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ArrayScan® VTI HCS Reader: Brightfield Module User's Guide

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Thermo Fisher Scientific Inc.
100 Technology Drive
Pittsburgh, Pennsylvania 15219
Telephone: (412) 770-2200

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Introduction

The ArrayScan® V^{TI} HCS Reader now offers the ability to acquire transmitted light images through the addition of the Brightfield Module.

Highlights include:

- Integrated software control for acquisition and focusing of transmitted light images
- Transmitted light images of a field can be added as another channel beyond fluorescence images, or used on its own
- Provides images for confirmation of cell density or fluorescent probe localization, and avoids destructive labeling techniques

The Brightfield Module includes the Brightfield Light Source, filter insert, and the Brightfield Controller.

About this Guide

The chapters that follow this introduction are described below.

Chapter 1 provides an overview of the Brightfield Light Source and Controller.

Chapter 2 provides instructions for Brightfield setup and operation.

Terminology, Conventions, and Symbols

This guide assumes that you have a basic knowledge of computers using the Microsoft® Windows® operating system and that you have experience working with windows, menus, commands, buttons, tabs, dialog boxes, and other Microsoft Windows elements. If you are unfamiliar with these terms, please refer to Microsoft Windows documentation.

Throughout this guide certain terminology, conventions, and symbols are used consistently. These conventions are described in the following sections.

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Symbol	Description
	Risk of Fire.
	Risk of Eye Injury – Wear safety glasses designed to filter dangerous ultraviolet wavelengths.
NOTE 	A tip, suggestion, or additional information.

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Safety Precautions

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Chapter

1

Overview of the Brightfield Module

WARNING

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This chapter provides an overview of the Brightfield Light Source and Brightfield Controller. Operating instructions and specifications can be found in subsequent chapters.

Overview of the Brightfield Light Source and Controller

The optional Brightfield Module for use with the ArrayScan V^{TI} HCS Reader enables the acquisition of transmitted light images. The following photograph shows the three external components of the Brightfield module installed on the ArrayScan V^{TI} HCS Reader.

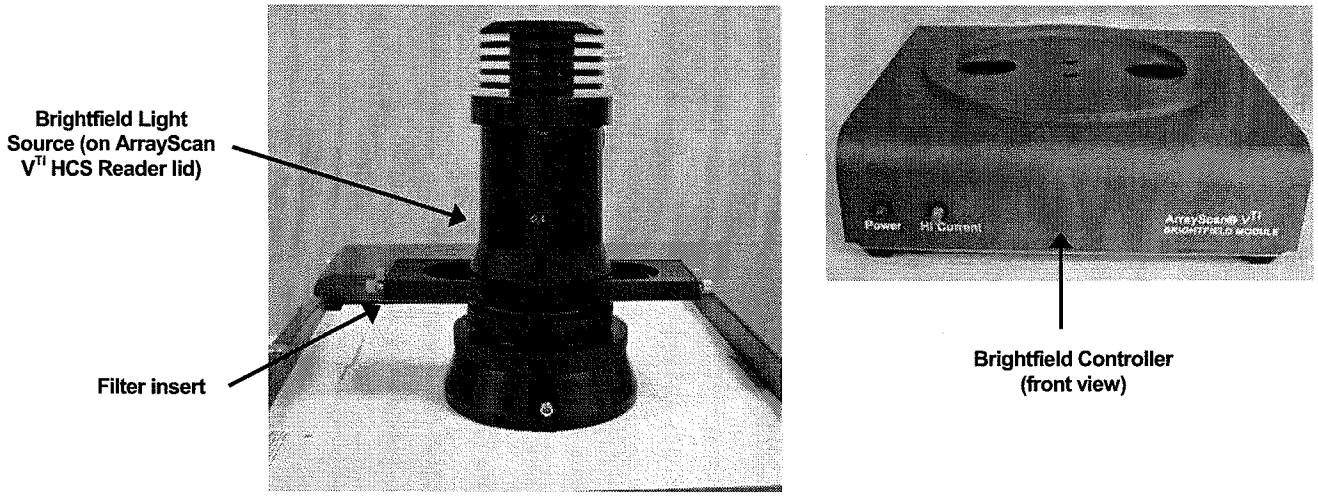


Figure 1.1 *ArrayScan V^{TI} HCS Reader Brightfield Module Components*

Please refer to **Chapter 2, Operating the Brightfield Module** for instructions on engaging and disengaging the module.

