RSAM-5800 and ISS-5116

Remote Service Analyzer Module and Input Selector Switch

Getting Started Guide

JDSU

RSAM-5800 and ISS-5116

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Table of Contents

About This Guide

Purpose and scope

The purpose of this guide is to help you successfully configure the RSAM-5800 and ISS-5116. This guide includes task-based instructions that describe how to configure the RSAM-5800 and ISS-5116. Additionally, this guide provides a complete description of JDSU's warranty, services, and repair information, including terms and conditions of the licensing agreement.

Related information

Resources that provide additional, related information pertaining the RSAM-5800 and ISS-5116 system include:

– PathTrak™ Video Monitoring Getting Started Guide (P/N 21125943-001)

Technical assistance

If you need assistance or have questions related to the use of this product, call or e-mail JDSU's Cable Technical Assistance Center for customer support.

Table 1 Technical assistance centers

Region	Phone Number	
Americas	866 228 3762 World Wide: 301 353 1550	tac@jdsu.com
Cable TV/Multimedia Products	America: 800 428 4424 Ext. 8350 World Wide: 317 788 9351 Ext. 8350	catv.support@jdsu.com

Table 1 Technical assistance centers (Continued)

Region	Phone Number	
Europe, Africa, and Mid-East	+49 (0) 7121 86 1345 (Europe)	hotline.europe@jdsu.com
	+800 882 85822 (European Freephone)	support.uk@jdsu.com
	+49 (0) 6172 59 11 00 (JDSU Germany)	hotline.ger-many@jdsu.com
	+33 (0) 1 39 30 24 24 (JDSU France)	hotline.ger-many@jdsu.com
Asia and the Pacific	+852 2892 0990 (Hong Kong)	
	+86 10 6655 5988 (Beijing-China)	
All others	866 228 3762	tac@jdsu.com

During off-hours, you can request assistance by doing one of the following: leave a voice mail message at the Technical Assistance number in your region; e-mail North American Technical Assistance Center, tac@jdsu.com, or European Technical Assistance Center, support.uk@jdsu.com; or submit your question using our online Technical Assistance Request form at www.jdsu.com.

Conventions

This guide uses naming conventions and symbols, as described in the following tables.

Table 2 Typographical conventions

Description	Example
User interface actions appear in this **typeface**.	On the Status bar, click **Start**.
Buttons or switches that you press on a unit appear in this **TYPEFACE**.	Press the **ON** switch.

Table 2 Typographical conventions (Continued)

Description	Example
Code and output messages appear in this `typeface`.	`All results okay`
Text you must type exactly as shown appears in this **`typeface`**.	Type: **`a:\set.exe`** in the dialog box
Variables appear in this ***typeface***.	Type the new ***hostname***.
Book references appear in this ***typeface***.	Refer to ***Newton's Telecom Dictionary***
A vertical bar | means "or": only one option can appear in a single command.	`platform [a|b|e]`
Square brackets [] indicate an optional argument.	`login [platform name]`
Slanted brackets < > group required arguments.	`<password>`

Table 3 Keyboard and menu conventions

Description	Example
A plus sign + indicates simultaneous keystrokes.	Press **Ctrl+s**
A comma indicates consecutive key strokes.	Press **Alt+f,s**
A slanted bracket indicates choosing a submenu from menu.	On the menu bar, click **Start > Program Files**.

Table 4 Symbol conventions

This symbol represents a general hazard.

This symbol represents a risk of electrical shock.

NOTE

This symbol represents a Note indicating related information or tip.

Table 5 Safety definitions

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.

RSAM-5800 Installation and Configuration

1

This chapter provides task-based instructions for installing and configuring the RSAM-5800. The topics discussed in this chapter are as follows:

Installing an RSAM-5800

The RSAM-5800 Analog/QAM RF Monitoring Probe (Figure 1) is a 2 RU 19 inch rack-mounted control chassis providing forward path remote service analysis and MPEG monitoring. A standard 6-foot, 19-in rack accommodates up to ten RSAM-5800's.

Figure 1 RSAM-5800 Analog/QAM RF Monitoring Probe

JDSU provides two variations of the RSAM-5800.

- Standard RSAM-5800
- NEBS (Network Equipment-Building System) compliant RSAM-5800

NOTE

To configure a standard RSAM-5800 as a NEBS compliant RSAM-5800 a JDSU "Rack Grounding Equipment Jumper" kit must purchased and attached.

The following procedures provide the instructions for each variation of the RSAM-5800.

- "Installing a standard RSAM -5800" on page 2
- "Installing a NEBS RSAM -5800" on page 3

Installing a standard RSAM -5800

To install a standard RSAM-5800

1. Remove the **RSAM-5800** from the shipping container.
2. Gently slide the **RSAM-5800** into position inside the rack.
3. Using four screws, secure the **RSAM-5800**.

NOTE

JDSU does not provide screws.

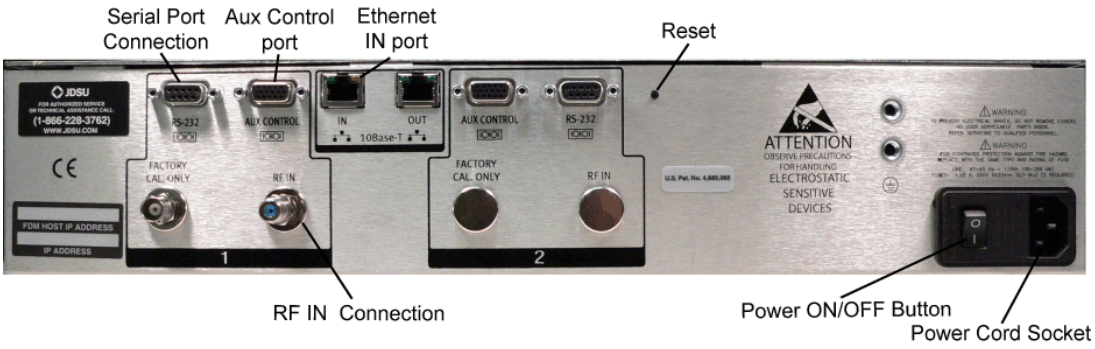

Figure 2 RSAM-5800 Back Panel

4 Using a standard RJ45 Ethernet cable, connect the **Ethernet IN port** of the RSAM-5800 to an **Ethernet data port connection**. (See Figure 2 on page 3)

5 Using a **75 Ohm cable** coaxial cable, connect the **RF IN of the RSAM-5800** to a **standard forward path combining network input.** (See Figure 2 on page 3)

6 Connect power cord and apply power to **RSAM-5800**.

Installing a NEBS RSAM -5800

The following text provides NEBS compliant RSAM-5800 instructions.

NOTE

Only refer to the NEBS compliant installation text if you are installing a NEBS compliant RSAM-5800.

