HP J4225A/26A
DWDM Receiver Modules

User's Manual

Where to Find it - Online and Printed Information:

System installation (hardware/software)	VXIbus Configuration Guide* HP VIC (VXI installation software)* HP SpectralBER Installation & System Reference Manual
Module configuration	This Manual
Module control	This Manual
SCPI information	HP SpectralBER Remote Control Manual
VXI programming	HP SpectralBER Online Help
VXI example programs	HP SpectralBER Online Help HP SpectralBER Installation & System Reference Manual HP SpectralBER Remote Control Manual
VXI function reference	HP SpectralBER Online Help
Soft Front Panel information	HP SpectralBER Installation & System Reference Manual HP J4225A/26A DWDM Receiver and HP J4230A/31A/32A DWDM Transmitter Module User's Manuals HP SpectralBER Online Help
VISA language information	HP VISA User's Guide
HP VEE programming information	HP VEE User's Manual

**Supplied with HP Command Modules , Embedded Controllers, and VXLink.*

Legal and Safety Information

Hewlett-Packard Warranty Statement

HP Product: J4225A, J4226A **Duration Of Warranty:** 1 year

1. HP warrants HP hardware, accessories and supplies against defects in materials and workmanship for the period specified above. If HP receives notice of such defects during the warranty period, HP will, at its option, either repair or replace products which prove to be defective. Replacement products may be either new or like-new.

2. HP warrants that HP software will not fail to execute its programming instructions, for the period specified above, due to defects in material and workmanship when properly installed and used. If HP receives notice of such defects during the warranty period, HP will replace software media which does not execute its programming instructions due to such defects.

3. HP does not warrant that the operation of HP products will be interrupted or error free. If HP is unable, within a reasonable time, to repair or replace any product to a condition as warranted, customer will be entitled to a refund of the purchase price upon prompt return of the product.

4. HP products may contain remanufactured parts equivalent to new in performance or may have been subject to incidental use.

5. The warranty period begins on the date of delivery or on the date of installation if installed by HP. If customer schedules or delays HP installation more than 30 days after delivery, warranty begins on the 31st day from delivery.

6. Warranty does not apply to defects resulting from (a) improper or inadequate maintenance or calibration, (b) software, interfacing, parts or supplies not supplied by HP, (c) unauthorized modification or misuse, (d) operation outside of the published environmental specifications for the product, or (e) improper site preparation or maintenance.

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The customer shall provide:
1. Access to the products during the specified periods of coverage to perform maintenance.
2. Adequate working space around the products for servicing by Hewlett-Packard personnel.
3. Access to and use of all information and facilities determined necessary by Hewlett-Packard to service and/or maintain the products. (Insofar as these items may contain proprietary or classified information, the customer shall assume full responsibility for safeguarding and protection from wrongful use.)
4. Routine operator maintenance and cleaning as specified in the Hewlett-Packard Operating and Service Manuals.
5. Consumables such as paper, disks, magnetic tapes, ribbons, inks, pens, gases, solvents, columns, syringes, lamps, septa, needles, filters, frits, fuses, seals, detector flow cell windows, etc.

Certification

Hewlett-Packard Company certifies that this product met its published specifications at the time of shipment from the factory. Hewlett-Packard further certifies that its calibration measurements are traceable to the United States National Bureau of Standards, to the extent allowed by the Bureau's calibration facility and to the calibration facilities of other International Standards Organization members.

Assistance

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Laser Safety Warning

To prevent personal injury, ensure the following information is reviewed before operating the module.

For your protection, review all laser information given in this manual before installing or using this module.

To avoid hazardous exposure to laser radiation, it is recommended that you do the following:

ALWAYS DEACTIVATE THE LASER BEFORE CONNECTING OR DISCONNECTING OPTICAL CABLES.

When connecting or disconnecting cables between the module(s) and the device-under-test, observe the connection sequence given below:

Connecting: Connect the optical cable to the module's optical input connector **before** connecting to the optical transmitter's output connector.

Disconnecting: Disconnect the optical cable from the optical transmitter's output connector **before** disconnecting from the module's input connector. Always ensure the screw cap is fitted properly on to the laser aperture.

NEVER examine or stare into the open end of a broken, severed, or disconnected optical cable when it is connected to the module's optical output connector.

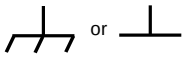
Arrange for service-trained personnel, who are aware of the hazards involved, to repair optical cables.

Use of controls or adjustments or performance procedures other than those specified herein may result in hazardous radiation exposure.

Safety Symbols

Instruction manual symbol affixed to product. Indicates that the user must refer to the manual for specific WARNING or CAUTION information to avoid personal injury or damage to the product.

Indicates the field wiring terminal that must be connected to earth ground before operating the equipment—protects against electrical shock in case of fault.



Frame or chassis ground terminal—typically connects to the equipment's metal frame.

Alternating current (AC)

Direct current (DC).

Indicates hazardous voltages.

WARNING Calls attention to a procedure, practice, or condition that could cause bodily injury or death.

CAUTION Calls attention to a procedure, practice, or condition that could possibly cause damage to equipment or permanent loss of data.

Indicates that a laser is fitted. The user must refer to the manual for specific Warning or Caution information to avoid personal injury or damage to the product.

Warnings

The following general safety precautions must be observed during all phases of operation, service, and repair of this product. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the product. Hewlett-Packard Company assumes no liability for the customer's failure to comply with these requirements.

Ground the equipment: For Safety Class 1 equipment (equipment having a protective earth terminal), an uninterruptible safety earth ground must be provided from the mains power source to the product input wiring terminals or supplied power cable.

DO NOT operate the product in an explosive atmosphere or in the presence of flammable gases or fumes.

For continued protection against fire, replace the line fuse(s) only with fuse(s) of the same voltage and current rating and type. DO NOT use repaired fuses or short-circuited fuse holders.

Keep away from live circuits: Operating personnel must not remove equipment covers or shields. Procedures involving the removal of covers or shields are for use by service-trained personnel only. Under certain conditions, dangerous voltages may exist even with the equipment switched off. To avoid dangerous electrical shock, DO NOT perform procedures involving cover or shield removal unless you are qualified to do so.

DO NOT operate damaged equipment: Whenever it is possible that the safety protection features built into this product have been impaired, either through physical damage, excessive moisture, or any other reason, REMOVE POWER and do not use the product until safe operation can be verified by service-trained personnel. If necessary, return the product to a Hewlett-Packard Sales and Service Office for service and repair to ensure that safety features are maintained.

DO NOT service or adjust alone: Do not attempt internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present.

