

CheckScanner™

Operator's Manual

Version 1.1
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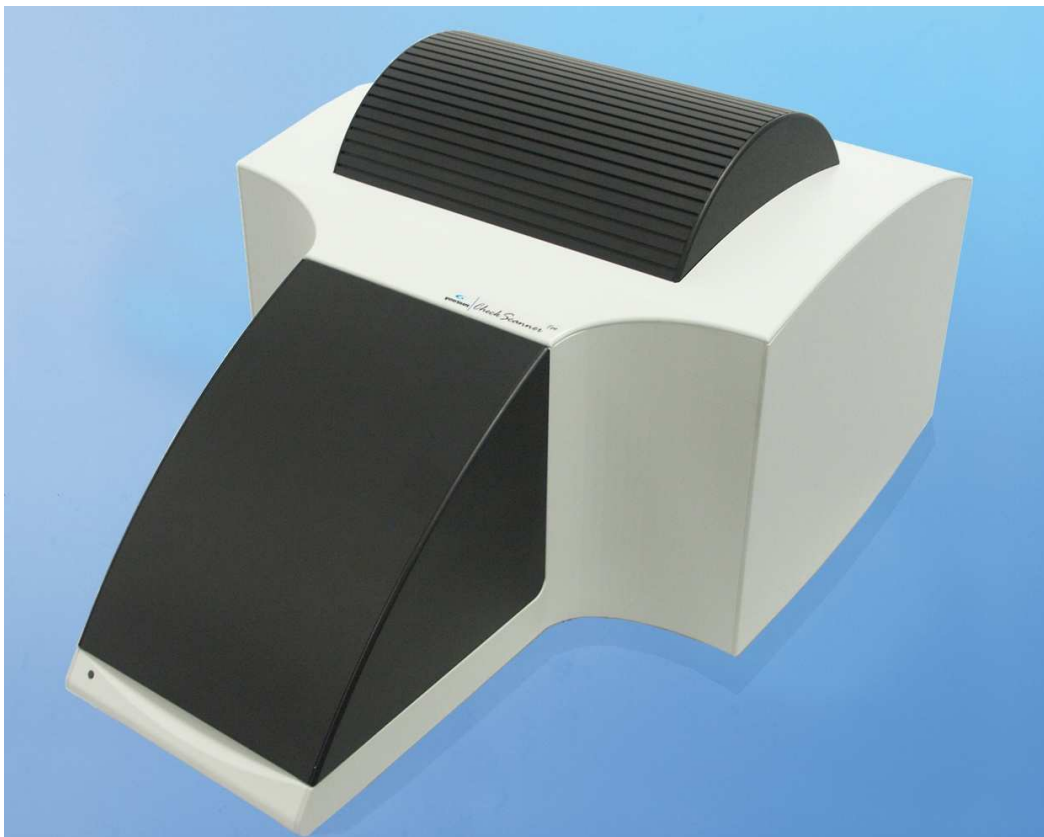


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Revision History

Manual Version	Revision Date
1.1	June 2006

This publication is for operators of the CheckScanner™ using software CheckReport 2.0.3 or higher. Due to software evolution slight changes in the dialog boxes displayed in this manual may occur. When a modification is made that may have adverse effects on operating the system using this manual, an update or amendment will become available.

Every effort has been made to ensure that the information contained in this manual is current and accurate as of the date of publication or revision and that it is consistent with the product it describes. However, no guarantee is given or implied that the document is error-free or that it is accurate with regard to any specifications. The instrument manufacturer reserves the right to make changes to this manual without notification. Any comments on this manual are appreciated.

Intended Use

The CheckScanner™ is a PC-controlled biochip fluorescence scanner for the general laboratory use in combination with the CheckReport™ Software. It is designed to scan with high performance ready to use microarrays in HTA slides or plates manufactured by Greiner Bio-One. It is important that the operator reads this manual thoroughly before using the instrument. The scanner must be operated by skilled lab personnel only.

