Operating Manual

Spectro LFP S3

RT and Tex

automatic
reflection and transmission spectrophotometer

Edition E5

barbieri®

Contents

Chapter 1: Introduction

May we congratulate you on your choice!
We from BARBIERI electronic are proud of presenting to you the spectrophotometer Spectro LFP. This instrument features most precise optics, state-of-the-art electronics and software. It is especially created for use in color management for the digital digital imaging market.
May we suggest you read the operating manual first for fully enjoying the capabilities of this instrument; thus you will be able to get familiar with its functions step by step. As always, BARBIERI electronic supports you with a one year warranty through its service organisation. Please get in touch with us in case of need. May we also thank you for the confidence you have put in us by purchasing this instrument.

Siegfried Barbieri
Company founder

1.1 What you can do with this instrument

Most precise color measurement
Spectro LFP enables you to exactly determine the colors of both transmission and reflection copy. Thanks to a highly sophisticated diffraction grating and state-of-the-art electronics using best components this revolutionary spectrophotometer warrants utmost precision in determining color values, as required today for numerous applications.

Most different materials
The following materials printed on large format inkjet-printers can be measured automatically: papers, vinyl, textiles, cardboards, plastic plates, gypsum plates, wood, glass, stone and ceramics plates.

For LFP market
Individual ICC profiles for large format output equipment (printers) can be created based on measuring values of Spectro LFP. These profiles are used by color management applications (RIP, Adobe Photoshop etc.) for exactly matching the colors of original and copy. Hence an instrument like the Spectro LFP is indispensable for utmost true color rendition of scanned-in and elaborated film or paper originals.

	Spectro LFP RT	Spectro LFP Tex
Reflective measurements	X	X
Transmissive measurements	X	
2mm measuring aperture	X	
6mm measuring aperture	X	
8mm measuring aperture	X	X
Up to 2mm thick media	X	X
Up to 20mm thick media	X	

1.2 Components of the Spectro LFP RT instrument

The Spectro LFP RT comes with the following components:

- Spectrophotometer with xy-table
- Guide to be fixed at the right side of the instrument to help support samples
- Reflection sample holder (code: C200A52)
- Transmission sample holder (code: C200A54 Model 3)
- USB connecting cable for Mac and PC
- CD with USB driver and Gateway measuring software for Mac OSX and Windows
- power supply adapter
- this operating manual
- package (keep it for possible transports)

1.3 Components of the Spectro LFP Tex instrument

The Spectro LFP Tex comes with the following components:

- Spectrophotometer with xy-table
- Guide to be fixed at the right side of the instrument to help support samples
- Reflection sample holder (code: C200A52)
- Set of 3 textile sample holder (code: C200A50-S2)
- USB connecting cable for Mac and PC
- CD with USB driver and Gateway measuring software for Mac OSX and Windows
- power supply adapter
- this operating manual
- package (keep it for possible transports)

1.4 Optional components:

• UV cut filter for reflection (Code: C050F00-2)

To be used when measuring samples with optical brighteners.

• Polarization filter for reflection (Code: C050F10-1)

To be used when measuring samples with shiny surface.

• Set of 3 sample holders for special materials (code: C200A50-S1) consisting of:

1. Reflection sample holder for extra heavy reflective materials (code: C200A50)

2. Transmission sample holder for thick transparent materials (code: C200A53 Model 2)

3. Additional transmission sample holder for transparent materials.
(code: C200A54 Model 3)

• Electrostatic sample holder for reflective thin materials and textiles (Code: C200C61)

• Upgrade from Spectro LFP Tex to RT (software activation) (Code: C200S01)

Chapter 2: Installation

2.1 Installing the USB driver software

If you use the USB connection, you need to install the USB driver on your computer before connecting the instrument to the computer.

2.1.1 Installing on a Mac computer under OS X

Switch off the Spectro LFP.
Insert the supplied CD-Rom into your computer, run the "Barbieri Gateway software installer" or the "USB Driver Installer program" on the CD and follow the instructions.

