodes.

Note: Molecular Devices recommends that you always use barcodes for accurate data tracking.

Using a Barcode Reader

1. Select the **Use Barcode Reader** check box to scan source and destination receptacles for barcodes.
2. Click a **Read Failure Option** to define the system response when a barcode cannot be read correctly.
   - Click **Manual Prompt** to open a dialog where you can type a barcode or name for the receptacle.
   - Click **Skip Receptacle** to ignore the receptacle and scan the next receptacle for a barcode.

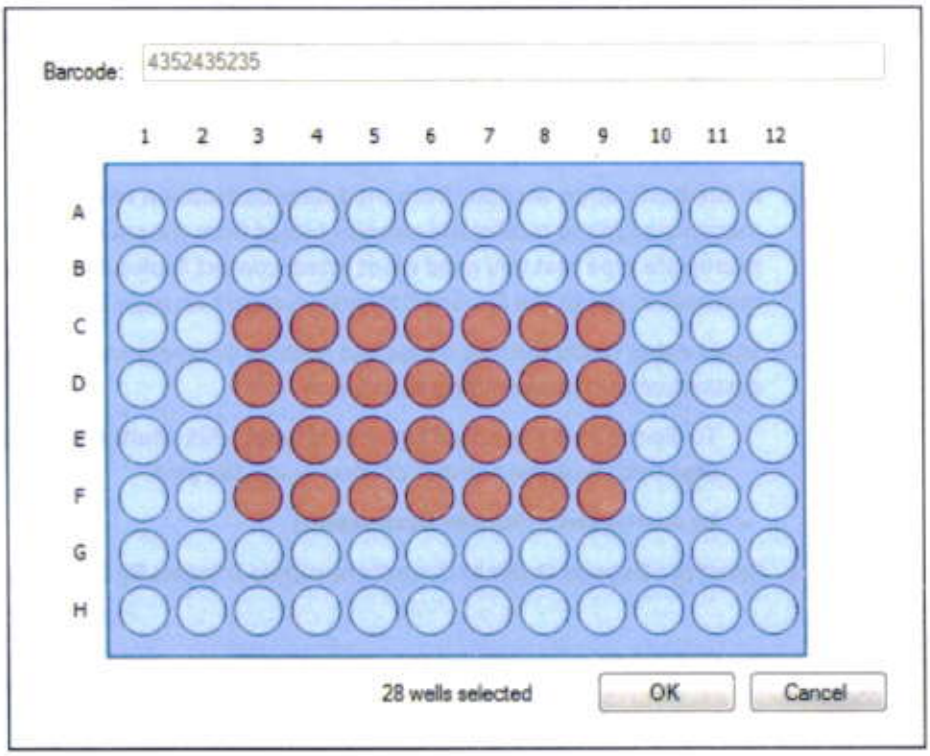
     Note: If the system fails to identify a barcode for the source receptacle, the routine ends, since the source requires a valid barcode.
   - Click **Auto Generate** to allow the system to automatically assign a valid random barcode and continue the routine.
3. Click **Next** to define the source microplate options. See Selecting the Source Microplate Options on page 196.

Selecting the Source Microplate Options

1. In the **Source** window, from the **Source Microplate** list, select the source microplate type to hold the colonies to be rearrayed. If the microplate type that you need is not listed, contact Molecular Devices to add a new microplate type to the list. See Obtaining Support on page 248.
2. Use the **Source Microplate** list to define all the source microplates for the process.
   - To import source microplates from a previously saved .frd (Fusion) or .imp (QSoft) file, click **Import** and then select the file from which to import the source microplate information.
   - To use source microplates in the database, click **From Database**. In the Barcode Search dialog, you can search for source microplates **By Tag** or **By Process**.
     - Click the **By Tag** tab to search for a tagged routine, receptacle, or location (colony). See Working With Tags on page 225.
     - Click the **By Process** tab to search by barcode or identifier from previously run routines.

   In the list on the left, click the process that was used to create the source microplate, and then select the routine from the expanded list. In the **Destination** list on the right, click the source microplate and then click **Add Selected Barcode**. If you add a microplate to the **Selected Barcodes** list that is not a source for this routine, then select the microplate and click **Remove**. When all the required source microplates are in the **Selected Barcodes** list, click **Import**.

3. Select a barcode or identifier in the **Source Microplate** list, and then click **Insert** to open an image of the microplate from which you can define the wells to dip or skip for the rearraying routine.



- To dip a well, click the well. Wells to be dipped are displayed in light red.
- To dip multiple contiguous wells, right-click and drag across the wells.
- To skip a well that you selected to dip, click the well again. Wells to be skipped are displayed in light blue.

After defining the wells to dip or skip, click **OK**.

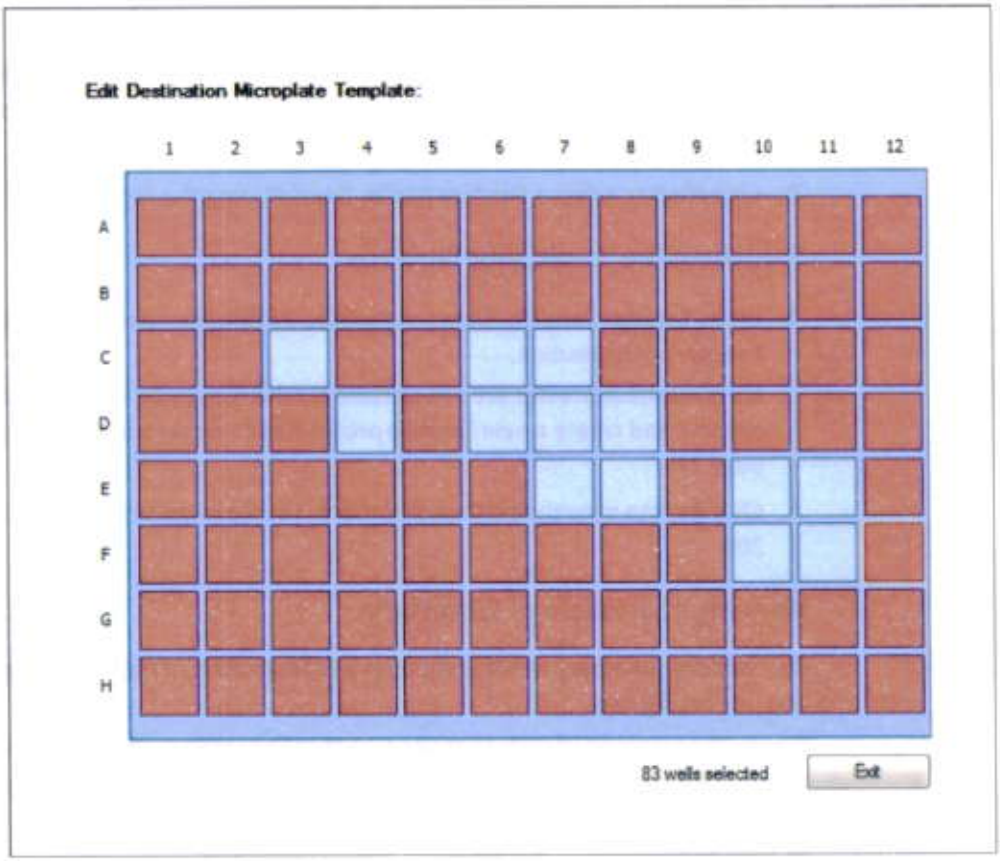
4. Define the wells to dip or skip for each of the microplates in the **Source Microplate** list.
5. To export the list of source microplates to a new .frd (Fusion) or .imp (QSoft) file, click **Export**. The new file can be used for importing source microplates into a different rearraying routine.
6. To edit a microplate in the **Source Microplate** list, select the microplate and then click **Edit**.
7. To remove a microplate from the **Source Microplate** list, select the microplate and then select **Remove**.
8. To clear the entire **Source Microplate** list, click **Remove All**.
9. To stir the wells before picking the colonies, select the **Stir Source** check box.

10. In the **Microplates To Process Before Depositing** field, type the number of source microplates from which to pick colonies before depositing the colonies into the destination microplates.
11. Click **Next** to set the destination source options. See Selecting the Destination Microplate Options on page 198.

Selecting the Destination Microplate Options

1. In the **Destination** window, from the **Select Destination Microplate** list, select the microplate type to receive the colonies picked from the source microplates. If the microplate type that you need is not listed, contact Molecular Devices to add a new microplate type to the list. See Obtaining Support on page 248.
2. Select either to dip the pins a specified number of times or to stir the wells of the destination microplate during inoculation.
   - To dip the pins a specified number of times, click **Multi Dip** and in the **Number of Dips** field, type the number of times to dip the pins.
   - To stir the wells, click **Stir Destination**.
3. Select the **Deposit Order** to deposit the picked colonies **By Columns** or **By Rows**.

4. Under **Destination Microplate Template**, click **Edit** to define the wells to dip or skip. You can skip wells that you want to use as blank or control wells. The defined template is used for all the destination microplates during the rearraying routine.



- To skip a well, click the well. Wells to be skipped are displayed in light blue.
- To skip multiple contiguous wells, right-click and drag across the wells.
- To dip a well that you selected to skip, click the well again. Wells to be dipped are displayed in light red.

After defining the wells to dip or skip, click **Exit**.

5. Click **Next** to select the head options. See Selecting the Head Options on page 200.

Selecting the Head Options

1. In the **Head** window, from the **Select Head** list, select the head to use for the rearraying routine
2. Under **Inoculation Heights (mm above well bottom)**, type a value for the distance in millimeters (mm) above the bottom of the microplate where the pins stop in the **Source** and **Destination** microplate wells.
3. Click **Next** to select a **Sanitise** profile. See Selecting the Sanitizing Options on page 200.

Selecting the Sanitizing Options

1. In the **Sanitise** window, from the **Sanitise Profile** list, select the **Sanitise** profile to use for the rearraying routine.

   If the available profiles are not suitable for the rearraying routine, exit the rearraying process and create a new **Sanitise** profile. See Creating and Editing Sanitise Profiles on page 34.
2. Click **Next** to view the settings summary. See Viewing the Settings Summary on page 200.

Viewing the Settings Summary

The **Settings Summary** window contains a full summary of the rearraying routine settings you just configured.

Review the summary details to make sure that the settings and options are configured correctly for the rearraying routine. If you need to make changes, click **Back** until you return to the window where the changes can be made.

To print the summary, click **Print**.

Click **Next** to change the head, as needed. See Changing the Picking Head on page 200.

Changing the Picking Head

The **Change Head** window reminds you which picking head should be loaded, based on the **Setting Summary** routine you just configured, and provides you an opportunity to change the head if needed.

The head is housed in a unique actuator system that permits easy exchange and set-up of the head.

Although it is possible to manually move the actuator assembly, Molecular Devices recommends using the software to safely move the actuator into position to remove or install the head.

WARNING! PINCH HAZARD. The actuator assembly has moving parts that can cause pinch injuries if it is moved manually. To prevent pinch injuries, use the software Change Head process to safely move the actuator.

To change the picking head:

1. Click **Move to Load Position** to move the picking head arm to the loading position.
2. When the warning message is displayed, make sure that the bed is clear of obstructions and that the door is closed, and then click **OK** to move the actuator into position near the front of the instrument.
3. Open the front door.
4. Install the specified picking head.
   - To remove an installed head, unscrew and remove the thumbscrew and washer on the left that secures the head to the actuator assembly. Then, grab the handle on the right and slide the head out of the actuator.

     Before storing the head, or whenever it needs cleaning, wipe the exterior of the head with a cloth using 70% ethanol. To store the head, slide it into its metal cover with the pins facing inward and then secure it in place with the thumbscrew and washer.
   - To install a head, hold the head by its handle with the pins pointing down and then slide the head into the actuator assembly from the right. Then, attach the thumbscrew and washer on the left and hand tighten the thumbscrew to secure the head to the actuator.
5. Close the front door.
6. Click **Move to Park Position** to move the picking head arm to the run ready park position.
7. When the warning message is displayed, make sure that the bed is clear of obstructions and that the door is closed, and then click **OK** to home the actuator to its starting position.
8. Click **Next**.to arrange the source microplates in the instrument. See Arranging the Microplate Layout on page 202.

Arranging the Microplate Layout

1. Open the instrument door.
2. In the **Holder Layout Summary** window, follow the instructions to correctly arrange the microplate holders in the instrument. The layout is defined by the selections you made in earlier steps.
3. Select the **Checked?** check box to confirm the microplate holder layout.
4. Click **Next**.
5. Remove all microplate lids.
6. In the **Load Plates** window, follow the instructions to correctly place the microplates.
7. Select the **Checked?** check box to confirm the microplate layout.
8. Close the instrument door.
9. Click **Next** to start rearraying. See Running a Rearraying Process on page 203.

Running a Rearraying Process

After a rearraying routine has been configured, you can run the process on the instrument. If you have not configured the rearraying routine you want to run, you must create a new rearraying routine or edit an existing routine. See Creating and Editing a Rearraying Process on page 193.

Note: Before running a rearraying process, it is important that you do the cleaning and set up procedures in Preparing to Run a Process on page 27.

Some steps that are included in these procedures might not be available to you, depending on the features included with your instrument and license. Optional features are identified within the procedures when applicable.

To run a configured rearraying routine:

1. Open the **Rearraying** window. See Opening the Rearraying Window on page 194.
2. Select the rearraying routine you want to run. See Selecting a Rearraying Routine on page 194.

   If you do not need to make changes to the selected routine, select the **Skip Steps** check box before clicking **Next**.
3. Review the configured settings for the routine. See Viewing the Settings Summary on page 200.
4. In the **Settings Summary** window, click **Next**.
5. In the **Continue Or Save New Routine** dialog or the **Save Changes To Routine** dialog, select whether or not to save the routine before continuing with the rearraying process.

   If you are creating a new routine from scratch, the **Continue Or Save New Routine** dialog is displayed.

   - To save the settings for the routine before continuing, click **Save Routine**, type a **Name** and a short **Description** for the routine, and then click **Save**.
   - To continue without saving the settings for the routine, click **Routine Without Saving** and then click **OK**.

   If you are editing an existing routine, the **Save Changes To Routine** dialog is displayed.

   - To save the settings for the routine before continuing, click **Save**.
   - To save the settings as a new routine without changing the existing routine, click **Save As**, type a **Name** and a short **Description** for the routine, and then click **Save**.
   - To continue without saving the settings for the routine, click **No**.

6. Make sure that the instrument door is closed.
7. Click **Next** to run the replication routine.
8. The **Rearraying Progress** window is displayed. See Viewing the Rearraying Progress on page 204.

Viewing the Rearraying Progress

While the rearraying routine is running, the **Rearraying Progress** window displays a summary of the routine.

- **Start Time** shows the time the rearraying process began.
- **Source Plate No** shows the number of the source microplate that is being rearrayed.
- **Source Barcode** shows the barcode or identifier of the source microplate that is being rearrayed.
- **Source Well** shows the well from which the sample is being picked.
- **Pin** shows the picking pin that is being used.
- **Destination Plate No** shows the number of the microplate into which the sample is being deposited.
- **Destination Barcode** shows the barcode or identifier of the microplate into which the sample is being deposited.
- **Destination Offset** shows the well in the destination microplate into which the "A1" pin is being lowered. This value changes for 384-well microplates.
- **Total Wells Rearrayed** shows the number of wells that have been rearrayed.
- **Total Wells to Rearray** shows the total number of wells to be rearrayed.
- **Estimated Time Remaining** indicates remaining time in the routine.
- **Current Action** displays what the system is currently doing, such as **Deposit** when the system is depositing colonies into the destination microplate.

To safely pause the routine, click **Pause**.

After all the source microplates have been rearrayed to the destination microplates, the **Rearraying Process** window is displayed. See Viewing the Rearraying Summary on page 205.

Viewing the Rearraying Summary

After rearraying routine has completed, the **Rearraying Process** window is displayed, showing the number of source wells that were rearrayed, how many destination plates were used, and how many source plates were missing.

To save this information in .csv format, click **Export**.

To view details of all activities related to the source and destination microplates, click **Details**.

- To save the detailed information in .csv format, click **Export**.
- To close the picking details and return to the **Rearraying Process** window, click **Close**.

In the **Rearraying Process** window, click **Next** and then click **Finish** to return to the **Rearraying** window.

Chapter 15: Gridding Processes

15

The QPix™ 420 Colony Picking System uses the gridding process to collect liquid samples from one or more source microplates and then to deposit the liquid on the surface of one or more filters or on the surface of the agar in one or more QTrays. The gridding head stamps the sample in a defined grid pattern on the filter or agar.

Note: Before running a gridding process, it is important that you do the cleaning and set up procedures in Preparing to Run a Process on page 27.

If this is your first gridding process, you must edit or create a **Sanitise** profile to use with the gridding process. See Creating and Editing Sanitise Profiles on page 34.

Creating and Editing a Gridding Process

If this is your first gridding process, you must edit or create a **Sanitise** profile to use with the gridding process. See Creating and Editing Sanitise Profiles on page 34.

Creating and editing a gridding process involves the following procedures:

- Opening the Gridding Window on page 208
- Selecting a Gridding Routine on page 208
- Selecting Barcode Options on page 209
- Selecting the Head and Sanitizing Options on page 210
- Setting Source and Destination Options on page 211
- Creating a Filter Design Layout on page 212
- Selecting the Destination Positions on page 216
- Selecting Stamping and Inking Options on page 216
- Viewing the Settings Summary on page 217
- Changing the Picking Head on page 217
- Arranging the Microplate Layout on page 218

After creating the routine, you can close the process and run it at a later time, or you can run it immediately.

Note: Some steps that are included in these procedures might not be available to you, depending on the features included with your instrument and license. Optional features are identified within the procedures when applicable.

Opening the Gridding Window

1. From the **Navigation** window under **Gridding Processes**, double-click the **Gridding** icon.
2. In the **Gridding** window, click **Start**.

The system "homes" the drives, and then displays the **Routines** window. See Selecting a Gridding Routine on page 208.

Selecting a Gridding Routine

1. In the **Routines** window, select to create a new routine from scratch or to edit an existing routine.
   - To create a new routine from scratch, click **New Routine**.
   - To edit an existing routine, click **Run Existing Routine** and then select the name of the routine from the **Select Routine** list.

     If you want to run the selected routine without making changes, select the **Skip Steps** check box.
2. Click **Next** to go to the next step.
   - If you selected to create a new routine from scratch or to edit an existing routine, see Selecting Barcode Options on page 209.
   - If you selected the **Skip Steps** check box to run the selected routine without making changes, see Viewing the Settings Summary on page 217.

Note: You can import, export, and delete routines in the **Routines** window. See Adding and Removing Gridding Routines on page 208.

Adding and Removing Gridding Routines

The **Select Routine** list contains the related routines that are in the database. Only routines that match the type of routine that you are creating are included in the list.

If you no longer need a routine, you can permanently delete it from the database.

Deleting a Routine

To delete a routine, select the routine in the **Select Routine** list and then click **Delete**. In the **Delete Routine** dialog, click **OK** to permanently remove the routine from the database.

Selecting Barcode Options

You can scan source and destination receptacles for barcodes or define unique identifiers for receptacles without scanning for barcodes.

Note: Molecular Devices recommends that you always use barcodes for accurate data tracking.

Using a Barcode Reader

1. Select the **Use Barcode Reader** check box to scan source and destination receptacles for barcodes. Barcodes compatible with the barcode reader are code 39, code 93, and code 128.

   To define unique identifiers for source receptacles without scanning for barcodes, see Defining Unique Identifiers Without Barcodes on page 210.

2. Click a **Read Failure Action** to define the system response when a barcode cannot be read correctly.
   - Click **Manual Prompt** to open a dialog where you can type a barcode or name for the receptacle.
   - Click **Skip Receptacle** to ignore the receptacle and scan the next receptacle for a barcode.

     Note: If the system fails to identify a barcode for the source receptacle, the routine ends, since the source requires a valid barcode.

   - Click **Auto Generate** to allow the system to automatically assign a valid random barcode and continue the routine.
3. Optionally, use the **Validation Barcode** list to define all the valid barcodes for source receptacles. If the scanned barcode on a source receptacle cannot be found in the list, an error message is displayed.
   - To manually enter valid barcodes, type each barcode in the field below the list and then click **Insert**.
   - To import valid barcodes from a text or .csv file, click **Import** and then select the file from which to import the barcodes.
   - To use the valid barcodes in the database, click **From Database**.
   - To remove a barcode from the list, click the barcode in the list and then click **Remove**.
4. Click **Next** to define the head and choose a **Sanitise** profile. See Selecting the Head and Sanitizing Options on page 210.

Defining Unique Identifiers Without Barcodes

1. Clear the **Use Barcode Reader** check box to define unique identifiers for source receptacles without scanning for barcodes.

   To scan source and destination receptacles for barcodes, see Using a Barcode Reader on page 209.

2. Select the method for defining the unique identifiers.

   - To have the software generate random identifiers with the prefix **Auto** for the source receptacles, select the **Generate Random Barcodes** check box . No other parameters are required for this option.
   - To manually define identifiers for the source receptacles, type each identifier in the field below the **Barcode** list and then click **Insert**.
   - To import identifiers for the source receptacles from a text or .csv file, click **Import** and then select the file from which to import the identifiers.
   - To generate a defined list of identifiers for the source receptacles, click **Generate List**.

