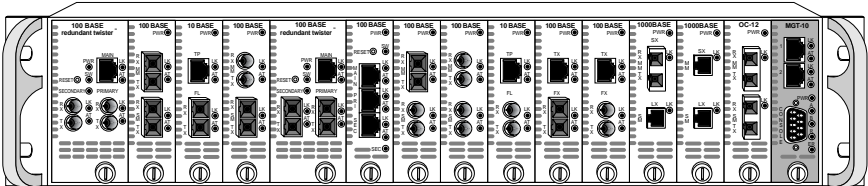METRObility
optical systems

RADIANCE
R5000
CENTRAL SERVICE PLATFORM

Installation & User Guide

Model: R5000-17HS

Radiance Series

Central Service Platform:
 R5000-17HS _____ 17-slot 2U platform

Accessories:
 ACPS-17HS _____ Load-sharing hot-swappable AC power supply
 DCPS-17HS _____ Load-sharing hot-swappable DC power supply
 R000-01 _____ Blank panels (6)
 7500-D _____ Power supply display card
 R5000-RM _____ 23-inch rackmount hardware

The following is a listing of available Radiance line cards and software. Refer to each product's specific installation and user guide for operational features.

Line Cards:

10Mbps
    Copper to coaxial
    Copper to fiber
    Redundant
10/100Mbps
    Copper to copper
    Copper to fiber
    Fiber to fiber
SONET
    Fiber to fiber

100Mbps
    Copper to fiber
    Fiber to fiber
    Redundant
    Access
Gigabit
    Fiber to fiber
    Copper to fiber
    Redundant
T1/E1
    Copper to fiber
T3/E3
    Coaxial to fiber

Management:
 R502-M _____ Management card with dual Ethernet interfaces and embedded WebBeacon management software
 NetBeacon® _____ Element and service provisioning management software

Table of Contents

Radiance R5000 Central Service Platform Installation & User Guide

Overview

The Radiance R5000 Central Service Platform is an IP services demarcation unit that operates where electrical and optical networks converge to deliver managed, high availability solutions for distance, copper-to-fiber and fiber-to-fiber connectivity. Using the platform, network designers can implement and manage high-speed fiber connections from the Central Office to the point of presence (POP) at the client site.

Available as a 19" or 23" rackmount platform with slots for management cards and up to 16 line cards, the R5000 supports two load-sharing, hot-swappable AC or DC power supplies to ensure nonstop operation. Radiance line cards support IP/Ethernet interfaces at 10, 100, 1000Mbps, T1/E1, T3/E3, SONET OC-3/STM-1 and OC-12/STM-4 as well as Ethernet, Fast Ethernet, and Gigabit Ethernet redundant data paths.

To increase reliability and reduce troubleshooting time, Metrobility® offers several management options. The SNMP management card collects a variety of network data and link information including the unit's voltage and temperature. NetBeacon® management software provides proactive management support including automatic e-mail notification. For web-based management of the R5000 using a standard web browser, Metrobility provides the WebBeacon kernel embedded into the management card.

Metrobility's carrier class solutions provide seamless connectivity with all major switch and router manufacturers and offer a flexible solution for fiber connectivity while reducing costs and adding functionality.

The Radiance R5000 Central Service Platform provides the following key features:

- Support for two hot-swappable, load-sharing AC or DC power supplies.

- Optional management card for SNMP management using the NetBeacon software or any SNMP application.

- WebBeacon, embedded in the management card, allows you to monitor network connections via the Internet with standard browsers such as Netscape® Navigator® and Microsoft® Internet Explorer.

- Separate bus paths for management, data and power for more efficient internal communications.

- Strict standards compliance ensuring compatibility with other vendors' equipment for flexible connectivity.

- Rugged rackmount ears with heavy-duty handles.

- Certified for NEBS Level 3 (DC only).