DO NOT substitute parts or modify equipment: Because of the danger of introducing additional hazards, do not install substitute parts or perform any unauthorized modification to the product. Return the product to a Hewlett-Packard Sales and Service Office for service and repair to ensure that safety features are maintained.

Operating Location: Sheltered location where air temperature and humidity are controlled within this product's specifications and the product is protected against direct exposure to climatic conditions such as direct sunlight, wind, rain, snow, sleet, and icing, water spray or splash, hoarfrost or dew. (Typically, indoor.) Pollution environment for which this product may be operated is IEC 664 Pollution degree 2.

Module connectors and test signal cables connected to them cannot be operator accessible. Cables and connectors are considered inaccessible if a tool (e.g., screwdriver, wrench, socket, etc.) or a key (equipment in a locked cabinet) is required to gain access to them. Additionally, the operator cannot have access to a conductive surface connected to any cable conductor (High, Low or Guard).

Assure the equipment under test has adequate insulation between the cable connections and any operator-accessible parts (doors, covers, panels, shields, cases, cabinets, etc.). Verify there are multiple and sufficient protective means (rated for the voltages you are applying) to assure the operator will NOT come into contact with any energized conductor even if one of the protective means fails to work as intended. For example, the inner side of a case, cabinet, door, cover or panel can be covered with an insulating material as well as routing the test cables to the module's front panel connectors through non-conductive, flexible conduit such as that used in electrical power distribution.

Statement of Compliance

This module has been designed and tested in accordance with IEC Publication 1010-1 + A1:1992 Safety requirements for Electrical Equipment for Measurement, Control and Laboratory Use, and has been supplied in a safe condition. The instruction documentation contains information and warnings which must be followed by the user to ensure safe operation and to maintain the module in a safe condition.

The CE mark shows that the product complies with all relevant European legal Directives.

ISM 1-A

This is a symbol of an Industrial Scientific and Medical Group 1 Class A product.

The CSA mark is a registered trademark of the Canadian Standards Association.

Australian EMC Regulations

The C-Tick mark is a registered trademark of the Spectrum Management Agency of Australia. This signifies compliance with the Australian EMC Framework Regulations under the terms of the Radiocommunications Act of 1992.

Noise Declaration (German)

LpA<70dB

am Arbeitsplatz (operator position)
normaler Betrieb (normal position)
nach DIN 45635 pt.19 (per ISO 7779)

Electromagnetic Compatibility

This product has been designed to meet the protection requirements of the European Communities Electromagnetic Compatibility (EMC) directives:

CISPR11 Level A
EN50082-1:1992

In order to preserve the EMC performance of the product, any cable which becomes worn or damaged must be replaced with the same type and specification. Also ensure that any spare slots in the VXI Mainframe are fitted with blanking plates (HP E8400-60202).

Fuse Information

Fuses on the HP J4225/26A DWDM Receiver Modules and the HP J4230A/31A/32A DWDM Transmitter Modules are **not** user replaceable.

In both the HP DWDM Receiver and the DWDM Transmitter Modules the fuses are:

HP Ref.	HP Part No.	Amp	Volt	Type
F1, F2	2110-0945	3 A	125 V	NB*
F3, F4, F500, F501	2110-0946	10 A	125 V	NB*
F5	2110-1138	15 A	125 V	NB*
F6	2110-0936	4 A	125 V	NB*

* NB = Normal Blow

Declaration of Conformity

according to ISO/IEC Guide 22 and EN45014

Manufacturer's Name:	**Hewlett-Packard Ltd.**
Manufacturer's Address:	Telecomms Networks Test Division South Queensferry West Lothian, EH30 9TG Scotland, United Kingdom

Declares that the product

Product Name:	HP SpectralBER DWDM Short Reach Receiver
Model Number:	HP J4225A
Product Options:	This declaration covers all options of the above product as detailed in TCF A-5951-9852-01

Conforms with the protection requirements of European Council Directive 89/336/EEC on the approximation of the laws of the member states relating to electromagnetic compatibility, against EMC test specifications EN 55011:1991 (Group 1, Class A) and EN 50082-1:1992 .

As Detailed in:	Electromagnetic Compatibility (EMC) Technical Construction File (TCF) No. A-5951-9852-01
Assessed by:	DTI Appointed Competent Body EMC Test Centre, GEC-Marconi Avionics Ltd., Maxwell Building, Donibristle Industrial Park, Hillend, Dunfermline KY11 9LB Scotland, United Kingdom

Technical Report Number:6893/2200/CBR, dated 21August 1997

Supplementary Information:

The product conforms to the following safety standards:

EN 61010-1(1993)
IEC 61010-1(1990) +A1(1992) +A2(1995)
CSA-C22.2 No. 1010.1-93
EN 60825-1(1994) / IEC 825-1(1993)

The product herewith complies with the requirements of the General Product Safety Directive 92/59/EEC.

South Queensferry, Scotland	***30 July 1999***	***W.R. Pearson / Quality Manager***
Location	***Date***	

Europe Contact:
Your Local Hewlett-Packard Sales and Service Office or Hewlett-Packard GmbH, Department 2Q / Standards Europe
Herrenberger Strasse 130, D7030 Boblingen (Fax: +49-7031-143143)

Declaration of Conformity

according to ISO/IEC Guide 22 and EN45014

Manufacturer's Name:	**Hewlett-Packard Ltd.**
Manufacturer's Address:	Telecomms Networks Test Division South Queensferry West Lothian, EH30 9TG Scotland, United Kingdom

Declares that the product

Product Name:	HP SpectralBER DWDM Long Reach Receiver
Model Number:	HP J4226A
Product Options:	This declaration covers all options of the above product as detailed in TCF A-5951-9852-01

Conforms with the protection requirements of European Council Directive 89/336/EEC on the approximation of the laws of the member states relating to electromagnetic compatibility, against EMC test specifications EN 55011:1991 (Group 1, Class A) and EN 50082-1:1992 .

As Detailed in:	Electromagnetic Compatibility (EMC) Technical Construction File (TCF) No. A-5951-9852-01
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Herrenberger Strasse 130, D7030 Boblingen (Fax: +49-7031-143143)

Contents

Chapter 1
Module Overview

Introduction

This manual provides you with information about the following Dense Wave Division Multiplexing (DWDM) receiver modules:

- HP J4225A Short Reach Optical Receiver (operates with optical levels down to −19 dBm).
- HP J4226A Long Reach Optical Receiver (operates with optical levels down to −28 dBm).

Description

The HP J4225A and HP J4226A are register-based C-size double slot VXI modules. Each module has four optical **Input** ports, each port can receive optical signals with wavelengths between 1200 nm and 1600 nm.