     To define the parameters for the generated list, type static text for the start of the identifier in the **Prefix** field, the first number to generate in the **Start Number** field, the number of digits in the generated number in the **Digit Padding** field, and the number of identifiers to generate in the **Number to Generate** field. The **Preview** area shows examples of the first and last generated identifiers. To view the generated identifiers in the **Barcodes** list, click **Generate**.
   - To remove an identifier from the list, click the identifier in the list and then click **Remove**.

3. Click **Next** to define the head and choose a **Sanitise** profile. See Selecting the Head and Sanitizing Options on page 210.

Selecting the Head and Sanitizing Options

1. In the **Head** and **Sanitise** window, from the **Gridding Head** list, select the head to use for the gridding routine.
2. From the **Sanitise Profile** list, select the **Sanitise** profile to use for the gridding routine.

   If the available profiles are not suitable for the gridding routine, exit the gridding process and create a new **Sanitise** profile. See Creating and Editing Sanitise Profiles on page 34.
3. Click **Next** to define options for the source and destination receptacles. See Setting Source and Destination Options on page 211.

Setting Source and Destination Options

1. In the **Microplates and Filters** window, from the **Select Microplate** list, select the microplate type for the source. If the microplate type that you need is not listed, contact Molecular Devices to add a new microplate type to the list. See Obtaining Support on page 248.
2. Select either to dip the pins a specified number of times or to stir the wells of the source microplate.
   - To dip the pins a specified number of times, click **Multi Dip** and in the **Number of Dips** field, type the number of times to dip the pins.
   - To stir the wells, click **Stir Source**.
3. In the **Inoculation Height (mm)** field, type a value for the distance in millimeters (mm) above the bottom of the microplate where the pins stop in the **Source** microplate wells.
4. From the **Destination Receptacle** list, select **Filter**, **OmniTray**, or **QTray**.
5. Click **Next** to define the filter design layout. See Creating a Filter Design Layout on page 212.

Creating a Filter Design Layout

In the **Filter Design** window, you define the **Spot Pattern** to be stamped on your destination surface in the defined **Field Pattern**.

- The **Spot Pattern** determines the pattern and the number of times that a pin is stamped on the destination surface. The numbers and colors represent the samples taken from separate microplates and stamped on the surface in the defined locations.
- The **Field Pattern** divides the destination surface into areas, or fields, that are the size of a 96-pin head. Each field represents one head stamp of the defined **Spot Pattern**. The colors and numbers identify the fields. Duplicate fields can be created where two or more fields have the same number and color. The field number also influences the sample deposit order. Field 1 is visited before field 2. Six fields are available for Qtray and Filter destination receptacles, while only one field is available for an OmniTray destination receptacle.

Although, the numbers and colors used in the patterns look similar, there is no relation between the numbers and colors used in the **Spot Pattern** and the **Field Pattern**.

You can stamp from a maximum of 57600 samples to a minimum of 96 samples on your destination surface.

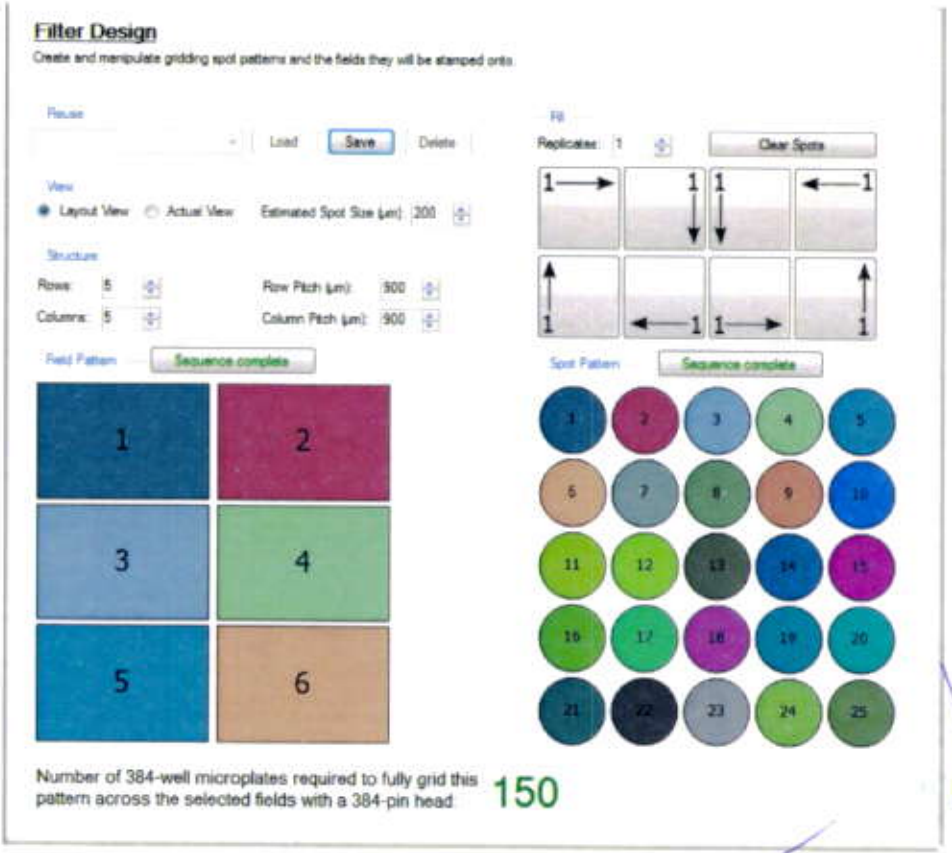


Figure 15-1: The Filter Design window with the maximum number of samples

The maximum number of samples can be defined with 25 spots in the **Spot Pattern** and 6 fields in the **Field Pattern** that requires 150 filled 384-well microplates.

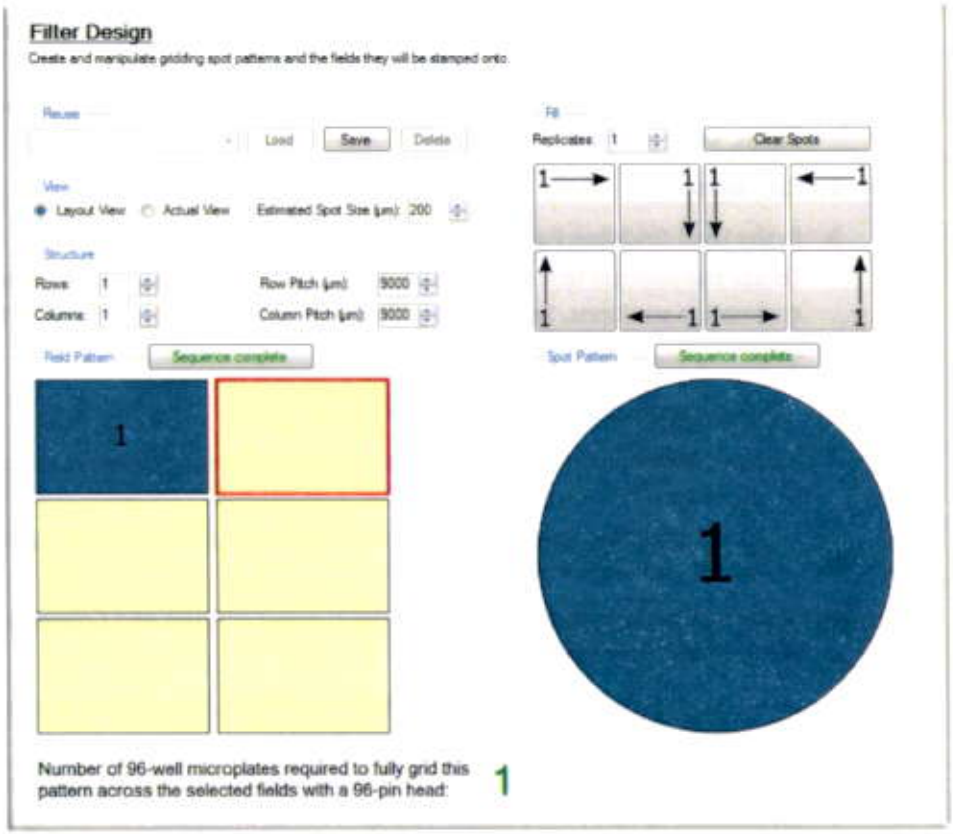


Figure 15-2: The Filter Design window with the minimum number of samples

The minimum number of samples can be defined with 1 spot in the **Spot Pattern** and 1 field in the **Field Pattern** that requires 1 filled 96-well microplate.

You can define the **Spot Pattern** and **Field Pattern** that meets your needs in the **Filter Design** window. See Selecting the Destination Positions on page 216.

Defining the Filter Design Layout

1. In the **Filter Design** window, from the **Reuse** list, select a previously defined filter design layout, if applicable.

   If there are no filter designs in the **Reuse** list, or if the existing designs do not meet your needs, skip to step 4.

2. Click **Load**.

3. In the **Load Gridding Pattern?** message, click **Yes**.

   To use the selected filter design layout without making changes, click **Next** to select the destination positions. See Selecting the Destination Positions on page 216.

4. Select the **View** for the filter design.

   - Click **Layout View** to edit the filter design layout.
   - Click **Actual View** to see a realistic representation of the layout and spot pattern of the pins.

     To change the representation of the spot size, in the **Estimated Spot Size (µm)** field, type a value in microns up to 1500.

5. Under **Structure** field, type values for the number of **Rows** and **Columns** to be stamped in the **Spot Pattern** for each pin.

6. In the **Row Pitch (µm)** and **Column Pitch (µm)** fields, type values in microns to define the space between each spot in the **Spot Pattern**.

   The values in the **Row Pitch (µm)** and **Column Pitch (µm)** fields change depending on the number spots in the pattern. You can reduce the space between spots, but you cannot exceed the maximum values computed by the software.

7. In the **Replicates** field, type a value for the number of times to replicate each sample in the **Spot Pattern**.

8. Click one of the direction buttons that represents the starting point for the first pin and the direction for the **Spot Pattern**.

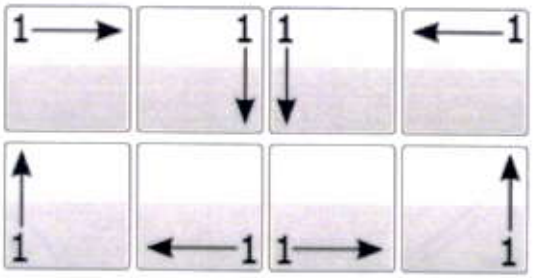


Figure 15-3: Direction buttons for the Spot Pattern.

9. In the **Fill Pattern?** message, click **OK** to create and display a **Spot Pattern** based on the values in the **Rows**, **Columns**, and **Replicates** fields.

10. Edit the **Spot Pattern**, if needed.
    - To change the assigned number for a spot, select the existing number in the spot and then type a new number.

      Your spot pattern must have a logical numerical sequence to it, such as 1,2,3,4 or 1,2,2,4. If you create an illogical sequence, such as 1,3,4,3 or 1,4,1,2, the message **Can't Calculate** is displayed in red text, the **No Sequence** button is displayed in red, and the **Spot Pattern Status** message appears describing the error.
    - To reset the **Spot Pattern**, click one of the direction buttons.
    - To skip a spot, select the existing number in the spot and then press **Delete** on your keyboard.
    - To clear all the spots in the pattern, click **Clear Spots** and then in the **Clear Pattern?** message, click **OK**.
11. Edit the **Field Pattern** to define the layout of the destination surface. Each field represents one head stamp of the defined **Spot Pattern**.
    - To change the assigned number for a field, select the existing number in the field and then type a new number from 1 to 6. Each different number assigned to a field represents a different sample to be stamped in that field.

      Your field pattern must have a logical numerical sequence to it, such as 1,2,3,4,5,6 or 1,2,2,3,3,4. If you create an illogical sequence, such as 1,1,2,5,3,5, the **No Sequence** button is displayed in red. For information about the error, click **No Sequence** to display the **Field Pattern Status** message.
    - To skip a field, select the existing number in the field and then press **Delete** on your keyboard.
    - If the layout contains two identical fields with the same color and number, the fields will be copies of each other.
12. To include the filter design layout in the **Reuse** list, click **Save** at the top of the window and give the new design a name.
13. Click **Next** to select the filter layout. See Selecting the Destination Positions on page 216.

Selecting the Destination Positions

For the QPix 420 Colony Picking System, no options are available in the **Filter Layout** window for QTray usage. Click **Next** to select the "stamping" and "inking" options. See Selecting Stamping and Inking Options on page 216.

1. In the **Filter Layout** window, in the **Positions to use** list, type the number of positions to use for gridding.
   - For filters, 3 positions are available.
   - For OmniTrays, 2 positions are available.
2. In the **Receptacle Offset** field, type the number of the first position to be used for gridding.

   The preview image displays the defined positions of the destination.
3. Click **Next** to select the "stamping" and "inking" options. See Selecting Stamping and Inking Options on page 216.

Selecting Stamping and Inking Options

1. In the **Substrate** window, in the **Stamps Per Spot** field, type a number from 1 to 5 for the number of times to stamp the pins in each spot.
2. To dip the pins in the source microplate between multiple stamps, select the **Re-Ink After # of Stamps** check box and then type a number in the field for the number of stamps to do before returning to the source microplate. Then select the **Multiple Stamp Loop** method:
   - Click **Cyclic** to stamp all the spots for a sample the defined number of times before returning to the source microplate.

     For example, if the sample has three replicate spots to be stamped four times and "re-inked" after two stamps, the **Cyclic** method stamps all three spots two times before returning to the source microplate to collect more sample, and then stamps all three spots two more times.
   - Click **Immediate** to stamp one of the spots for a sample the defined number of times before returning to the source microplate.

     For example, if the sample has three replicate spots to be stamped four times and "re-inked" after two stamps, the **Immediate** method stamps the first spot two times before returning to the source microplate to collect more sample, and then stamps the second spot two times before returning to the source microplate to collect more sample, and then stamps the third spot two more times.
3. In the **Stamp Time (ms)** field, type the number of milliseconds to press the pins against the destination surface for each stamp.
4. In the **Dwell Time (ms)** field, type the number of milliseconds to dip the pins in the source microplate wells.

5. In the **Overtravel Adjustment (mm)** field, type the number of millimeters from 1 to 15 for the pins to travel below the detected surface of the destination. This allows all the pins to make firm enough contact with an uneven surface for a good transfer of sample.
6. Click **Next** to lock the instrument door and view a summary of the settings. See Viewing the Settings Summary on page 217.

Viewing the Settings Summary

The **Settings Summary** window contains a full summary of the gridding routine settings you just configured.

Review the summary details to make sure that the settings and options are configured correctly for the gridding routine. If you need to make changes, click **Back** until you return to the window where the changes can be made.

To print the summary, click **Print**.

Click **Next** to change the head, as needed. See Changing the Picking Head on page 217.

Changing the Picking Head

The **Change Head** window reminds you which picking head should be loaded, based on the **Setting Summary** routine you just configured, and provides you an opportunity to change the head if needed.

The head is housed in a unique actuator system that permits easy exchange and set-up of the head.

Although it is possible to manually move the actuator assembly, Molecular Devices recommends using the software to safely move the actuator into position to remove or install the head.

WARNING! PINCH HAZARD. The actuator assembly has moving parts that can cause pinch injuries if it is moved manually. To prevent pinch injuries, use the software Change Head process to safely move the actuator.

To change the picking head:

1. Click **Move to Load Position** to move the picking head arm to the loading position.
2. When the warning message is displayed, make sure that the bed is clear of obstructions and that the door is closed, and then click **OK** to move the actuator into position near the front of the instrument.
3. Open the front door.
4. Install the specified picking head.

- To remove an installed head, unscrew and remove the thumbscrew and washer on the left that secures the head to the actuator assembly. Then, grab the handle on the right and slide the head out of the actuator.

  Before storing the head, or whenever it needs cleaning, wipe the exterior of the head with a cloth using 70% ethanol. To store the head, slide it into its metal cover with the pins facing inward and then secure it in place with the thumbscrew and washer.
- To install a head, hold the head by its handle with the pins pointing down and then slide the head into the actuator assembly from the right. Then, attach the thumbscrew and washer on the left and hand tighten the thumbscrew to secure the head to the actuator.

5. Close the front door.
6. Click **Move to Park Position** to move the picking head arm to the run ready park position.
7. When the warning message is displayed, make sure that the bed is clear of obstructions and that the door is closed, and then click **OK** to home the actuator to its starting position.
8. Click **Next** to arrange the source microplates in the instrument. See Arranging the Microplate Layout on page 218.

Arranging the Microplate Layout

1. Open the instrument door.
2. In the **Holder Layout Summary** window, follow the instructions to correctly arrange the microplate holders in the instrument. The layout is defined by the selections you made in earlier steps.
3. Select the **Checked?** check box to confirm the microplate holder layout.
4. Click **Next**.
5. Remove all microplate lids.
6. In the **Load Plates** window, follow the instructions to correctly place the source microplates.
7. Select the **Checked?** check box to confirm the source microplate layout.
8. Close the instrument door.
9. Click **Next** to start gridding. See Running a Gridding Process on page 218.

Running a Gridding Process

After a gridding routine has been configured, you can run the process on the instrument. If you have not configured the gridding routine you want to run, you must create a new gridding routine or edit an existing routine. See Creating and Editing a Gridding Process on page 207.

Note: Before running a gridding process, it is important that you do the cleaning and set up procedures in Preparing to Run a Process on page 27.

Some steps that are included in these procedures might not be available to you, depending on the features included with your instrument and license. Optional features are identified within the procedures when applicable.

To run a configured gridding routine:

1. Open the **Gridding** window. See Opening the Gridding Window on page 208.
2. Select the gridding routine you want to run. See Selecting a Gridding Routine on page 208.

   If you do not need to make changes to the selected routine, select the **Skip Steps** check box before clicking **Next**.
3. Review the configured settings for the routine. See Viewing the Settings Summary on page 217.
4. In the **Settings Summary** window, click **Next**.
5. In the **Continue Or Save New Routine** dialog or the **Save Changes To Routine** dialog, select whether or not to save the routine before continuing with the gridding process.

   If you are creating a new routine from scratch, the **Continue Or Save New Routine** dialog is displayed.

   - To save the settings for the routine before continuing, click **Save Routine**, type a **Name** and a short **Description** for the routine, and then click **Save**.
   - To continue without saving the settings for the routine, click **Routine Without Saving** and then click **OK**.

   If you are editing an existing routine, the **Save Changes To Routine** dialog is displayed.

   - To save the settings for the routine before continuing, click **Save**.
   - To save the settings as a new routine without changing the existing routine, click **Save As**, type a **Name** and a short **Description** for the routine, and then click **Save**.
   - To continue without saving the settings for the routine, click **No**.
6. After the **Please Load Destination** window is displayed, load the destination receptacles in the correct locations on the instrument deck.
7. Close the instrument door.
8. Click **Next** to run the gridding routine.
9. The **Gridding Progress** window is displayed. See Viewing the Gridding Progress on page 220.

Viewing the Gridding Progress

While the gridding routine is running, the **Gridding Progress** window displays a summary of the routine.

- **Start Time** shows the time the gridding process began.
- **Source Plate No** shows the number of the source microplate from which the sample is being taken.
- **Source Barcode** shows the barcode or identifier of the source microplate from which the sample is being taken.
- **Destination Receptacle No** shows the number of the destination receptacle onto which the sample is being stamped.
- **Destination Barcode** shows the barcode of the destination receptacle onto which the sample is being stamped.
- **Field** shows the field on the destination receptacle onto which the sample is being stamped.
- **Spot** shows the spot on the destination receptacle onto which the sample is being stamped.
- **Field Replicate** shows the current destination field replicate onto which the sample is being stamped.
- **Spot Replicate** shows the current destination spot replicate onto which the sample is being stamped.
- **Stamp** shows the current stamp being gridded.
- **Estimated Time Remaining** shows an estimate of the time remaining in the gridding process in hours, minutes, and seconds.
- **Current Action** displays what the system is currently doing, such as **Washing** when the system is running the **Sanitise** profile.

To safely pause the routine, click **Pause**.

After all the samples have been transferred from the source microplates to the destination receptacles, the **Gridding Process** window is displayed. See Viewing the Gridding Summary on page 221.

Viewing the Gridding Summary

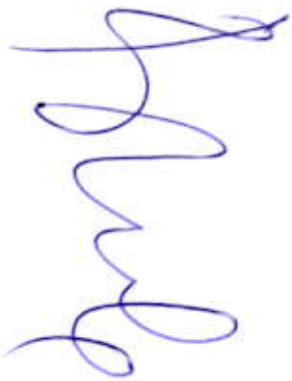
After the gridding routine has completed, the **Gridding Process** window is displayed, showing the number of spots that were stamped and the number of source microplates from which the samples were taken.

To save this information in .csv format, click **Export**.

To view details of all activities related to the source and destination receptacles, click **Details**.

- To save the detailed information in .csv format, click **Export**.
- To close the picking details and return to the **Gridding Process** window, click **Close**.

In the **Gridding Process** window, click **Next** and then click **Finish** to return to the **Gridding** window.















Chapter 16: Data Viewer Processes

16

The database stores information about the routines run on the QPix™ 420 Colony Picking System. You can view the data details and manage the database with Data Viewer processes.