To install a NEBS Compliant RSAM-5800 Analog/QAM RF Monitoring Probe

1 Remove the **RSAM-5800** from the shipping container.

NOTE

A NEBS compliant RSAM-5800 must be installed in a central office or headend that provides restricted access. Also ensure the unit is positioned so the AC power can be easily connected and disconnected. The Power On/Off switch, AC inlet plug or the wall plug must be accessible.

2 Gently slide the **RSAM-5800** into position inside the rack.

3 Using four screws, secure the **RSAM-5800**.

NOTE:

JDSU does not provide screws.

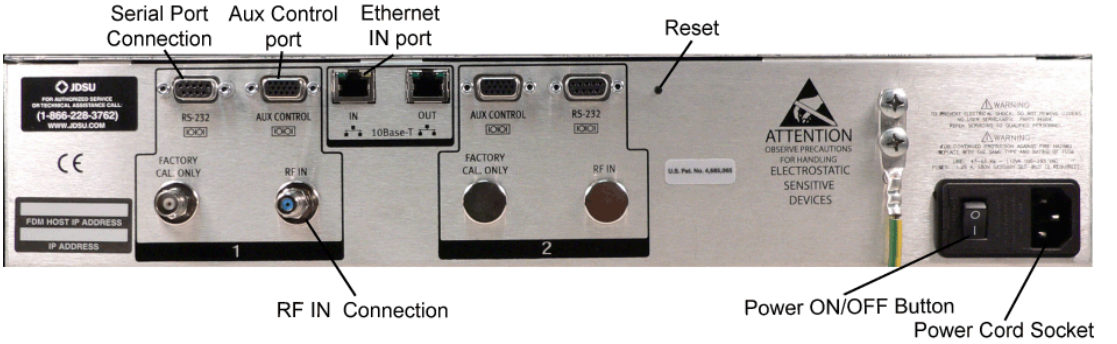

Figure 3 NEBS Compliant RSAM-5800 Back Panel

NOTE

A NEBS compliant RSAM-5800 must use a shielded RJ45 Ethernet cable that is grounded on both ends.

4 Using a shielded RJ45 Ethernet cable, connect the **Ethernet IN port** of the RSAM-5800 to an **Ethernet data port connection**. (See Figure 2 on page 3)

5 Using a **75 Ohm cable** coaxial cable, connect the **RF IN of the RSAM-5800** to a **standard forward path combining network input.** (See Figure 2 on page 3)

WARNING

The intra-building port(s) of a NEBS compliant RSAM-5800 is suitable for connection to intra-building or unexposed wiring or cabling only. The intra-building port(s) of the RSAM-5800 MUST NOT be metallically connected to interfaces that connect to the equipment for Outside-Plant (OSP) or its wiring. These interfaces are designed for use as intra-building interfaces only (Type 2 or Type 4 ports as described in GR-1089-CORE, Issue 4) and require isolation from the exposed OSP cabling. The addition of Primary Protectors is not sufficient protection in order to connect these interfaces metallically to OSP wiring.

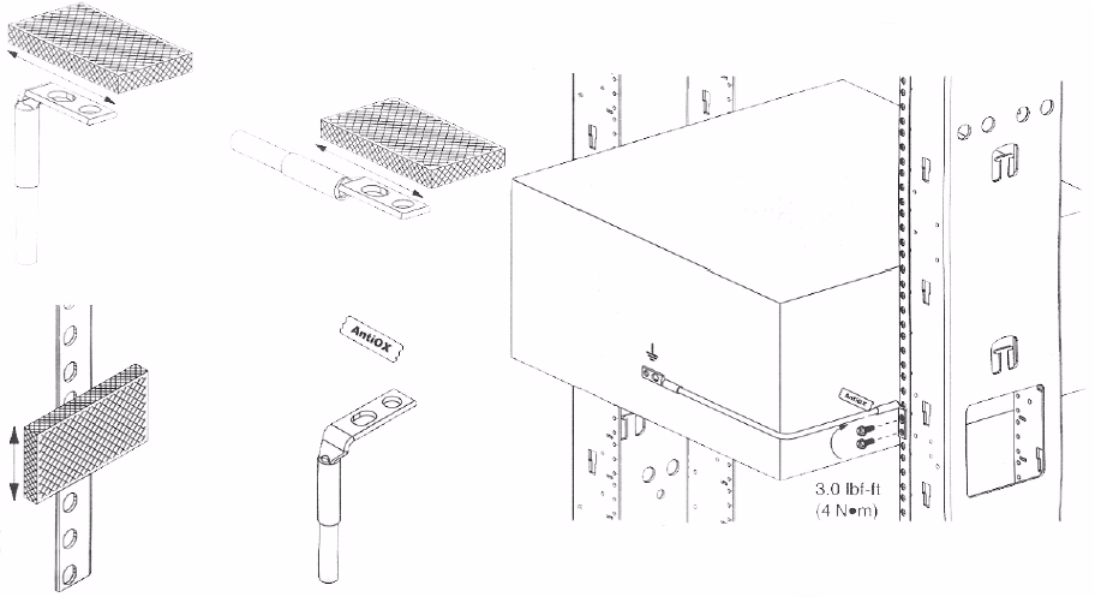

Figure 4 NEBS Compliant Equipment Mounting Diagram

NOTE

A NEBS compliant RSAM-5800 must be grounded to a Common Bonding Network. Copper cables must be used to ground unit.

NOTE

Refer to Figure 4 on page 5 and the NEBS compliant RSAM-5800 “Rack Grounding Equipment Jumper” kit for additional grounding cable installation instructions and diagrams.

6 For a NEBS compliant RSAM-5800 use the supplied abrasive cleaning pad to clean the following areas:
   – Grounding cable L-shaped tongue ring (both sides),
   – Grounding cable flat end tongue ring (both sides),
   – Grounding cable mounting holes on the back of the RSAM-5800 unit, and
   – Grounding cable mounting holes on rack.

7 For a NEBS compliant RSAM-5800 apply a thin layer of supplied antioxidant (NO-OX-ID “A”) to cleaned areas.

8 For a NEBS compliant RSAM-5800 secure supplied copper #10 AWG grounding cable L-shaped tongue ring to the back of the RSAM-5800 unit with supplied screws (¼”-20) and lock washers.

9 For a NEBS compliant RSAM-5800 secure supplied copper #10 AWG grounding cable flat end tongue ring to rack unit grounding strip with supplied screws (10-32, 12-24, M5, or M6) and lock washers.

NOTE

For a NEBS compliant RSAM-5800 a Surge Protection Device (SPD) can be used at the ac input of the RSAM-5800, but not required.

10 Connect power cord and apply power to **RSAM-5800**.

NOTE

If a NEBS compliant RSAM-5800 is used in a manner not specified by JDSU, the protection provided by the equipment may be impaired.

Configuring an RSAM-5800 for Ethernet Communications

To configure an RSAM-5800 for Ethernet Communications

NOTE:

A temporary PC is used for the serial data port connection. This connection is used to set the RSAM-5800's IP address, Subnet Mask, Gateway, and PathTrak™ Video Monitoring Server information.