The manufacturer does not assume any liability for any use of the instrument not described in this manual, or for any customer modifications made to the instrument.

Trademarks

All trademarks mentioned in this manual are the property of their respective trademark holders. Microsoft® and Windows® are registered trademarks of the Microsoft® Corporation.

Approvals

This instrument is in compliance with the following directives of the Council of the European Community and the according standards:

73/23/EC (EN 61010-1)

89/336/EC (EN 61326, EN 61000-3-2, EN 61000-3-3)



Abbreviations

Abbreviation	Definition
EN	European Standard
EMC	Electromagnetic Compatibility
LAN	Local Area Network
PC	Personal Computer (here: Windows-based)

Definitions

Definition	Description
Chip	prestructured biochip with 1, 2 or 12 wells. Identified by one barcode.
Strip	prestructured biochip with 24 wells. Identified by one barcode.
Test	reaction of sample with spotted probes in one or several wells.
Well	cavity on a prestructured biochip for containing the sample.

Conventions

The following conventions are used in this document:



WARNING indicates a potentially hazardous situation, which, if not avoided, could result in death or serious injury.



CAUTION indicates a potentially hazardous situation, which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.



Notes offer additional useful advice.

About The Operator's Manual

This Operator's Manual is designed for end users of the CheckScanner™ system and contains all necessary information to enable the safe and reliable operation.

It is divided into the following chapters:

Chapter 1 contains safety and related information about the intended use of the CheckScanner™ system.

Chapter 2 contains an overview of the CheckScanner™ system

Chapter 3 contains a complete list of items included in the sales package, and information about the necessary conditions required for installing the scanner, such as environmental conditions, instrument and computer connections.

Chapter 4 contains information about routine use of the system, based on a description of the Scan Tests Module in the CheckReport™ Software.

Appendix contains additional information such as a list of accessories, the maintenance check lists and the technical data.



1 Preface

The CheckScanner™ is a fluorescence biochip reader processing up to four slides. The system is controlled by a PC using the corresponding instrument control software. Many features of the scanner are designed to maximize ease of operation and thereby minimize the chance of errors.

The specified performance of the instrument can only be warranted if the instrument is serviced by qualified, trained personnel using the prescribed, original parts.



Keep this manual in the vicinity of the instrument and safe from damage, ensuring that it is always available for use.

Scope and Audience

This manual is intended for operators of the CheckScanner™. It describes the instrument and its application software in detail.

This publication contains no information specific to technical service procedures which must be performed by the manufacturer or its representatives.

Operator Qualification

The CheckScanner™ should be operated by or under the supervision of a technician or operator who is sufficient qualified for according laboratory work.

Before operating the CheckScanner™ the operator should:

- Read and understand the Operator's Manual
- Be aware of all relevant laboratory procedures
- Be aware of all relevant safety rules and regulations

Carefully follow the procedures specified in the Operator's Manual for the operation and maintenance of the system. Maintenance not described in the Operator's Manual should be left to qualified service engineers.

Safety Information

It is essential that the warnings, cautions and safety requirements contained in this manual are read and understood by the operator before operating the system.

Warning symbols have been placed on the instrument to draw your attention to areas of potential hazards.



Familiarize yourself with the following icons and their meanings:



This label warns that there is a danger of hazardous situations within the vicinity of this label which may result in serious injury.



This label warns that there are lasers operating within the vicinity of this label. Do not look directly into beam.



This label warns that there is a danger of electric shock when gaining access to parts of the system marked with this label.

Safety Precautions

Particular attention must be paid to the following safety precautions. If these safety precautions are ignored, the operator may suffer injury. Each individual precaution is important.

Warning Messages

Electric Shock Precautions



Electronic equipment can be the source of electrical shocks. DO NOT attempt to gain access to parts of the instrument marked with this label. DO NOT attempt to repair any electrical parts. DO NOT open the instrument housing.

Service and repair should only be carried out by authorized and qualified personnel of the manufacturer.

