Installation/User's Guide

Agilent J3988A OC-12 ATMProbe

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AGILENT PRODUCT	DURATION OF LIMITED WARRANTY
OC-12 ATMProbe	1 year

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Operating Restrictions

The following warnings and operating information are shown in French followed by the English translation.

MISE ENGARDE

Cet appareil répond aux normes de la «Classe de sécurité I» et est muni d'un fil de mise à la terre pour votre protection.

MISE ENGARDE

Pour prévenir les risques de choc électrique, la broche de mise à la terre du cordon d'alimentation ne doit pas être désactivée.

Restrictions d'utilisation
L'utilisateur se doit d'observer les mesures de précaution énumérées ci-dessous pour toutes les phases d'utilisation, de service et de réparation de cet appareil. Le fait de ne pas s'y conformer équivaut à ne pas respecter les mises en gardes spécifiques contenues dans ce manuel et constitue une violation des normes de sécurité relatives à la conception, la fabrication et l'utilisation prévue de cet appareil. La société Agilent Technologies, Inc. n'assume aucune responsabilité envers un client qui manquerait de se conformer à ces exigences.

Mise à la terre
Afin de minimiser les risques de choc électrique, le chÀssis et le cabinet de l'appareil doivent être mis à la terre. L'appareil est équipé d'un cordon d'alimentation muni d'une fiche homoloquée à trois lames, compatible c.a. La prise murale et la prise femelle de la rallonge électrique doivent respecter les normes de sécurité de la «Commision électrotechnique internationale» (IEC).

WARNING

This product is a Safety Class I instrument with a protective earth terminal.

WARNING

For protection from electric shock hazard, power cord ground must not be defeated.

Operating Restrictions
The following general safety precatuions must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions with specific warnings in this manual violate safety standards of design, manufacture, and intended use of this instrument.

Grounding
To minimize shock hazard, the instrument chassis and cabinet must be connected to an electrical ground. The instrument is equipped with a three-conductor AC power cable compatible with an approved three-contact electrical outlet. The power jack and mating plug of the power cord must meet International Electrotechnical Commission (IEC) safety standards.

Environnement
Ne faites pas fonctionner cet appareil en présence de gaz inflammables ou de vapeurs dangereuses. L'utilisation de n'importe quel appareil électrique dans ces conditions constitue un risque élevé pour votre sécurité.

Service et ajustement
Des «tensions dangereuses» résident dans cet appareil. Par conséquent, le service et l'ajustement doivent être effectués uniquement par une personne qualifiée.

Ne remplacez pas de composantes lorsque le cordon d'alimentation est sous tension. Il pourrait y avoir présence de «tensions dangereuses» même lorsque l'appareil est déconnecté.

Ne faites pas de service interne ou d'ajustement sauf en présence d'une autre personne, capable de prodiguer les premiers soins et de pratiquer la réanimation.

Service non autorisé
L'installation de pièces étrangères, ou toute modification apportée à l'appareil sans le consentement de Agilent Technologies, Inc. est formellement interdit. Le fait de procéder à de tels modifications sans autorisation pourrait entraîner l'annulation de la garantie de l'appareil ou de tout contrat de service.

Pour un service et des réparations autorisées, retournez l'appareil à un point de vente et service Agilent Technologies, Inc.

Environment
Do not operate the instrument in the presence of flammable gases or fumes. Operation of any electrical instrument in such an environment constitutes a definite safety hazard.

Service and Adjustment
Dangerous voltages exist within this instrument. Service and adjustment of this instrument is to be performed only by trained service personnel.

Do not replace components with the power cable connected. Dangerous voltages may be present even when the power cable is disconnected.

Do not perform internal servicing or adjustment unless another person, capable of rendering first aid and resuscitation is present.

Unauthorized Service
The installation of substitute parts or the installation of any instrument modification not authorized by Agilent Technologies, Inc. is specifically forbidden. The performance of such unauthorized service can negate the instrument warranty or any maintenance agreements.

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NetMetrix Division
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Colorado Springs, Colorado 80919-2497

Safety Information

Before you use this instrument, be sure to pay special attention to the “Safety” and “Warning” topics in this Manual. Failure to comply with the precautions or with specific warnings in this book violates safety standards of design, manufacture, and intended use of this instrument. Agilent Technologies, Inc. assumes no liability for the customer’s failure to comply with these requirements.

Electric Shock Hazard. Do not remove the system covers. To avoid electric shock, use only the supplied power cords and connect only to properly grounded (3-pin) wall outlets.

Explosion Hazard. Do not operate in the presence of flammable gases.

Fire Hazard. For continued protection against fire hazard replace only with fuse of same type and rating.

Indoor Use. This instrument is designed for indoor use.

Cleaning. To clean the instrument, use a damp cloth moistened with a mild solution of soap and water. *Do not* use harsh chemicals. *Do not* let water get into the instrument.

Product Damage. Do not use this product when:

- the product shows visible damage,
- fails to perform,
- has been stored in unfavorable conditions, or
- has been subject to severe transport stresses.

Make the product inoperative and secure it against any unintended operation. Contact your nearest Agilent Technologies, Inc. sales office for assistance.