1. Using a standard DB9 serial cable (supplied with the RSAM-5800 unit), connect the **serial data port** of the RSAM-5800 to a **PC serial data port connection**.
2. Power up the **temporary PC** and the connected **RSAM-5800**.
3. Using the temporary PC, launch the **HyperTerminal** application.
4. Configure **HyperTerminal** for direct connection using the available **COM port**.
5. Configure the COM port with the following settings:
   - **Bits Per Second: 57600**
   - **Data Bits: 8**
   - **Parity: None**
   - **Stop Bits: 1**
   - **Flow Control: None**
6. Using the HyperTerminal application, set the **RSAM-5800's IP address**, **Subnet Mask**, **Gateway, DNS IP**.

   The RSAM-5800 should be given a fixed IP address in order to maintain connectivity. The RSAM-5800 IP address will be populated into the PathTrak™ Video Monitoring database for communications and control.
7. From the **HyperTerminal** command prompt type the following command:

   ```
   setup
   ```

   The following setup text is displayed:

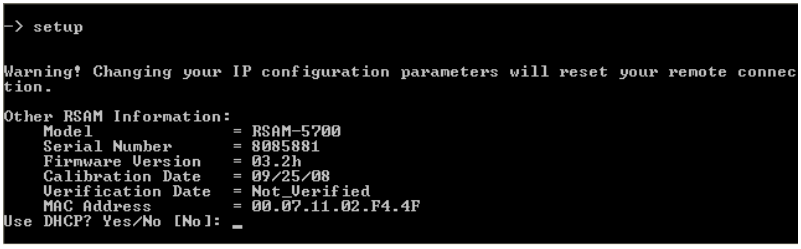

Figure 5 Setup text

8. Using the HyperTerminal, answer the DHCP prompt.
   - Use DHCP? Yes/No [No], type **No**.

9 Using the HyperTerminal set the RSAM-5800's:

- Static IP address:
- Subnet Mask:
- Default Gateway:
- Host PVM IP Address:
- SNMP Destination 1:
- SNMP Destination 2:
- SNMP Destination 3:
- SNMP Destination 4:
- SNMP Destination 5:

10 To confirm each entry, press **Enter**.

11 To close the HyperTerminal window, click the Close button.

AC Input Fuse Removal and Replacement

The power switch and AC voltage input connector on the back of the RSAM-5800 provides two replaceable fuses. The fuses are located behind a hinged plastic fuse cover on the AC voltage input connector.

To remove and replace fuses

1 Ensure unit is properly powered off.

2 Ensure power switch is in the Off position.

3 Remove AC plug from RSAM-5800.

4 Using a small flat blade screw driver the size of the opening on the side of the AC voltage input connector, gently open hinged plastic fuse cover.

With the hinged plastic cover opened you will notice two black plastic fuse holders with white arrows.

5 Using the same small flat blade screw driver, carefully place the flat blade of the screw driver on the top of the white arrow and gently pry loose fuse holder. Repeat for second fuse.

NOTE

Replacement fuses must be 1.25 A, 250V 5x20mm SLO-BLO.

6 Remove and replace fuse(s).

NOTE

Ensure white arrows are facing up when replacing plastic fuse holders.

7 Gently insert plastic fuse holder back in place.

8 Gently close hinged plastic fuse cover.

9 Connect power cord and apply power to **RSAM-5800**.

ISS-5116 Input Selector Switch Installation and Configuration

2

This chapter provides task-based instructions for installing and configuring the Input Selector Switch. The topics discussed in this chapter are as follows:

Installing an ISS-5116

The ISS-5116 sixteen port RF Input Selector Switch (Figure 6) is a 1 RU 19-in-rack-mounted input selector switch designed to work integrally with the RSAM-5800. The ISS-5116 provides the ability to add additional input ports to the RSAM-5800.

Figure 6 ISS-5116 Sixteen Port RF Input Selector Switch

JDSU provides two variations of the RSAM-5800.

- Standard ISS-5116
- NEBS (Network Equipment-Building System) compliant ISS-5116

NOTE

To configure a standard ISS-5116 as a NEBS compliant ISS-5116 a JDSU “Rack Grounding Equipment Jumper” kit must purchased and attached.

The following procedures provide the instructions for each variation of the RSAM-5800.

- “Installing a standard ISS-5116 Input Selector Switch” on page 12
- “Installing a NEBS ISS-5116 Input Selector Switch” on page 14

Installing a standard ISS-5116 Input Selector Switch

To install a standard ISS-5116

1. Remove the **ISS-5116** from the shipping container.
2. Select and record the **DIP switch position** (Figure 7 and Table 6) to be assigned to the ISS-5116.

   This position is needed to properly configure the switch in the **PathTrak™ Video Monitoring**.

NOTE

When daisy-chaining the switches, each DIP switch must have a different switch identification setting.

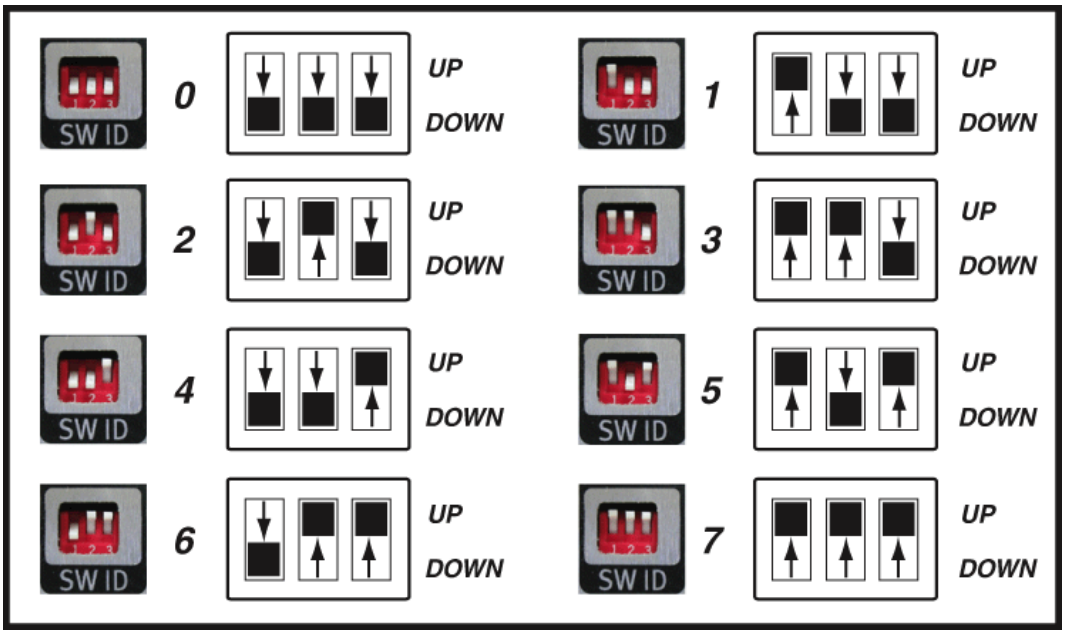

Figure 7 ISS-5116 DIP Switch

Table 6 ISS-5116 DIP switch assignment

ISS-5116	DIP Switch 1	DIP Switch 2	DIP Switch 3
0	DOWN	DOWN	DOWN
1	UP	DOWN	DOWN
2	DOWN	UP	DOWN
3	UP	UP	DOWN
4	DOWN	DOWN	UP
5	UP	DOWN	UP
6	DOWN	UP	UP
7	UP	UP	UP

3 Gently slide the **ISS-5116** into position inside the rack.

4 Using four screws, secure the **ISS-5116**.

NOTE:

JDSU does not provide screws.