Mechanical Safety Precautions



As with any mechanical system, certain precautions must be taken when operating the scanner. The instrument has a loading lid intended to prevent the operator coming into contact with any moving parts.

DO NOT raise the lid when the scanner is in operation. DO NOT tamper with the safety sensors of the lid.

Caution Messages

Lasers



Avoid looking directly into any reflected laser light potentially leaking from the instrument, as this may damage your eyesight.

Spillage

Any liquid spilled on the instrument may result in the malfunctioning of the system. If liquid is spilled on the instrument, wipe it up immediately. If liquid has entered the instrument, call the manufacturer's service.





DO NOT load humid or wetted microarray slides. Besides non-reproducible measuring data, the fast scanning movement of the slide might lead to contamination of optical components of the scanner, which only can be cleaned by a service technician.

DO NOT measure slides with potentially infectious materials.

Electromagnetic Compatibility

The CheckScanner™ is a class A system with respect to Electromagnetic Compatibility (EMC) requirements for industrial areas. It fulfils the emission limits for class A equipment according to EN 61326 (Electrical equipment for measurement, control and laboratory use) including amendment A1. It does not fulfil the emission limits for class B equipment.

Electromagnetic Devices: Devices that emit electromagnetic waves may affect measurement data, or cause the instrument to malfunction. DO NOT operate the following devices in the immediate vicinity of the instrument when it is in use: Mobile or cordless phones; Transceivers; Other electrical devices that generate intensive electromagnetic waves.



2 Introduction

The CheckScanner™ is a PC-controlled biochip fluorescence scanner for the general laboratory use in combination with the CheckReport™ Software. It is designed to scan with high performance ready to use microarrays in HTA slides or plates manufactured by Greiner Bio-One.

Subsequent scans of the microarray are performed at two different wavelengths, and potentially each at different sensitivities. The output of the instrument are single- or multi-TIFF images which allow the operator to measure the corresponding signal intensities of the microarray spots using the CheckReport™ Software.

The independent scanning of one up to four microarray slides is automatically carried out in one scan job according to specific scan protocols.

Many features of the CheckScanner™ system have been designed to maximize operator comfort and thereby minimize the chance of errors.

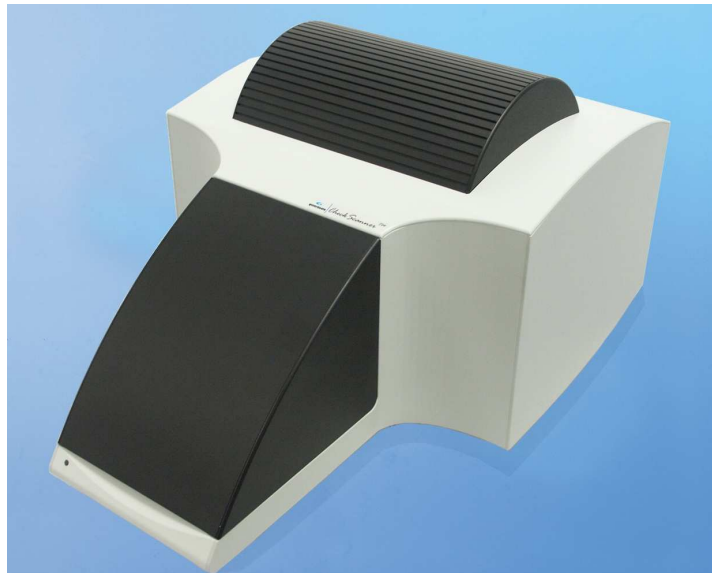


Figure 1-1 CheckScanner™

System Overview

The compact CheckScanner™ is composed of the bench top instrument, an external power supply and the controlling computer (Windows PC). Instrument and PC are connected via an USB cable.

Besides the on/off-switch, the user interference to the instrument is limited to loading/unloading the four microarray slides. A loading lid protects the operator from inadvertent contact with moving parts, and shields the measuring optics from ambient light during scanning. All

further instrument control steps are processed via the CheckReport™ software.