Check if driver is correctly installed

- Switch on instrument
- Open “System Information” (About this Mac/ More info...)
- Show the “System Report” and check “Hardware/ USB”. The instrument “Spectro LFP” must be listed

2.1.2 Installing on a PC with Microsoft Windows XP or newer

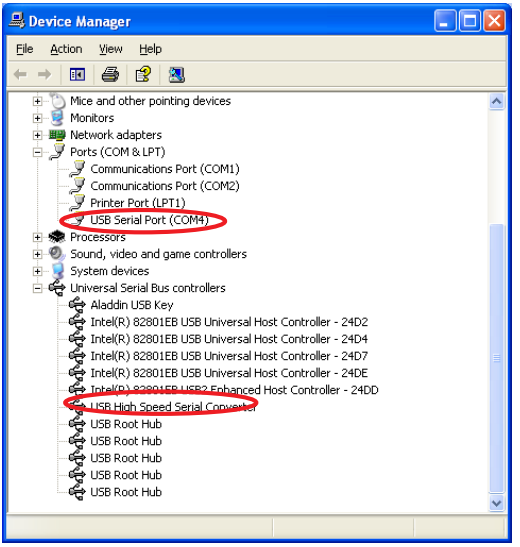
There are two drivers to be installed for the connection between your computer and Spectro LFP:

A. High speed USB to serial converter
B. USB virtual serial port driver

Switch off the Spectro LFP.
Insert the supplied CD-Rom into your computer, run the "Barbieri Gateway software installer" or the "USB Driver Setup program" on the CD and follow the instructions.
The installation procedures are guided automatically by an installation wizard.

Check if driver is correctly installed

- Switch on instrument
- Open “Control Panel”, “System”
- Select “Hardware” and click “Device Manager”.
- Look into “Ports” and “Universal Serial Bus controllers”.



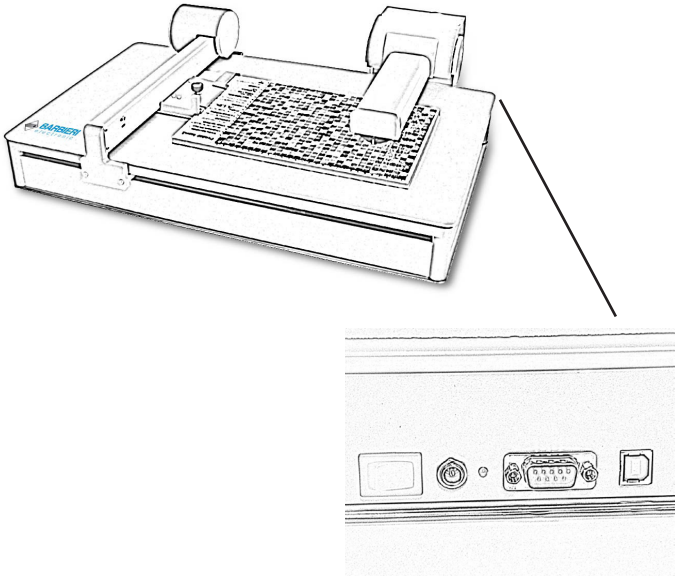
2.2 Installing the hardware

Installing the connecting cables:

• The power supply for the spectrophotometer is connected to the rear side of the instrument

• When connecting the instrument to an Apple computer, use the USB cable connection

• When connecting to a Windows PC, you have the choice between serial or USB connection. Please connect only ONE cable to the computer.



from left to right:
on/off switch, power connector, serial port, USB port

2.3 Product registration

It is recommended to register your instrument with Barbieri electronic in order to get access to privileged information like access to download area, product information/ firmware updates etc.