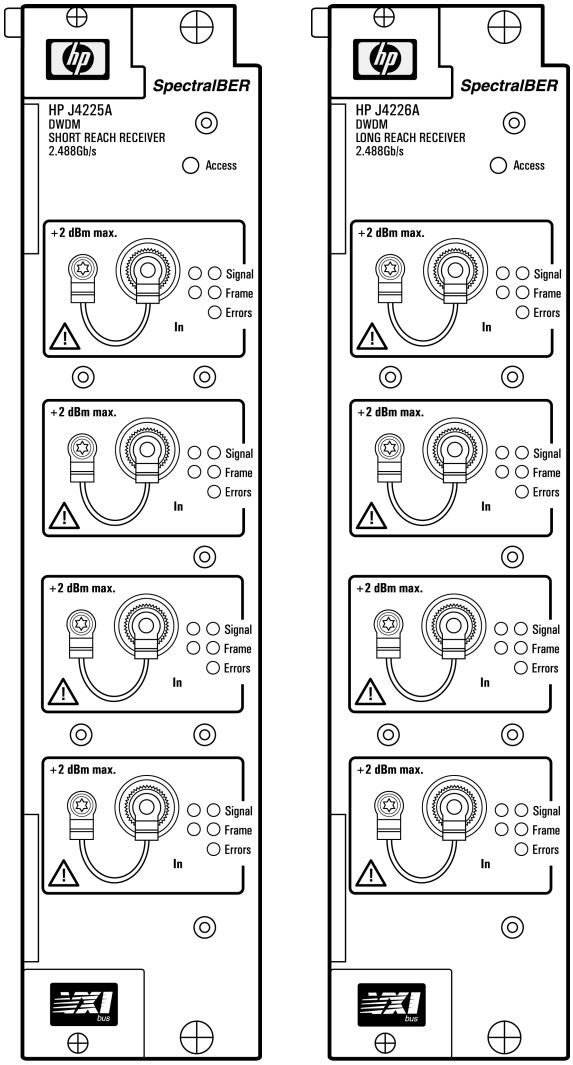
These modules can detect alarms (see list below), make BER measurements and capture the J0 trace message in a 2.4 Gb/s concatenated SDH STM-16C or SONET OC-48C signal carrying PRBS payloads.

- Loss of Signal (LOS)
- Out of Frame (OOF)
- Loss of Frame (LOF)
- Pattern Sync Loss

Each module can detect B1, B2 and Bit errors. These errors can then be presented to you as an error count or as an error ratio. Error counting is inhibited when alarm conditions occur. For example, B1 and B2 error counting is inhibited during a LOS or LOF condition, and Bit Error counting is inhibited during a LOS, LOF or Pattern Sync Loss condition.

Note Alarms are latched during the gating period. The status of these alarms can be read via SCPI or from the soft panel.

Front Panel Features



HP J4225A **HP J4226A**

Ports

HP J4225A and HP J4226A modules have four 2.4 Gb/s optical **Input** ports. Each port can receive optical signals with wavelengths between 1200 nm and 1600 nm and a maximum input power of +2 dBm without damage.

Caution **Damage can be caused if the optical input power is greater than +2 dBm.**

LEDs

Access This LED is ON when the module is being accessed.

Signal The red LED is ON for a LOS condition, the green when the signal is good.

Frame The red LED is ON for a LOF or OOF condition, the green when framing is good.

Errors This red LED is ON when errors are detected.

Module Identification

An identification label is attached to the module clamshell enclosure. The serial number on the label has a two letter reference denoting country of origin (GB = Great Britain) and an eight digit serial number. The serial number is unique to each module and should be quoted in all correspondence with Hewlett-Packard.

Safety Precautions for the Operator

The following general safety precautions must be observed during all phases of operation, service, and repair of this module. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the module. Hewlett-Packard Company assumes no liability for the customer's failure to comply with these requirements.

In particular, the operator should note the following safety information:

- "Laser Safety Warning" on page 3
- "Safety Symbols" on page 4
- "ESD Precautions" on page 14
- "Operators Maintenance" on page 14

DO NOT operate damaged equipment: Whenever it is possible that the safety protection features built into this product have been impaired, either through physical damage, excessive moisture, or any other reason, REMOVE POWER and do not use the product until safe operation can be verified by service-trained personnel. If necessary, return the product to a Hewlett-Packard Sales and Service Office for service and repair to ensure the safety features are maintained.

Additional Safety Precautions for Service Engineers

DO NOT substitute parts or modify equipment: Because of the danger of introducing additional hazards, do not install substitute parts or perform any unauthorized modifications to the module. Return the module to a Hewlett-Packard Sales and Service Office for service and repair to ensure the safety features are maintained.

DO NOT service or adjust alone: Under certain conditions, dangerous voltages may exist even with the equipment switched off. To avoid dangerous electrical shock, service trained personnel must not attempt internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present.

ESD Precautions

Caution **The module contains components sensitive to electrostatic discharge. To prevent component damage, carefully follow the handling precautions presented below.**

The smallest static voltage most people can feel is about 3500 volts. It takes less than one tenth of that (about 300 volts) to destroy or severely damage static sensitive circuits. Often, static damage does not immediately cause a malfunction but significantly reduces the component's life. Adhering to the following precautions will reduce the risk of static discharge damage.

- Keep the module in its conductive storage box when not installed in the VXI Mainframe. Save the box for future storage of the module.
- Before handling the module, select a work area where potential static sources are minimized. Avoid working in carpeted areas and non-conductive chairs. Keep body movement to a minimum. Hewlett-Packard recommends that you use a controlled static workstation.
- Handle the module by its front panel. Avoid touching any components or edge connectors. When you install the module, keep one hand in contact with the protective bag as you pick up the module with your other hand. Then, before installing the module, make contact with the metal surface of the VXI Mainframe with your free hand to bring you, the module and the VXI Mainframe to the same static potential. This also applies whenever you connect/disconnect cables on the front panel.

Operators Maintenance

WARNING **NO OPERATOR SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED PERSONNEL. TO PREVENT ELECTRICAL SHOCK DO NOT REMOVE COVERS.**

Maintenance appropriate for the operator is:

- Cabinet cleaning and Optical Connector Cleaning

Cleaning

Cabinet Cleaning

Clean the cabinet using a damp cloth only.

Optical Connector Cleaning

It is recommended that the optical connectors be cleaned at regular intervals using the following materials:

Description	HP Part Number
Blow Brush	9300-1131
Isopropyl Alcohol	8500-5344
Lens Cleaning Paper	9300-0761
Adhesive Tape Kit	15475-68701

Caution **Do not insert any tool or object into the IN or OUT ports of the module as damage to or contamination of the optical fibre may result.**

1. Switch off the VXI Mainframe, then remove the power cord from the ac mains power socket.
2. Remove the adapters from the **In** ports.
3. Using the blow brush with the brush removed blow through the ferrule of the standard flexible connector and the adapter.