This chapter describes the procedures that follow:

- Finding Data in the Database on page 224
- Displaying the Settings for Routines on page 225
- Working With Tags on page 225
- Adding Annotations to a Routine, Receptacle, or Location on page 227
- Exporting Data or Settings on page 227
- Working With Microplate Properties on page 228
- Viewing a Map of Receptacle Locations on page 229
- Working With Sample Trails on page 229

Note: Some steps that are included in these procedures might not be available to you, depending on the features included with your instrument and license. Optional features are identified within the procedures when applicable.

Finding Data in the Database

1. From the **Navigation** window under **Data Viewer Processes**, double-click the **Data Viewer** icon.
2. In the **Data Viewer** window from the list on the left, click the process or search method you want.
   - Click a process to display a list of all the routines that were run by that process. Click a routine in the list to display a list of the receptacles used and annotations for the routine. If necessary, click **More** in under **Barcoded Receptacles** to display more receptacles in the **Source Receptacles** or **Destination Receptacles** window.
   - Click **By Barcode** and then in the **Barcode** field, type the barcode and press **Enter**. The related receptacle is displayed.
   - Click **By Date** and then click the date on the calendar to display a list of all the routines that were run on that date. Click a routine in the list to display a list of the receptacles used and annotations for the routine. If necessary, click **More** in under **Barcoded Receptacles** to display more receptacles in the **Source Receptacles** or **Destination Receptacles** window.
   - Click **By Location** and then in the **Barcode** field, type the barcode, or from the **Well** list, select a microplate well, and click **Search**. The details for the related receptacle or well are displayed.
   - Click **By Tag** and then from the **Available Tags** list, select the tag you want and click **Add** to add the tag to the **Search Tags** list. You can add as many tags as you need. The items related to the selected tags are displayed. See Working With Tags on page 225.
   - Click **By User** and then from the **User** list, select the user name for the search to display a list of all the routines that were run on that date. Click a routine in the list to display a list of the receptacles used and annotations for the routine. If necessary, click **More** in under **Barcoded Receptacles** to display more receptacles in the **Source Receptacles** or **Destination Receptacles** window.
3. Double-click an item in the list to display details.
4. Depending on the type of data available, continue to double-click items until you reach the level of detail you need.
5. Click **Close** to return to the **Navigation** window.

Displaying the Settings for Routines

1. Find the routine for which you want to display the settings. See Finding Data in the Database on page 224.
2. Double-click the routine in the list to display details.
3. Click the **Settings** link at the top of the details display.
   The **View Settings** window displays all the settings for the selected routine.
   To print the settings, click **Print**.
4. Click **Exit** to return to the details display.

Working With Tags

A tag is a user-created identifier for a routine, receptacle, or location. Use tags to easily identify data of interest. You can create, add, or remove tags in the **Data Viewer** window. You must create one or more tags before you can add the tags to routines, receptacles, or locations. You can use tag names to find tagged items. See Finding Data in the Database on page 224.

Creating a Tag

1. From the **Navigation** window under **Data Viewer Processes**, double-click the **Data Viewer** icon.
2. In the **Data Viewer** window from the list on the left, click **Create Tag**.
3. In the **Create Tag** dialog in the **Tag** field, type a name for the tag.
4. In the **Description** field, you can type a short description.
5. Click **Create Tag** to create the tag and return to the **Data Viewer** window.





Adding Tags to a Routine, Receptacle, or Location

Before you can add a tags to a routine, receptacle, or location, you need to create the tag. See Creating a Tag on page 225.

1. Find and select the routine, receptacle, or location to which you want to add tags. See Finding Data in the Database on page 224.
2. From the list on the left, click **Add Tag**.
3. In the **Select Tags to Add** dialog, click either **Process**, **Receptacle**, or **Location** to define the type of item that you want to tag.

   The available items are dependent on the level of detail you have selected in the **Data Viewer** window.
4. From the list of tags, select one or more tags to add. To select multiple tags, press the **Ctrl** key as you click each tag.
5. Click **Add Tags**, to close the **Select Tags to Add** dialog.

The added tags are displayed on the right side of the **Data Viewer** window.

Removing Tags From a Routine, Receptacle, or Location

1. Find and select the routine, receptacle, or location from which you want to remove tags. See Finding Data in the Database on page 224.

   The related tags are displayed on the right side of the **Data Viewer** window.
2. From the list on the left, click **Remove Tag**.
3. In the **Select Tags to Remove** dialog, select one or more tags remove. To select multiple tags, press the **Ctrl** key as you click each tag.
4. Click **Remove**, to remove the tags and close the **Select Tags to Remove** dialog.

Adding Annotations to a Routine, Receptacle, or Location

1. Find and select the routine, receptacle, or location to which you want to add an annotation. See Finding Data in the Database on page 224.
2. From the list on the left, click **Add Annotation**.
3. In the **Add Annotations** dialog, type the annotation.
4. Click either **Process**, **Receptacle**, or **Location** to define the type of item to which you want to add the annotation.

   The available items are dependent on the level of detail you have selected in the **Data Viewer** window.
5. Click **Add**, to close the **Add Annotation** dialog.

The annotation is displayed at the bottom of the **Data Viewer** window.

1.34

Exporting Data or Settings

1. Find and select the routine from which you want to export the data or the settings. See Finding Data in the Database on page 224.
2. From the list on the left, select the type of export.
   - Click **Export Data** to export the data from the routine in .csv format.
   - Click **Export Settings** to export the settings from the routine in .html format.
3. In the **Export** dialog, navigate to the folder where you want to save the file and give the file a name.
4. Click **Save**, to export the data or settings and close the **Export** dialog.

Working With Microplate Properties

User-defined properties can be added to the default properties related to individual wells in the microplates used for routines. You can add or remove microplate properties in the **Data Viewer** window. You cannot remove the default properties related to a microplate well.

Adding a Microplate Property

1. Find and select the microplate well to which you want to add the property. See Finding Data in the Database on page 224.
2. From the list on the left, click **Add Property**.
3. In the **Add Property** dialog in the **Property Name** field, type a name for the property.
4. In the **Property Value** field, type the value for the property.
5. From the **Property Type** list, select the type of value to be used for the property.
   - Click **String** if the value is text, such as **Positive Sample**.
   - Click **Int** if the value is an integer, such as **5**.
   - Click **Double** if the value is a decimal number, such as **6.75**.
   - Click **Bool** if the value is boolean, such as **True**.
6. Click **Add**, to add the property to the microplate well and close the **Add Property** dialog.

The new property is displayed in the **Location Properties** list to the right of the microplate image.

Deleting a Microplate Property

1. Find and select the microplate well from which you want to delete the property. See Finding Data in the Database on page 224.
2. From the **Location Properties** list on the right, select the property that you want to delete.

   You cannot remove the default properties related to a microplate well.
3. From the list on the left, click **Delete Property**.
4. In the **Delete Property** dialog, confirm that the property information belongs to the property that you want to delete.
5. Click **Delete Property**, to delete the property from the microplate well and close the **Delete Property** dialog.

Viewing a Map of Receptacle Locations

1. Find and select the microplate well of which you want to view the location map. See Finding Data in the Database on page 224.
2. From the list on the left, click **Show Locations Map**.
3. In the **Add Property** dialog in the **Property Name** field, type a name for the property.

   The **Location Map** dialog displays the connection between the selected microplate and the related source or destination receptacle. For example, a destination microplate can be mapped to a source QTray in a picking process.
4. Click **Close**, to close the **Location Map** dialog.

Working With Sample Trails

You can use a sample trail to display the details of how one or more wells were used in a microplate for a routine. Add wells to the **Sample Trail** list in the lower-right corner of the **Data Viewer** window. After you have defined a sample trail, you can display or clear the sample trail from the list on the left.

- To display the details of a defined sample trail for a microplate, from the list on the left side of the **Data Viewer** window, click **Display Sample Trail**. In the **Sample Trail Locations** dialog, click **Save** to save the details in .csv format.
- To delete a sample trail definition from a microplate, from the list on the left side of the **Data Viewer** window, click **Clear Sample Trail**.

Display Sample Trail and **Clear Sample Trail** are not available until after you have created a sample trail for the selected microplate. See Creating and Editing a Sample Trail on page 229.

Creating and Editing a Sample Trail

1. Find and select the microplate to which you want to add a sample trail. See Finding Data in the Database on page 224.
2. From the **Sample Trail** list in the lower-right area of the **Data Viewer** window, click **Add/Remove**.
3. In the **Edit Sample Trail** dialog, click the wells that you want to include in the sample trail.

   Unselected wells are yellow, and selected wells are red.

   To deselect a well, click it again.
4. Click **OK**, to close the **Edit Sample Trail** dialog.

The selected wells are displayed in the **Sample Trail** list in the lower-right area of the **Data Viewer** window.

Chapter 17: Maintenance and Troubleshooting

17

Do only the maintenance described in this guide. Maintenance procedures other than those specified in this guide can be done only by Molecular Devices qualified personnel. See Obtaining Support on page 248.

Before operating the instrument or performing maintenance operations, make sure that you are familiar with the safety information in this guide. See Safety Information on page 7.

Maintenance and troubleshooting procedures that can be done by users to ensure optimum operation of the instrument are described as follows.

- Performing Preventive Maintenance on page 232
- Cleaning the Instrument on page 233
- Testing the Pins on page 236
- Aligning the Camera on page 238
- Replacing Fuses on page 241
- Moving the Instrument on page 242
- Adding a New User to the SQL Server on page 243
- Running the Software as an Administrator on page 243
- Resetting the Path to the SQL Server on page 244
- Troubleshooting on page 245

WARNING! Service or maintenance procedures other than those specified in this guide can be done only by Molecular Devices qualified personnel. When service is required, contact Molecular Devices technical support.

Performing Preventive Maintenance

You are responsible for performing daily and weekly maintenance. Also, strongly recommends that a complete instrument maintenance be done every six (6) months by a approved service engineer.

Daily Maintenance

- Ensure that the interior of the instrument is free from dirt and dust. Check the surface of the x-drive drag-chain support bracket. Dust and debris collected here can be swept onto the instrument bed during operation. See Cleaning the Instrument on page 233.
- Before storing the head, or whenever it needs cleaning, wipe the exterior of the head with a cloth using 70% ethanol. To store the head, slide it into its metal cover with the pins facing inward and then secure it in place with the thumbscrew and washer.
- Remove, clean, and sanitize the wash bath and brushes..
- Check the air regulator for signs of moisture. If necessary, twist the drain clockwise approximately a half turn to force moisture out. Some types of regulators might require the drain purge to be pushed up towards the regulator bowl.

Weekly Maintenance

- Completely dismantle the head and thoroughly clean all component parts. See Cleaning the Head and Pins on page 233.
- Check the operation of the **Emergency Stop** button. See Emergency Stop on page 26.
- If the instrument door shows signs of damage, request a replacement door from Molecular Devices. See Obtaining Support on page 248.

Semi-Annual Maintenance

A complete instrument maintenance should be done every six months by a approved service engineer. To obtain a maintenance contract or schedule a service visit, contact your representative or technical support. See Obtaining Support on page 248.

Cleaning the Instrument

For efficient decontamination of pathogenic micro-organisms, all non-removable parts within the instrument should be wiped with a cloth using 70% ethanol.

CAUTION! Molecular Devices recommends that you always use ethanol for cleaning, because autoclaving is not compatible with anodized parts. Do not use abrasive cleaners, as they can damage the surface of the bed.

The instrument can be left in a laboratory during formaldehyde vapor fumigation at a safe concentration. However, excessive formaldehyde treatment can damage sensitive electrical and optical components.

You can clean all components that come into close contact with biological materials.

The picking head and pins can be removed for cleaning. See Installing or Removing the Head on page 28. Before storing the head, or whenever it needs cleaning, wipe the exterior of the head with a cloth using 70% ethanol. To store the head, slide it into its metal cover with the pins facing inward and then secure it in place with the thumbscrew and washer.

Molecular Devices recommends sonicating the pins weekly. See Cleaning the Head and Pins on page 233.

Cleaning the Head and Pins

The reusable pins in the head are automatically sanitized when running a process that includes a **Sanitise** profile. They are cleaned before the first pick, between each cycle of picking, and at the end of the run. A **Sanitise** profile consists of the following configurable tasks:

- Brush the pins in one or more of the three wash baths.
- Use the halogen dryer to remove residual ethanol from the pins.

For more thorough cleaning of the head and pins, remove the head from the actuator. See Installing or Removing the Head on page 28.

The head is housed in a unique actuator system that permits easy exchange and set-up of the head.

Although it is possible to manually move the actuator assembly, Molecular Devices recommends using the software to safely move the actuator into position to remove or install the head.

WARNING! PINCH HAZARD. The actuator assembly has moving parts that can cause pinch injuries if it is moved manually. To prevent pinch injuries, use the software Change Head process to safely move the actuator.

Before storing the head, or whenever it needs cleaning, wipe the exterior of the head with a cloth using 70% ethanol. To store the head, slide it into its metal cover with the pins facing inward and then secure it in place with the thumbscrew and washer.

Automated cleaning with a **Sanitise** profile does not replace sonicating the pins. See Sonicating the Pins on page 234.

Sonicating the Pins

Molecular Devices recommends sonicating the pins weekly. Before sonicating the pins, remove the pins from the head and sonicate the pins only.

Removing the Pins From the Head

1. Remove the head from the actuator. See Installing or Removing the Head on page 28.
2. Slide the head into its metal cover with the pins facing inward and then secure it in place with the thumbscrew and washer.
3. Remove the 10 screws that secure the top plate to the head.

   The screws that secure the top plate can differ depending on the type of head and the date of manufacture. Make sure that you use the correct tool for removing and installing the screws.

   - If the screw head looks like  , use a slot-head screwdriver.
   - If the screw head look like  , use a 3 mm hex key.
   - If the screw head looks like  , use a pozidriv screwdriver.
4. Remove the top plate to expose the pins.
5. Carefully pull the pins and springs up to remove them from their mounting holes.

   Note: A gridding head does not contain springs.
6. Separate the springs from the pins, if applicable.
7. Sonicate the pins.

To clean the head, wipe it with a cloth using 70% ethanol. If required for further decontamination, soak the head in 100% ethanol. Before reassembly, make sure that all parts are thoroughly dry.

If necessary, you can soak the springs and screws in 100% ethanol and then let them to thoroughly dry.

CAUTION! Molecular Devices recommends that you always use ethanol for cleaning, because autoclaving is not compatible with anodized parts.

Sonicating the Picking Pins

1. Prepare a 2% solution of aQu Clean Microarray Pin Cleaning Solution.
2. Sonicate the pins in the 2% aQu Clean solution for 10 minutes.
3. Rinse the pins with deionized water.
4. Sonicate the pins in deionized water for 10 minutes.
5. Rinse the pins with 100% ethanol.
6. Allow the pins to thoroughly dry in a biosafety hood for a few hours or overnight.

Replacing the Picking Pins in the Head

Before reassembly, make sure that all parts are thoroughly dry.

1. Insert each pin in its spring and then insert each pin assembly into a mounting hole, pointed side down.

   Note: A gridding head does not contain springs.

2. Place the top plate in position making sure that the countersinks for the screw holes are facing up, if applicable.
3. Loosely tighten the 10 screws in their holes.

   The screws that secure the top plate can differ depending on the type of head and the date of manufacture. Make sure that you use the correct tool for removing and installing the screws.

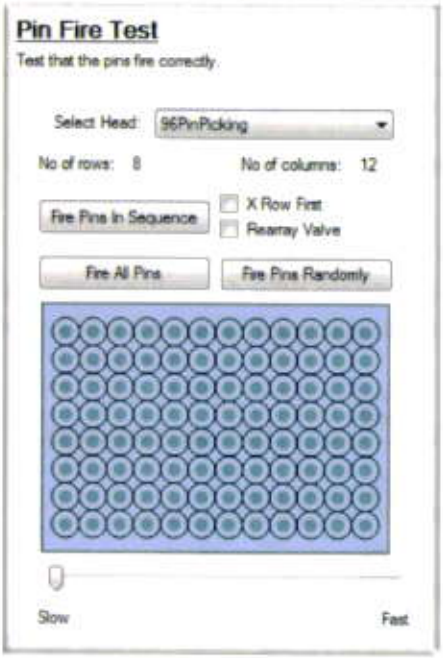
   - If the screw head looks like  , use a slot-head screwdriver.
   - If the screw head look like  , use a 3 mm hex key.
   - If the screw head looks like  , use a pozidriv screwdriver.
4. Evenly tighten the screws until they are snug, but do not over tighten them.
5. Install the head on the actuator. See Installing or Removing the Head on page 28.
6. Run a Pin Fire Test. See Testing the Pins on page 236.

Testing the Pins

The Pin Fire Test checks that the pins on an installed head are obstruction-free and can move freely.

1. From the **Navigation** window under **Utility Processes**, double-click the **Instrument Utilities** icon.
2. In the **Instrument Utilities** window, double-click the **Pin Fire Test** icon.
3. When the **Pin Fire Test** message is displayed, make sure that the bed is clear of obstructions and that the door is closed, and then click **OK** to move the actuator into position near the front of the instrument.

   If you have not previously installed the head that you want to test, you can install it at this time. See Installing or Removing the Head on page 28.



4. In the **Pin Fire Test** window, select the head you are testing from the **Select Head** list.

   The window displays the number of rows and columns for the selected head.

5. Click the type of test that you want to run. The test starts immediately after you click the button for the test.
   - **Fire Pins In Sequence** test fires the pins one-by-one in column order, unless you select the **X Row First** check box to fire the pins in row order. To dampen the pins as they retract, select the **Rearray Valve** check box. The test continues until you click **Stop** or all the pins have been fired.
   - **Fire All Pins** test fires all the pins at once.
   - **Fire Pins Randomly** test fires the pins in a random order. To dampen the pins as they retract, select the **Rearray Valve** check box. The test continues until you click **Stop** or all the pins have been fired.

   The image in the window indicates which pin is fired by clearing the dot from the circle for its position on the picking head.

   To define the speed at which the pins fire during the test, drag the slider located below the image.

   CAUTION! Wait for all pin firing to stop before opening the door.

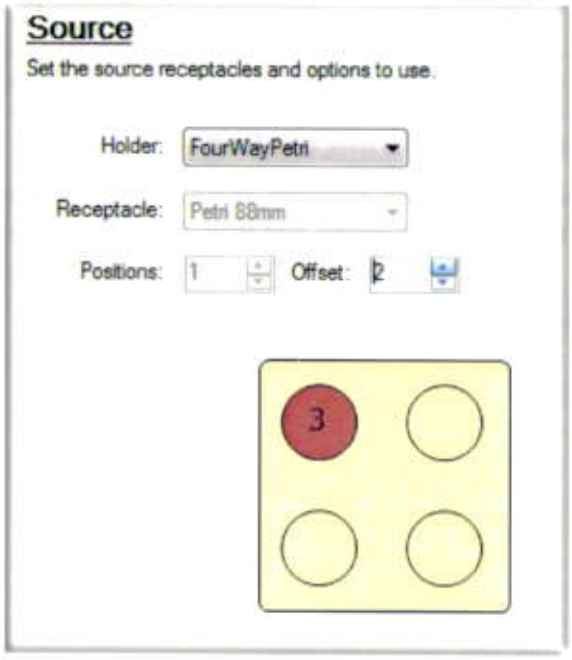
6. After you have finished testing the pins, click **Next**.
7. When the **Pin Fire Test** message is displayed, make sure that the bed is clear of obstructions and that the door is closed, and then click **OK** to home the actuator to its starting position.
8. In the **Instrument Utilities** window, click **Next**.

Aligning the Camera

To ensure accurate picking, the camera must be calibrated and correctly aligned to get pin-to-spot precision, relating the image pixel co-ordinates with the instrument x and y coordinates. Do this process whenever the head is returned to the actuator or if the actuator is hit during a maintenance operation, as this can have a negative effect on picking precision.