Defects and Abnormal Stresses. Whenever this instrument has been damaged or wet, make the product inoperative and secure it against any unintended operation.

Warning Symbols Used in This Book

Instruction book symbol: the product will be marked with this symbol when it is necessary for the user to refer to the instruction book in order to protect against damage.

Indicates potential for electrical shock.

WARNING An operating procedure, practice, etc. which, if not correctly followed could result in personal injury or loss of life.

CAUTION An operating procedure, practice, etc. which, if not strictly observed, could result in damage to, or destruction of, equipment or software.

Conventions Used in this Book

NOTE

An operating procedure, practice, or information of importance, is separated from normal text as shown in this NOTE.

Terminology and conventions in this manual are handled with the following methods:

- Keys on the keyboard such as **PgDn** (page down) or **F1** (function key #1) are printed in the characters you see here.
- Text that you should type is printed in characters such as: `Filename.ext`
- In some cases, you must press two keys simultaneously. This is represented as **CTRL + Q**.

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Printing History

New editions are complete revisions of this book. Update packages may contain new or additional material and be released between editions. See the date of the current edition on the back cover of this book.

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Additional Help

You can obtain additional assistance in the U.S. by calling U.S. Response Center at 888 699 7280, or Internationally by calling your local Agilent Technologies, Inc. Sales Office.

Contents

Figures

Tables

1

Introduction

Introduction

This chapter introduces the Agilent J3988A OC-12 ATMProbe, shown in Figure 1-1.

The OC-12 ATMProbe supports the OC-12C, STS12C and STM-4C standards.

You can use your ATMProbe with the NetMetrix[1]/UX software, supported by HP-UX and Solaris.

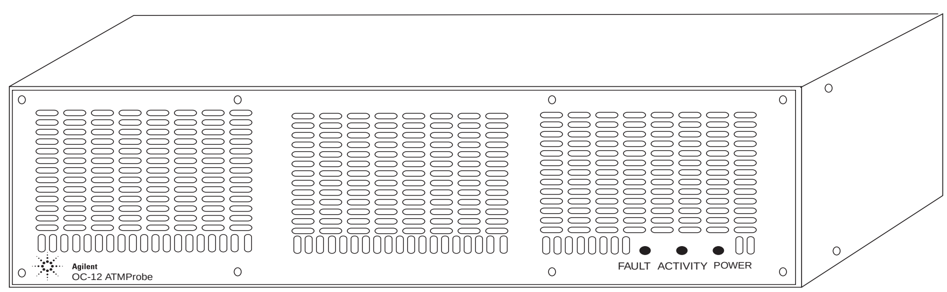

Figure 1-1: The OC-12 ATMProbe

1.The term "NetMetrix" is used in this manual to refer to HP OpenView NetMetrix/UX.

Probe Overview

The OC-12 base hardware configuration supports an OC-12 ATM interface, a 10Base-T/100Base-TX telemetry interface, and a PPP (Point-to-Point Protocol) connection. The OC-12 ATM interface monitors both directions of a full-duplex circuit simultaneously. Probe data is retrieved using SNMP (Simple Network Management Protocol) via a LAN or PPP connection. The OC-12 ATM interface uses either multimode or single-mode transceivers with two Fiber SC connectors.

The OC-12 ATMProbe has a 6-pin mini-DIN connector (Bypass Power) that allows the ATMProbe to be connected to an external optical bypass. For multimode fiber interfaces using Fiber SC connectors, the optical bypass maintains the network link even if the OC-12 ATMProbe has a power interruption. Optical splitter equipment is also available for multimode and single mode fiber. This equipment is recommended for network link integrity.

The OC-12 ATMProbe has 64 MB of memory (optionally 128 MB), and uses Flash EPROM.

Upgrades to the probe’s firmware are easily downloaded over the network to multiple probes simultaneously.

The ATMProbe maintains a variety of statistical measurements on network performance, continuously keeping track of traffic levels, errors, and other important trends. A variety of alarm thresholds can be set to immediately alert the network manager or to initiate a packet trace to capture details of an event for later analysis. AAL-5 traffic and error levels are monitored for the ATM connection. Information is available on a per-PVC (Permanent Virtual Circuit) basis or as an aggregate of all active SVCs. This information is presented as a single set of statistics.

In addition to using SNMP and selected RMON MIB (Remote Network Monitoring Management Information Base) groups, the ATMProbe uses Agilent private MIB extensions to:

- Define event notification for multiple SNMP trap addresses, or groups of addresses.

- Use a real-time utilization variable to provide alarm capability for instantaneous peaks of network load.
- Establish an additional Out-of-Band connection to the probe using PPP, either directly, or with a modem.

CAUTION Because the OC-12 ATMProbe repeats the received signal, a loss of power to the probe results in an interruption of the network signal on the monitored fiber link. To eliminate this possibility, you must install the optional Optical Bypass Switch (J4615A) or SMF/MMF Optical Splitters (J4613A and J4614A).

Installation and Configuration Overview

To quickly install and configure the probe, it is important to understand the basic configuration and installation options. Configuration consists of setting a variety of probe parameters, for example IP address. Installation involves configuring the probe and connecting it to the network.