Registration can be done through the Barbieri Gateway measuring software or manually by registering on the Barbieri web site: www.barbierielectronic.com

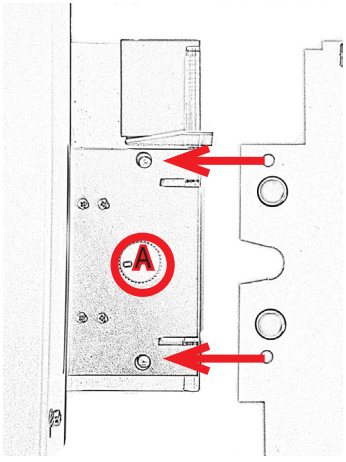
Chapter 3: Putting into operation

The instrument is switched on in the following sequence:
• Switch on your computer
• Switch on Spectro LFP (The switch is situated on the back side of the instrument)
The power LED on the back side of Spectro LFP near the switch will light.

The instrument performs the following movements:
• the measuring head goes in its up position
• the xy-table moves to the right side near the measuring head and moves then to the left side.

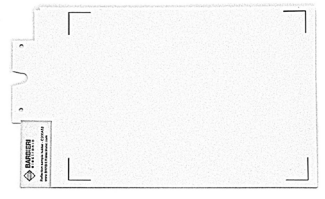
The instrument is now ready for operation and you can now start the measuring software on your computer.

Insert the sample holder as follows:
- unscrew the holding mechanism
- insert holder until it fits correctly
- screw tight holding mechanism



3.1 Measuring reflective samples

Reflective materials must be measured using the supplied reflection sample holder.



This sample holder is made of a selected white material with the following characteristics:

- no whitener
- L* value of approx. 97
- C* value < 2

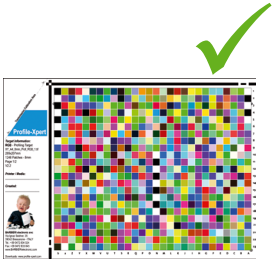
Measurements made with this sample holder are also named "white backing measurements" as recommended by the ICC (International Color Consortium) for the creation of ICC profiles.

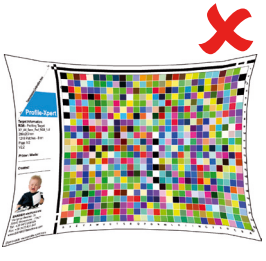
If "black backing measurements" are requested, please fix a dark sheet (density > 1.5) on this sample holder.

This sample holder can be used for samples up to 150 g of weight. For heavier samples, please use the optional sample holder for heavy materials. See Chapter 3.3.1.

The sample to be measured must be fixed inside the indicated corner marks using a tape:

When fixing the sample, make sure the target is printed in a straight position.
This may be important particularly with textiles or similar materials.





3.2 Measuring transmissive samples

Transmissive materials must be measured using the supplied transmission sample holder model 3.

For measuring insert the sample between the two transparent sheets of the sample holder and position inside the corner marks.

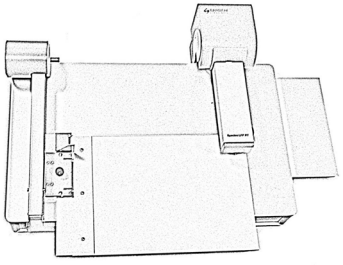
3.3 Measuring special materials

For measuring special reflective or transmissive materials there is a set of 3 special sample holders available. (See page 6)

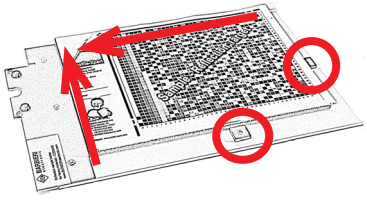
3.3.1 Measuring heavy reflective materials

When measuring heavy reflective materials, the optional sample holder for heavy materials must be used.

It consists of a metallic holder with 2 magnets which are used to fix the sample. The anti-slip mat helps keep target from moving during measuring.