Installing a NEBS ISS-5116 Input Selector Switch

To install a NEBS compliant ISS-5116.

NOTE

Only refer to the NEBS compliant text if you are installing a NEBS compliant ISS-5116.

1 Remove the **ISS-5116** from the shipping container.

2 Select and record the **DIP switch position** (Figure 8 and Table 7) to be assigned to the ISS-5116.

This position is needed to properly configure the switch in the **PathTrak™ Video Monitoring**.

NOTE

When daisy-chaining the switches, each DIP switch must have a different switch identification setting.

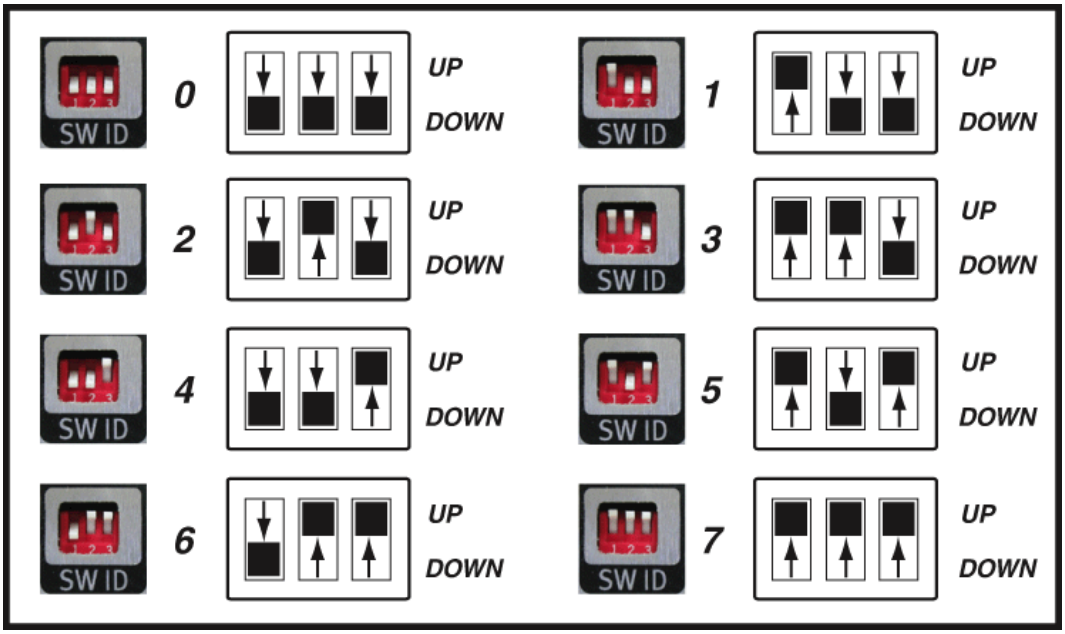

Figure 8 ISS-5116 DIP Switch

Table 7 ISS-5116 DIP switch assignment

ISS-5116	DIP Switch 1	DIP Switch 2	DIP Switch 3
0	DOWN	DOWN	DOWN
1	UP	DOWN	DOWN
2	DOWN	UP	DOWN
3	UP	UP	DOWN
4	DOWN	DOWN	UP
5	UP	DOWN	UP
6	DOWN	UP	UP
7	UP	UP	UP

NOTE

A NEBS compliant ISS-5116 must be installed a central office or headend that provides restricted access. Also ensure the unit is positioned so AC power can be easily connected and disconnected. The Power On/Off switch, AC inlet plug or the wall plug must be accessible.

3 Gently slide the **ISS-5116** into position inside the rack.

4 Using four screws, secure the **ISS-5116**.

NOTE:

JDSU does not provide screws.

WARNING

The intra-building port(s) of a NEBS compliant ISS-5116 is suitable for connection to intra-building or unexposed wiring or cabling only. The intra-building port(s) of the ISS-5116 MUST NOT be metallically connected to interfaces that connect to the equipment for Outside-Plant (OSP) or its wiring. These interfaces are designed for use as intra-building interfaces only (Type 2 or Type 4 ports as described in GR-1089-CORE, Issue 4) and require isolation from the exposed OSP cabling. The addition of Primary Protectors is not sufficient protection in order to connect these interfaces metallically to OSP wiring.