Caution **If the optical fibre of the fixed connector requires further cleaning this entails disassembly of the module which should only be carried out by suitably trained service personnel.**

4. Apply some isopropyl alcohol to a piece of the cleaning paper and clean the barrel of the adapter. Using a new piece of cleaning paper, clean the face of the adapter. Repeat this operation, using a new piece of cleaning paper each time.
5. Lightly press the adhesive side of the tape provided against the front of the adapter, then remove it quickly - repeat twice. This removes any particles of cleaning paper which may be present.
6. Replace the adapters on the flexible connector.

Storage and Shipment

The module may be stored or shipped in environments within the following limits:

Temperature: −10 °C to +70 °C

Altitude: Up to 15,200 meters (50,000 feet)

Humidity: up to 95% relative humidity to 40 °C.

The module should also be protected from temperature extremes which could cause condensation within the module.

Repackaging for Shipment

Tagging for Service

If the module is being returned to Hewlett-Packard for service, please complete a repair tag and attach it to the module.

Original Packaging

Containers and materials identical to those used in factory packaging are available from Hewlett-Packard offices. If the module is being returned to Hewlett-Packard for servicing, attach a tag indicating the type of service required, return address, model number, and full serial number. Mark the container FRAGILE to ensure careful handling. In any correspondence, refer to the module by model number and full serial number.

Other Packaging

The following general instructions should be followed when repackaging with commercially available materials:

- Wrap module in heavy paper or plastic. If the module is being shipped to Hewlett-Packard, attach a tag indicating the type of service required, return address, model number and full serial number.
- Use a strong shipping container. A double wall carton made of 350 pound test material is adequate.
- Use a layer of shock absorbing material 70 to 100 mm (3 to 4 inch) thick, around all sides of the module to provide firm cushioning and prevent movement inside the container. Protect the Front Panel controls and Rear Panel connectors with cardboard.
- Seal shipping container securely.
- Mark shipping container FRAGILE to ensure careful handling.
- In any correspondence, refer to the module by model number and full serial number.

Weight

3.1 kg (6.8 lb)

Dimensions

261 mm (10.3 in) high, 60 mm (2.36 in) wide, 360 mm (14 in) deep

Chapter 2
Installation

Initial Inspection

WARNING **TO AVOID HAZARDOUS ELECTRICAL SHOCK, DO NOT PERFORM ELECTRICAL TESTS WHEN THERE ARE SIGNS OF SHIPPING DAMAGE TO ANY PORTION OF THE OUTER ENCLOSURE (COVERS, PANELS, METERS).**

Inspect the shipping container for damage. If the shipping container or cushioning material is damaged, it should be kept until the contents of the shipment have been checked for completeness and the module has been checked both mechanically and electrically. Procedures for checking electrical operation are given in Chapter 3. If the contents of the shipment are incomplete, if there is mechanical damage or defect, notify the nearest Hewlett-Packard office. If the module does not pass the electrical performance tests given in Chapter 3, notify the nearest Hewlett-Packard office. If the shipping container is also damaged, or the cushioning material shows signs of stress, notify the carrier as well as the nearest Hewlett-Packard office. Keep the shipping materials for the carrier's inspection. The Hewlett-Packard office will arrange for repair or replacement without waiting for claim settlement.

Operating Environment

This module is designed for indoor use only. **DO NOT** operate the product in an explosive atmosphere or in the presence of flammable gasses or fumes.

This module may be operated in environments within the following limits:

Temperature: 0^{o} C to $+40^{o}$ C.

Altitude: up to 3050m (10,000ft).

Humidity: up to 95% relative humidity to 40 ^{o}C.

The module should be protected from temperature extremes which may cause condensation.

Caution **The module is designed for use in Installation Category II and Pollution Degree 2 per IEC 1010 and 644 respectively.**

Caution **VENTILATION REQUIREMENTS: When installing the module in a cabinet, the convection into and out of the module must not be restricted.**

Preparation for Use

Caution **Damage can occur to optical input ports if optical input power exceeds +2 dBm see page 12.**

Caution **If a module is not used as specified, the protection provided by the equipment could be impaired. The module must be used in a normal condition only (in which all means of protection are intact).**

Power Requirements

The modules are powered by dc voltages which are provided from the backplane of the VXI Mainframe that houses the modules during normal operation. Power consumption of each module is 89.3 W.

Connecting to a Network

Caution **Before connecting or disconnecting, ensure that you are grounded, or make contact with the metal surface of the VXI Mainframe with your free hand to bring you, the module, and the mainframe to the same static potential. Modules remain susceptible to ESD damage while the module is installed in the VXI Mainframe. Additional ESD information is required when servicing see "ESD Precautions" on page 14.**

Optical Interface Adapters

FC/PC optical interface adapters are supplied with the module. Alternative optical interface adapters that can be used with this module are listed below:

Interface Type	Part Number
Biconic	HP 81000WI
D4	HP 81000GI
Diamond HMS-10/HP	HP 81000AI
DIN 47256	HP 81000SI
SC	HP 81000KI
SMA	HP 81000JI
ST	HP 81000VI

SMA Adaptors

These adaptors (HP 1250-1462) are available and can be screwed on to the Ref Clock Out port to protect the threads of the connector.

Installing and Removing the Module

Caution **Review the "ESD Precautions" on page 14 before installing or removing modules. Do not install or remove a module while the VXI Mainframe is powered-up. Doing so may cause irreparable damage to the module or the VXI Mainframe.**