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Brightfield Light Source Components

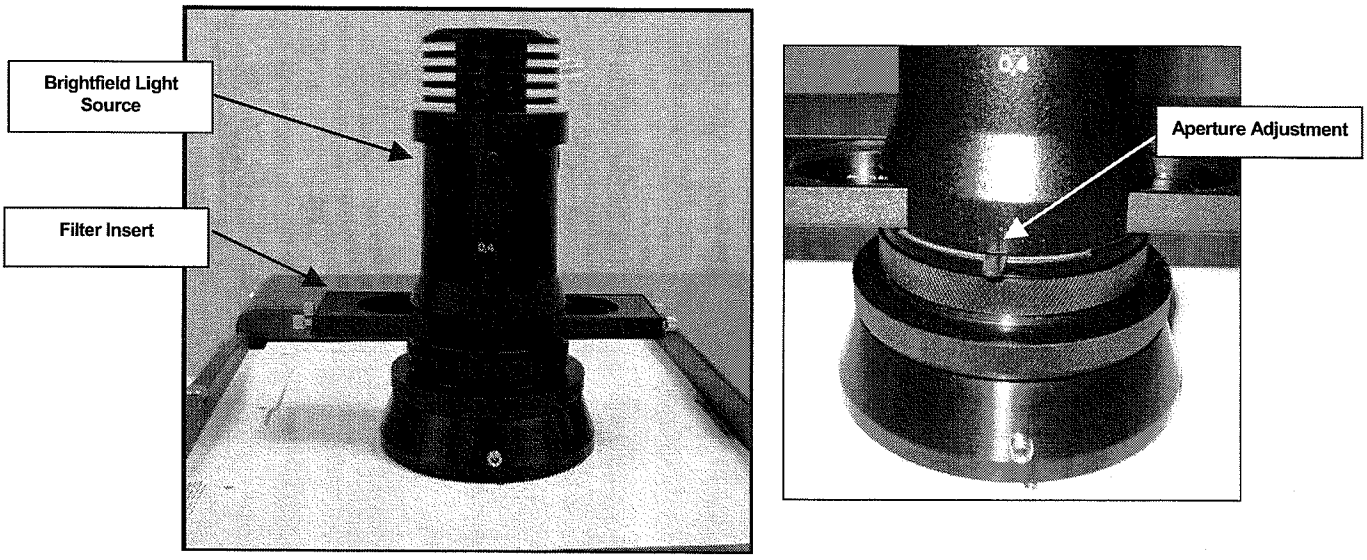


Figure 1.4 *Front Views of the Brightfield Light Source*

Module Maintenance

If any spills occur on the Brightfield unit, turn OFF the Brightfield Module, disconnect the AC power cords from the unit, and clean up any spills immediately. For routine cleaning, use a damp cloth to clean the outside of the Brightfield Controller and Light Source.

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Chapter

2

Operating the Brightfield Module

WARNING



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WARNING



RISK OF ELECTRIC SHOCK!

- **ONLY QUALIFIED SERVICE PERSONNEL** may install, disassemble or perform testing or repairs. The instrument may only be opened by trained, qualified service personnel and only after it has been disconnected from the mains.
- The ArrayScan V^{TI} HCS Reader contains voltages that are potentially hazardous. The ArrayScan instrument may only be connected to power outlets that are properly grounded and free from electrical or mechanical defects. The grounding effect must not be nullified by an extension cable which does not have a protective ground wire.
- Check whether the local line voltage and the operating voltage of the ArrayScan instrument and all the other electrical components are identical. Incorrect voltage settings which do not meet the specifications may damage the instrument or impair its functions.
- If it is established that the protection measures are no longer being met, the instrument must be switched OFF and safeguarded against inadvertent operation.
- Periodically inspect power cords and plugs for proper condition and replace as necessary.

This chapter describes how to operate the Brightfield Module on the ArrayScan V^{TI} HCS Reader. The following topics are described in detail in this chapter:

- System Startup and Shutdown procedures
- Brightfield Setup Procedures

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Starting the ArrayScan Hardware

Please refer to your *ArrayScan V^TI HCS Reader User's Guide* for instructions on starting the ArrayScan hardware. Please refer to all safety precautions before attempting a startup. When you power the Reader, the Brightfield Controller is automatically powered.