Related Documentation
Refer to the following documents for additional specific information on the Radiance Central Service Platform:

- *Radiance 10Mbps Single Interface Line Cards Installation & User Guide*
- *Radiance 100Mbps Single Interface Line Cards Installation & User Guide*
- *Radiance 10Mbps Redundant Interface Line Cards Installation & User Guide*
- *Radiance 100Mbps Redundant Interface Line Cards Installation & User Guide*
- *Radiance 1000Mbps Redundant Interface Line Cards Installation & User Guide*
- *Radiance 10/100Mbps Interface Line Cards Installation & User Guide*
- *Radiance Gigabit Single Interface Line Cards Installation & User Guide*
- *Radiance 1Gbps Interface Line Cards with SFP Optics Installation & User Guide*
- *Radiance SONET Single Interface Line Cards Installation & User Guide*
- *Radiance Access Line Cards Installation & User Guide*
- *Radiance T1/E1 Single Interface Line Cards Installation & User Guide*
- *Radiance T3/E3 Single Interface Line Cards Installation & User Guide*
- *Radiance Chassis Stacking Line Card Installation & User Guide*
- *Command Line Interface Reference Guide*
- *NetBeacon Management Software Installation & User Guide*
- *WebBeacon Management Software Installation & User Guide*

Installation Guide

Follow the simple steps outlined in this section to install and start using the Radiance R5000 Central Service Platform.

1 *Unpack the Platform and Accessories*

Check that the following components have been included:

- Radiance R5000 Central Service Platform
- Rackmounting hardware
- Six (6) blank panels for unused slots
- Four (4) rubber feet

The following items are available separately:

- AC or DC power supplies
- Power supply LED display card
- Management cards
- NetBeacon management software
- Line cards
- 23" rackmounting hardware
- Blank panels for unused slots

Your order has been provided with the safest possible packaging, but shipping damage does occasionally occur. Inspect it carefully. If you discover any shipping damage, notify the carrier and follow their instructions for damage and claims. Save the original shipping carton if return or storage of the unit is necessary.

2 Mount the Platform in an Appropriate Location

Rackmounting the Platform

The R5000 Central Service Platform is designed to be mounted flush or recessed in a standard 19- or 23-inch equipment rack. Use the rackmounting hardware included with the R5000 to secure the mounting brackets to the platform. Use separate screws provided with the equipment rack to mount the platform in the rack. Make sure that the mounting of the equipment in the rack does not impose a hazardous condition due to uneven mechanical loading. Consider the overall loading of the branch circuit before installing any equipment into a rack. Ensure that reliable grounding is maintained in the rack system. This unit is intended to be connected to earth ground.

Caution: Elevated ambient conditions can occur in an enclosed equipment rack or multi-rack assembly. When installing the platform, make sure that the exhaust fan at the back of the unit is not blocked—improper venting of the exhaust fan can cause the unit to overheat.

Desktop Installation

When using the platform as a standalone unit on a desktop, attach the four rubber feet to the bottom corners of the unit and place it on a flat surface. The feet provide a space for air circulation.

The R5000 must be located within six (6) feet of the AC or DC power source being used and placed as far away as possible from electrical noise generating equipment such as copiers, electrostatic printers and other motorized equipment. If exposed twisted-pair wiring is used nearby, the wiring should be routed as far away as possible from power cords and data cables to minimize interference.

Do not place any equipment, including another platform, on top of the R5000 when it is placed on a desktop.

3 Install the Power Supply

Follow the steps outlined below to install the ACPS-17HS or DCPS-17HS power supply into the Radiance R5000.

Do not apply power to the power supply while it is out of the platform.
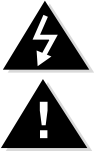
IMPORTANT
Disconnect all power sources before
installing the power supply.

A blank panel must remain installed
in any empty power supply slot.

For each power supply you are installing, do the following:
- Remove the blank panel from the back of the platform.

- Insert the power supply into the slot. Do not force it into the platform unnecessarily. It should slide in easily and evenly.

- Push gently until the face panel is flush with the platform.