3 Installation

Although the CheckScanner™ will typically be unpacked and installed by your local distributor, a technically skilled person can install the instrument alone. This is particularly useful if the system needs to be re-installed elsewhere. This section describes the process required to connect the instrument and computer as well as to prepare the software for operation.

Sales Package

When the CheckScanner™ system is received, it is important to check that all components of the sales package are included. If any of the items below have not been delivered, please contact your local distributor.

Item	Quantity
CheckScanner™ (instrument)	1
External Power Supply (AC adapter)	1
USB Connection Cable	1
Operator's Manual	1



All packing material and potential transport protections mounted at the instrument are very specific. It is strongly recommended that these materials be kept in case the instrument must be shipped.

Environmental Conditions

To ensure trouble free running of the CheckScanner™ system, it is important to locate the instrument in an appropriate environment.

Installation dimensions	395 (w) x 305 (h) x 595 (d) on bench top (approx.)
Temperature	Operating: 15 to 30 °C Storage: 0 to 40 °C
Humidity	20 - 80%, non-condensing
Sunlight	No direct sunlight or other intensive light sources
Altitude	Up to 2000 m above mean sea level Storage: as required for air travel
Dust	Preferred dust-free environment
Mains power	Wall socket with grounding providing 110/230 V (for external power-supply provided with the instrument)
LAN	Connection of PC to LAN (optional)



The CheckScanner™ must be placed on a firm (laboratory) bench avoiding potential vibration or shaking due to instrument's scanning oscillation.



Adequate space should be provided for accessing the system, i.e. for loading of slides and to access the mains switch at the right handed rear panel.

A gap of at least 10 cm behind the instrument is needed for ventilation.

Connections

The following guidelines outline the connections required for the trouble free operation of the CheckScanner™ system. For completeness, connections to both the instrument and the computer are listed.

Instrument Connections

The instrument is connected to the laboratory mains power socket via the specific external power supply (AC adapter) included in the sales package. Use solely this specific external power supply! The mains power must provide grounding. Switch off the instrument. Connect the 24 V outlet cable of the external power supply to the corresponding connector at the rear panel of the instrument. Connect now the mains power cord of the external power supply to the mains supply voltage (110/220 V) of your laboratory.

A USB connection is used to transfer data between the computer and the instrument. Use the included USB cable to connect one of the PC's USB ports (1.1 or 2.0) to the USB connector at the rear panel of the scanner.



The RS232-connector at the rear of the instrument is only used for service purposes by a service engineer. Don't connect it to the computer.

Computer Connections

A standard computer power cord is used to connect the computer to the mains supply voltage of the laboratory. The monitor (power supply and data connection) is connected in the same manner as a standard computer.

A USB connection is used to transfer data between the computer (USB 1.1 or 2.0) and the instrument.

If desired, the computer is connected to a network (LAN).

Software Installation

A detailed description of the installation of the corresponding USB-drivers, ".NET framework" and the CheckReport™ Software is located in the "CheckReport™ Software Installation document" which is



located on the CD accompanying every microarray kit from Greiner Bio-One.

Repackaging Before Shipment

If it is necessary to remove the scanner from your laboratory, it must be repacked using the original packaging.

Before repackaging can take place, make sure the scanner is free of any potential infectious contamination. If not, it must be disinfected.

4 Software Description

This section describes the scanning of a chip using the CheckReport™ Software.

The CheckReport™ user guide, describing the software in detail will be located in the folder "CheckReport\doc\en", if the CheckReport™ software has been successfully installed.



Before starting the applications the CheckReport™ Software needs to be installed correctly and a user must be created as described in "CheckReport™ Software Installation" and "CheckReport™ Software User Guide".

Program Start



The desktop displays three icons, one for each of the CheckReport™ modules. Double-click on an icon to start the module. Modules can also be started from the Windows Start menu: Choose Start->Programs->CheckReport->ProgramName.