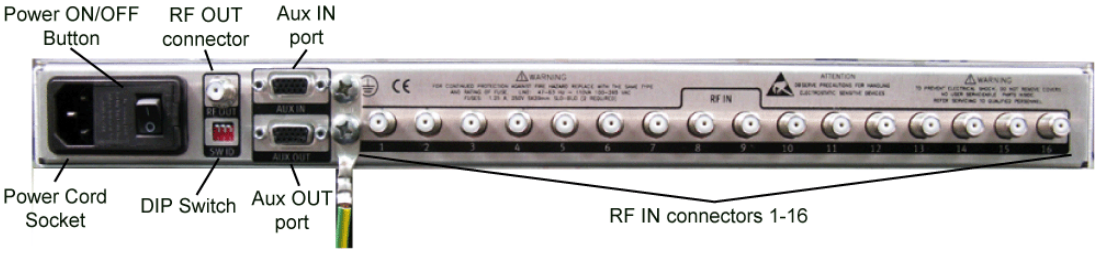

Figure 9 ISS-5116 Back Panel

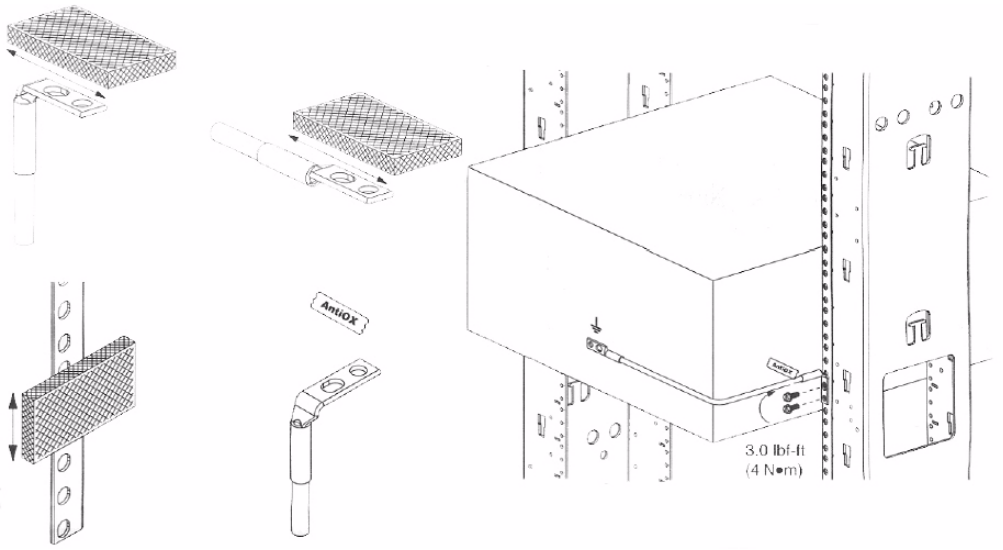

Figure 10 Equipment Mounting Diagram

NOTE

The ISS-5116 must be grounded to a Common Bonding Network. Copper cables must be used to ground unit.

NOTE

Refer to Figure 10 on page 17 and the “Rack Grounding Equipment Jumper” kit for additional grounding cable installation instructions and diagrams.

5 Using the supplied abrasive cleaning pad, clean the following areas:
   – Grounding cable L-shaped tongue ring (both sides),
   – Grounding cable flat end tongue ring (both sides),
   – Grounding cable mounting holes on the back of the ISS-5116 unit, and
   – Grounding cable mounting holes on rack.

6 Apply a thin layer of supplied antioxidant (NO-OX-ID “A”) to cleaned areas.

7 Secure supplied copper #10 AWG grounding cable L-shaped tongue ring to the back of the ISS-5116 unit with supplied screws (¼”-20) and lock washers.

8 Secure supplied copper #10 AWG grounding cable flat end tongue ring to rack unit grounding strip with supplied screws (10-32, 12-24, M5, or M6) and lock washers.

NOTE

For additional grounding cable installation instructions, refer to the “Rack Grounding Equipment Jumper” installation instructions.

Configuring an ISS-5116 Sixteen Port RF Input Selector Switch

Up to eight ISS-5116 switches can be daisy-chained and connected to an RSAM-5800 to provide the ability to monitor up to 128 ports from a single RSAM. This section provides instructions for configuring a single unit or configuring multiple units to a RSAM-5800.

– “Configuring a single ISS-5116 to an RSAM” on page 18
– “Configuring multiple ISS-5116's to an RSAM” on page 20

Configuring a single ISS-5116 to an RSAM

To configure a single ISS-5116 to an RSAM

1 Using a **75 Ohm coaxial cable**, connect the ISS-5116 **RF OUT** connector (Figure 11) to the RSAM-5800 **RF IN** connector (Figure 12).

Figure 11 ISS-5116 Back Panel

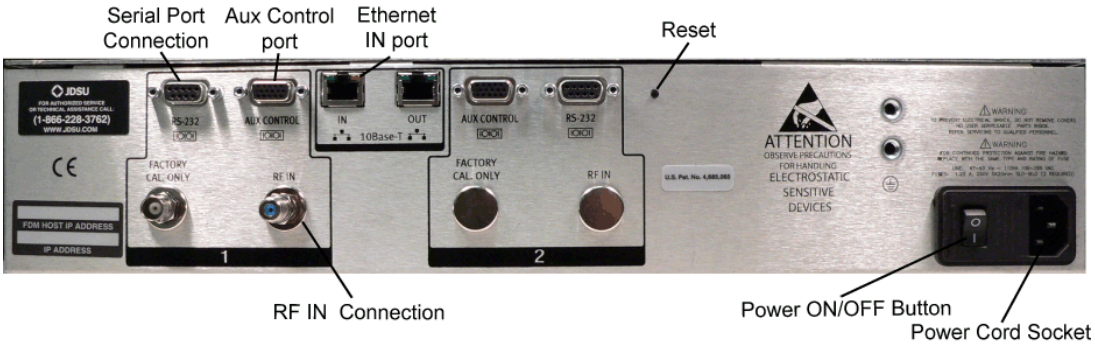

Figure 12 RSAM-5800 Back Panel

2 Using the supplied **15-SUB-D straight through cable**, connect the ISS-5116 **AUX IN** port to the RSAM-5800 **AUX CONTROL 1** port.

NOTE

The ISS-5116 uses a parallel TTL compatible input, the cable must be a straight through cable as supplied by JDSU. A VGA cable will not work and may cause damage

3 Using a **75 Ohm coaxial cable**, connect desired **RF** connection to an **ISS-5116 RF IN** connector.

4 Terminate any **unused ISS-5116 RF IN** connectors.

NOTE

A Surge Protection Device (SPD) can be used at the ac input of the NEBS Compliant ISS-5116 but not required.

5 Connect and apply power to the connected **ISS-5116 and RSAM-5800**.

NOTE

If a NEBS compliant ISS-5116 is used in a manner not specified by JDSU, the protection provided by the equipment may be impaired.

6 Add the **RSAM-5800's and ISS-5116's** into the **PathTrak™ Video Monitoring** and configure the **testpoints**.

Configuring multiple ISS-5116's to an RSAM

To configure multiple ISS-5116's to an RSAM

1 Using **75 Ohm coaxial cables**, connect **ISS-5116 OUTPUTS** to an external combining network.

2 Using a **75 Ohm coaxial cable**, connect the **OUTPUT** of the combining network to the RSAM-5800 **RF IN** connector (Figure 12).

3 Using the test point compensation feature in the **PathTrak™ Video Monitoring**, record the loss of the **combining network** feeding into the RSAM, so the system can automatically compensate the measurements.

4 Using the supplied **15-SUB-D straight through cable**, connect the ISS-5116 **AUX IN** to the RSAM-5800 **AUX CONTROL 1** port.

NOTE

The ISS-5116 uses a parallel TTL compatible input, the cable must be a straight through cable. A VGA cable will not work and may cause damage

5 Using an **15-SUB-D straight through cable**, connect the first ISS-5116 **AUX OUT** connector to the next ISS-5116 **AUX IN** connector. Continue this procedure for as many each installed ISS-5116 switch.

6 Using a **75 Ohm coaxial cable**, connect the desired **RF inputs** to the **ISS-5116 RF IN** connector.

7 Terminate any **unused ISS-5116 RF IN** connectors.

NOTE

A Surge Protection Device (SPD) can be used at the ac input of the NEBS compliant ISS-5116 but not required.

8 Connect and apply power to the connected **ISS-5116** and **RSAM-5800**.

NOTE

If a NEBS compliant ISS-5116 is used in a manner not specified by JDSU, the protection provided by the equipment may be impaired.