Configuring the Brightfield Hardware

You can use the ArrayScan Configuration Tool to enable and disable the Brightfield Module.

When you first install the Brightfield Module, you must follow the procedures below to **enable** the module.

You can also use this tool to **disable** the Brightfield Module. For example, you may wish to disable the module when a technical support issue can be isolated to the Brightfield module but you wish to continue to use the rest of the system without the Brightfield module.

To enable or disable the Brightfield Module at the system level (as opposed to simply not using it in an Assay Protocol) ,

1) Verify that the ArrayScan software application is closed.

2) From the ArrayScan installation folder (default location: C:\Program Files\Cellomics\ArrayScan60), select the **Tools** folder and then select the **Customer** folder. Double-click the **ArrayScanConfig.exe** file.

3) The ArrayScan Configuration Tool appears as shown in the following figure.

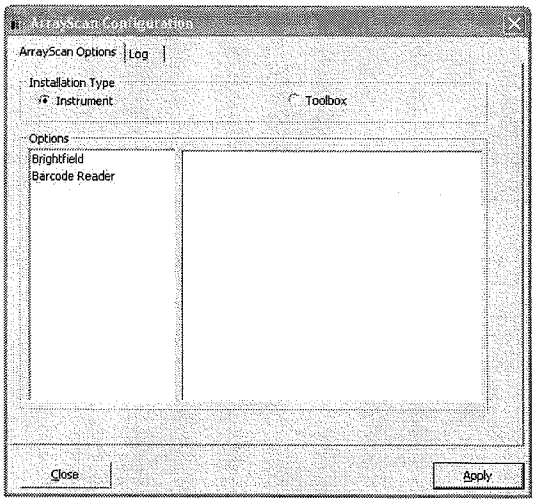


Figure 2.1 *ArrayScan Configuration Tool*

4) Highlight the **Brightfield** option.

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Positioning the Brightfield Module

The Brightfield Module can be positioned for use by physically moving the Brightfield Light Source as described below.

WARNING



RISK OF EYE AND SKIN INJURY!
Do not attempt to remove the Brightfield Module cover plate or Light Source from the ArrayScan V^{TI} lid when the ArrayScan lamp is illuminated such as during a plate scan or acquiring an image. Turning power on to the Brightfield Light Source without the Light Source properly installed can increase your risk of exposure to UV light.

Wear safety glasses designed to filter dangerous ultraviolet wavelengths. Wear protective gloves and clothing to filter infrared light. Never look into the light emitting end of the light guide or Brightfield Light Source. The light could severely damage the cornea and retina of the eye if the light is observed directly.

To position the Brightfield Light Source for use,

1) If present, remove the Brightfield module cover plate (see previous WARNING statement). It is located on the top of the ArrayScan V^{TI} lid and is secured with four flat head screws.

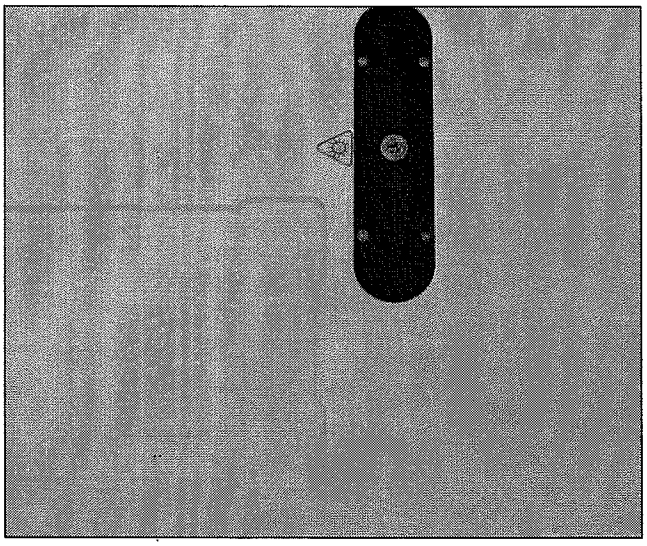


Figure 2.3 *Brightfield Module cover plate*

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To remove the Brightfield Light Source from use,

WARNING

RISK OF EYE AND SKIN INJURY!
Do not attempt to remove the Brightfield Module cover plate or Light Source from the ArrayScan V^{TI} lid when the ArrayScan lamp is illuminated such as during a plate scan or acquiring an image. Turning power on to the Brightfield Light Source without the Light Source properly installed can increase your risk of exposure to UV light.