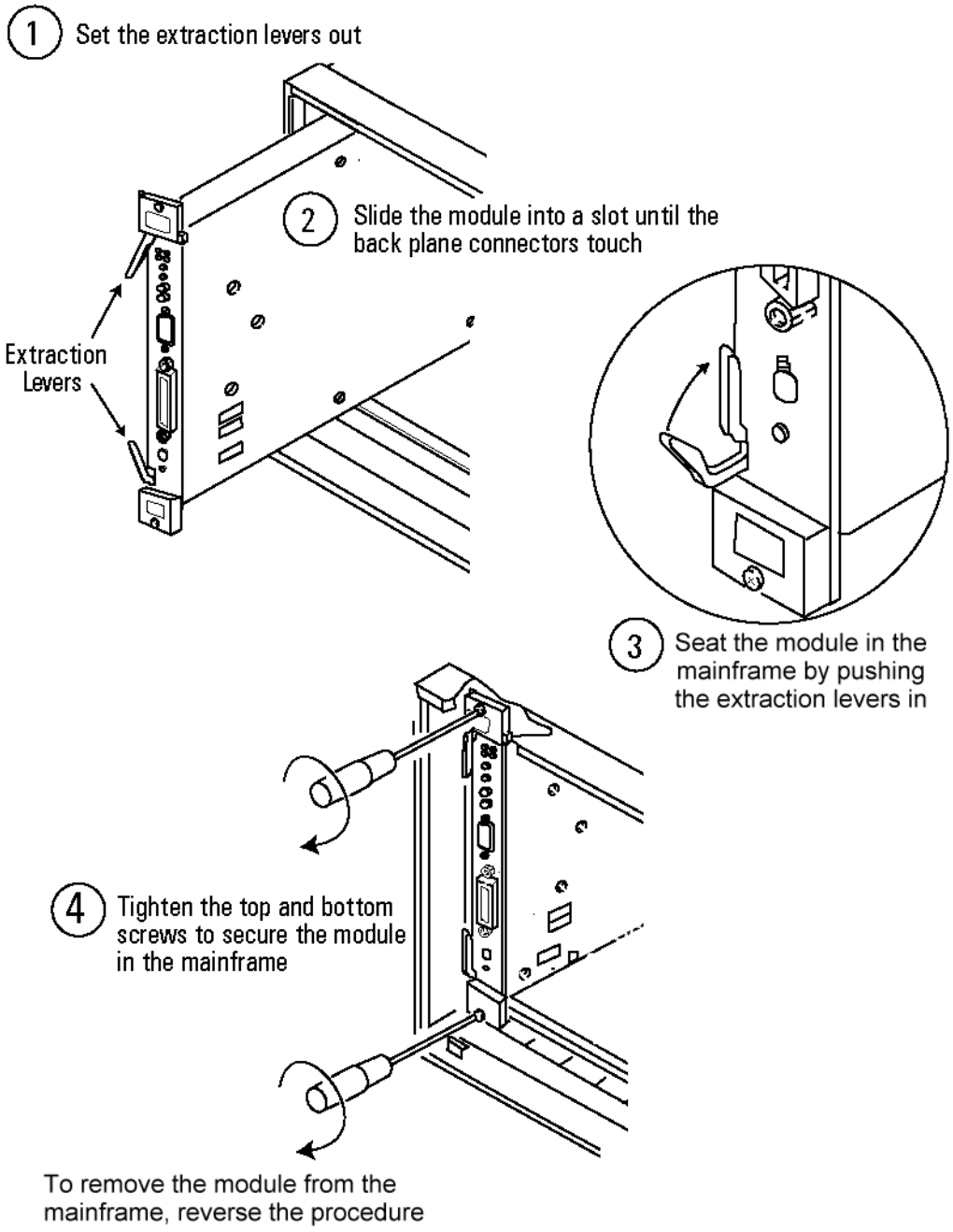


Figure 2-1. Installing and Removing a Module

Addressing

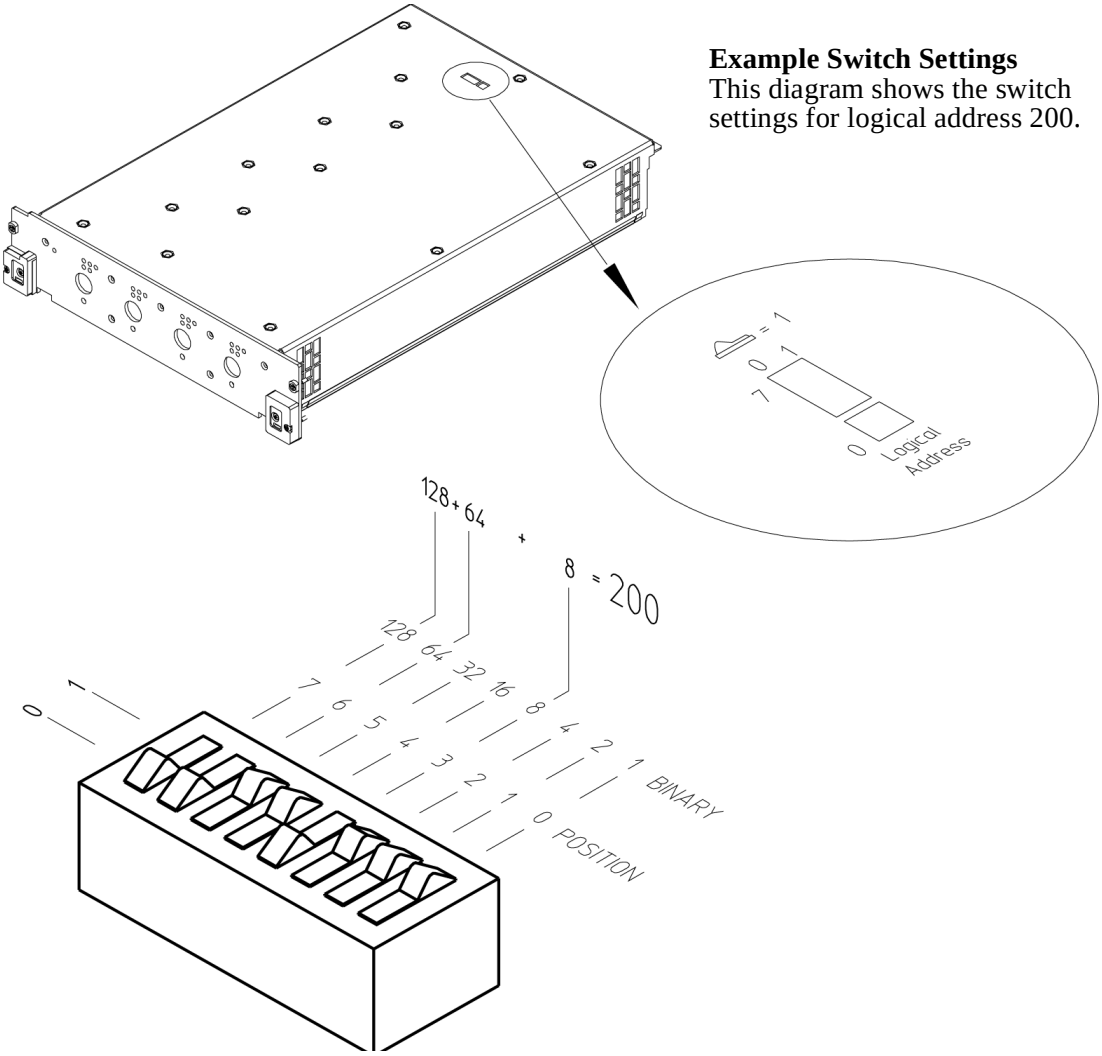
The optical transmit modules are servants to the HP J4223A DWDM Controller (commander module).The logical address of each optical transmit module must be within the servant area of the DWDM Controller.