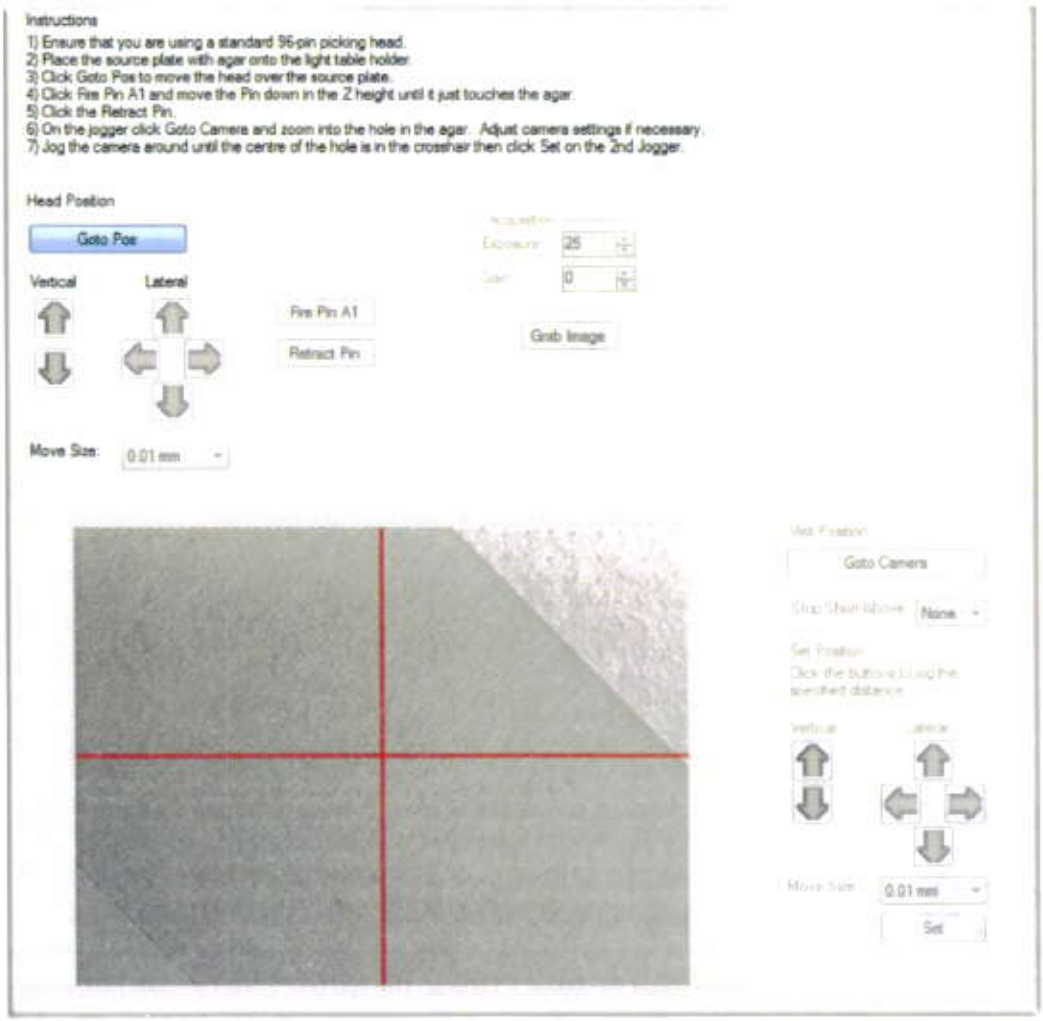
For the camera alignment procedure, make sure that you are using a standard 96-pin picking head.

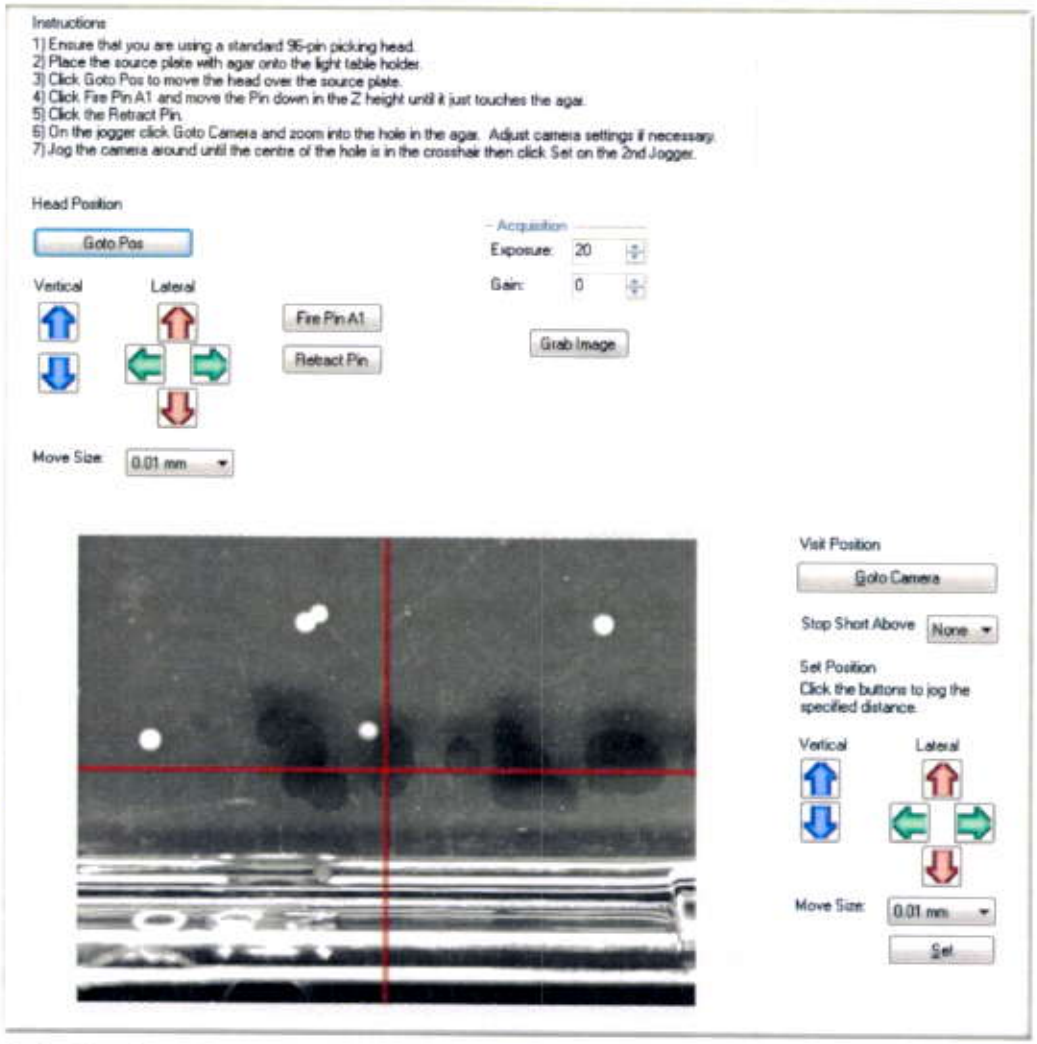
1. From the **Navigation** window under **Utility Processes**, double-click the **Camera Alignment Process** icon, and wait for the **Camera Alignment Process** window to open.
2. Place a source plate with agar on the light table as instructed.
3. Select the type of source plate that you placed on the light table from the **Holder** and **Receptacle** fields.
4. If needed, change the **Offset** to specify an area of the source plate to use for the camera alignment process other than the default position.



5. Make sure that the source plate is in the position indicated and then click **Next**.

6. Click **Goto Pos** to enable the position screen controls and move the pin head over the source tray.





7. Under **Head Position > Lateral**, the red and green arrows move the pin head according to the millimeter distance increments specified in the **Move Size** field.
8. Under **Acquisition**, edit the **Exposure** and **Gain** settings and click **Grab Image** until the image is clearly visible.
9. Click **Fire Pin A1** and then click the blue arrows on the left to move the pin down until it creates a visible indent in the agar.

   You can adjust the increment for each movement by editing the **Move Size** field under the positioning arrows.
10. Click **Retract Pin**.
11. Under **Visit Position**, click **Goto Camera**.
12. Under **Lateral**, click the red and green arrows to move the camera until the red crosshairs align with the center of the hole in the agar.

    You can adjust the increment for each movement by selecting from the **Move Size** list.

13. After you are satisfied with the camera alignment settings, click **Set**.
14. Click **Close**.

Replacing Fuses

Fuses burn out occasionally and must be replaced.

If the instrument does not seem to be getting power after switching it on, check to see whether the supplied power cord is securely plugged into a functioning power outlet and to the power port on the rear of the instrument.

If the power failed while the instrument was on, check that the power cord is not loose or disconnected and that power to the power outlet is functioning properly.

If these checks fail to remedy the loss of power, replace the fuses. You can obtain replacement fuses from Molecular Devices. Fuses must be replaced with the correct type and rating as specified in Technical Specifications on page 253.

CAUTION! Do not touch or loosen screws or parts other than those specifically designated in the instructions. Doing so could cause misalignment and possibly void the warranty.

The fuses are located in the fuse carriers on the side of the instrument.

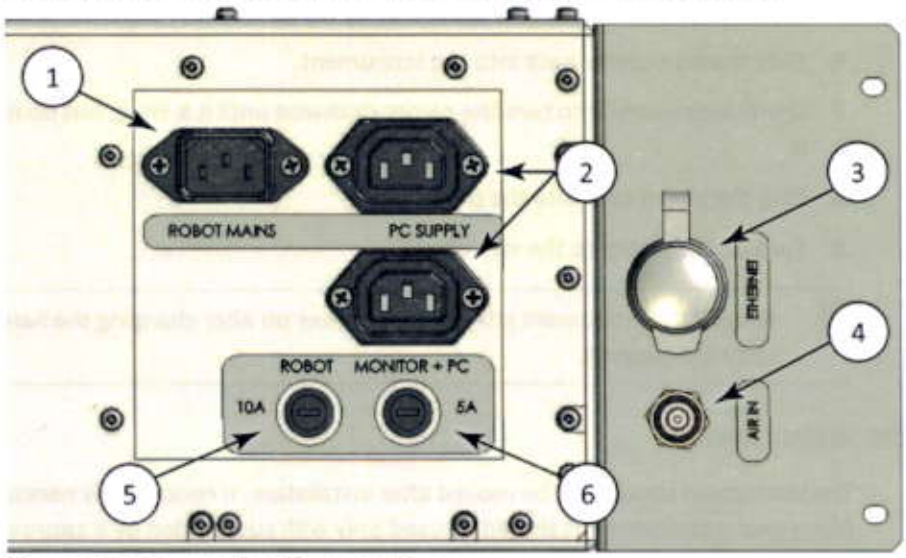


Figure 17-1: Connection Ports and Fuses

Item	Description
1	Power Inlet: Instrument Mains
2	Power Outlets: Computer and Monitor
3	Ethernet port
4	Compressed air inlet

Figure 17-1: Connection Ports and Fuses (continued)

Item	Description
5	Fuse carrier: Instrument Mains
6	Fuse carrier: Computer and Monitor

The mains power inlet and the computer and monitor power outlets are separately fused.

To replace a fuse:

WARNING! HIGH VOLTAGE Always turn the power switch off and disconnect the power cord from the main power source before performing a maintenance procedure that requires removal of a panel or cover or disassembly of an interior instrument component.

1. Switch the power switch on the front of the instrument to the off position.
2. Unplug the power cord from the power port.
3. Use a small slot-head screwdriver to turn the fuse carrier counter-clockwise and then pull the fuse carrier out to expose the fuse.
4. Use the screwdriver to gently lift the old fuse from the carrier.
5. Gently place a new fuse into the carrier by hand.
6. Slide the fuse carrier back into the instrument.
7. Use the screwdriver to turn the carrier clockwise until it is snug, but do not over tighten it.
8. Plug the power cord into the power port.
9. Turn on the power to the instrument.

Note: If the instrument still does not power on after changing the fuse, contact technical support.

Moving the Instrument

The instrument should not be moved after installation. If relocation is necessary, standard lifting gear is sufficient but should be used only with supervision by a approved engineer.

Move the instrument into position using applicable handling equipment such as forklift trucks or dolly trucks. Make sure that the instrument is properly balanced on the forks before lifting.

CAUTION! Do not use part of the exterior body of the instrument to lift it, as this can cause irreparable damage.

Adding a New User to the SQL Server

If a new user cannot log on to the QPix 420 Software, then add the user to the SQL database.

Note: This procedure requires a user with administrator privileges.

1. Log into the SQL Server database using Microsoft SQL Server Management Studio with an account that has administrator privileges.
2. In the **Microsoft SQL Server Management Studio**, expand the**Security** folder.
3. Right-click **Logins** and then click **New Login**.
4. In the **Login - New** window in the **Login name** field, specify the Windows user name.
5. Click the **Windows authentication** option.
6. From the **Default database** list, select **ReceptacleVault**.
7. From the **Select a page** list on the left, click **User Mapping**.
8. From the **Users mapped to this login** list on the right, select the **ReceptacleVault** check box.
9. In the **User** field, type the user name.
10. From the **Database role membership for: ReceptacleVault** list, select the **db_owner** and **public** check boxes.
11. Click **OK**.
12. In the **Microsoft SQL Server Management Studio** window, expand Databases > ReceptacleVault > Security > Users.
13. Confirm that the new user name is included in the list.
14. Close the **Microsoft SQL Server Management Studio** window.

Running the Software as an Administrator

The QPix 420 Software must be run by a user with administrator privileges. If a user does not have administrator privileges, then change the program compatibility settings to run the program as an administrator.

1. On the Windows desktop, right-click the QPix 420 icon and select Properties.
2. In the **Properties** dialog, click the **Compatibility** tab.
3. Under **Privilege level**, select the **Run this program as an administrator** check box.
4. Click **OK**.

Resetting the Path to the SQL Server

If you have recently renamed the computer, you need to reset the path to the SQL Server. The new computer is included in the path to the SQL Server, but the software continues to look for the original path that contains the original computer name. To update the SQL path in the software, retrieve the computer name and then edit the path statement in the software.

To retrieve the computer name:

1. On the Windows desktop, right click the **Computer** icon and then click **Properties**.
2. Under **Computer name, domain, and workgroup settings**, find the **Computer name**.
3. Write down the computer name exactly as it is displayed.

Note: Make sure that you use the **Computer name**, not the **Full computer name** if it is different.

To edit the path statement in the software:

1. Close all open windows, and then start the QPix 420 Software.
2. In the **Navigation** window, click **Tools > Configuration**.
3. In the **Edit Configuration** dialog, double-click **Verbs**.
4. From the **Verbs** list under **QPixDataManagerVerb**, click **QPixDataManager**.
5. In the list on the right, find the property named **ConnectionString**.
6. Set the **Connection String** value so that the new computer name is included in the path statement:
   Data Source=COMPUTERNAME\sqlexpress;Initial Catalog=ReceptacleVault;Integrated Security=True
   Where **COMPUTERNAME** is the current name of the computer.
7. Click **Close**.
8. Close the **Edit Configuration** dialog by clicking the **X** in the upper-right corner.
9. In the **Navigation** window, click **File > Exit**.

To test the SQL Server connection:

1. Close all open windows, and then start the QPix 420 Software.
2. In the **Navigation** window under **Data Viewer Processes**, double-click the **Data Viewer** icon.

If the **Data Viewer** window is displayed without an error message, then the connection is successful.

Troubleshooting

This section describes some common problems that can occur and possible solutions.

Typically, crash recovery involves some form of the following procedure:

1. An error is identified in the software or the instrument stops.
2. If the error condition is caused by a receptacle or other item, then remove the item from the instrument.
3. Reactivate the software , usually by clicking **Next**.

Common Problems and Possible Solutions

The instrument does not start. The system does not function correctly

- Make sure that the main power switch is turned on at the wall, the **Emergency Stop** button is pulled out, and the **Start** button is pressed. See Pre-Power-Up Check List on page 25.
- Make sure that the power cord is seated fully in the mains input of the instrument. See Instrument Connections on page 19.
- Make sure that the mains input fuse is in good condition. See Replacing Fuses on page 241.
- Turn off the instrument power and then turn it on again.

The computer does not start

- Make sure that the power switch on the computer is in the on position and that the main power switch is turned on at the wall.
- Make sure that the fuses are in good condition. See Replacing Fuses on page 241.

One or more of the axes will not move

- Make sure that the main power switch is turned on at the wall, the **Emergency Stop** button is pulled out, and the **Start** button is pressed. See Pre-Power-Up Check List on page 25.

The drive system fails to home the actuator

- Make sure that the door is closed.
- Manually move the head to the center of the instrument then close the door and retry the process.

The UV light does not turn on

- Make sure that the door is closed.
- Make sure that filaments in the lamp are not burned out.

Lamp failure

- Determine whether the halogen lamps need to be replaced.

The Picking alignment is incorrect

- Inspect the head for loose or bent pins.
- Run a Pin Fire Test. See Testing the Pins on page 236.

The pins bend when inoculating in microplate wells

- Make sure that the microplate is aligned correctly towards both arrows in the plate holder.
- Make sure that the correct microplate, head, and spacer blocks are installed.

Poor picking results

- Run the camera alignment process. See Aligning the Camera on page 238.
- Inspect for bent pins in picking process.
- Make sure that the head is fastened securely.
- Make sure that the picking height is set correctly.
- Make sure that you are using the correct wash bath routines and that the fluid levels are adequate.
- Make sure that the air pressure is at 100 psi (689 kPa).
- Make sure that colonies of an adequate size are being picked. 97% pick efficiency is expected with colonies between 1 mm and 1.5 mm.
- Check the size, roundness, axis ratio, and threshold parameters.
- Contact technical support to discuss the results. See Obtaining Support on page 248.

The instrument crashes during destination well inoculation

- Make sure that the microplates are aligned correctly towards both arrows in the plate holder.
- Make sure that the lids are off the microplates during the inoculation.

The picking pins bend on the edge of the bioassay tray

- Check the agar volume setting, bioassay tray positioning, and tray holder positioning in the bed.

A Door Open warning is displayed

- Make sure that the door is closed and locked.

Low air warning

- Make sure that the air pressure is at 100 psi (689 kPa).
- Make sure that the air compressor is turned on.

A message is displayed indicating that the license is expiring soon

- Follow the instructions in the software to send a license request file (.req) to Molecular Devices.

Failed to connect to devices error message is displayed

- Make sure that the instrument is powered on.
- Make sure that the ethernet connections are seated fully for both the instrument and the computer. See Instrument Connections on page 19.
- Restart the software.

The barcodes fail to be read correctly

- Make sure that the barcodes are correctly positioned on the receptacle.
- Make sure that the barcodes are of the correct type. Barcodes compatible with the barcode reader are code 39, code 93, and code 128.

Cannot connect to the SQL Server

- If a new user cannot log on, then add the user to the SQL database. See Adding a New User to the SQL Server on page 243.
- If the user does not have administrator privileges, then change the program compatibility settings to run the program as an administrator. See Running the Software as an Administrator on page 243.
- If you have recently renamed the computer, reset the path to the SQL Server. See Resetting the Path to the SQL Server on page 244.

Fluorescence Problems and Possible Solutions

No signal is detected in the fluorescence channel

- Confirm that the biology sample is fluorescing.
- Make sure that the correct filter pair is selected.
- Visually check that the light is coming through.
- Make sure that sufficient exposure time has been set.

Excessive background fluorescence

- Check the integrity of the biological sample. The fluorescence can possibly leach into the agar.
- Reduce the exposure time.

Obtaining Support

Molecular Devices is a leading worldwide manufacturer and distributor of analytical instrumentation, software and reagents. We are committed to the quality of our products and to fully supporting our customers with the highest possible level of technical service.

Our support web site, www.moleculardevices.com/support.html , has a link to the Knowledge Base with technical notes, software upgrades, safety data sheets, and other resources. If you do not find the answers you are seeking, follow the links to the Technical Support Service Request Form to send an email message to a pool of technical support representatives.

You can contact your local representative or contact Molecular Devices Technical Support by telephone at 800-635-5577 (U.S. only) or +1 408-747-1700. In Europe call +44 (0) 118 944 8000.

Please have your instrument serial number or Work Order number, and your software version number available when you call.