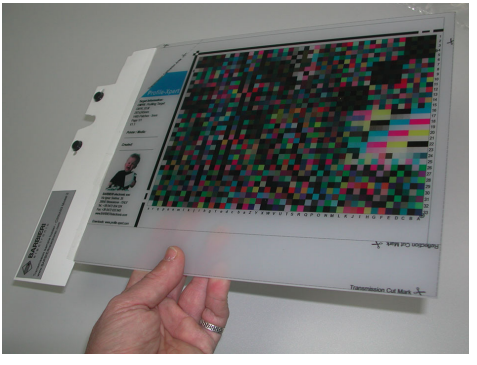
This sample holder can be used for samples up to 3 kg of weight. Fix the side guide and the sample holder on your instrument.



The target sample must be fixed with the two magnets and pushed towards the upper left corner of the sample holder.

3.3.2 Measuring thick transparent materials

When measuring thick transparent materials like glass or plastic plates use the sample holder Model 2. The recommended media thickness is up to 5mm. The thicker the material is, the larger must the patches be. For material of 5mm thickness the recommended patch size is 10mm.



The sample is fixed to the sample holder using a tape.

3.3.3 Measuring special transparent materials

When you measure transparent materials like textiles which you like to measure in transmissive mode use the sample holder model 3.

For measuring insert the sample between the two transparent sheets of the sample holder and position inside the corner marks.

Chapter 4: Using the instrument

4.1 Calibrating the instrument

The instrument is capable of self-calibration.

Reflection

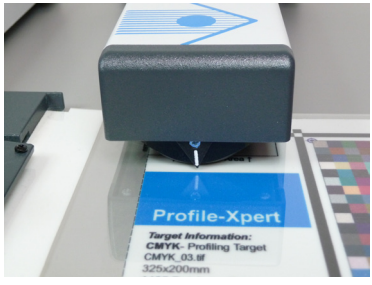
Reflection calibration is done by means of its internal white calibration standard placed under the measuring head.

Note: The validity of this reference white is 24 months from the production date. See the serial no.on the reference white . The first four characters indicate the year and the month of production. For example a calibration strip with a serial number A601021 indicates: Year: A6= 2006, Month: 01= January.This reference white is valid until January, 2008.

The instrument automatically calibrates itself before starting measurements.

Transmission

Transmission calibration is done automatically on the position of the upper left corner of the target area.



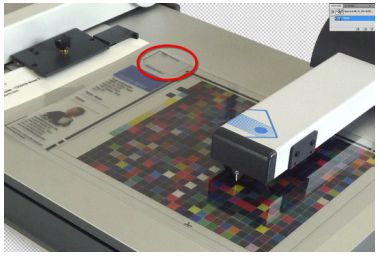
In transmission, you have the option to choose between two calibration modes:

- relative (default) or
- absolute

Relative white calibration

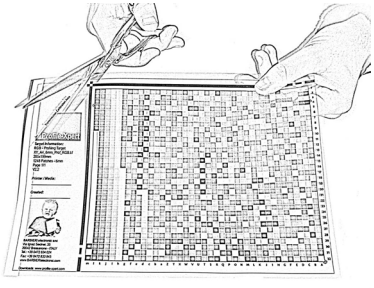
Nearly all linearization and profiling targets require to calibrate against the white of the material to be measured, assuming this as the reference white with a value of L*=100 a*=0 b*=0.

This is in particular necessary for the creation of ICC profiles for non completely transparent materials (like Kodak Duratrans etc.). In this case, the calibration area is covered by the white part of the material and the instrument automatically calibrates to that white.



Absolute white calibration

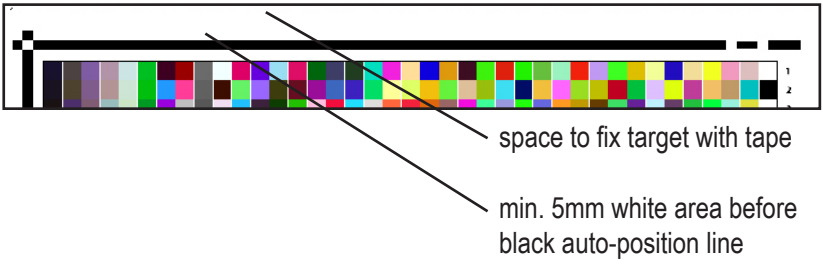
The absolute white calibration method is used to determine the correct L* a* b* values of the target including its white point. As the L* value can be as low as 50 or lower for diffuse materials, this method is not recommended for linearization and color management applications as it will not result in accurate calculation of ICC profiles.