Caution **Before assigning a logical address to an optical transmit module, check the logical address and servant area switch settings of the DWDM Controller module.**

You assign a logical address to an optical transmit module by setting a series of switches which you access through a slot in the module's clamshell enclosure, see the following diagram. The switches are binary weighted, the weightings *0* (LSB) to *7* (MSB) are marked on the clamshell enclosure.

Ensure the logical address you select falls within the servant area of the HP J4223A DWDM Controller.

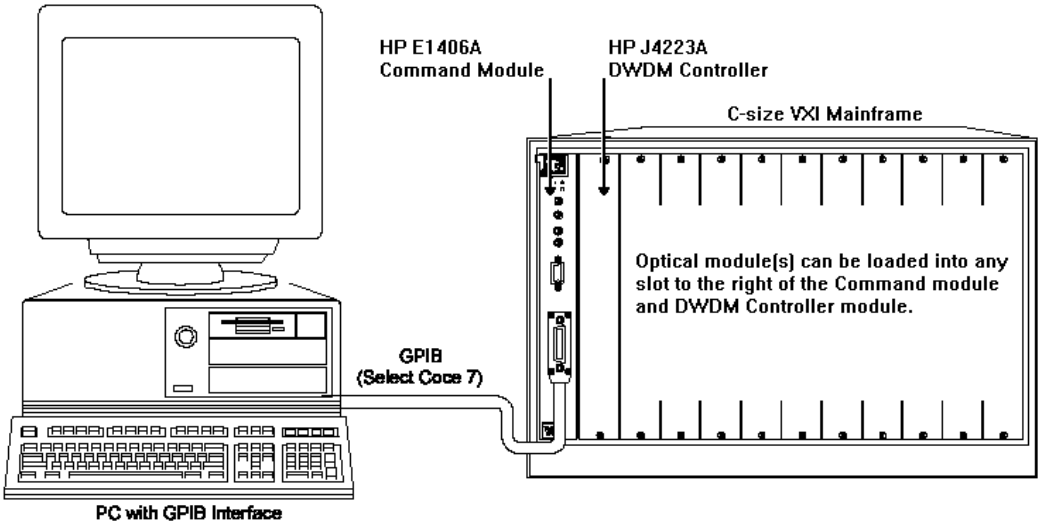
Note The value you select must not conflict with the logical address of any other module(s) serving the DWDM Controller module.



Example Switch Settings
This diagram shows the switch settings for logical address 200.

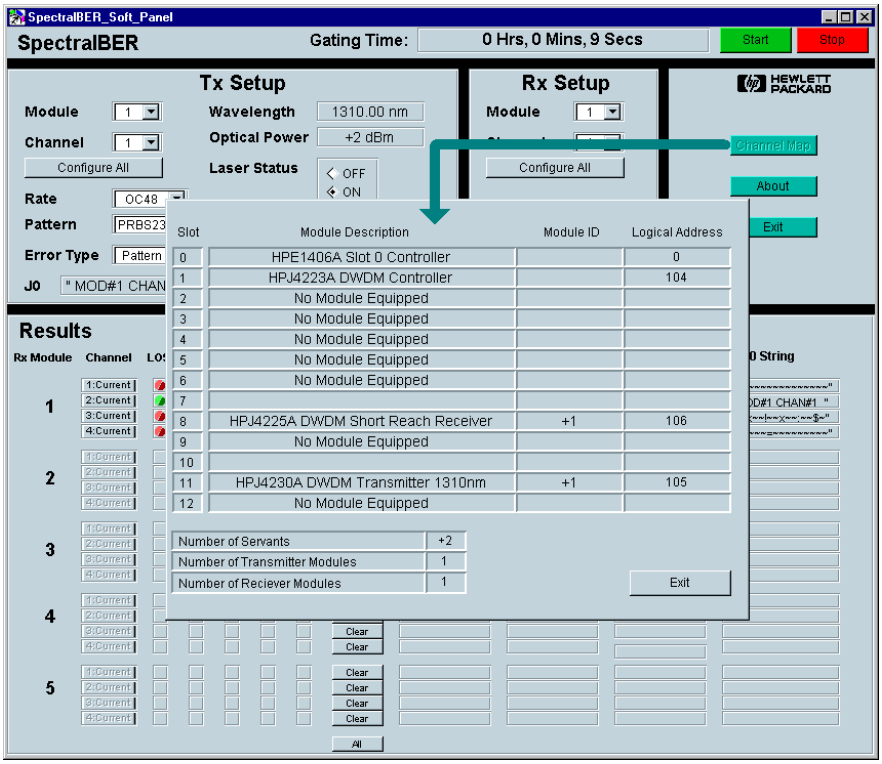
Module Slot Location

It is recommended that modules be loaded as shown below.



Verify Module Installation

You can verify module installation using soft panels. (Soft panel software installation information will be found in the *Installation & System Reference Manual*.)The following diagram shows a typical soft panel and how to verify which modules are installed in a VXI Mainframe. When you click on the Show Status button, details of the total number of servants and the number of individual Receivers and Transmitters are displayed.



Chapter 3
Module Control

Introduction

The DWDM Receiver Modules can be controlled from a PC or workstation using SCPI commands, Universal Instrument Drivers or manually using soft panels. If you want to control modules using soft panels on your display, you will need install the appropriate soft panel software.

For more information on installing soft panel software and controlling modules manually, see the HP SpectralBER *Installation & System Reference Manual*.

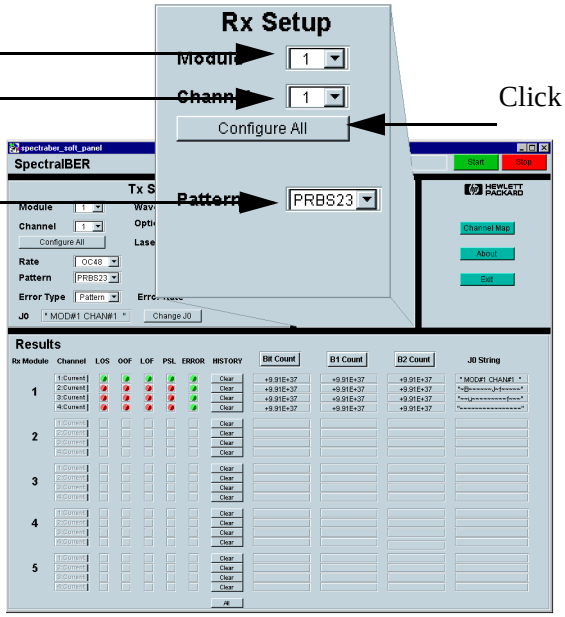
For more information on SCPI commands, see the HP SpectralBER *Remote Control Manua*l.