For more information about QPix™ instruments and accessories visit:
www.moleculardevices.com/qpix-sw2.0

Appendix A: Replacement Parts and Optional Extras

A

For an up-to-date list of replacement parts and optional extras, see the web site at:

www.moleculardevices.com

Table A-1: QPix 420 Colony Picking System Replacement Parts and Optional Extras

Part Number	Description
ME4541	Wash Bath
ME4542	Wash Brushes
SL9400-A06	QPix™ Chroma Colorimetric Colony Selection Software License. Blue/White Colony Selection Software License for QPix 420 Colony Picking Systems
SL9400-A07	Zone of Inhibition Detection Software License for QPix 420 Colony Picking Systems.
SL9400-A08	QPix™ 420 Software Version 2.0 or Newer Upgrade
X1101	QPix Chroma Filter, thin film optical filter for Blue/White colony selection, qty 1
X1102	QPix Chroma Filter, thin film optical filter for Blue/White colony selection, qty 25
X1103	QPix™ Chroma Colorimetric Colony Selection Software Kit. Blue/White Colony Selection Software Kit for QPix 420 Colony Picking Systems. Includes software license and 2 QPix Chroma Filters (X1101).
X4006A	Picking head for E. coli/phagemid, 96-pin, tip diameter 0.55 mm, deep-well
X4006B	Picking head for Phage plaque, 96-pin, tip diameter 1 mm
X4006C	Picking head for Phage picker+, 96-pin, tip diameter 1.6 mm
X4006D	Picking head for yeast picker+, 96-pin, tip diameter 1.6 mm
X4006E	Picking head for streptomyces and yeast, 96-pin, tip diameter 1 mm
X4006F	Picking head for streptomyces and yeast, 96-pin, tip diameter 1 mm, deep-well
X4006G	Picking head for E. coli/phagemid, 96-pin, tip diameter 0.55 mm
X4006H	Picking head for Phage plaque, 96-pin, tip diameter 1 mm, deep-well
X4006J	Picking head for Phage picker+, 96-pin, tip diameter 1.6 mm, deep-well
X4006K	Picking head for yeast picker+, 96-pin, tip diameter 1.6 mm, deep-well
X4225	Gridding head for bacteria and phage, 96-pin for 96-well and 384-well microplates, tip diameter 0.4 mm
X4226	Gridding head for DNA macroarrays, 96-pin for 96-well and 384-well microplates, tip diameter 0.25 mm
X4227	Gridding head for protein macroarrays, 96-pin for 96-well and 384-well microplates, tip diameter 0.15 mm
X4228	Gridding head for yeast and streptomyces, 96-pin for 96-well and 384-well

Table A-1: QPix 420 Colony Picking System Replacement Parts and Optional Extras (continued)

Part Number	Description
	microplates, tip diameter 1 mm
X4241	Gridding pins for DNA macroarrays, tip diameter 0.25 mm
X4242	Gridding pins for protein macroarrays, tip diameter 0.15 mm
X4243	Gridding pins for yeast and streptomyces, tip diameter 1 mm
X4260	Gridding head for Bacteria and Phage, 384-pin for 384-well plates, tip diameter 0.4 mm
X4261	Gridding head for DNA macroarrays, 384-pin for 384-well plates, tip diameter 0.25 mm
X4262	Gridding head for protein macroarrays, 384-pin for 384-well plates, tip diameter 0.15 mm
X4263	Gridding head for yeast and streptomyces, 384-pin 384-well plates, tip diameter 1 mm
X4300	Picking Head 96-pin
X4310A	Re-arraying and replicating head, standard transfer, 96-pin for 96-well and 384-well microplates, tip diameter 0.55 mm, pin length 49.5 mm
X4310B	Re-arraying and replicating head, high-capacity transfer, 96-pin for 96-well and 384-well microplates, tip diameter 1.6 mm, pin length 49.5 mm
X4311	Re-arraying pin, high-capacity, standard transfer (E coli/high viability samples), tip diameter 0.55 mm
X4315	Re-arraying pin, high-capacity, standard transfer (E coli/high viability samples), tip diameter 0.55 mm, deep-well
X4320	Re-arraying pin, high-capacity, (yeast/medium viability samples), tip diameter 1.6 mm
X4321	Re-arraying pin, high-capacity, (yeast/medium viability samples), tip diameter 1.6 mm, deep-well
X4330	Replacement Pin for spreading head
X4345	Spreading head, 8 pins, 3.0 mm diameter
X4370	Picking pin for E.coli/phagemid, tip diameter 0.55 mm
X4371	Picking pin for phage plaque, tip diameter 1 mm
X4372	Picking pin for yeast, tip diameter 1.6 mm
X4373	Picking pin for streptomyces, tip diameter 1 mm
X4375	Picking pin for E.coli/phagemid, tip diameter 0.55 mm, deep-well
X4376	Picking pin for yeast picker+, tip diameter 1.6 mm

Table A-1: QPix 420 Colony Picking System Replacement Parts and Optional Extras (continued)

Part Number	Description
X4377	Picking pin for yeast picker+, tip diameter 1.6 mm, deep-well
X4378	Picking pin for yeast, tip diameter 1.6 mm, deep-well
X4379	Picking pin for streptomyces, 1 mm, deep-well
X4380	Picking pin for Phage picker+, tip diameter 1.6 mm, deep-well
X4390	Picking springs
X4451	Petri dish holder, 4 hole
X4452	Petri dish holder, 1 hole
X4453	Petri dish holder, 5 hole
X4454	OmniTray holder, 2 hole
X6023	Vented QTray with cover, 242 mm x 240 mm x 20 mm
X6029	Vented QTray with cover and 48-Well Divider, 242 mm x 240 mm x 20 mm
X9401	Adjustable petri dish holder, 1 hole, diameter 140 mm
X9402	Adjustable microplate holder, 2 hole
X9403	Adjustable petri dish holder, 4 hole, diameter 100 mm
X9404	Adjustable petri dish holder, 5 hole, diameter 90 mm

Replacement Fuses

Fuses must be replaced with the correct type and rating as specified in Technical Specifications on page 253.

For instructions, see Replacing Fuses on page 241.

Appendix B: Technical Specifications

B

The following tables list the technical specifications of the QPix™ 420 Colony Picking System.

Table B-1: Technical Specifications

Item	Description
Environment	Indoor use only
Power requirements (instrument)	Europe: 230 VAC ±10%, 50 Hz, 1250 W, 750 VA average, 2500 VA maximum North America: 115 VAC ±10%, 60 Hz, 1250 W, 750 VA average, 2500 VA maximum
Power requirements (compressor)	Europe: 230 VAC ±10%, 50 Hz, 3.4 A North America: 115 VAC ±10%, 60 Hz, 7.5 A
Dimensions	144 cm (56.7 in.) W x 79 cm (31.1 in.) D x H
Weight	Instrument: 184 kg (405.7 lbs) Table, including compressor: 165 kg (363.8 lbs) Total assembled unit: 349 kg (769.5 lbs)
Power disconnect minimum clearance	Instrument: on the right side of the instrument Compressor: at the rear of the instrument table
Ambient operating temperature	10°C to 40°C (59°F to 104°F)
Ambient storage and transport temperature	-25°C to 55°C (23°F to 104°F)
Humidity restrictions	20% to 80% (non-condensing)
Altitude restrictions	Up to 2000 m (6562 ft)
Compressed air pressure	689 kPa to 827 kPa (100 PSI to 120 PSI) Minimum volume: 80 L (2.8 ft^3) per minute
Sound pressure level	Maximum sound pressure at one meter: 70 dBA
Installation category (Overvoltage category)	II
Pollution degree	2
Fuses	Input F1: T10 A, 250 V (Instrument Mains and Halogen Heater) Output F2: T5 A, 250 V (Computer and Monitor)
Power connections	IEC Input: Instrument Mains and Halogen Heater

Table B-1: Technical Specifications (continued)

Item	Description
	IEC Output: Computer and Monitor
Mains power cord length	3 m (9.8 ft) maximum Ensure that all power connections for the instrument meet the specified power requirements for the country of use.
Data connection	10/100 Ethernet port

Appendix C: System Diagrams and Dimensions

C

In the following drawings, the dimensions are show in centimeters and inches.

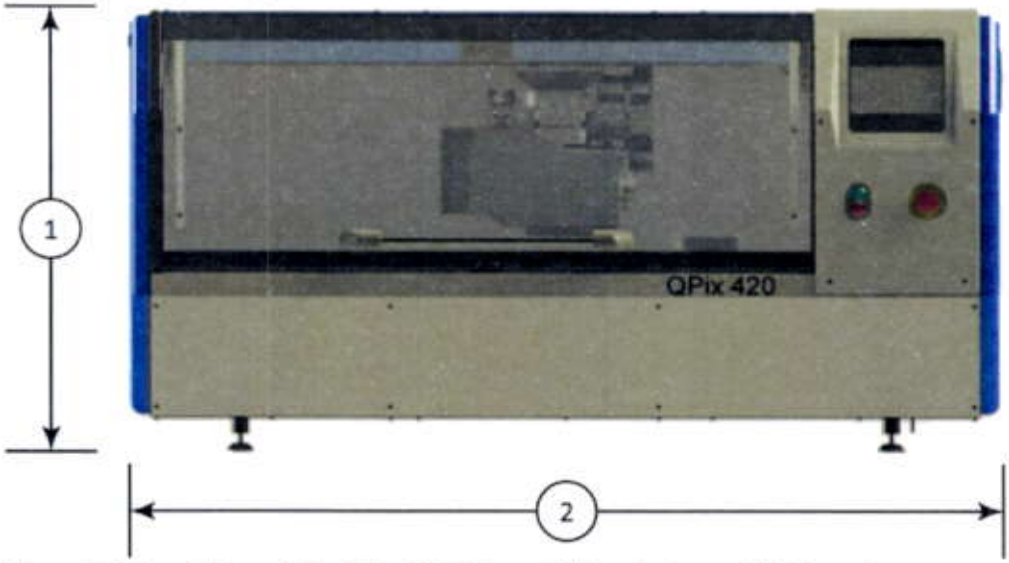


Figure C-1: Front View of the QPix 420 Colony Picking System with Dimensions

Item	Description
1	Height of instrument: 78 cm (30.7 in.)
2	Width of instrument: 144 cm (56.7 in.)

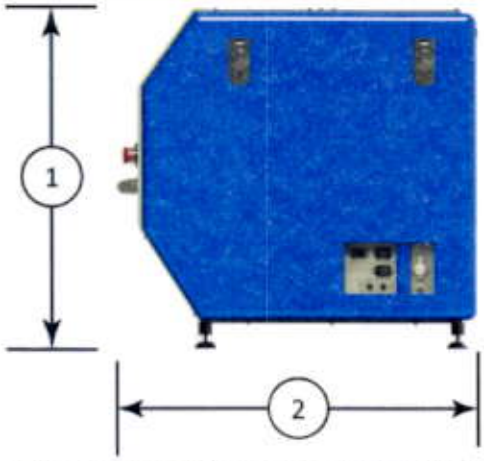
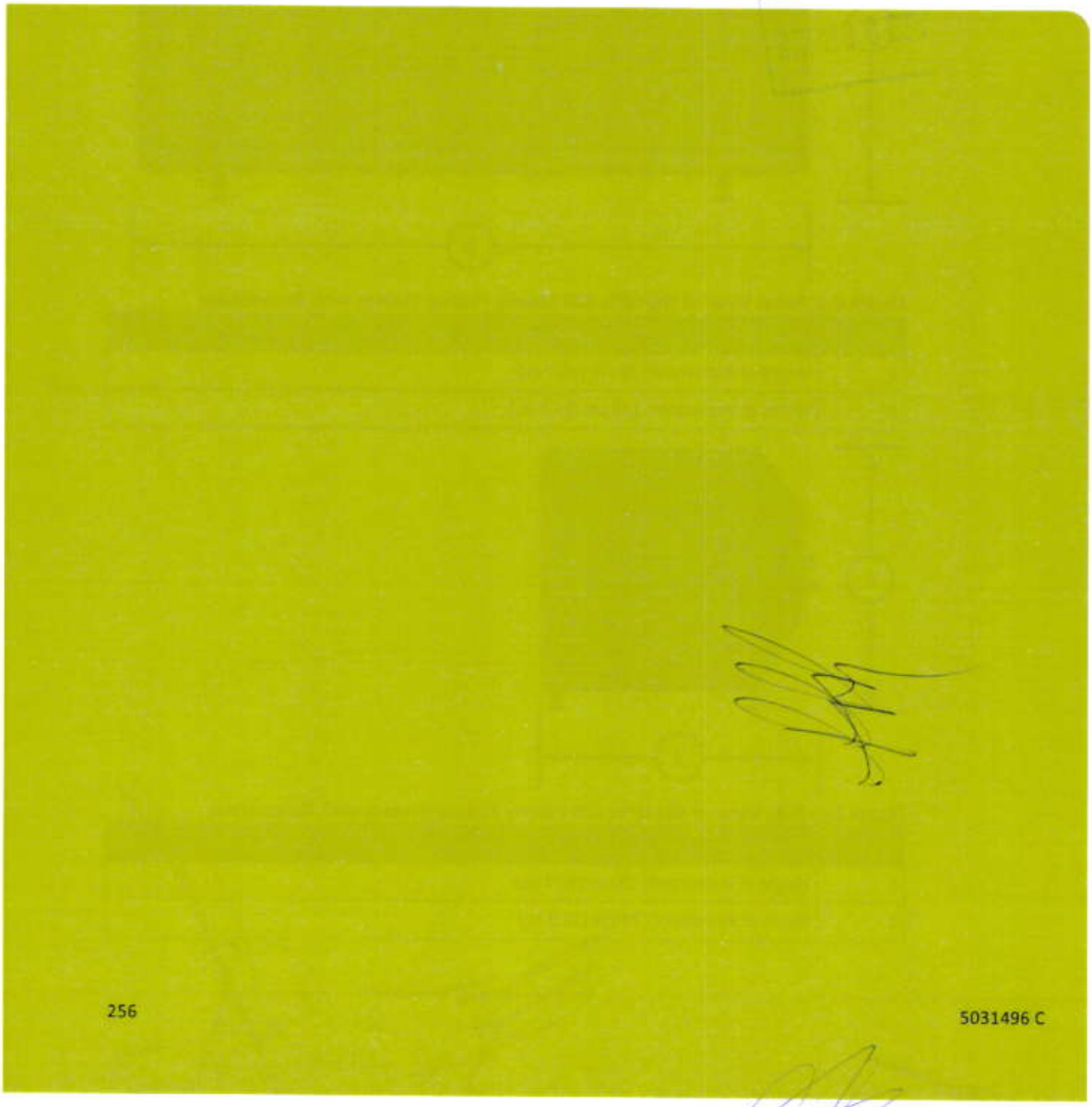


Figure C-2: Side View of the QPix 420 Colony Picking System with Dimensions

Item	Description
1	Height of instrument: 78 cm (30.7 in.)
2	Depth of instrument: 79 cm (31.1 in.)



Appendix D: Electromagnetic Compatibility

D

Regulatory for Canada (ICES/NMB-001:2006)

This ISM device complies with Canadian ICES-001.

Cet appareil ISM est conforme à la norme NMB-001 du Canada.

ISM Equipment Classification (Group 1, Class A)

This equipment is designated as scientific equipment for laboratory use that intentionally generate and/or use conductively coupled radio-frequency energy for internal functioning, and are suitable for use in all establishments, other than domestic and those directly connected to a low voltage power supply network which supply buildings used for domestic purposes.

Information to the User (FCC Notice)

This equipment has been tested and found to comply with the limits for non-consumer ISM equipment, pursuant to part 18 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a non-residential installation. This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions, might cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

In order to maintain compliance with FCC regulations, shielded cables must be used with this equipment. Operation with non-approved equipment or unshielded cables is likely to result in interference to radio and TV reception. The user is cautioned that changes and modifications made to the equipment without the approval of the manufacturer could void the user's authority to operate this equipment.

Glossary

D

Destination Plate

For a picking process, the destination plate is a 96-well or 384-well microplate pre-filled with liquid medium to collect picked colonies.

H

Halogen Dryer

The halogen dryer is a proprietary ultra-high temperature dryer used to dry the pins in a **Sanitise** profile.

P

Process

A process is a series of configurable steps that can be used to define and run an experiment. For example, to run a Picking process, you define the parameters of the process in a routine, and then run the picking experiment based on the selected parameters in the routine. See Routine on page 259.

R

Routine

A routine contains the defined parameters of a process used to run an experiment. For example, to run a Picking process, you define the parameters of the process in a routine, and then run the picking experiment based on the selected parameters in the routine. See Process on page 259.

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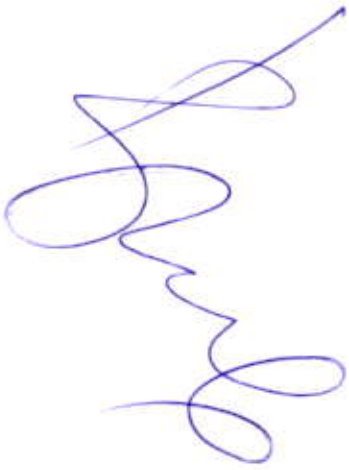
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Документ 12.

Стр.3.

1.1.3.

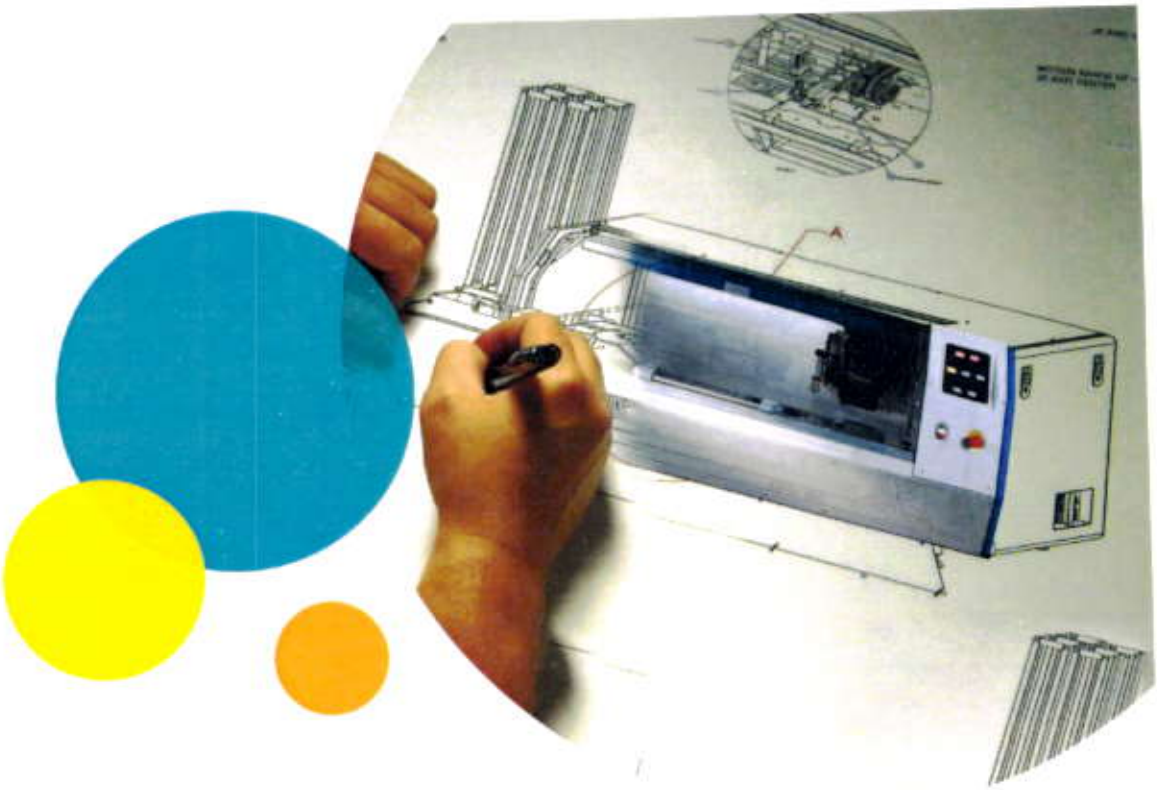
Модифициране на системата QPIX за високопроизводителен скрининг при изследвания на белтъчната еволюция

В този проект, клиентът Х изучава директната (насочена) еволюция на белтъци. Важна стъпка в тяхната работа е скрининг на бибилотеки от белтъци и антитела при бактерии, задача която включва селекция на колонии и инокулиране. На тях им беше нужна система, която може да отбере и инокулира повече от 30 стандартни 96-ямкови плаки и дълбоки плаки на ден.

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QPix Custom Microbial Colony Pickers

Документ 12

Tailored by Advanced Workflow Engineering Solutions (AWES)



ВЯРНО С ОРИГИНАЛА

MOLECULAR DEVICES

KEY BENEFITS OF CUSTOMIZATION

- A wide range of hardware and software customization possibilities to fit your unique workflow needs
- The AWES team provides comprehensive services from consultation through implementation
- Automation features can be added in modules, so system capabilities can be upgraded through AWES at any time



Get the highest level of flexibility in application and experimental design

Our expert team of engineers and application scientists can tailor the QPix™ systems to meet your workflow demands for automated microbial colony picking and plating.

Reduce hands-on FTE time with robotic operation
Add in robotic automation to increase throughput, eliminate human errors, and achieve consistent sample handling.

- Modular automation design—components can be added in modules and are upgradable

Keep samples & people safe and clean
Minimize contamination with optional additions of HEPA filters, interlocked safety guards, and more.

Suit your unique picking needs with custom picking and plating
Configure picking heads, plate holders, plating and streaking patterns, and software tools for those non-conventional microbes.



Accommodate a wide range of labware
Modify the QPix decks to be compatible with a variety of standard and non-standard labware.

Screen colonies based on attributes such as size, color, and fluorescence
Customize cameras, filters, and detection algorithms to see and pick more.

- Modes include red/white and blue/white, fluorescence

Be more efficient managing data
Simplify workflow, audit trails, and file import and export with software customization.

- Integrate with LIMS and data management systems through API

Документ 12.

Стр.3.

1.1.3.

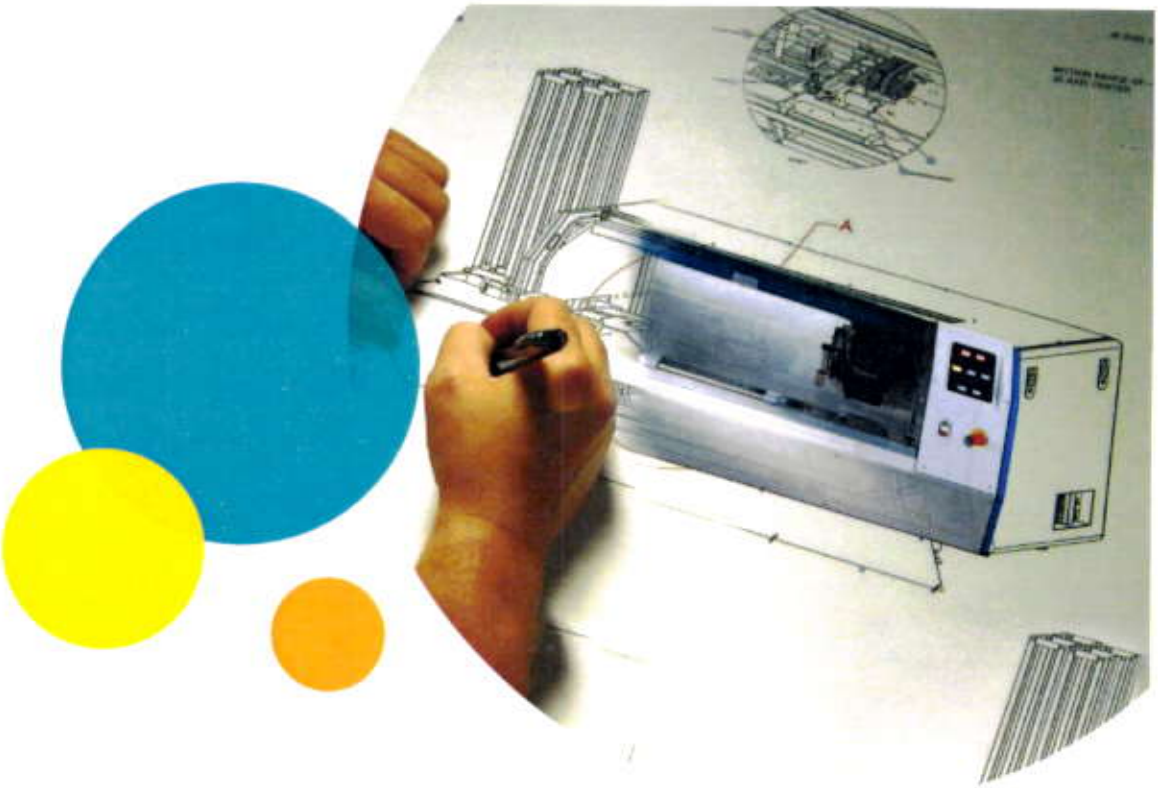
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Examples of AWES projects

PROJECT 1

Integrating QPix system into a fully automated, high-throughput DNA manufacturing workflow

The Edinburgh Genome Foundry (EGF) is dedicated to automated design and assembly of large DNA constructs using a fully automated robotic platform. They needed an automated colony picker that can be integrated into their existing DNA assembly workflow, which included 3 robot arms, 2 liquid handlers, incubators, and PCR machines. The AWES solution:

- Modified the QPix system structural design to allow for robotic arm access
- Developed a custom picking head for the spreading of 8 samples onto a single, undivided agar tray
- Provided open API and software support for the integration process

Results

- The modified Qpix system provided the necessary high throughput sample handling (3,000 colonies/hr)
- Integrated, reliable sample tracking for effective sample data management
- Decreased FTE labor and reduced operational costs



Modified QPix system. The back of the instrument has been customized to allow robotic arm access.