- Turn the thumb screws clockwise and tighten to secure the power supply into the platform.
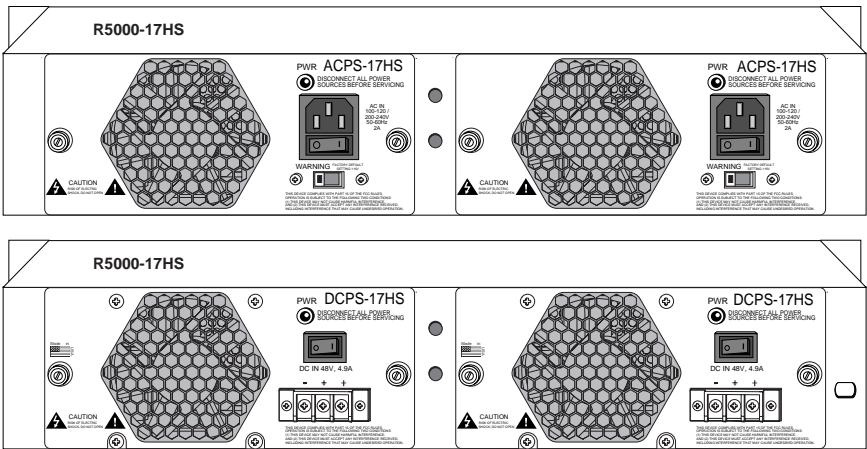
4 Install the Line Cards

The R5000 Central Service Platform supports multiple media types—via line cards—in any combination. These cards offer the ease of plug-and-play installation and are hot-swappable. Up to 17 line cards can be installed in the platform. Refer to each card's user guide for detailed installation instructions.

Before installing any card, note the following:
- The management card must be installed in slot #17. The optional 7500-D power supply display card must be installed in either slot #16 or #17.

- All other cards can be installed into any slot.

- All switches and jumpers on the cards must be set prior to installation. Refer to each card's specific user guide for a complete description of the settings.

5 Connect to the Network

Connecting the Management Card

The management card supports 10Base-T Ethernet.

- Using a standard Category 3, 4, or 5 UTP cable, connect the management card to your network. Although the port can be configured for either full or half duplex, half duplex is recommended. Refer to the *Command Line Interface Reference Guide* for a detailed description of configuration commands.

- Using the supplied null-modem console cable, connect the male DB-9 port on the management card to the serial port on your PC.

Connecting the Line Cards

To connect the individual cards to the network, refer to their corresponding installation and user guides.

6 **Attach the Grounding Lug (Optional)**

On the back panel, the R5000 provides two vertical grounding points where a grounding lug can be installed. Use a Panduit® copper, standard barrel, two-hole lug (part number LCD8-10A-L) or its equivalent. Use two 10-32 screws to fasten the lug to the platform. Use a No. 8 AWG copper wire to connect the lug to the grounding point at your site

.
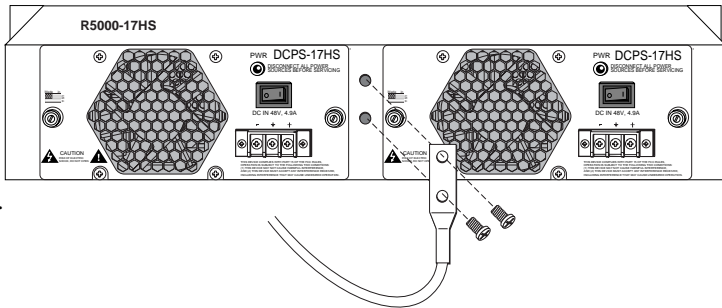
7 **Apply Power to the Platform**

Power connections for the ACPS-17HS and DCPS-17HS power supply are located on the rear of the platform. When illuminated, the power (PWR) LED on the power supply's front panel indicates that the power supply is turned on, connected to an active power source, and providing power to the platform's backplane. Because the power supplies are load-sharing, the PWR LEDs on both power supplies illuminate simultaneously when two supplies are installed.

DC Power Supply Connections

For DC power supply connections, follow these guidelines:

• Make sure the power switch is in the OFF position (O).

• Remove the plastic safety cover to expose the terminals.

• Connect the wire leads to the appropriate terminals. There is one each for a positive, a negative and a platform ground. To make a connection, loosen the terminal screw, insert the exposed wire, then tighten the screw. If two power supplies have been installed, connect each power supply to a separate power source.

• Replace the plastic safety cover over the terminal block.

- Set the power switch to the ON position (I).

- Verify proper connection and operation via the PWR LED on the power supply front panel. The LED is lit when the power supply is functioning properly.

Note: The DCPS-17HS is designed to protect against overheating. The power supplies will go into thermal shut-down mode if they are operated above the specified temperature of 50°C. Normal operation can be reestablished once the temperature drops to the specified range by power cycling the unit.