User Authentication

When starting a module, you need to identify yourself to the system.

- Enter your user name and password
- Click Login

A screenshot of a user authentication dialog box. It has a light gray background. At the top right, there is a mouse cursor icon. Below it, there are two text input fields. The first is labeled "User Name:" and the second is labeled "Password:". Below the input fields, there are two buttons: "Login" and "Abort".

User Name:	<input type="text"/>
Password:	<input type="password"/>
<input type="button" value="Login"/> <input type="button" value="Abort"/>	

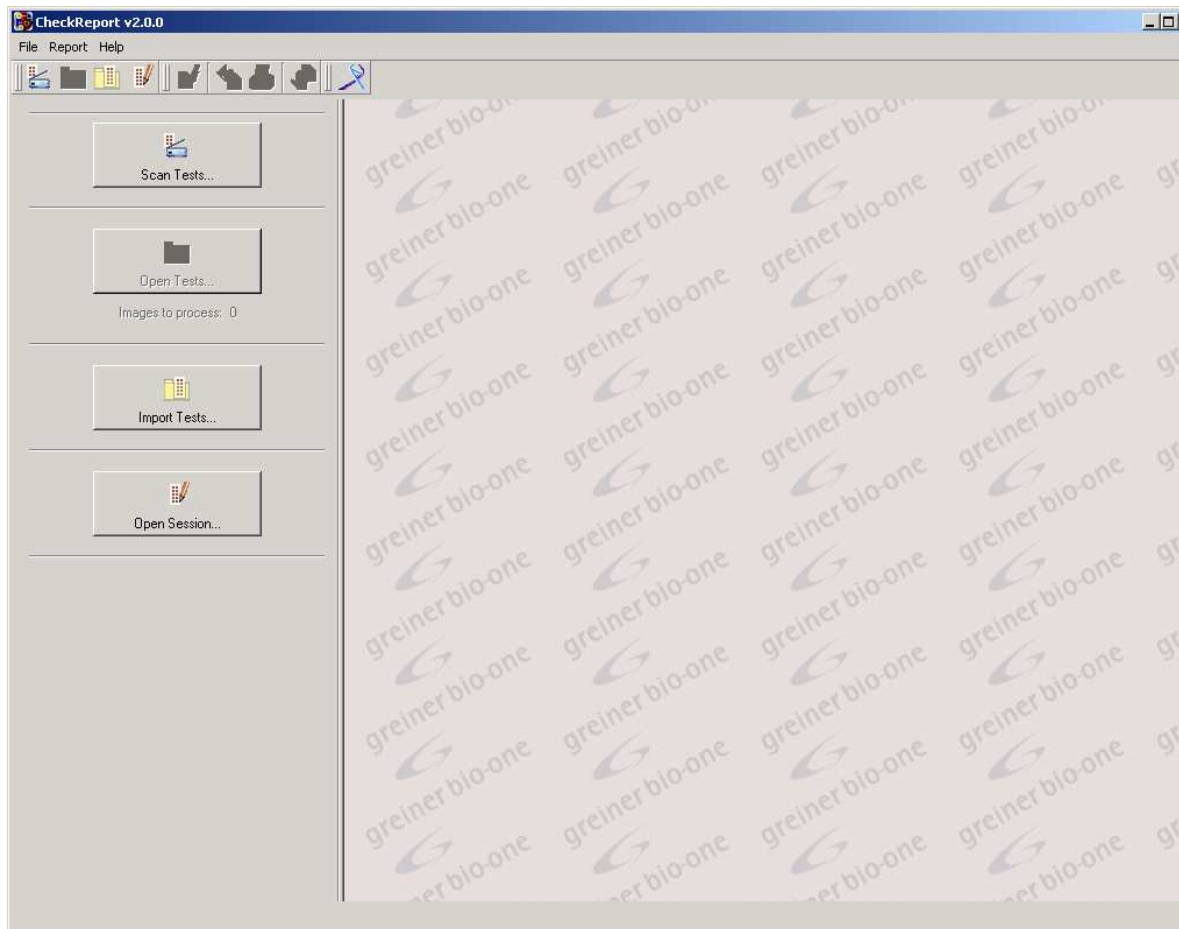
CheckReport™Results





Module CheckReport™Results is the central part of the CheckReport™ suite. It is used to scan and evaluate chips, to assess their quality and to generate reports.