Note All four ports of a Receiver module are gated together and all modules controlled by a common DWDM Controller module are gated together.

Receiver Module Soft Panel Overview

- Figure 3-1 on page 24 shows a typical soft panel, and how to set up an Optical Receive module.
- Figure 3-2 on page 24 shows how to Start and Stop gating.
- Figure 3-3 on page 25 describes the Results section of the soft panel.

1. Click here to select a module.
2. Click here to select a channel (1 to 4).
3. Click here to select a pattern (PRBS23, PRBS15, PRBS11 or PRBS9)



Click here to apply the displayed settings to all modules.

Figure 3-1. Optical Receiver Module Setup

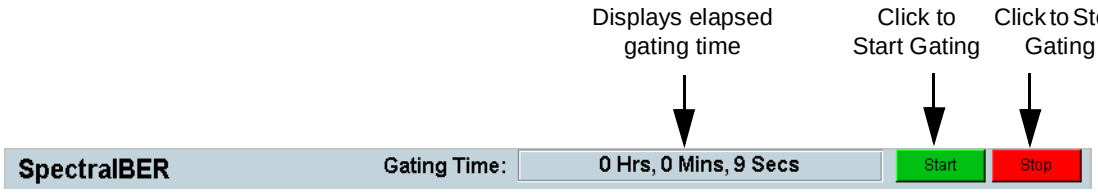


Figure 3-2. Gating Control

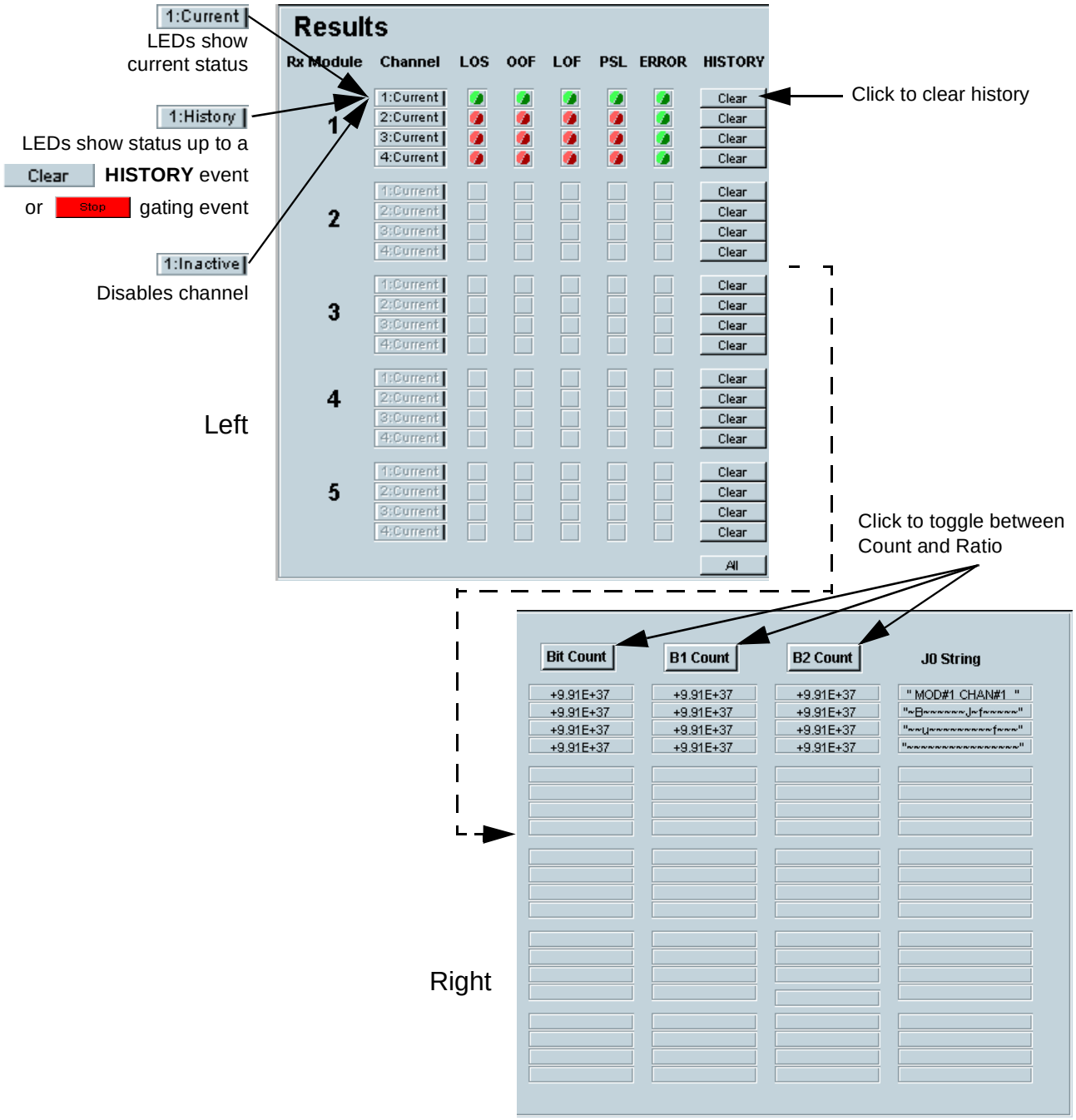


Figure 3-3. Results Panel

Chapter 4
Performance Tests

Introduction

This chapter contains Information to enable you to test the warranted specifications of the HP J4225A and HP J4226A DWDM Receiver modules in the HP J4221A and HP J4222A SpectralBER systems.

Note The warranted specifications are supplied as part of the documentation package provided with the system.

Recommended Test Equipment

Table 4-1lists the equipment required for performance testing of the system. Alternative equipment that meets or exceeds the critical specification of the listed equipment may be substituted. (Recommended models are those typically used in HP Service Centers.) Calibration Cycle

Table 4-1. Recommend Test Equipment

Instrument	Critical Specification	Recommended Model
Frequency Counter	Range: 0 to 200MHz	HP 5335A Option 010
Lightwave Multimeter		HP 8153A
Multi Wavelength Meter		HP 86120B
DWDM Transmitter Module		HP J4230A/31A/32A
Optical Attenuator	Wavelength: 1200 to 1600 nm Range: 0 to 30db	HP 8157A
FC/PC Optical Interface Connector	Unique	HP 81000FI (x 4)
Optical Cable	Unique	HP 11871A (x 2)
Cable	SMA to SMA 0.5 meter	HP E1675-64210
Adapter	SMA (female) to BNC (male)	HP 1250-2015

Depending on the use and environmental conditions, the performance of the modules should be checked once a year, by using the following performance tests.