9 Add the **RSAM-5800's and ISS-5116's** into the **PathTrak™ Video Monitoring** and configure the **testpoints**.

ISS-5116 AC Input Fuse Removal and Replacement

The power switch and AC voltage input connector on the back of the ISS-5116 provides two replaceable fuses. The fuses are located behind a hinged plastic fuse cover on the AC voltage input connector.

To remove and replace fuses

1. Ensure unit is properly powered off.
2. Ensure power switch is in the Off position.
3. Remove AC plug from ISS-5116.
4. Using a small flat blade screw driver the size of the opening on the side of the AC voltage input connector, gently open hinged plastic fuse cover.

   With the hinged plastic cover opened you will notice two black plastic fuse holders with white arrows.
5. Using the same small flat blade screw driver, carefully place the flat blade of the screw driver on the top of the white arrow and gently pry loose fuse holder. Repeat for second fuse.

NOTE

Replacement fuses must be 1.25 A, 250V 5x20mm SLO-BLO.

6. Remove and replace fuse(s).

NOTE

Ensure white arrows are facing up when replacing plastic fuse holders.

7. Gently insert plastic fuse holder back in place.
8. Gently close hinged plastic fuse cover.

NOTE

A Surge Protection Device (SPD) can be used at the ac input of the NEBS compliant ISS-5116 but not required.

9. Connect power cord and apply power to **ISS-5116**.

RSAM-5800 and ISS-5116 Specifications

A

This chapter describes the RSAM-5800 and ISS-5116 specifications. Topics discussed in this chapter include the following:

Unit physical specifications

Table 8 RSAM-5800 Physical specifications

Parameter	Specification
Height	3.5 inches (8.89 cm)
Front Panel Width	19 inches (48.26 cm)
Chassis Width	17 inches (43.18 cm)
Depth	13.5 inches (34.29 cm)
Weight	7.7 lb (3.4 kg)

Table 9 ISS-5116 Physical specifications

Parameter	Specification
Height	1.75 inches (3.175 cm)
Front Panel Width	19 inches (48.26 cm)
Chassis Width	17 inches (43.18 cm)
Depth	10.375 inches (26.35 cm)
Weight	6.12 lb (3.07 kg)

RSAM-5800 and ISS-5116 Environmental specifications

Table 10 Operating and Storage Temperatures

Parameter	Specification
Operating Temperature	32 to 120° F (0 to +50° C)
Storage Temperature	0 to 120° F (-20 to +50° C)

RSAM-5800 and ISS-5116 Electrical specifications

Table 11 Power Supply

Parameter	Specification
Input	47-63 Hz, ~110VA, 100-265 VAC

Operational specifications

Table 12 RSAM-5800 Measurement specifications

Parameter	Specification
Frequency	50 to 1000 MHz
Accuracy	±10 ppm at 77°F (25°C)
Tuning resolution	Analog 10 kHz Digital 50 kHz
Channel bandwidth	6 and 8 MHz

Table 13 ISS-5116 Measurement specifications

Parameter	Specification
Frequency	50 to 1000 MHz
Insertion loss	<2.75 dB
Input Return loss: (output terminated)	15.5dBrl
Output Port Return Loss: (input terminated)	17.8dBrl
Non-selected Input Port to Output Port Isolation	55dB, 50-700 MHz 53dB, 700-1000 MHz

RSAM-5800 Level measurement specifications

Table 14 Analog Measurements

Parameter	Specification
Signal types	CW, video and audio (NTSC, PAL, and SECAM)
Range	-40 to +60 dBmV (Typical, detectable range)
Resolution	0.1 dB
Resolution bandwidth	280 kHz
Accuracy (Accuracy for levels between -20 to 60 dBmV Additional uncertainty ±0.5 dB across -20°C to 50°C	±1.5 dB typical @ 25°C

Table 15 Digital Measurements

Parameter	Specification
Modulation types	QPSK, QAM (DVB/ATSC)
Range	-40 to +60 dBmV (Typical, detectable range)
Resolution	0.1 dB
Resolution bandwidth	280 kHz
Accuracy (Accuracy for levels between -20 to 50 dBmV Additional uncertainty ±0.5 dB across -20°C to 50°C	±2.0 dB typical @ 25°C

RSAM-5800 Downstream QAM demodulation specifications

Table 16 Analog Measurements

Parameter	Specification
Modulation type	64 and 256 QAM, ITU-T J.83 Annex A, B or C (selectable)
Input range (lock range)	-15 to +50 dBmV total integrated power from 50 to 1000 MHz
BER	Pre- and Post-FEC 10-4 to 10-9
MER (Accuracy and behavior from 50 MHz to 1000 MHz for levels between -5 to 50 dBmV (typical))	Range 64 QAM: 21 to 35 dB Accuracy ±2 dB (typical) Range 256 QAM: 28 to 35 dB Accuracy ±2 dB (typical)
EVM (Accuracy and behavior from 50 MHz to 1000 MHz for levels between -5 to 50 dBmV (typical))	Range 64 QAM: 1.2% to 5.8% Accuracy ±0.5% (1.2% to 2.0%) ±1.0% (2.1% to 4.0%) ±1.4% (4.1% to 5.8%) Range 256 QAM: 1.1% to 2.4% Accuracy ±0.6%
Symbol rate	Annex A, 5.057 to 6.952 Msps for 64 and 256 QAM Annex B, 5.057 Msps for 64 QAM and 5.361 Msps for 256 QAM Annex C, 5.274 Msps for 64 QAM and 5.361 Msps for 256 QAM
Interleaver Depth	Up to 128,4 (Annex B)

RSAM-5800 and ISS-5116 Standards specifications

Table 17 Standards specifications

Parameter	Specification
Shock and vibration	IEC 60068
Drop	IEC 61010
Handle stress	IEC 61010
Safety - emissions	EN 55022
Safety - immunity	EN 61000

Interface specifications

Table 18 RSAM-5800 Various interface specifications

Parameter	Specification
RF	75 ohm, F81 or BNC option Max. sustained voltage 100 VAC, 140 VDC
RS232	Standard via DB9
Ethernet	RJ45, 10 base T, TCP/IP and UDP supported
AUX	TTL compatible output for controlling accessories

Table 19 ISS-5116 Various interface specifications

Parameter	Specification
RF	75 ohm, F81 or BNC option Max. sustained voltage 100 VAC, 140 VDC
CONTROL IN	TTL compatible input
CONTROL OUT	TTL Compatible Output for connecting additional ISS-5516 switch

Customer Services

B

This chapter describes the customer services available through JDSU. Topics discussed in this chapter include the following:

About our services

JDSU offers an unmatched portfolio of services to deploy, support and innovate purchased equipment through its Customer Care and Global Services and Solutions organizations. Customer Care is standard with every product sale and consists of business hour technical assistance, in-warranty repair, calibration, and upgrade services. Global Services and Solutions provides professional services to optimize product capabilities and maximize efficiencies, including field engineering and deployment, technical training, product support, consulting and custom software development. Together these organizations supply the services necessary successfully utilize purchased equipment.