Part of EGF's fully automated setup. The modified QPix system (red arrow) is in the upper left, behind the robotic arm. A second robotic arm is also visible, approaching a plate hotel.

PROJECT 2

Modifying QPix system for high-throughput screening in protein evolution studies

In this project, Customer X studies directed evolution of proteins. An essential step in their workflow is screening libraries of proteins and antibodies in bacteria, a task that involves that requires colony picking and inoculation. They required a system that can pick and plate over thirty 96-well standard and deepwell plates per day. The AWES solution:

- Modifies the structural design to allow for robotic access
- Includes an automation platform powered by Green Button Go software, Preciseflex PF3400 sample mover, ambient plate and QTray storage (88 plates), and clean air HEPA enclosure.

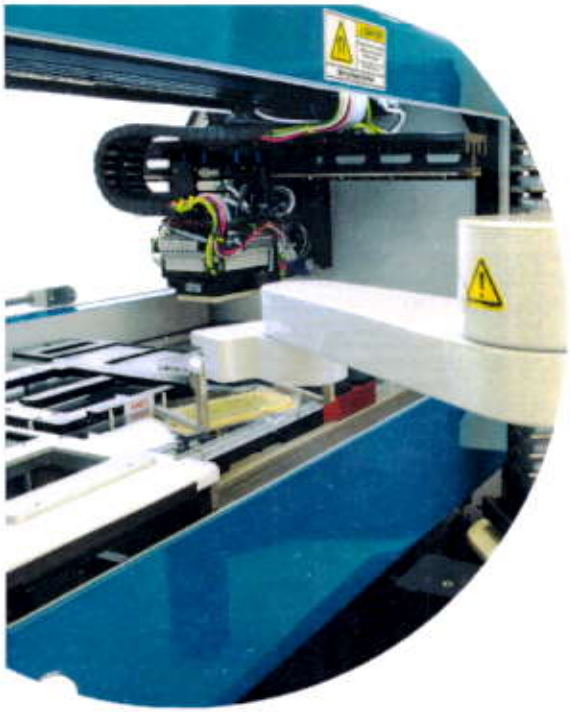




CAD drawing of the QPix setup. (1) QPix system modified to allow robot access. **(2)** Plate storage. **(3)** Preciseflex PF3400 sample mover. **(4)** HEPA enclosure.

Goals

- The modified Qpix system is intended to provide the necessary high throughput sample handling (3,000 colonies/hr) while simultaneously processing over 80 plates per run
- Decrease FTE labor, increase throughput, and reduce operational costs



Explore modifications with AWES

The Molecular Devices Advanced Workflow Engineering Solution team has successfully tailored QPix colony pickers for some customers to include customized software and hardware as well as integration of other lab components such as incubators, liquid handlers, and robotics for a fully automated work cell.*

*Price, time to deliver, and specifications will vary based on mutually agreed technical requirements. Solution requirements may cause adjustment to standard performance.



Turnkey service

Our AWES team works with you to match our service offerings with your needs. Our solutions are tested and validated in-house before being installed in your lab.



Scale-up automation

We can deliver a customized, automation-ready QPix system for future integration; adapt it to integrate into an existing automated solution; or design and test an entire workstation from scratch.



Hardware customization

From custom labware, to unique transfer pins, to special handling requirements, we'll work to find a solution and prove it through validation.



Software customization

We can match specific API needs, enable unique workflow capability, integrate into LIMS or data management systems, customize a UI, and/or control any custom designed hardware.



Biological validation

Our application scientists work with you to understand your process and biological requirements, to reproduce and test the actual performance in-house prior to shipment.



Global service and support

With over 30 years of experience in the life science industry, you can count on Molecular Devices to deliver quality products and worldwide support.

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Документ 13.

Стр.2.

1.17.2.

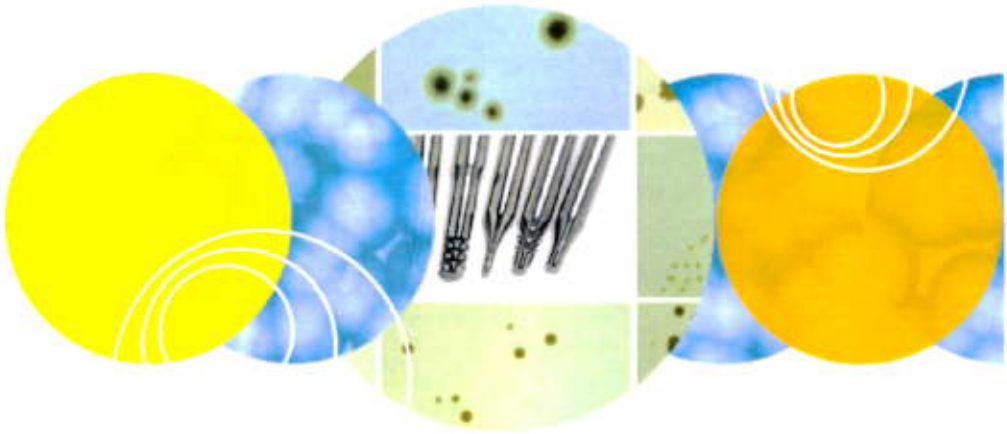
Фиг. 1. Трансферът на колонии може значително да варира в зависимост от вида на използваните игли за подбор на колонии. Представителна информация е посочена за Escherichia coli, Saccharomyces cerevisiae и Streptomyces venezuelae. Всички игли са за многократна употреба, гарантиращи възпроизводимост на специфичните трансфери на микроорганизми. Чрес стриктното прилагане на процедури по стерилизация на иглите се избягва кръстосано замърсяване.

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Документ 13



Not just *E. coli*—Efficient, automated microbial colony transfer for a wide variety of microorganisms

QPix 400 Series organism-specific picking pins and detection software

KEY FEATURES

- **Specialized pin designs enable maximal transfer of diverse microorganisms**
- **Ultrasonic agar height sensor automatically determines optimal pin picking height to ensure maximum picking efficiency**
- **Robust and flexible colony detection algorithms readily identify a variety of biological organisms**

Flexible hardware and software enable detection and selection of diverse biology

The value of an automated colony picking solution extends far beyond *E. coli* research applications. The QPix™ 400 Series of automated microbial colony pickers by Molecular Devices is designed to meet research needs across a diverse range of microbial workflows. Powerful and versatile colony detection algorithms combined with specialized pins are specifically tailored to pick, plate, and replicate bacteria, fungi, algae, phage, and yeast cells.

Agar height sensor and the right pin optimize colony transfer efficiency

Repetitive failure of a colony transfer can result in project delays, wasted biomaterials, or the loss of valuable clones. To ensure optimal colony transfer for a diverse range of microorganisms, Molecular Devices offers a unique portfolio of picking pins that come in a variety of shapes, sizes, and textures. Moreover, proprietary agar height sensor automatically determines the optimal picking height on-the-fly, thus enabling optimal transfer and outgrowth of biological materials. Together, proper pin selection and agar height sensor enhance microbial colony transfer efficiency, by as much as 40% as shown in an example dataset (Figure 1).

MOLECULAR DEVICES

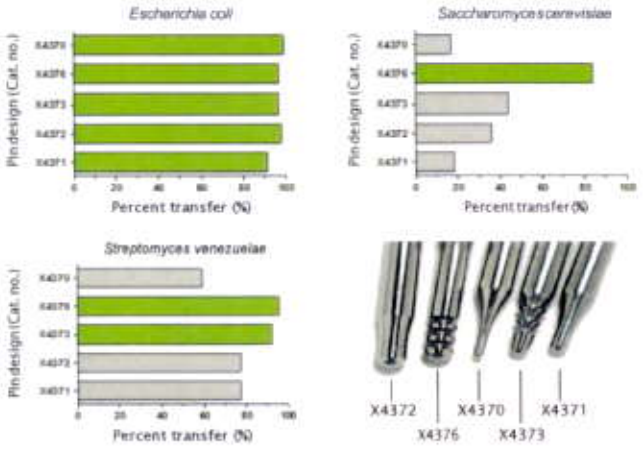


Figure 1. Colony transfer efficiencies can vary widely according to the pairings between microorganisms and colony-picking pins. A representative dataset is shown for *Escherichia coli*, *Saccharomyces cerevisiae*, and *Streptomyces venezuelae*. All pins are reusable providing reproducibility to microorganisms specific transfers. Strict applying pins sterilization procedures avoids cross contamination.

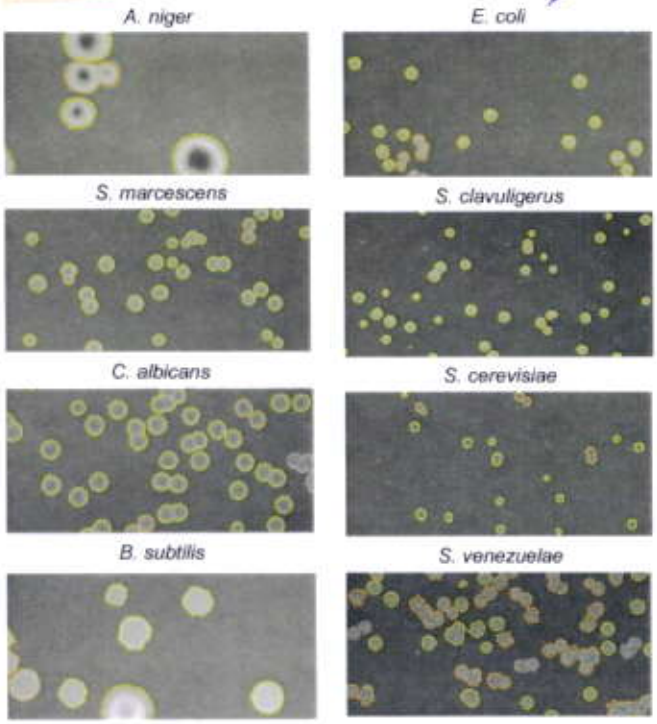


Figure 2. Morphologically distinct colonies are identified by QPix colony detection algorithms based on user-defined parameters: compactness, axis ratio, size, and proximity. Colonies surrounded by yellow border are selected for picking based on the user criteria, while colonies bordered with red fail to meet user-defined criteria and are excluded from picking.

Powerful colony detection algorithms handle microorganism diversity with ease

A colony detection algorithm optimized for *E. coli* may not work optimally when applied to yeast, algae, or other microorganisms that produce colonies with different phenotypic attributes. The QPix Software offers experimental flexibility by automatically identifying and selecting colonies produced from a wide range of microorganisms (Figure 2). Furthermore, ease-of-use of the software allows users to custom define parameters such as shape, size and proximity to neighboring objects for efficient and tailored selection of any colony forming microorganism.

Comprehensive automation platform improves workflow efficiency

With a unique portfolio of colony picking pins and an intelligent software package that are suited for a diverse range of microorganisms beyond *E. coli*, the QPix system can project speed and efficiency across a variety of research workflows and host organisms.

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Документ 14.

Стр.1.

2.4. Възпроизводимост: ≥ 99 %, Точност: ≤ 1 %

2.1. Диаметър на петри: ..... 100 mm и 150 mm

2.3. Минимален обем: < 10 nl

Максимален пипетиран обем: 100 µl

Стр.2.

2.

Спиралното накапване е широко приет метод на повърхностно посаванее, която беше създадена през 70те години на 20 век за намаляване на количеството използвани петри с хранителни среди, използвани при повърхностните посявки за получаване на единични колонии. Избягва се използването на серийни разреждания, изискващите много време, необходими при традиционните повърхностни посявки.

2.2. Когато петрито с хранителна среда се върти, спринцовката автоматично накапва точни обеми от пробата върху повърхността на агара, рисувайки спирала с пробата.

2.5. Когато IUL пусна на пазара Eddy Jet 1 през 1998 г., революционният подход към спиралното инокулиране беше постигнат чрез въвеждането на стерилизирани чрез гама облъчване микроспринцовки за еднократна употреба с които се извършва инокулирането на пробата по повърхостта.

Патентованите микроспринцовки на IUL предотвратяват кръстосаното замърсяване, което прави Eddy Jet 2 спиралния инокулатор за най-висока чувствителност.

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Документ 14

Accessories and Disposables



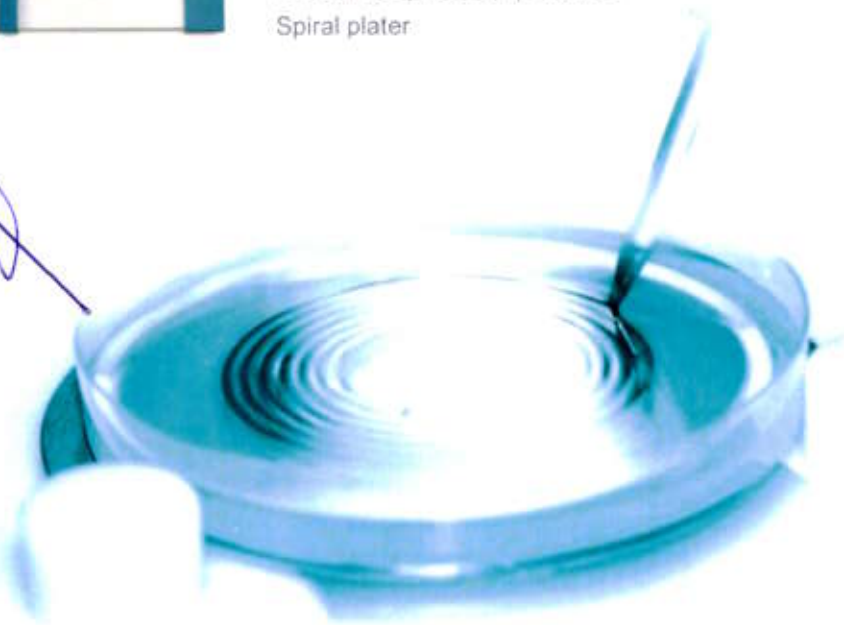
1. 1000 Y-irradiated Microsyringes CAT.90001780
2. 1000 Y-irradiated Sample Beakers CAT.90001790
3. Plate for 15 cm Petri Dishes CAT.90001715
4. Holder for sample beaker box CAT.90001949
5. Holder for Micro-syringe box CAT.90001950
6. Sampling Holder for Beakers CAT.90001974
7. Barcode reader CAT. 90005700



EDDY JET

Cleaner, faster, better

Spiral plater



Technical data

2.4 Reproducibility: > 99%; Accuracy: < 1%

Time for a full cycle: 30 s
(disposable syringes make disinfection unnecessary)

Spreading modes stored:
22 spread modes (44 counting those for 15mm Petri plates)

2.1 Petri plate diameters: ...100 and 150mm

2.3 Minimum volume: < 10 nl

2.3 Maximum pipetted volume: 100 µl

Syringe material: Polypropylene

Plunger material: Polyethylene H.D.

Autochecking: Programmed in 6 regions

Touch screen: 5.71 in

Operating system: Windows embedded CE 6.0 R3

External balance connection: Serial RS232 DB9

Printer connection: Serial RS232 DB9

Barcode reader connection: Specific connection for IUL barcode readers

Connection for updates: Ethernet/ USB pendrive

Additional connections for peripherals: 2 x USB Host ports

Dimensions (WxHxD)
51.5 x 42 x 50 cm / 20.3 x 16.5 x 19.7 in

Weight: 20 Kg / 44 lb.

Motion control: Microcontroller regulated stepper motors

Specifications subject to change without notice

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Introduction to spiral plating

Spiral plating is a widely accepted microbiological surface plating technique that was created in the 1970s to **reduce the amount of Petri dishes** used in surface spreads. Time-consuming serial dilutions required in conventional spread plating are avoided. A single spiral spreaded plate spares the inoculation of 3 Petri plates, drastically reducing operation times and materials.

This technique is based on the usage of an Archimedean spiral spread. Volumes poured along a spiral decrease exponentially so that a single plate hosts several sample concentrations distributed across the spiral. Once incubated, plates are read using a specific counting grid.

Eddy Jet 2 as a leading edge spiral plater

Eddy Jet 2 is an unmatched spiral plater that pushes the outstanding standards of the first EDDY JET even further by adding trendsetting innovations to spiral plating:

- Its **state of the art connectivity** (featuring an Ethernet connection , 2xUSB ports and 2xRS-232 ports): allow for connection to:
  - a printer: that can print labels and records of the inoculations performed
  - a barcode reader: that allows for plate traceability
- EJ2's **streamlined intuitive software** is commanded from a color touch panel
- IUL also **improved spread times** in this device.

EJ2 stands out as the spiral plater with the widest range of spiral distributions: **it can make up to 22 different spiral distributions.**

Eddy Jet 2 Workflow



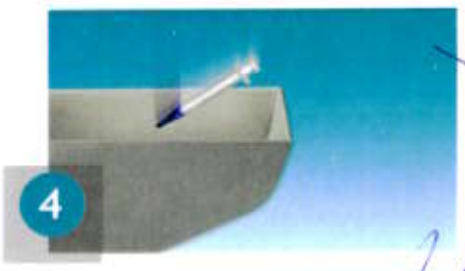
Eddy Jet 2's beak grabs a **brand new sterile syringe.**



The syringe draws in a liquid sample.



As the agar plate spins, the syringe automatically dispenses accurate volumes of sample over the plate drawing a spiral with the loaded sample, providing formation of countable single colonies on the agar.



Eddy Jet 2 gets rid of the sample-contaminated syringe.



IUL's patented syringe method

When IUL released Eddy Jet 1, in 1998, a revolutionary approach to spiral plating was achieved by implementing disposable **Gamma-ray sterilized microsyringes** to perform sample spreading

IUL's **world patented microsyringes** prevent any cross-contamination from taking place making Eddy Jet 2 the spiral spreader with the highest sensitivity.

Also, Gamma-ray microsyringe sterilization makes cleaning cycles unnecessary, saving large amounts of time.

Unlike other spiral plating devices, Eddy Jet 2 doesn't require for bleach disinfection. Implying that no leftover bleach may affect sample bacteria, avoiding false negative results. Thus, Eddy Jet 2 offers labs the **highest specificity** available in the market.



Exclusive microsyringes that ensure genuine sampling sterility

Revolutionary connectivity

Outstanding performance

СОФИЯ АКВАХИМ AQUACHIM AD BULGARIA

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Документ 15.

Стр.1.

Автоматично броене на колонии и измерване на зони на инхибиране

Стр.2.

3.1.1.

SphereFlash® е автоматичен брояч на колонии, който покрива всички изисквания на съвременната микробиологична лаборатория.

3.1.2.

Със софтуера Colony Lite може да се направи броене на колонии в ръчен и автоматичен режим, по прост и надежден начин, благодарение на световния си софтуер и патентованата си вградена система на осветяване.

3.1.3.

С допълнителния софтуер Halos Pro, SphereFlash® може да бъде трансформиран в уред за измерване на зоните на инхибиране, като се задават различни кръгови критерии на приближение за получаване на съответните диаметри на виртуалните площи на кръгове.

3.3.

Преброяване на стандартни, хромогенни среди, дълбочинни, повърхностни и спирални посявки, мембранни филтри и филм среди.

3.2.

Софтуер на световно ниво: лесен и интуитивен и много мощен софтуер. Дори при Lite версията, той ще детектира голям диапазон от различни типови колонии ≥ 0.1 mm без да е необходимо или с много малко задаване на параметри от потребителите.

3.4.

Осветяване без отражения. Патентованата сферична камера елиминира отблясъци както при колониите, така и при петрита и осигурава равномерно осветяване за подобрена снимка, която ще доведе до по-добри, по-надеждни и възпроизводими резултати. Авточатичното регулиране на контраст и чувствителност, автоматично корекция на балончета и бучки в агара на петрито.