Performance Test Record

The results of the performance tests can be recorded on the performance test record at the end of the tests. The performance test record lists all the tested specifications and the acceptable limits. The results recorded at Incoming Inspection can be used for comparison during periodic maintenance, troubleshooting or after repair or adjustment.

Receiver Optical Sensitivity Test

Specifications

Table 4-2. HP J4225A Receiver Module Sensitivity Specification

Data Rate:	2488.32 MHz
Wavelength:	1200nm to 1600nm
Maximum Input Power:	–3 dBm (for BER =1E–10)
Sensitivity:	–19 dBm (for BER =1E–10)

Table 4-3. HP J4226A Receiver Module Sensitivity Specification

Data Rate:	2488.32 MHz
Wavelength:	1200nm to 1600nm
Maximum Input Power:	–8 dBm (for BER = 1E–10)
Sensitivity:	–28 dBm (for BER = 1E–10)

Description

This test verifies the Input Sensitivity range of the optical **In** ports for both the Short Reach Receiver (J4225A) and the Long Reach Receiver (J4226A) modules by attenuating the Transmitter output and checking for errors in back-to-back mode.

Equipment Required

Lightwave Multimter:	HP 8153A
Optical Attenuator:	HP 8157A
Multi-wavelength Meter:	HP 81620B
Optical Cables:	HP 11871A (x 2)
FC/PC Optical Connectors:	HP 81000FI (x 4)
DWDM Transmitter Module:	HP J4230A/31A/32A

Procedure

HP J4225A Receiver Module

1. Switch on the VXI mainframe.

2. Check that at power-on, the **Access** LED is ON and that the **Signal** (loss) (Red LED is ON) and the **Frame** (loss) (Red LED is ON).

3. Connect the optical **Out** port on the Transmitter Module to the HP 8153A through the Optical Attenuator. (Ensure that all connectors are tight and that the cables have no twists.)

4. Set up the HP 8153A as follows:
   a. Press **PARAM** key to display wavelength [λ]
   b. Using ⬅,➡ ⬆ and ⬇ keys, set the wavelength to 1310nm.
   c. Press **PARAM** key to display Time [t]
   d. Using ⬅,➡ ⬆ and ⬇ keys, set the time to 200mS.
   e. Press **PARAM** key to display REF.
   f. Using ⬅,➡ ⬆ and ⬇ keys, set the REF to 0.000dBm.
   g. Press **PARAM** key to display CAL.
   h. Using ⬅,➡ ⬆ and ⬇ keys, set the CAL to 0.000dBm.
   i. Press the **ZERO** key on the Power Meter to calibrate - the Power Meter is now ready.

5. Press **MODE** to select the Power Level measurement on the HP 8153A.

6. Set the Optical Attenuator wavelength to 1310 nm and set the attenuation to obtain an optical power reading of –3 dBm on the HP 8153A.

7. Disconnect the Optical Attenuator from the HP 8153A and connect to the optical **In** port.

8. Check that **Signal** present and **Frame** synchronization conditions are present (Green LEDs are ON) and that no **Errors** are detected (Red LED is OFF.)

9. Increase the Optical attenuation until the **Errors** LED is ON. Decrease the attenuation until the **Errors** LED goes OFF.

10. Reconnect the Optical Attenuator to the HP 8153A and check that the optical power reading is > –19 dBm.

11. Repeat steps 3 to 10 for all optical **In** ports on this module and any other HP J4225A Receiver Modules.

12. Disconnect the test equipment.

HP J4226A Receiver Module

1. Switch on the VXI mainframe.

2. Check that at power-on, the **Access** LED is ON and that the **Signal** (loss) (Red LED is ON) and the **Frame** (loss) (Red LED is ON).

3. Connect the optical **Out** port on the Transmitter Module to the HP 8153A through the Optical Attenuator. (Ensure that all connectors are tight and that the cables have no twists.)

4. Set up the HP 8153A as follows:
   a. Press **PARAM** key to display wavelength [λ]
   b. Using ←, → ↑ and ↓ keys, set the wavelength to 1310nm.
   c. Press **PARAM** key to display Time [t]
   d. Using ←, → ↑ and ↓ keys, set the time to 200mS.
   e. Press **PARAM** key to display REF.
   f. Using ←, → ↑ and ↓ keys, set the REF to 0.000dBm.
   g. Press **PARAM** key to display CAL.
   h. Using ←, → ↑ and ↓ keys, set the CAL to 0.000dBm.
   i. Press the **ZERO** key on the Power Meter to calibrate - the Power Meter is now ready.

5. Press **MODE** to select the Power Level measurement on the HP 8153A.

6. Set the Optical Attenuator wavelength to 1550 nm and set the attenuation to obtain an optical power reading of –8 dBm on the HP 8153A.

7. Disconnect the Optical Attenuator from the HP 8153A and connect to the optical **In** port.

8. Check that **Signal** present and **Frame** synchronization conditions are present (Green LEDs are ON) and that no **Errors** are detected (Red LED is OFF.)

9. Increase the Optical attenuation until the **Errors** LED is ON. Decrease the attenuation until the **Errors** LED goes OFF.

10. Reconnect the Optical Attenuator to the HP 8153A and check that the optical power reading is > –28 dBm.

11. Repeat steps 3 to 10 for all optical **In** ports on this module and any other HP J4226A Receiver Modules.

12. Disconnect the test equipment.

Performance Test Record

HP J4225A, J4226A
SpectralBER DWDM Receiver Modules

Location: *Serial No.:*

Tested by:

Temperature: *Certified by:*

Humidity: *Date:*

Page	Test Description		Result		
			Min.	**Actual**	**Max.**
28	***Receiver Optical Sensitivity Test HP J4225A***				
29	Step 2			Pass/Fail	
29	Step 8			Pass/Fail	
29	Step 9			Pass/Fail	
29	Step 10	> –19 dBm	–19 dBm	Pass/Fail	
29	Step 11	Repeat 3 to 10		Pass/Fail	
30	***Receiver Optical Sensitivity Test HP J4225A***				
30	Step 2			Pass/Fail	
30	Step 8			Pass/Fail	
30	Step 9			Pass/Fail	
30	Step 10	> –28 dBm	–28 dBm	Pass/Fail	
30	Step 11	Repeat 3 to 10		Pass/Fail	