Customer care

Customer Care is accompanied with the sale of every JDSU product. Customer Care services include:

- Needs Analysis on Products and Services
- Comprehensive Product and Service Literature
- Pre-Sales Consulting
- Technical Assistance (Business Hour)
- Instrument Repair (Under Warranty Repair and Calibration Services)
- Immediate Return Authorizations

Contact a Customer Care representative through your local distributor or by accessing www.jdsu.com for information on upgrades, calibration, warranty policies or any of Global Services and Solutions offerings. Representatives also provide assistance with product repairs and returns.

Technical assistance (business hour)

Expert business hour technical support, including help with product configuration, circuit qualification, and complete network trouble sectionalization is provided with your product (see"Technical assistance" on page vi). For around-the-clock support, 7x24 technical assistance may be purchased through Global Services and Solutions FleetCare program (see "Product support" on page 36).

Instrument repair

Our service centers provide repair, calibration and upgrade services for under warranty equipment. JDSU understands the impact of equipment down time on operations and is staffed to ensure a quick turnaround. Available services include the following:

Product Repair — All equipment returned for service is tested to the same rigorous standards as newly manufactured equipment. This ensures products meet all published specifications, including any applicable product updates.

Calibration — JDSU's calibration methods are ISO 9001 approved and based on NIST standards.

Factory Upgrades — Any unit returned for a hardware feature enhancement will also receive applicable product updates and will be thoroughly tested, ensuring peak performance of the complete feature set.

Additional repair, calibration and upgrade services are available for purchase through Global Services and Solutions (see "Product support" on page 36).

Equipment return instructions

Please contact your local Customer Care location via telephone or web site for Return or Reference Authorization to accompany your equipment. For each piece of equipment returned for repair, attach a tag that includes the following information:

- Owner's name, address, and telephone number.
- The serial number, product type, and model.
- Warranty status. (If you are unsure of the warranty status of your instrument, contact JDSU Customer Care.)
- A detailed description of the problem or service requested.
- The name and telephone number of the person to contact regarding questions about the repair.
- The return authorization (RA) number (US customers), or reference number (European Customers).

If possible, return the equipment using the original shipping container and material. If the original container is not available, the unit should be carefully packed so that it will not be damaged in transit; when

needed, appropriate packing materials can be obtained by contacting JDSU Customer Care. JDSU is not liable for any damage that may occur during shipping. The customer should clearly mark the JDSU issued RA or reference number on the outside of the package and ship it prepaid and insured to JDSU.

Warranty information

The warranties described herein shall apply to all commercially available JDSU Communications Test and Measurement products. Any additional or different warranties shall apply only if agreed to by JDSU in writing. These warranties are not transferable without the express written consent of JDSU.

Hardware Warranty — JDSU warrants that Hardware Product sold to customer shall, under normal use and service, be free from defects in materials and workmanship. Information regarding the specific warranty period for this product can be obtained by contacting your local JDSU Customer Service Representative, or at our web site www.jdsu.com. The warranty period shall begin upon shipment to Customer. Hereafter these periods of time shall be collectively referred to as the “Initial Warranty Period.”

JDSU’s obligation and customer’s sole remedy under this Hardware Warranty is limited to the repair or replacement, at JDSU’s option, of the defective product. JDSU shall have no obligation to remedy any such defect if it can be shown: (a) that the Product was altered, repaired, or reworked by any party other than JDSU without JDSU’s written consent; (b) that such defects were the result of customer’s improper storage, mishandling, abuse, or misuse of Product; (c) that such defects were the result of customer’s use of Product in conjunction with equipment electronically or mechanically incompatible or of an inferior quality; or (d) that the defect was the result of damage by fire, explosion, power failure, or any act of nature.

JDSU performed repairs shall be warranted from defective material and workmanship for a period of ninety (90) days, or until the end of the Initial Warranty Period, whichever is longer. Risk of loss or damage to Product returned to JDSU for repair or replacement shall be borne by customer until delivery to JDSU. Upon delivery of such product, JDSU shall assume the risk of loss or damage until that time that the product being repaired or replaced is returned and delivered to customer. Customer shall pay all transportation costs for equipment or software shipped to JDSU for

repair or replacement. JDSU shall pay all transportation costs associated with returning repaired or replaced product to customer.

Software Warranty — JDSU warrants that Software Products licensed to Customer shall, under normal use and service, and for a period of ninety (90) days from the date of shipment of the Software to Licensee (the “Warranty Period”), perform in all material respects in accordance with the published specifications for such Software as established by JDSU. However, JDSU does not warrant that the Software will operate uninterrupted or error free, operate in the combination with other software, meet Customer’s requirements, or that its use will be uninterrupted.

JDSU’s obligation and Customer’s sole and exclusive remedy under this Software Warranty is limited to, at JDSU’s option, either (i) correcting the material errors reported to JDSU in writing by Customer during the Warranty Period and which JDSU is able to reproduce, (ii) replacing such defective Software, provided that JDSU received written notice of such defect within the Warranty Period, or (iii) provided that JDSU received written notice of such defect within the Warranty Period, terminating the License and, upon return to JDSU of the Software, Documentation and all other materials provided by JDSU under the applicable License, providing Customer with a refund of all charges paid with respect thereto. JDSU shall have no warranty obligations hereunder if (a) the Software is altered or modified or is merged with other software by Customer or any third party or (b) all or any part of the Software is installed on any computer equipment other than the Designated Server or used with any operating system for which the Software is not designed.

WARRANTY DISCLAIMER — FOR HARDWARE, AND/OR SOFTWARE FURNISHED BY JDSU, THE FOREGOING WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTEES AND CONDITIONS, EXPRESS OR IMPLIED. JDSU SPECIFICALLY DISCLAIMS ALL OTHER WARRANTIES, EITHER EXPRESS OR IMPLIED, ON ANY HARDWARE, SOFTWARE, DOCUMENTATION OR SERVICES INCLUDING BUT NOT LIMITED TO WARRANTIES RELATING TO QUALITY, PERFORMANCE, NONINFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AS WELL AS THOSE ARISING FROM ANY COURSE OF DEALING, USAGE OR TRADE PRACTICE. UNDER NO CIRCUMSTANCES WILL JDSU BE LIABLE FOR ANY INDIRECT OR CONSEQUENTIAL DAMAGES RELATED TO BREACH OF THIS WARRANTY.

Global services and solutions

Global Services and Solutions markets a broad portfolio of services to enable customers to aggressively build their competitive advantage within the markets they serve. Global Services and Solutions innovative offerings respond to our customers' dynamic needs:

– System deployment and field engineering services
– Technical training
– Product support
– Consulting
– Custom software development
– Integrated service programs

Additional information can also be found on our web site under Services.