Cut off the reference area of the target to allow the instrument to calibrate to absolute white.

4.2 The auto-position feature

The instrument is capable of automatically finding the position of the sample to be measured.
When you insert a target for measurement, the instrument needs to know where the patches are located. This is automatically determioned by scanning some special border lines (auto-position lines):



Please verify when inserting the target into the sample holder (specially in transmission), that the space before the auto-position line is visible and not covered by the sample holder or tape.

4.3 Measuring modes

The Spectro LFP RT supports three measuring modes:
1. Up-Down mode
In up-down mode the measuring head of the instrument moves up and down between each measurement. Use this mode for sensitive materials to avoid any scratches on the surface of the target.

2. Fast (default) mode
Fast measuring mode is the default mode of the Spectro LFP RT. In this mode the measuring head lies on the target and the surface is scanned.

3. Contactless mode
The contactless mode is similar to the above fast mode with a difference that the measuring head does not touch the surface of the target. This measuring mode is suitable for sticky and sensitive materials.

4.4 Changing the measuring aperture

The instrument is equipped with a selectable measuring aperture. The switching occurs either automatically by the software or manually by pressing the button placed on the right side of the measuring head. The aperture size is valid for reflective and transmissive measurements.

The small aperture corresponds to 2mm aperture, the wide aperture to 8mm.

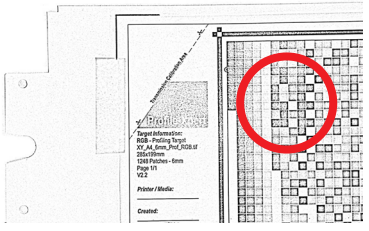
Pressing the button will select the following apertures:
- LED=off: the 2mm aperture is selected
- LED=on intermittent: the 6mm aperture is selected
- LED=on always: 8mm aperture is selected

The small aperture is the default aperture.
The wide aperture should be used with structured materials or if the print resolution is smaller than 120 dpi.
When using the wide aperture, make sure that your target to be measured has patches equal or larger than 10mm.

The recommended patch size is as follows:
2 mm aperture: 5 mm or larger
6 and 8 mm aperture: 10 mm or larger

4.5 Media thickness

The measuring head is automatically positioned in its highest position when switching it on.
In this position, you can load samples with thickness up to 20mm.
When starting measurement, the instrument moves to a upper left position on the sample and lowers the measuring head until it touches the surface of the sample.

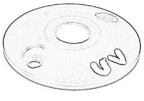


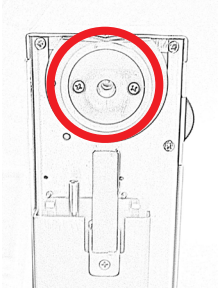
As the thickness of the sample to be measured is determined in only 1 position, it is important that the material has the same thickness on the whole measuring area. Tolerances of up to +/- 1 mm are acceptable.

The instrument supports measurement of samples up to 20mm thickness.
While this is an outstanding feature for reflective materials, it has to be used with caution for transmissive materials. If colors are printed only on the surface of the transparent material, straylight can influence measurements and measuring values will be wrong. Transparency measurements are for this reason in most cases limited to a thickness of up to 3mm.

4.6 UV cut filter and Polarization filter

The optionally available UV cut filter for reflection measurements or the polarization filter for reflection measurements can be exchanged by simply removing with your finger the original reflection optics cover and replacing it with the desired filter cover. The cover is holding by a magnet:





The UV cut filter is used to avoid wrong measurements when measuring samples with optical brighteners. Measurements correspond to measurement condition M2 of ISO 13655:2009

The Polarization filter is used when measuring shiny surfaces. Measurements correspond to measurement condition M3 of ISO 13655:2009

When the polarization filter is mounted, measuring speed is slower and the autopositioning feature of the instrument is not anymore working correctly. Manual positioning must be used!