- Start CheckReport™Results.

The main window is displayed:

On the left hand side, the window contains a number of buttons to access the most important Functions:



With **Scan Tests**  the scanner is started. Several chips may be scanned in a row. The scanned images are saved to disk. The chips can be analyzed later on by using the **Open Tests**  function. **Import Tests**  allows to import an image generated by other scanner types than the default device. **Open Sessions**  opens a saved CheckReport™Results session.


Scan Tests

To scan a chip or strip:

- Open the lid.
- Insert the chip or strip into the scanner.



To ensure the correct position insert the slide exactly to the metal stopper.

- Close the lid.
- Click **Scan Tests** .

The scanner control software is started. It scans the chip or strip, recognizes the barcode-unit and transfers the data to CheckReport™ Results. When the first scan is completed, the **Open Tests** function is activated. Additional scans are stored automatically and can be processed later using **Open Tests**. The number of unprocessed images is shown below the **Open Tests** button.



Only chips with a valid sample sheet can be analyzed!

5 Appendix

Technical Data

This chapter summarizes the specifications of the CheckScanner™ system.

Sample Size/Capacity	Up to 4 slides per run
Laser Excitation Wavelengths	532nm and 635nm (solid-state lasers)
Emission Filter Wavelengths	570 nm and 670 nm (standard) Easy exchange with two positions filter drawer or 6 positions filter wheel
Focus	Motorized focus adjustment
Simultaneous Wavelengths per Scan	One
Sample/Substrate Dimension	ISO slide standard: max. width 25.4 mm; min. width 24.9 mm (up to 4 simultaneously)
Sample Loading	Force-free loading of slides
Scanning Field	Slides: 23 x 76mm
Pixel Resolution	10 to 100µm adjustable
Scanning Speed (per wavelength)	<u>A. at 10µm-fast mode (2:1):</u> a) 20 x 20mm area: approx. 105 sec b) 22 x 73mm area: approx. 6.5 min <u>B. at 10µm (real mode 1:1):</u> a) 20 x 20mm area: approx. 3.5 min b) 22 x 73mm area: approx. 13 min
Dynamic Range	16-bit dynamic range, linear over 4 decades
Image File Format	TIFF (either single- or multi images per file)
Dynamic Range settings	Quantum efficiency-independent PMT-gain control
Barcode Identification	Barcode reading on slide (using optical scan)
PC Connection	USB interface
Electrical requirements	External AC-adapter: autoselecting from 100-240V; DC-connector at scanner: 24 V; 1.5 A (Fuse 3.15 A)
Dimensions (W x H x D)	Approx. 395 x 305 x 595 mm
Weight	Approx. 22 kg



Maintenance

The CheckScanner™ is generally designed maintenance-free (i.e. no periodic exchange of wearing parts or lubricants).

Nevertheless, being a high performance measuring device, the scanner should be handled very carefully. For convenient measuring results it is most important to keep the instrument internally dust-free.

- Clean the housing with a wetted wipe without detergents.
- Remove any dust from the slide loading table, e.g. using compressed oil-free air (e.g. canned air for optical parts/instruments).
- If you are observing any malfunction which is not related to wrong (software) operation, please call a qualified service engineer of the manufacturer or his according representative.



DO NOT open the instrument housing.

Electronic equipment can be the source of electrical shocks.

DO NOT attempt to repair any electrical parts.

Service and repair should only be carried out by authorized and qualified personnel of the manufacturer.

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