System deployment and field engineering

JDSU offers a range of support services for our centralized test systems, designed around the needs of the customer's network. Field engineering and deployment services provide a variety of options for implementing the test system into the network.

Deployment — Thorough deployment process covers the initial site survey through hardware and software installation, allowing rapid integration of systems product into customers' environment without the use of their own resources. Deployment includes survey, configuration, installation of hardware and software, site planning, cabling, acceptance testing, staging, certification and system documentation.

Basic Service for Systems — In today's fast-paced world of communications, network operators are deploying increasingly complex communications test and management systems. JDSU's Basic Service for Systems is designed to provide the system experts, support and methodologies to facilitate the integration of systems products into customers' environments. Basic Service for Systems encompasses system deployment, training, software upgrades, technical assistance and repair. This service is subject to availability, please visit www.jdsu.com or contact Customer Care for additional information.

Training

JDSU delivers training in instructor-led or alternative learning formats that are flexible, convenient, and timely. Our training solutions portfolio consists of network-specific test and management tools for optical transport, cable, access, data, and wireless environments.

Instructor-led training:

Public courses (JDSU sites)

Public courses help participants quickly acquire fundamental skills or broaden their communications knowledge with advanced instruction. Our courses deliver the ideal mix of theory and practice.

On-site training (Customer site)

JDSU provides practical, customized instruction at the customer's designated site. Whether your goal is to shorten turn-up times or increase operation-wide efficiency, on-site training can be a cost-effective way to train from one to 10 participants. Prior to training, the instructor contacts the customer to ensure the course content is aligned with the organization's training needs. We conduct step-by-step reviews of current technologies and products to help both new and experienced technicians translate theory into practical, hands-on expertise.

When scheduling an on-site course, please note that JDSU requires a minimum commitment of two consecutive days of training. Courses that are only one day in duration may either be paired with another course for a minimum total of two training days, or presented on two consecutive days to different groups of participants.

Alternative learning:

Courseware licensing program and train-the-trainer

Recommended for customers with internal training departments, JDSU's Courseware Licensing Program is a fast, affordable alternative that allows our customers to train their own staff using JDSU's courseware. Each course provides comprehensive instructor and participant materials to ensure consistent content delivery for the length of the agreement. A critical part of Courseware Licensing is the Train-the-Trainer program, which prepares the organization's own instructors to deliver JDSU training courses. Courseware Licensing is sold in increments of one, two, or three years.

Computer-based training (CBT)

By blending learning with technology, JDSU's CBT program provides our customers with a cost-effective way to learn technology fundamentals and product applications. Topics include ATM, Frame Relay, ISDN, LAN Basics, Fiber Optics, and more. CBTs are designed to complement both public and on-site training; they can serve to prepare students for classroom JDSU courses or be used after instructor-led training to reinforce learning. In addition to our pre-packaged CBTs, JDSU custom-develops CBTs to meet your organization's training needs.

To enroll in a course or for more information on the variety of JDSU training programs available, call 1-800-638-2049 or visit www.jdsu.com and complete the Training Requirement Form.

Product support

To continue repair, maintenance and upgrades after a product's warranty expires, JDSU offers a variety of product support plans.

FleetCare — Designed for customers with ten or more JDSU products, FleetCare extends each product's initial factory warranty to include repair parts, labor and one-way shipping. FleetCare allows customers to upgrade the base package with a variety of options, including Calibration Plans, Calibration Plan with Manager, Loaners, 7x24 Technical Assistance and Software Enhancement Agreements.

Software Enhancement Agreements — In response to new developments in technology, JDSU continually upgrades and revises the software that drives many of its products. Software Enhancement Agreements automatically ships the latest software revisions, releases and upgrades to ensure products are operating at the most technologically advanced level.

Product Maintenance Agreements — Yearly repair and calibration maintenance agreements simplify billing and help ensure equipment is always operating at optimum levels. Product maintenance agreements can be used to extend a current warranty or provide protection for out-of-warranty units.

Repair Pricing Options — For out-of-warranty repairs, JDSU offers two additional pricing options: time and material pricing and flat rate pricing. Under time and material pricing, customers are billed for the

actual cost of the repair, making this a cost-effective method for minor repairs. Under flat rate pricing, customers pay a fixed service charge to repair unit failures (excluding damage or abuse).

Consulting services

To quickly improve our customer's efficiency and productivity, JDSU offers personalized consulting programs designed to meet specific client needs. Our consulting staff will work as part of your team, providing a valuable blend of subject matter proficiency, an in-depth test and measurement systems perspective, and trusted telecommunications industry vision.

Methods and Procedure Development — JDSU's Methods and Procedure Development services include consulting with your staff and assessing your network plant's current test and turn-up procedures. After evaluating the skill level of your workforce in specific technologies and procedures, an JDSU team of experts identifies potential areas of improvement and makes appropriate recommendations in a formal implementation plan. Depending on your staff 's level of expertise, test procedures can be written to any level of detail, from general methods and procedures to detailed "button-by-button" test and network equipment-specific procedures. In addition, JDSU's experts offer hands-on training for your field technicians and can resolve specific problems at the central office. JDSU develops test plans and procedures for Service Providers, End-users and Manufacturers of Network Equipment.

Test Automation — With JDSU's Test Automation Development, a team of experts can develop customized automated and remote testing solutions so that you can keep your network functioning at peak levels. After consulting with you, the JDSU team can determine which of JDSU's test and analysis equipment and automation platforms can best streamline your testing processes, data analysis, and test result storage methods. The consulting team can develop and integrate automated testing applications on customers' currently installed computer platforms that match existing methods and procedures. An JDSU team of consultants can assist customers throughout every stage of the development and implementation of automated and remote testing solutions. Services range from developing automated scripts to integrating customized software applications to developing drivers to automated manufacturing tests.

On-site Test and Measurement Service — JDSU On-site Test and Measurement Service provides testing expertise to expedite the implementation, turn-up, and provisioning of network services. Applying their knowledge to your specific network requirements, JDSU's network consultants can quickly verify transmission systems' implementation, assess a fiber plant's suitability for advanced services, future-proof your system. Because incomplete testing often results in crippling losses of revenue, carriers and providers must operate their networks with a very low margin of error. Difficulties in ensuring network performance are further compounded when technicians must employ unfamiliar yet critical test and measurement processes. But with JDSU's dedicated, highly skilled team of professionals providing communications test and measurement solutions, your staff can concentrate on performing value-added services that will maximize your profitability.

Integrated service programs

Service Dollars (North America only) — To deliver the highest level of support with your product purchase, JDSU offers Service Dollars. Services Dollars can be purchased at anytime, for each JDSU instrument. If purchased at the same time as your product, Service Dollars are discounted 20 percent. This is a significant savings, as Service Dollars can be used towards the purchase of any of Global Services and Solutions offerings. Service Dollars are also flexible in the fact that they can be purchased at anytime and then used later towards the specific service that best fits your support needs.

Test and Measurement Regional Sales

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