4.7 Spectro LFP with Barbieri Gateway software

The function of this software is to allow you to drive a BARBIERI measuring device if your particular software (RIP etc.) does not support the device directly.This software will measure any type of targets and save a measuring file in text or XML format. The software runs under either Windows or Mac OSX and delivers measurement data either spectral, CIELab or density.

The software is available for download at the following web-site:

http://www.barbierielectronic.com

4.8 Spectro LFP with other color management software

When using color management software from a different manufacturer than Barbieri, please see the operating manual of your software on how to use the Spectro LFP with your software or use the above applications with file import.

Chapter 5: Instrument Maintenance

Thanks to its closed construction this instrument requires very little maintenance.

The external surfaces of all optical parts should be cleaned every now and then. Please bear in mind that the high-quality reflection optics in particular are very sensitive to scratches and, therefore, should only be cleaned with very fine brushes or compressed air!

5.1 Changing white calibration standard

Replace the reference white of the Spectro LFP RT if it is no more valid or it is somehow damaged. Any scratches, dust or dirt on the surface of the reference white may affect the accuracy of the instrument.

The validity of the reference white

The validity of the reference white is 24 months from the production date. See the serial number on the reference white, or if not present, the serial number of your instrument. The first four characters indicate the year and the month of production. For example a calibration strip with a serial number A603198 indicates: Year: A6= 2006, Month: 03= March.This reference white is valid until March, 2008.

5.2 Changing a measuring lamp

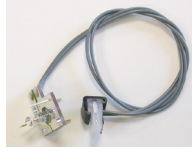
The Spectro LFP RT is equipped with 3 reflection measuring lamps and one transmission measuring lamp. The reflection lamps are situated in the measuring head and the transmission measuring lamp under the xy table. All the lamps can be replaced separately.

When replacement is needed

A measuring lamp of Spectro LFP RT lasts normally over many years and millions of measurements. In some cases, though, the life span of a lamp can be shortenend.
It is recommended to replace a measuring lamp of Spectro LFP RT if it is obvious that a lamp is broken:

Reflection: When the instrument is switched on the reflection lamps are blinking. Check if you see the light of all the three lamps on the xy table. If not, replace the defect lamp.

Transmission: To verify if the transmission lamp is defect, start a transmission measurement. Check if the transmission lamp is switched on, if not replace it.

Measuring lamp reflection order code: C050L01 Note: Spectro LFP has three equal reflection lamps which can be replaced separately.	 C050L01
Measuring lamp transmission order code: C200L02 Note: The measuring lamp unit consists of a lamp and a connecting cable including a plug.	 C200L02

The lamps come with lamp replacement instructions.

5.3 Packing the Spectro LFP for transport

The Spectro LFP is a highly sophisticated and sensitive instrument. Thus a special care is needed when the instrument is transported. Your instrument was shipped in a specially designed carton to assure against damage. Ship your Spectro LFP always in its original package.

It is very important to pack the Spectro LFP carefully to avoid any damage during the transport.

Put foam rubber under the measuring arm. This prevents the measuring arm from moving up and down during the transport.

When closing the package check that the upper coverage lies exactly in the right position covering the instrument. Especially the measuring arm is sensitive and can be bent, if not properly pillowed.

Check that the transport arm lies in the position as seen in the above picture.