Caution: A fully loaded platform is rated for 4.9A DC maximum current. Make sure that the supply current available is sufficient to power the R5000. Refer to rear panel text for voltage/current ratings. The center terminal connector provides grounding for the platform and must be maintained. Particular attention should be given to power supply connections other than direct connections to the branch circuit (e.g. use of power strips).

Important: The terminal block safety cover must be installed when power is present to prevent burn or energy hazards.

AC Power Supply Connections
The ACPS-17HS includes a standard North American 3-pin power cord which is UL (USA), CSA or CUL (Canada) listed or approved. For installation in regions outside North America, replace the power cord with a cord approved by appropriate safety agencies. The cord must have a CEE-22 standard V female connector on one end and meet IEC 320-030 specifications. European power cords must be harmonized and designated with a HAR marking on the outside of the cord jacket to comply with the CENELEC Harmonized Document HD-21.

Warning
The default voltage setting on the ACPS-17HS is 115V AC. Before applying power, make sure the voltage switch is set appropriately for the voltage source in your region.

For AC power supply connections, follow these guidelines:
- Make sure the power switch is in the OFF position (O).

- Plug the AC cord into the connector on the power supply, then insert the other end of the cord into the AC power source. If two power supplies have been installed, connect each power supply to a separate power source.

- Set the power switch to the ON position (I).

- Verify proper connection and operation via the PWR LED on the power supply front panel. The LED is lit when the power supply is functioning correctly.

Caution: A fully loaded platform is rated for 2A AC maximum current. Make sure that the power supply current is sufficient to power the R5000. Refer to the front panel text for voltage/current ratings. Reliable grounding of rackmount equipment must be maintained. Particular attention should be given to power supply connections other than direct connections to the branch circuit (e.g. use of power strips).

8 Boot the Management Card

Management of the Central Service Platform can be provided through Metrobility's NetBeacon or WebBeacon software or any SNMP network management application via a PC. WebBeacon is automatically installed when the management card is installed. SNMP is supported on many general network platforms: SunNet Manager, HP OpenView for UNIX, HP OpenView for NT, SNMPc and others.

Refer to the *Command Line Interface Reference Guide* for a detailed description of how to boot for SNMP management and a complete listing of configuration commands.

User Guide

This section contains information regarding certain operating features and maintenance instructions for the Radiance R5000 Central Service Platform.

Management Card

The management card is the SNMP agent for the Radiance R5000. Connected via the backplane to the cards in the platform, the management card reports individual board status to Metrobility's NetBeacon software or any SNMP application. Thus, the network administrator receives immediate information on network operations via a PC. Metrobility also provides the WebBeacon kernel, embedded into the management card, for Web-based management via the Internet using browsers such as Netscape Navigator or Microsoft Internet Explorer. Refer to the *Command Line Interface Reference Guide*, *NetBeacon Element Management Software Installation & User's Guide* or *WebBeacon Management Software Installation & User's Guide* for detailed software commands.

Line Cards

Metrobility's line cards deliver carrier-class media, speed and distance solutions to address the needs of today's telecommunications networks. An extensive line of plug-and-play, hot-swappable cards support IP/Ethernet interfaces at 10, 100, 1000Mbps, T1/E1, T3/E3, SONET OC-3/STM-1 and OC-12/STM-4. For mission-critical applications, Metrobility's Ethernet, Fast Ethernet, and Gigabit Ethernet redundant line cards feature network-on-demand accessibility, reliability and enhanced security.

Up to 17 line cards fit into a Radiance R5000 Central Service Platform. Maximum segment lengths are supported on either side of the devices, and all signal activity is reliably propagated from one cable to the other assuring accurate data flow across the network.

Automatic half-duplex or full-duplex operation ensures compatibility with devices from other leading network technology providers.

Refer to the each line card's specific installation and user guide for additional information.

Platform Technical Specifications

Power

ACPS-17HS
Input Operating Range _____ 100-120/200-240V AC, 50-60Hz, 2A
DCPS-17HS[*]
Input Operating Range _____ 48V DC, 4.9A

Environmental

Operating Temperature _____ 0° to 50° C
Storage Temperature _____ -30° to 70° C
Relative Humidity _____ 5% to 95% non-condensing
Physical Case _____ Fully enclosed metal construction
Dimensions _____ 15.0"L x 17.0"W x 3.5"H
                                          (38.1cm L x 43.18cm W x 8.89cm H)
Weight _____ 11 lb, 5 kg (platform)
                _____ 3.25 lb, 1.47 kg (AC power supply)
                _____ 3 lb, 1.36 kg (DC power supply)

* The DC power supply is approved up to 60V DC.