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Документ 15

Ordering Information



1.SphereFlash® Colony Counter unit
(includes Colonies LITE software)
CAT. 90007000

2. Colony PRO software
CAT. 90007001

3. Halos PRO software
CAT. 90007002

Technical data

Petri dish maximum usable diameter: 90mm
Computer interface: USB 3.0 Type-A socket
Mains AC adaptor Output: 12V DC 3.43A
Power Range: 90~264 VAC
Frequency Range_ 47~63Hz
Maximum Power:40W
Overvoltage Category: II
Air temperature 15-30ºC (59-86ºF)
Relative humidity: 10-75% (non-condensing)
Altitude: Up to 2000m (6500ft)
Place of operation: For indoor use only.
Frequency Range: 50-60Hz
Pollution level 2
Dimensions: 288x220x371 mm (1.34x8.66x14.6 in)
Weight: 5,5Kg (12.13 lb)

Computer Requirements:

- Microsoft Windows® 7, 8.1,10 (x64 platforms).
- 1 free USB 3.0 Port.
- 8 Gigabytes of RAM memory.
- 100 Megabytes of free disk space and 100 Gigabytes for the Database (for 5000 results stored with images).
- FullHD screen (1920x1080px) recomended.
- **24" screen size** recommended.
- Microsoft Excel® 2007 or higher, 64 bits to open exported Excel® files.
- A virtual PDF printer to create PDF reports.

Specifications subject to change without notice.

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For more information visit us at:
www.iul-inst.com

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Automatic Colony Counter & Inhibition Halos measurement

SPHERE® FLASH

World-class software, uniform & reflection-free illumination



CAT. 90007000
SphereFlash with Colony LITE software

iUL
www.iul-inst.com

Product Overview

3.1.1 The SphereFlash® is an Automatic Colony Counter that meets all the requirements that may be required in a modern microbiology laboratory.

3.1.2 With its Colony Lite software version it performs the colony counting in manual and automatic mode in a simple and reliable way thanks to its world-class software and its patented built-in lightning system.

For more demanding users the software can be upgraded to Colonies PRO to increase its capabilities, e.g. setting User's Permission Levels, **LIMS connectivity**, Worksheets, Barcode Reading, Reporting, Audit Trail, or **CFR21 Part 11**.

3.1.3 With the optional Halos PRO app, the Sphere Flash unit can be transformed to measure inhibition halos accepting various circle approximation criteria to obtain the corresponding diameters of virtual circle areas.

In all versions the lighting is done through LEDs that are oriented to the internal wall of a moving spheric chamber. The result is an unprecedented uniform and reflections-free illumination in a colony counter device.

The **moving sphere automatically closes the chamber** and prevents the area in which the Petri dish is located from any external light. It avoids any reflection or interference of external light, creating a luminous atmosphere without reflections of the walls of the Petri dish or of the colonies.

3.3. For the transparent media the light by transmission is also available in all versions. Counting of standard, chromogenic media, pour, surface, spiral plating, membrane filters and film media.

Main Benefits

3.2. **World-Class Software:** Easy & intuitive yet a powerful software. Even in its LITE version it will detect a wide range of colony types ≥ 0.1 mm with minor or none user parametrization.

3.4 **Reflections-Free Illumination**: Its patentend spheric chamber eliminates reflections in both, colonies and Petri plate, and provides a unifrom illumination for an improved image capture that will lead to better, more reliable, and consistent results. Automatic adjustment of brightness, contrast and sensitivity. Detection of agar bubbles and flecks.



Reflections-Free Image

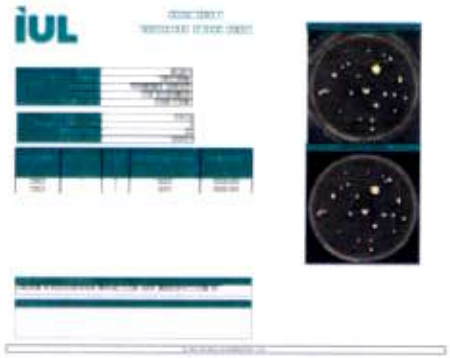
Image captured from a SphereFlash®



Image captured from a traditional counter



Audit Trail: Security-relevant chronological set of records that will provide documentary evidence of the sequence of activities that have affected at any time a specific operation or event in the SphereFlash®.



Report generation: Easy and automatic generation of result reports with customizable layout to include your Company's logo and/or information.

Scalability: Starting Colonies LITE software version (included with the unit) it can be independently upgraded to Colonies PRO or Halos PRO.

Software Comparison Table Feature	Colonies LITE Cat.No. 90007003	Colonies PRO Cat. No. 90007001	Halos PRO Cat. No. 90007002
Colony Counting	✔	✔	
Inhibition Zones Measurement			✔
Standard Methods	✔	✔	✔
Methods Edition		✔	✔
Automatic Calibration & Verification	✔	✔	✔
Users Management		✔	✔
Results Table Cusotomization		✔	✔
Worksheet Mode		✔	✔
Remote Input-Output Mode (LIMs)		✔	✔
Audit Trail		✔	✔
Report Generation	✔	✔	✔

High-Troughput: A fast and powerful image precessing software together with an automatic closing of the spheric chamber allows minor user intervention and time optimisation. Large amounts of plates can be accurely counted.

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Документ 16.

Стр.2.

4.5.6. Накапване при PCR-, qPCR и ELISA реакции

4.5.4. Серийни разреждания

4.5.1. Идентично накапване на микротитърни плаки (96/96 и 384/384)

4.5.2. и 4.5.3. Реформатиране на плаки (експанзия 4x96/1x384 и компресия 1x384/4x96)

4.5.5. накапване и провеждане на ензимни анализи

Стр.5.

4.5.Системата работи с единични епруветки, PCR, 8-стрипове, резервоари, микроплаки с 96 и 384 гнезда.

4.8. С цел да се осигури безопасността в лабораторията, работната маса и и главата за накапване на станзцията са поставени в прозрачна акрилна кутия за удобно наблюдение на всички процеси на пипетиране.

Стр.10.

4.1. Канали за накапване: 1 канал и 8 канала

4.2. Едноканални глави: 1-50 µl, 10-200 µl, 40-1000 µl

4.3. 8 канални глави: 1-50 µl, 20-300 µl

4.4. 8 работни позиции: P2-P8, P1 за кутията с отпадъци

4.2. Таблица за точност на пипетиране

Глава	Обхват на обема, µl	Стъпки на обема, µl	A*≤±%	CV*≤±%
едноканална	1 - 50	50	1.5	0.5
		25	2.0	0.8
		5	6.0	3.0
	10 - 200	200	1.0	0.3
		100	1.5	0.4
		20	4.0	1.5
	40-1000	1000	1.0	0.2
		500	1.5	0.3
		100	3.0	1.0
8 канална	1 - 50	50	1.5	0.6
		25	2.0	1.0
		5	8.0	4.0
	20-300	300	1.2	0.4
		150	1.6	0.6
		30	5.0	2.5

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Стр.11.

4.7.4. Кутия за отпадъци

4.7.5. Охладител за PCR епруветки

4.7. Адаптери за единични съдове и плаки

4.7.1.

Адаптер за микроепруветки 1.5 ml

Адаптер за микроепруветки 0.5 ml

Адаптер за микроепруветки 5 ml

4.7.2: адаптер за PCR плаки с 96 гнезда

4.7.2: адаптер за PCR плаки с 384 гнезда

Стр.12.

4.3.

Накрайници за пипетиране на робота

Накрайници за главите на робота, DE-M маркировка

Обем µl			
1-50			
10-200			
10-300			
40-1000			

Накрайницис филтър за главите на робота, DE-M маркировка

Обем µl			
1-50			
10-200			
10-300			
40-1000			

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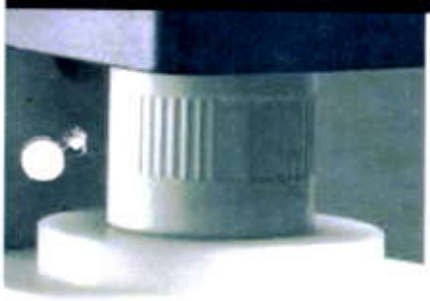
Simple, intuitive, and compact.

Документ 16

BRAND

Liquid Handling Station

FIRST CLASS · BRAND





The name BRAND is synonymous with high-precision volumetrics and high-performance life science products.

Our many years of experience in both areas have gone into the latest development from BRAND – the Liquid Handling Station. This pipetting system handles daily routine tasks with the highest possible precision, leaving time for other work.

Versatile

Seven freely configurable work positions accommodate anything from individual vessels up to 384-well plates, solving nearly any pipetting need.

Intuitive

Simplest possible method creation in minutes – intuitive software, no programming knowledge needed.

Compact

Just 60 x 49 cm, full power in eight stations – at a height of just 53 cm!

Made in Germany.



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Automated Liquid Handling

Simply uncomplicated!

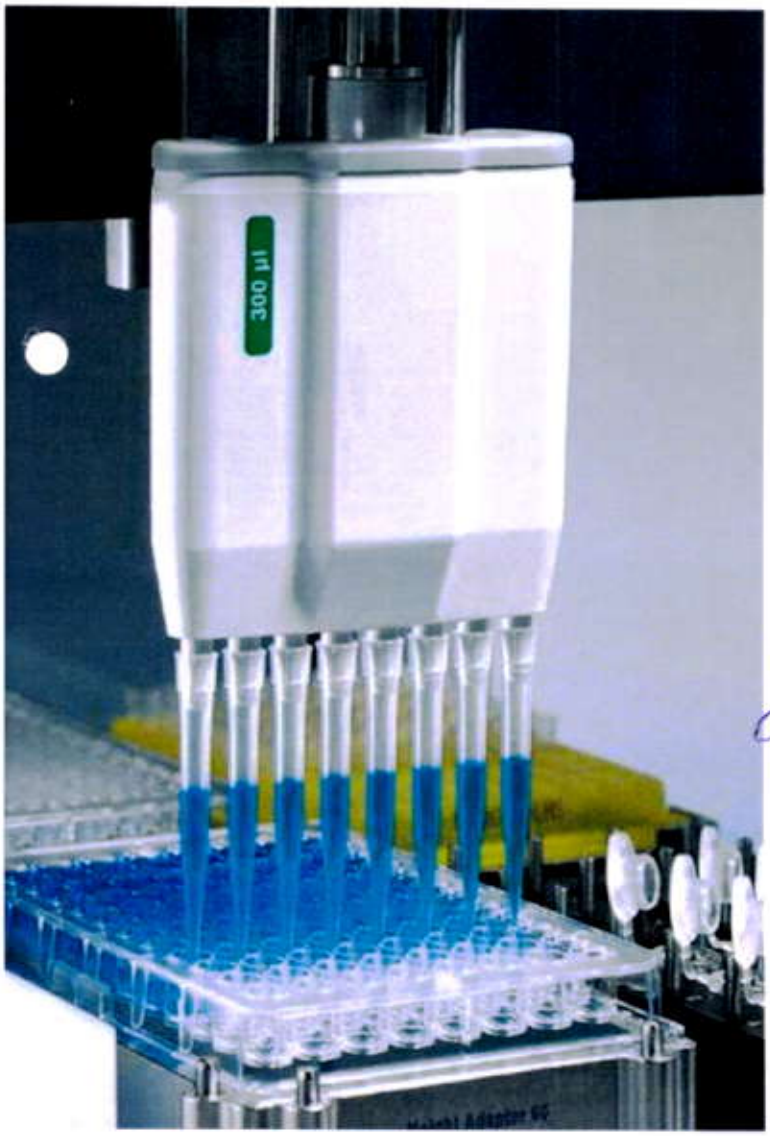
The Liquid Handling Station from BRAND combines 45 years of experience in the area of manual Liquid Handling with over 30 years in the manufacture of high-precision disposable items.

The pipette system works on the same air-interface principle as the piston-operated pipettes widely used in laboratories, and is designed for medium sample throughput.

The Liquid Handling Station takes care of simple, monotonous (and frequently error-prone) routine tasks as well as complex pipetting tasks, such as PCR, qPCR or cherry picking, working through them efficiently.

Typical applications

- Preparation of 'assay ready' plates
- PCR-, qPCR- and ELISA Set-up
- Serial dilutions
- Replication of microtiter plates (96/96 and 384/384)
- Reformatting of plates (4x96/1x384 and 1x384/4x96)
- Cell cultures
- General liquid transfers in single vessels, strips, and plates in the ANSI/SLAS format
- Preparation and execution of enzyme assay
- Sample preparation for following analysis
- Cherry-picking





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Variety for every application...

❸ Pipette modules (Liquid Ends)

The basis for the pipette modules are components from the familiar Transferpette® *S*.
Three single-channel Liquid Ends (SC) and two 8-channel Liquid Ends (MC) are available for contact-free liquid delivery.
Manual changes are so easy a child can do them, and they take only a few seconds. No tools are needed: Just press the ejection button, pull out the Liquid End, and insert a new one – and you're done!
The volume testing of the pipette modules is carried out according to ISO 8655 part 6.

The Liquid Handling Station and BRAND robotic tips and filter tips are designed to be used together. This is the only way to obtain the best possible results.


SC 1 - 50 µl


SC 10 - 200 µl


SC 40 - 1000 µl


MC 1 - 50 µl


MC 20 - 300 µl

❹ Adapters

Different height adapters, tip adapters, and racks ensure stable support and an even working height for the plates and vessels used.


Microtube rack 1.5


Microtube rack 0.5


Height adapter 60


Microtube rack 5.0


Height adapter 30


96-well PCR


Tip adapter


384-well PCR



A Closer Look

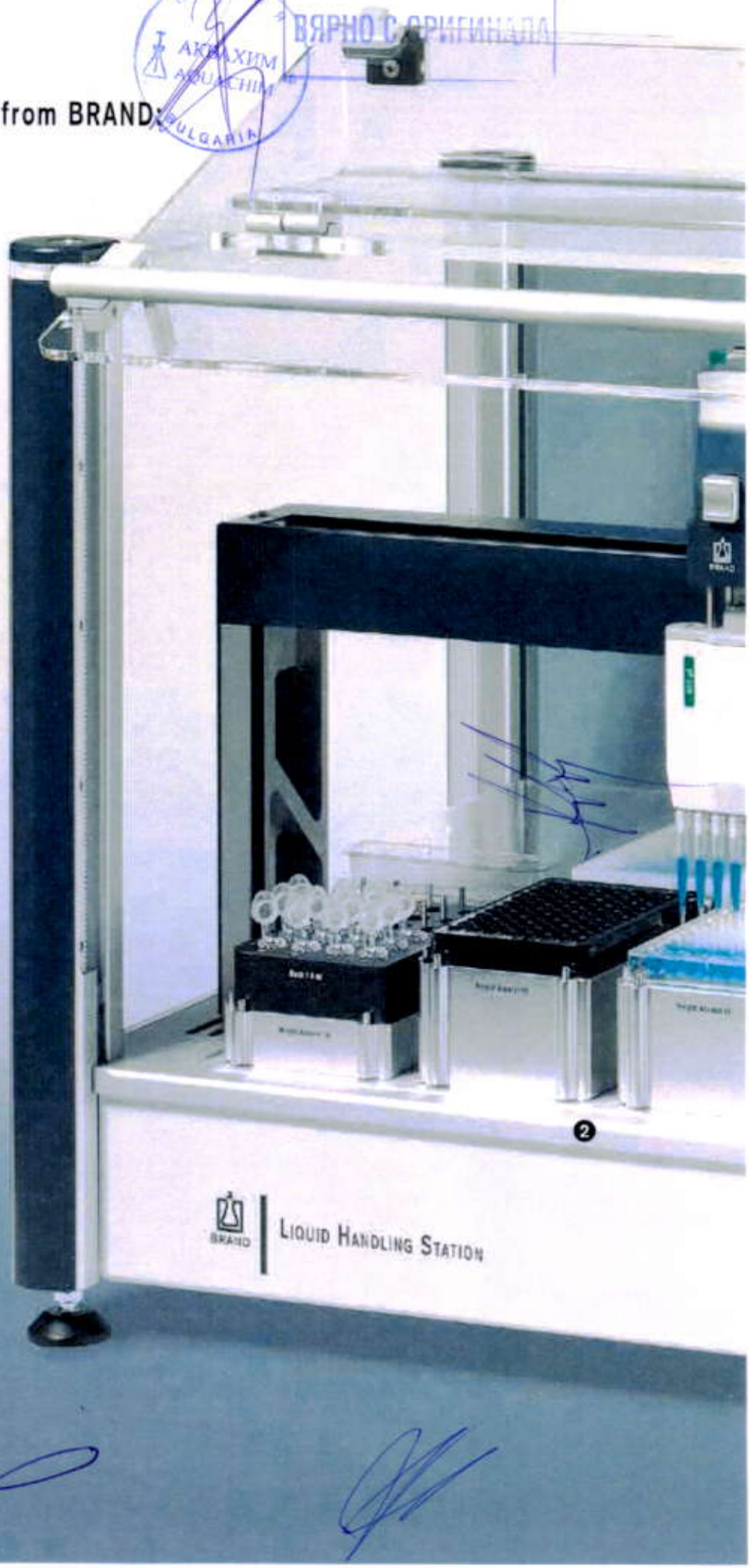
The Liquid Handling Station from BRAND: fast, quiet, and reliable.

The pipette system handles routine tasks at high speed and with the highest precision – quietly and reliably.

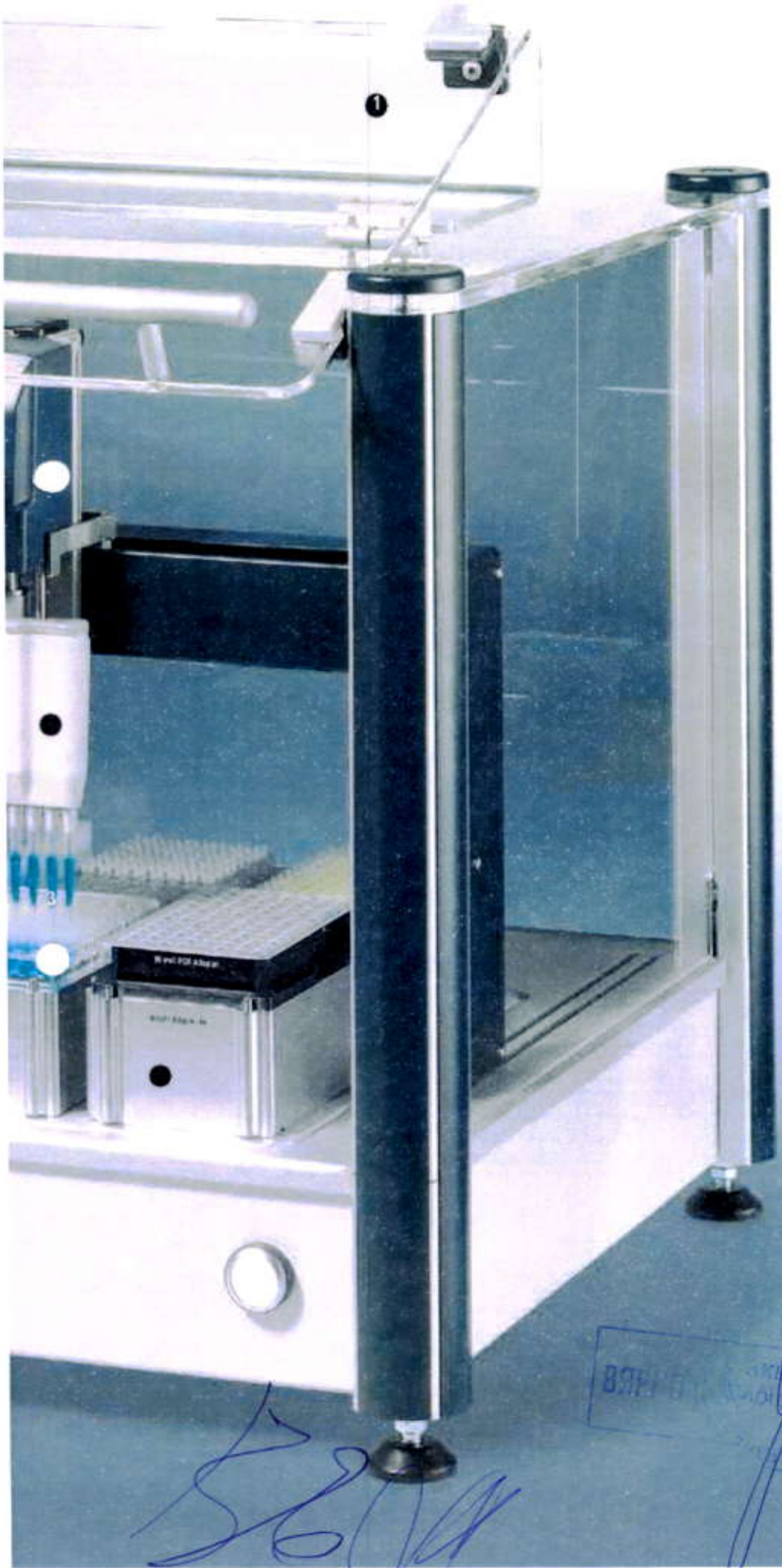
The Liquid Handling Station closes the gap between electronic pipettes and highly complex, expensive pipetting robots. It primarily consists of a 3-axis system, five different pipette modules (Liquid Ends) and seven different adapters.