Wear safety glasses designed to filter dangerous ultraviolet wavelengths. Wear protective gloves and clothing to filter infrared light. Never look into the light emitting end of the light guide or Brightfield Light Source. The light could severely damage the cornea and retina of the eye if the light is observed directly.

1) Verify that the ArrayScan lamp is not illuminated such as during a plate scan or acquiring images. **See previous WARNING statement.**

2) Remove the Brightfield Light Source from the ArrayScan V^{TI} Lid and place it on the Brightfield Controller (see following photographs for pin positioning).

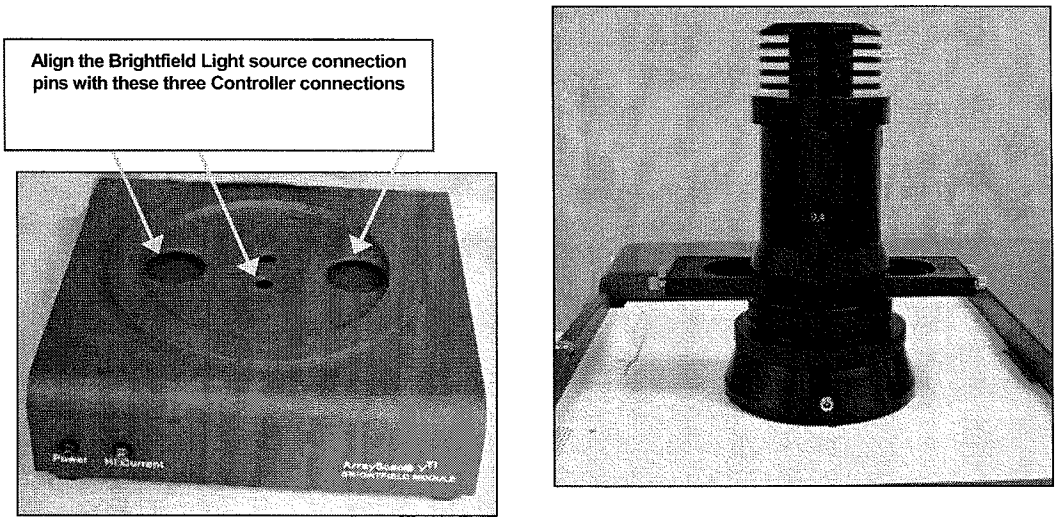


Figure 2.6 *Positioning the Brightfield light source on the Brightfield Controller*

3) Place the Brightfield Module cover plate in the slot on the ArrayScan VTI lid and secure it with using the four flat head screws.

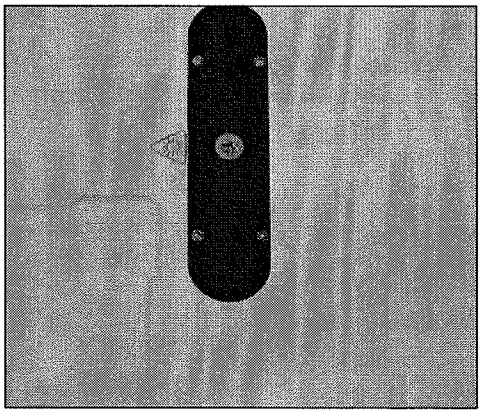


Figure 2.7 *Brightfield Module cover plate*

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3) Click the **Configure Focus** button. The Autofocus Options dialog box appears as shown in the following figure.