Operating Features of the Load-Sharing Power Supply

The ACPS-17HS and DCPS-17HS load-sharing power supplies are designed for AC and DC power sources, respectively. Both power supplies are field-replaceable. Refer to Step 3 in the Installation Guide section of this manual for instructions on how to install the power supply. Refer to the next section, Service Instructions for the Power Supply, for a complete description of how to replace the power supply.

When a platform is equipped with two load-sharing power supplies, they operate in tandem and share the load. If the power source to one of the supplies fails or is removed, the other power supply automatically provides the entire power load to the platform. This setup provides both the platform and the network with uninterrupted service. It also decreases the demand placed upon an individual power supply, thus prolonging its life.

When the power (PWR) LED on the front panel of the power supply is lit, it indicates that the power supply is turned on, connected to an active power source, and providing power to the platform backplane. Because the ACPS-17HS and DCPS-17HS are load-sharing, when two power supplies are installed and active in a single platform, the LEDs on both supplies are lit simultaneously.

An optional display card is available for visible verification of operating status from the front of the platform. The 7500-D, which must be installed in slot #16 or #17, provides two LEDs labeled A and B. When lit, these LEDs indicate that their corresponding power supplies are installed properly, connected to an active power source, turned on, and providing power to the platform backplane. When two power supplies are installed and active in a single platform, both LEDs are lit simultaneously.

DCPS-17HS
Rear Loading Power Supply

ACPS-17HS
Rear Loading Power Supply

7500-D
Front Panel
Display Card
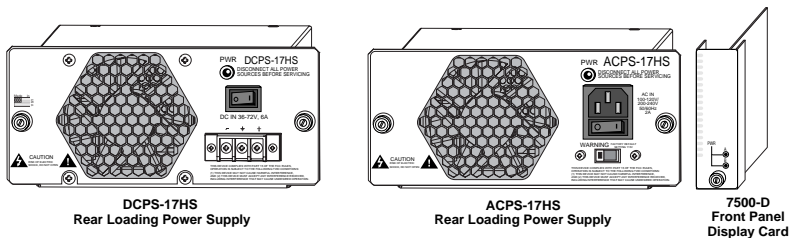
Service Instructions for the Power Supply

The following instructions explain how to replace an ACPS-17HS or DCPS-17HS power supply in the Radiance R5000 Central Service Platform.
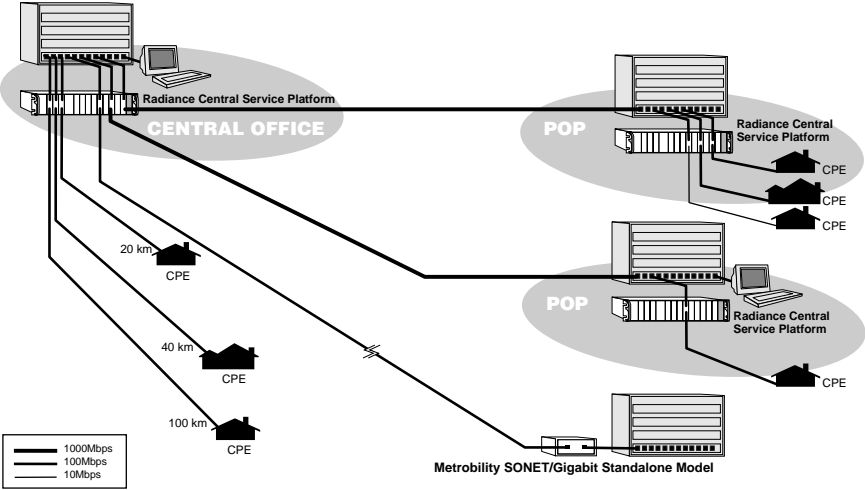
> IMPORTANT
> Disconnect all power sources before removing
> or installing a power supply module.
>
> A blank panel must remain installed
> in any empty power supply slot.