The speeds and the particularly dynamic movements of the axis system are designed to permit rapid, exact pipetting while simultaneously minimizing the risk of contamination due to loss of liquid drops during movement.

Adapters bring the plates/racks used to a single height, reducing unnecessary vertical movements. That saves time during pipetting!



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1 Front door*

With aim to secure the safety in the lab, the work table and liquid handling head of the station are placed in an transparent acrylic box for convenient observation of all pipetting processes. Thanks to its compact design and the front door, the Liquid Handling Station needs very little space! An area of just 595 mm x 485 mm and 690 mm in height with the door open allows it to be set up in close quarters in the lab or under the safety hood. The space-saving design of the front door allows it to be swung up easily and it is mechanically braked when closing.

* Patent pending

2 Work table

The work table has eight work positions, seven of which use the ANSI/SLAS format and can be freely assigned. The waste box in position 1 can hold up to three hundred 300 µl tips or one hundred fifty 1000 µl tips.

The Liquid Handling Station works with single vessels, PCR 8-strips, reservoirs, 96-well and 384-well plates.

The BRAND Liquid Handling Station is an open system. That means that disposable items (e.g., microplates, deep-well plates, single vessels, etc.) from other manufacturers can also be used. Special adapter, e.g., for cryogenic tubes, are available upon request. To obtain optimum results, the system works exclusively with the new robotic tips from BRAND.

Software

New workflow? No – as always!



All pipetting tasks that can be done with conventional pipettes can quickly be defined as a method in the software to save time. Simplest method creation in minutes – the intuitive software needs no programming skills.

Pipetting, dispensing, mixing – no problem!

Standard workflow:

1. Define the name for the pipetting method
2. Set up the work table
3. Define the transfer commands
4. Start executing
5. Done!

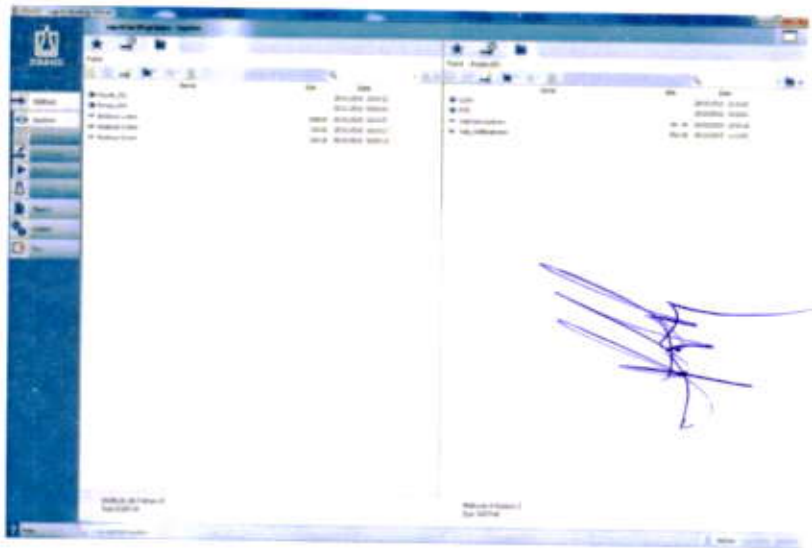
Functions:

- Professional user management
- Predefined liquid properties (liquid types) that can be changed or added at any time
- Disposable item (labware) database can be added to on a customer-specific basis
- Testing of inconsistencies by the software
- Automatic logging of procedures (customizable reports)
- Context-sensitive help function
- Data import/export
- E-Mail report
- Timeline

Application example

1. Defining the name for a method

Existing methods can be retrieved or modified.



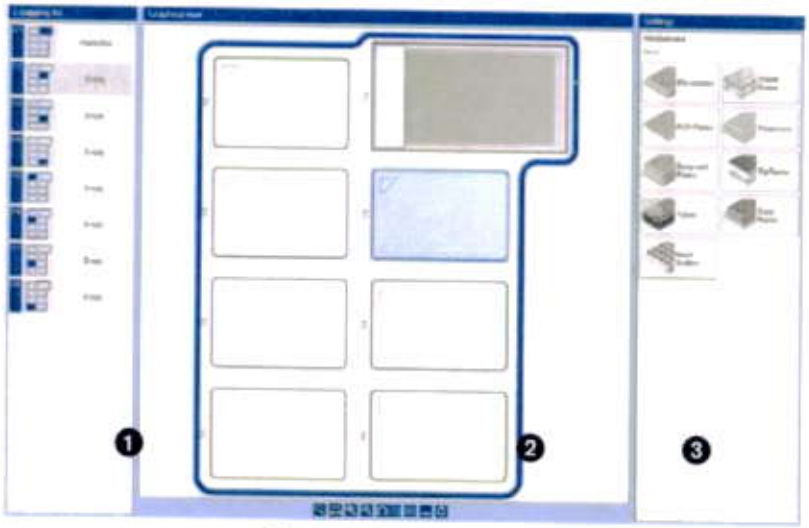
2. Setting up the work table

❶ **Equipping list:**
Selecting the work position to be used

❷ **Graphical view** (work table):
7 freely assignable work positions and 1 waste box

❸ **Settings:**
Here is where the disposable items (labware) available are stored that should be used to set up the predefined work positions.

This three-part screen layout is the same throughout the software, making data entry easier.

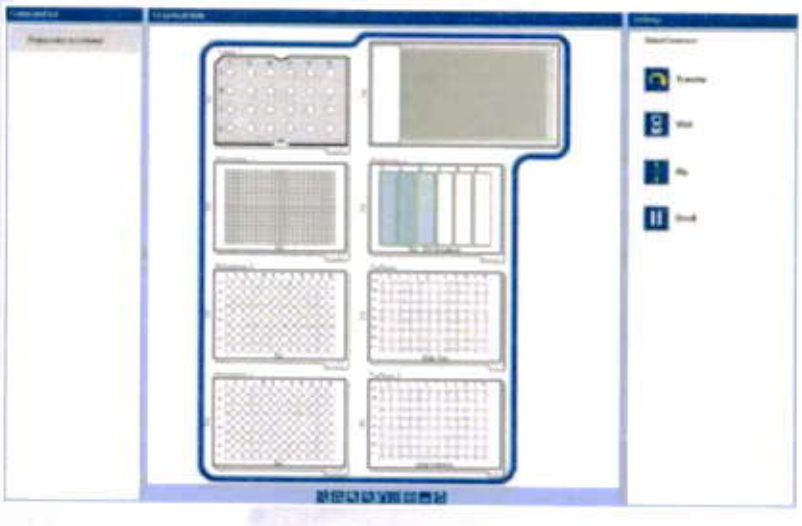




2. Setting up the work table (cont.)

The system works with robotic pipettes and filter tips from BRAND to guarantee the highest possible precision.

If the PC is connected to the Internet, BRAND*plates*® microplates can quickly be found and selected using the selection guide on the BRAND homepage.



3. Commands

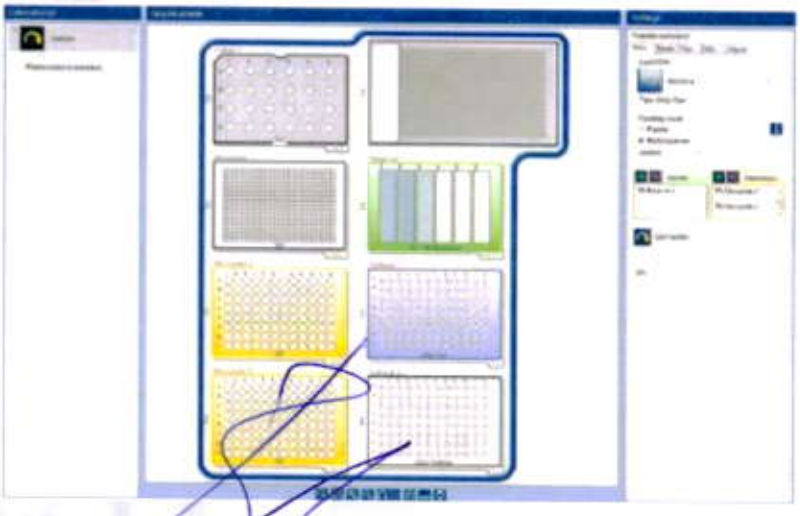
Four commands are available:

Transfer:
This higher-level main command can be used to define nearly any pipetting task, such as multi-dispensing, serial dilution setup, pooling, etc.

Wait:
For example, setting up incubation periods

Mix:
Mixing of samples

Break:
Interrupting the program sequence, for example to incubate or shake samples externally.



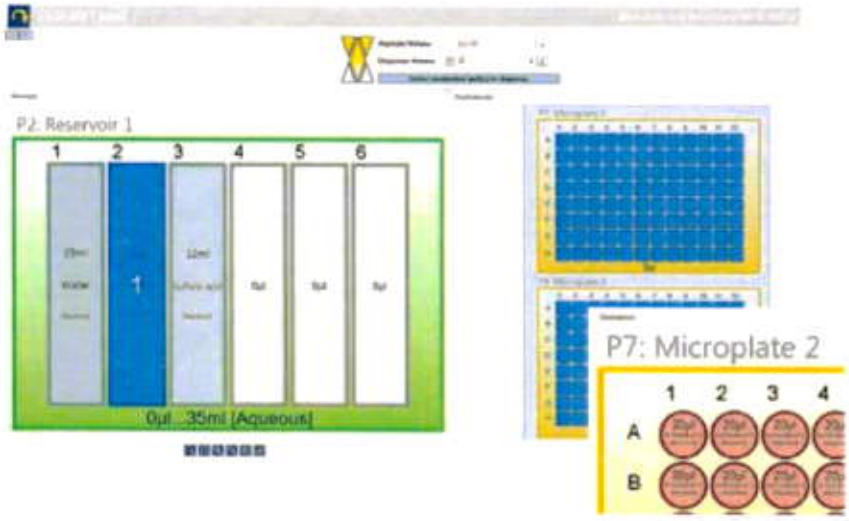
In the settings, a variety of predefined parameters can be changed as needed – from liquid types to prewetting of tips, even the determination of the immersion depth of the tips during liquid pickup and delivery.

The source and destination plates can easily be distinguished on the screen by color.

3. Commands (cont.)

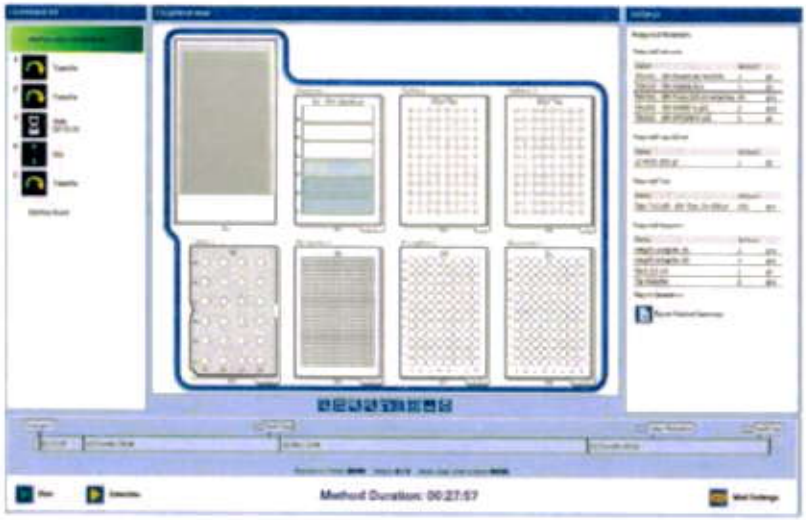
Single plates or multiple plates can easily be designated for liquid transfer by selecting them with the mouse.
Even complex pipetting patterns can easily be set up in a very short time.
An import function permits effortless insertion of pipetting tasks, for example from spreadsheet calculation programs (normalization, cherry-picking, etc.).

To track the content of wells in detail at any time just scroll the mouse over any well/location.

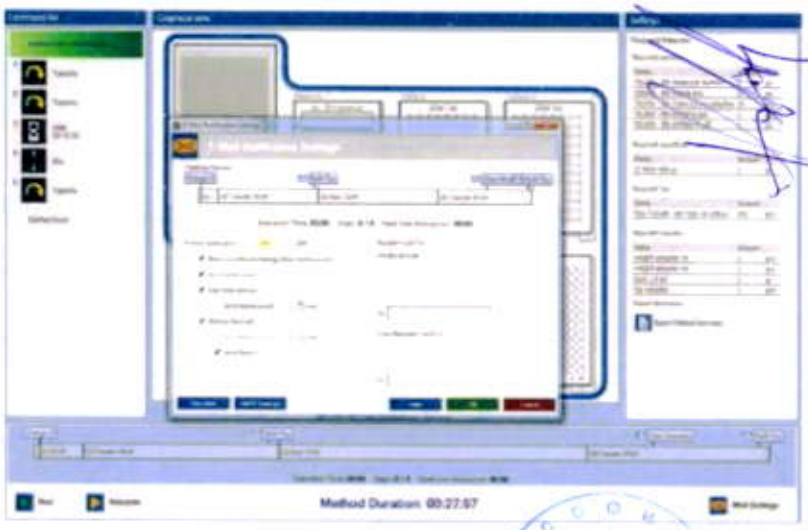


4. Execute

The Execute command starts the method.
First there is a confirmation of the layout of the work table to be sure that the labware has been correctly placed and the required Liquid End has been inserted.
The progress of the work sequence can be followed at any time.



The user will be informed among others about intervention points and the end of the method by e-mail.



A timeline shows the duration of the overall method, the individual steps, and even the points in time when interventions are required (e.g., changing the 200 LE).



5. Done!

Service Agreements

Standard – Plus – Premium

The warranty period for the Liquid Handling Station is one year. With BRAND Plus or Premium service agreements, this warranty can be extended by an additional 12 months.

	Standard	Plus	Premium
Service of mechanical components	✔	✔	✔
Cleaning and greasing the system	✔	✔	✔
Adjusting the Liquid Handling Station	✔	✔	✔
Software-Update	✔	✔	✔
Free replacement of wear parts*		✔	✔
Free replacement of damaged components			✔
Collect + Return		✔	✔
12-month warranty extension		✔	✔
Reminder service			✔
Leased equipment			✔

* even outside the warranty period

BRAND also offers users an optional equipment qualification as part of our quality management.

■ Installation Qualification (IQ)

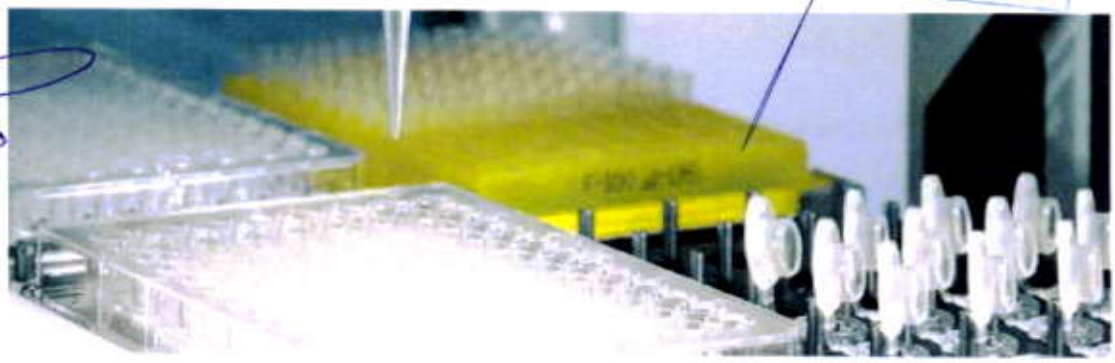
Based on IQ test plans and a subsequent report, we document that the Liquid Handling Station and its software meet the requirements of the product specification. Among other things, the scope of delivery is compared with the order data, the correct installation of the motor controller is checked, the system configuration is tested for correctness, compliance with legal safety regulations is examined, and the training of users documented.



■ Operational Qualification (OQ)

The correct functioning of the Liquid Handling Station and its components is tested against standards and true samples are tested against end user and BRAND specifications. Here, too, a test plan is executed and a report issued and approved by the user.

ВЕРНО С ОРИГИНАЛА



Technical Data

Specifications

Liquid Ends	1-channel Liquid Ends (SC), 8-channel Liquid Ends (MC)
Volume ranges	1-channel Liquid Ends: 1 - 50 µl, 10 - 200 µl, 40 - 1000 µl 8-channel Liquid Ends: 1 - 50 µl, 20 - 300 µl
Working positions	8 working positions: P2 - P8, P1 for waste box
Weight	approx. 25 kg
Dimensions	W 595 x D 485 x H 530 mm (closed) W 595 x D 485 x H 690 mm (open)
Operating temperature	+15 °C - +35 °C
Transport temperature	-20 °C - +65 °C
Supply voltage	100 - 240 V, 50/60 Hz
Fuse	2 x T 2.5A H 250V
Interfaces	1 USB
Power consumption	max. 150 W
Protection class	Protection class I
Housing	Protection class IP20
Safety standards	IEC 61010-1
EMC compatibility	Radio interference and interference resistance compliant with DIN EN 61326-1
Noise level	46 dB

Accuracy table

Liquid End	Volume range µl	Volume step µl	A* ≤ ± %	CV* ≤ %
1-channel	1 - 50	50	1.5	0.5
		25	2.0	0.8
		5	6.0	3.0
	10 - 200	200	1.0	0.3
		100	1.5	0.4
		20	4.0	1.5
	40 - 1000	1000	1.0	0.2
		500	1.5	0.3
		100	3.0	1.0
8-channel	1 - 50	50	1.5	0.6
		25	2.0	1.0
		5	8.0	4.0
	20 - 300	300	1.2	0.4
		150	1.6	0.6
		30	5.0	2.5

* Final test values related to the nominal capacity (maximum volume) or the indicated volume steps indicated on the Liquid End, obtained when Liquid End and distilled water are equilibrated at ambient temperature within the Liquid Handling Station (20 °C/68 °F), according to DIN EN ISO 8655. A = Accuracy, CV = Coefficient of variation

Ordering Data



Liquid Handling Station

Including motor control unit, operating software, user manual, power cable, USB cable, documentation, and on-site training.

Cat. No.	7094 00

Accessories

Pipette modules (Liquid Ends)

For use with the Liquid Handling Station, autoclavable at 121 °C, 20 min. DE-M marking, quality certificate included. Pack of 1.

Description	Cat. No.
SC 1 - 50 µl	7094 10
SC 10 - 200 µl	7094 13
SC 40 - 1000 µl	7094 16
MC 1 - 50 µl	7094 20
MC 20 - 300 µl	7094 23



Adapters

Pack of 1.

Description	Cat. No.
Height adapter 60 mm	7094 30
Height adapter 30 mm	7094 32
Tip adapter	7094 34



Waste box

Pack of 5.

Cat. No.	7094 58





PCR cooler

96-well, indirect cooling. Pack of 2.

Cat. No.	7094 56



Adapter racks for single vessels and plates

Pack of 1.

Description	Positions	Cat. No.
Microtube rack 1.5	24	7094 50
Microtube rack 0.5	24	7094 52
Microtube rack 5.0	9	7094 53
96-well PCR	-	7094 46
384-well PCR	-	7094 48

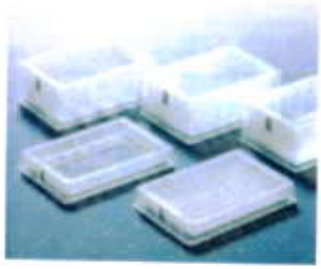
Holder for Liquid Ends

Without Liquid Ends. Pack of 1.

Description	Cat. No.
for 3 Liquid Ends	7094 63
for 5 Liquid Ends	7094 65



Accessories (cont.)



Reagent reservoirs

PP, Pack of 10.

Description	Working volume per column*	Bottom style	Cat. No.
1-column	220 ml	pyramid bottom, 96-well	7014 50
12-column, low profile	6 ml	pyramid bottom	7014 52
4-column	60 ml	pyramid bottom	7014 54
6-column	40 ml	pyramid bottom	7014 56
1-column, low profile	50 ml	flat bottom	7014 58

* The indicated volume applies to the use with automated systems

Robotic tips and robotic filter tips for the Liquid Handling Station

All tips and filter tips up to 1000 µl for the Liquid Handling Station are free of DNA (< 40 fg), RNase (< 8.6 fg), endotoxins (< 1 pg), and ATP (< 1 fg). Sterile tips and packaging are manufactured exclusively under BIO-CERT®-quality certification.



TipRack robotic tips, DE-M marking

Volume µl	Pack of	non-sterile Cat. No.	sterile Cat. No.
1 - 50	10 TipRacks, 96 each	7321 46	7321 66
10 - 200	10 TipRacks, 96 each	7321 48	7321 68
10 - 300	10 TipRacks, 96 each	7321 50	7321 70
40 - 1000	10 TipRacks, 96 each	7321 52	7321 72

TipRack robotic filter tips, DE-M marking

Volume µl	Pack of	non-sterile Cat. No.	sterile Cat. No.
1 - 20	10 TipRacks, 96 each	7326 46	7326 66
10 - 100	10 TipRacks, 96 each	7326 50	7326 70
10 - 200	10 TipRacks, 96 each	7326 52	7326 72
40 - 1000	10 TipRacks, 96 each	7326 54	7326 74



Further information about the Liquid Handling Station can be found at www.brand.de or can be requested from info-ALH@brand.de.

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