Specifications

Instrument	
Measuring apertures:	reflection 2 and 8mm (adjustable) transmission 2 and 8mm (adjustable) (Model RT additional 6mm)
Geometry:	reflection 45°:0° circumferential transmission d:0
Calibration:	automatic with internal white reference
Physical illumination:	type A
Measurement time:	< 0.3 seconds
Measuring speed:	approx. 10 min for 1248 fields
Repeatability:	< 0.2 ΔEab 94 on white or ±0.005 D (up to 1.000 D)
Inter-instrument agreement:	typ 1.0 ΔEab 94
Measuring sensor:	diffraction grating with diode array
Spectral resolution:	3.5 nm
Spectral range:	380 ... 780 nm
Density measuring range:	0 ... 2.3 D
Target thickness	max 20mm
Maximum measuring area:	290 x 200mm (LxH)
Smallest measuring step:	0.2mm
Interface:	USB, serial 57600 Baud for PC and MAC
Dimensions:	571 x 433 x 160mm (LxWxH)
Weight:	11 kg net
Specifications are subject to change without notice	

Order codes:	
C200C00	Spectro LFP RT Series 3
C050L01	Measuring lamp for Spectro LFP RT Reflection
C200L02	Measuring lamp for Spectro LFP RT Transmission
CXRW06R2	Reference white for SpectroLFP RT S2 and 3 (Validity 24 months from the production date)
Optionals:	
C200A50-S1	Set of sample holders for special materials
C050F00-2	UV cut filter reflection for S3 instruments
C050F10-1	Polarization filter for S3 instruments

System requirements

- Personal Computer running Microsoft Windows XP or higher
- Apple Intel Mac running OS X version 10.5 or newer

Pin grouping at RS 232C output

Pin 1:		not used
Pin 2:	RxD	Receive data (input)
Pin 3:	TxD	Transmit data (output)
Pin 4:	DTR	Densitometer ready
Pin 5:	Gnd	Signal Ground
Pin 6:	DSR	Data set ready
Pin 7:	RTS	Request to send
Pin 8:	CTS	Peripheral device ready
Pin 9:	RI	not used

Specifications are subject to change without notice

EG-Konformitätserklärung

Für das folgend bezeichnete Erzeugnis

Spectrophotometer Spectro LFP-RT

wird hiermit bestätigt, daß es den wesentlichen Schutzanforderungen entspricht, die in der Richtlinie des Rates zur Angleichung der Rechtsvorschriften der Mitgliedsstaaten über die elektromagnetische Verträglichkeit (89/336/EWG) festgelegt sind.

Diese Erklärung wird verantwortlich für den Hersteller:

BARBIERI electronic OHG
I. Seidner Str. 35
I-39042 Brixen (BZ)
Italien

abgegeben durch den gesetzlichen Vertreter: Barbieri Markus.

Federal Communication Commission Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CAUTION: Operational hazard exists if AC adaptor other than original is used.

NOTE: Shielded interface cables must be used in order to maintain compliance with the desired FCC and European emission requirements.

For Italy:
INFORMAZIONE AGLI UTENTI

Ai sensi dell'art. 13 del Decreto Legislativo 25 luglio 2005, n.151 "Attuazione delle Direttive 2002/95/CE, 2002/96/CE e 2003/108/CE, relative alla riduzione dell'uso di sostanze pericolose nelle apparecchiature elettriche ed elettroniche, nonché allo smaltimento dei rifiuti".

Il simbolo del cassonetto barrato riportato sull'apparecchiatura o sulla sua confezione indica che il prodotto alla fine della propria vita utile deve essere raccolto separatamente dagli altri rifiuti.

La raccolta differenziata delle presente apparecchiatura giunta a fine vita e'organizzata e gestita dal produttore. L'utente che vorrà disfarsi della presente apparecchiatura dovrà quindi contattare il produttore e seguire il sistema che questo ha adottato per consentire la raccolta separate dell'apparecchiatura giunta a fine vita.

L'adeguata raccolta differenziata per l'avvio successivo dell'apparecchiatura dimessa al riciclaggio, al trattamento e allo smaltimento ambientalmente compatibile contribuisce ad evitare possibili effetti negativi sull'ambiente e sulla salute e favorisce il reimpiego e/o riciclo dei materiali di cui è composta l'apparecchiatura. Lo smaltimento abusivo del prodotto da parte del detentore comporta l'applicazione delle sanzioni amministrative previste dalla normative vigente.

Operating Manual C200M01

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Member of