- Remove all power cords or wire leads from the power supply. Do not apply power to the power supply while it is out of the platform.

- Remove the power supply from the platform.

- Insert the replacement power supply into the slot. Do not force it into the platform unnecessarily. It should slide in easily and evenly.

- Push gently until the face panel is flush with the platform.

- Turn the thumb screws clockwise and tighten to secure the power supply into the platform.

- ACPS-17HS: Attach the power cord to the AC receptacle.

- DCPS-17HS: Remove the terminal block safety cover. Attach the wire leads to the appropriate terminal block connections; there is one each for a positive, a negative, and a platform ground. Replace the plastic safety cover.

- Reconnect to the appropriate active power source.

- Verify proper connection and operation via the power (PWR) LED.

Topology Solutions

Radiance Central Service Platform

CENTRAL OFFICE

POP

Radiance Central Service Platform

POP

Radiance Central Service Platform

20 km
CPE

40 km
CPE

100 km
CPE

CPE

CPE

CPE

CPE

Metrobility SONET/Gigabit Standalone Model

▬▬▬	1000Mbps
▬▬	100Mbps
—	10Mbps

Product Safety, EMC and Compliance Statements

This equipment complies with the following requirements:

- UL
- CSA
- EN60950 (TUV)
- FCC Part 15, Class A
- EN55022 Class A (emissions)
- EN50082-1 (immunity)
- IEC 825-1 Classification
- Class 1 Laser Product
- DOC Class A (emissions)
- NEBS Level 3 Certification (DC only)

This product shall be handled, stored and disposed of in accordance with all governing and applicable safety and environmental regulatory agency requirements.

The following *FCC* and *Industry Canada* compliance information is applicable to North American customers only.

USA FCC Radio Frequency Interference Statement

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: Changes or modifications to this equipment not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Canadian Radio Frequency Interference Statement

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Réglement sur le matériel brouilleur du Canada.

Warranty and Servicing

Three-Year Warranty for the Radiance R5000 Central Service Platform

Metrobility Optical Systems, Inc. warrants that every Radiance product will be free from defects in material and workmanship for a period of THREE YEARS from the date of Metrobility shipment. This warranty covers the original user only and is not transferable. Should the unit fail at any time during this warranty period, Metrobility will, at its sole discretion, replace, repair, or refund the purchase price of the product. This warranty is limited to defects in workmanship and materials and does not cover damage from accident, acts of God, neglect, contamination, misuse or abnormal conditions of operation or handling, including overvoltage failures caused by use outside of the product's specified rating, or normal wear and tear of mechanical components.

To establish original ownership and provide date of purchase, complete and return the registration card or register the product online at www.metrobility.com. If product was not purchased directly from Metrobility, please provide source, invoice number and date of purchase.

To return a defective product for warranty coverage, contact Metrobility Customer Service for a return materials authorization (RMA) number. Send the defective product postage and insurance prepaid to the address provided to you by the Metrobility Technical Support Representative. Failure to properly protect the product during shipping may void this warranty. The Metrobility RMA number must be clearly on the outside of the carton to ensure its acceptance.

Metrobility will pay return transportation for product repaired or replaced in-warranty. Before making any repair not covered by the warranty, Metrobility will estimate cost and obtain authorization, then invoice for repair and return transportation. Metrobility reserves the right to charge for all testing and shipping costs incurred, if test results determine that the unit is without defect.

This warranty constitutes the buyer's sole remedy. No other warranties, such as fitness for a particular purpose, are expressed or implied. Under no circumstances will Metrobility be liable for any damages incurred by the use of this product including, but not limited to, lost profits, lost savings, and incidental or consequential damages arising from the use of, or inability to use, this product. Authorized resellers are not authorized to extend any other warranty on Metrobility's behalf.
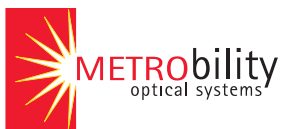
Product Manuals
The most recent version of this manual is available online at
http://www.metrobility.com/support/manuals.htm

Product Registration
To register your product, go to
http://www.metrobility.com/support/registration.asp

25 Manchester Street, Merrimack, NH 03054 USA
tel: 1.603.880.1833 • fax: 1.603.594.2887
www.metrobility.com