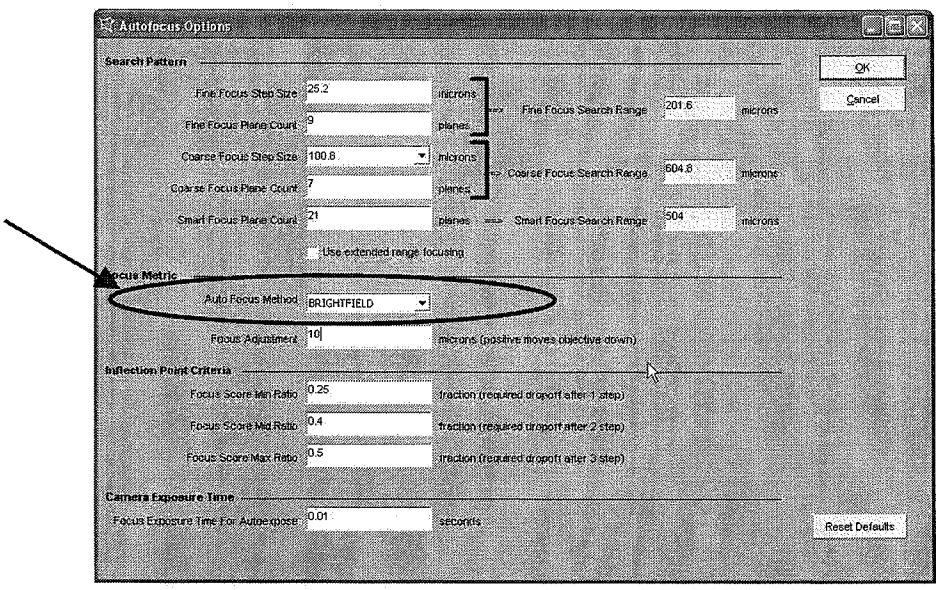


Figure 2.8 *Autofocus Options dialog box*

4) For best results, under Focus Methods, select **BRIGHTFIELD** from the Auto-focus Method drop-down menu.

5) Click OK.

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2) Slide the insert so that the center filter, the neutral density filter, is centered as shown in the previous photograph.

Note: Two phase rings are also available on the insert. These rings can be used for additional contrast in illuminating the sample. The ArrayScan instrument standard objectives are not phase contrast objectives. However, in some cases, use of the Phase Rings may improve the contrast of the Brightfield image by providing more oblique illumination.

Using Aperture Adjustment

The Brightfield Light Source includes an aperture adjustment setting so that you can experiment with various aperture sizes in order to optimize the quality of your Brightfield images.

WARNING



Do not change the aperture setting during a plate scan or image acquisition.

To change the aperture adjustment,

- Slide the aperture adjustment, shown in the following photograph, to the left or right. Sliding the aperture adjustment to the left, decreases the aperture opening. Sliding it to the right, increases the aperture opening. The aperture adjustment should be set in the middle by default.

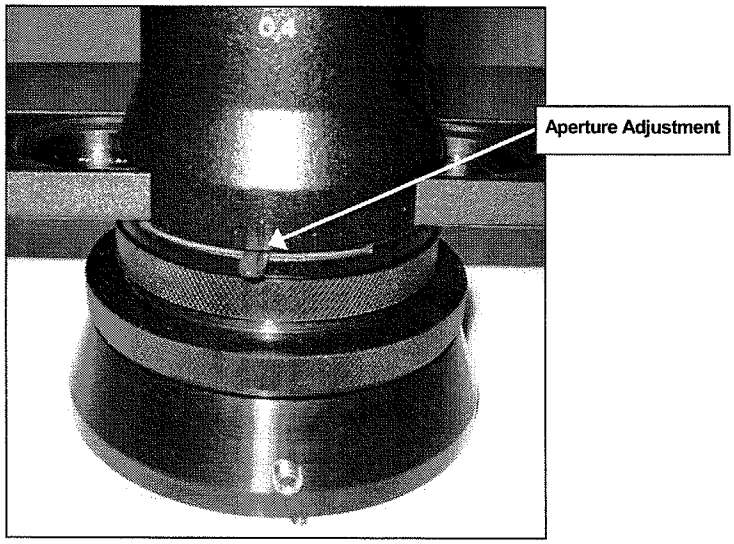


Figure 2.11 *Brightfield Light Source showing Aperture Adjustment*

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Appendix

A

Brightfield Module Specifications

NOTE

Technical specifications are subject to change without notice. Please refer to your *ArrayScan V™ HCS Reader User's Guide* for system specifications.

Electrical

Input Voltage/Frequency	100/240 V~, 50 Hz to 60 Hz into the in-line power supply; 24 VDC into the electronics box.
Input Current (Max)	1.25 A at 24V
Dimensions (WxHxD)	170 mm x 50mm x 170mm
Weight (kg)	1 kg

Environment

Intended Site	Closed Room
Permissible ambient temperature range during operation *	+ 18°C to + 25°C
Permissible ambient temperature range during transport	+ 5°C to + 50°C
Permissible relative humidity during operation (non-condensing)	< 75% at 30° C

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