Local Terminal Configuration and Installation

This method of installation and configuration requires configuring the probe first and then installing the probe. These procedures are detailed in “Local Terminal Configuration and Installation” on page 5 and in Chapter 3 “Introduction”.

System Overview

A typical probe distributed monitoring system consists of the following:

- One or more ATMProbes
- One or more NetMetrix management stations, using NetMetrix

Figure 1-2 on page 6 shows an ATMProbe system example.

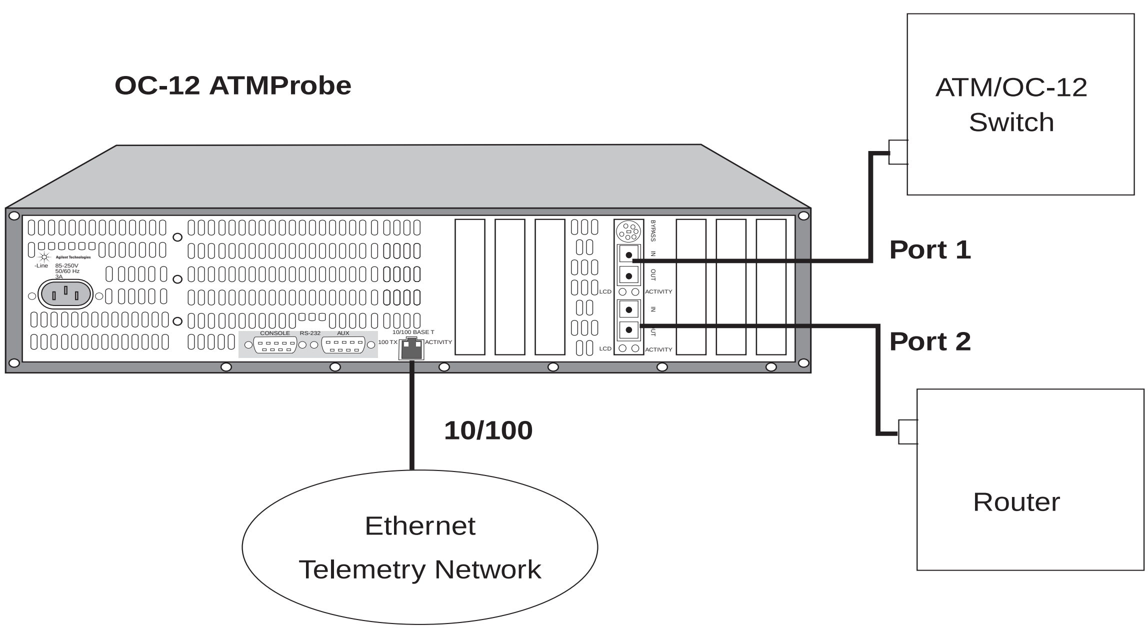

Figure 1-2: Probe System Example

Supported MIBs

The J3988A OC-12 ATMProbe uses SNMP, MIB-II, Agilent private MIB extensions, and implements groups 3, 7, 8, and 9 of RFC 1757, the Remote Network Monitoring Management Information Base (RMON-1 MIB) to provide the following features:

- Alarms
- Filters
- Packet Capture
- Events
- Log
- Trap
- PVC configuration
- ATM Layer Statistics
- ATM Layer Historical Statistics
- AAL-5 Protocol Statistics
- AAL-5 Historical Protocol Statistics
- Per PVC AAL-5 Protocol Statistics
- Per PVC AAL-5 Historical Protocol Statistics
- SVC Aggregate AAL-5 Protocol Statistics
- SVC Aggregate AAL-5 Historical Protocol Statistics

The J3988A OC-12 ATMProbe also implements all 10 groups of RMON-2 RFC 2021 and Protocol Directory RFC 2074. (Refer to the RFC for more information.)

Additionally, the probe uses the Agilent private MIB which:

- Contains all ATM statistics and allows configuration and administration of the probe.

- Provides enhanced authentication features, specification of trap destinations, remote download of new firmware revisions, serial line control, and other features.

The Agilent private MIB is available electronically with NetMetrix application software.

Management Stations

Management stations gather network data collected by Agilent probes. They present this information in easy-to-use and easy-to-understand text and graphic formats. You use a management station to communicate with the probe after it has been installed and configured.

The probe communicates with the NetMetrix software running on your management station. NetMetrix management applications allow you to review and reconfigure the probe parameters (such as IP address, trap destinations, filters, and packet captures), to manage the information collected by the probe (including statistics, historical studies, alarms, and captured packet traces), and to monitor local or remote networks (by gathering network statistics from Agilent probe agents as network monitors).

Refer to your NetMetrix documentation for more information.

Access Security

The probe's configuration menu allows network administrators to disable standard RMON functions which could be considered a security risk. The security menu allows network administrators to disable the RMON-1 packet capture capabilities of the probe to prevent network users from viewing network traffic. TFTP firmware downloads can be disabled to prevent users from downloading earlier versions of the probe firmware. For more information, refer to "Modify/View Security Values" on page 22.

The probe's private MIB uses a four-level access control scheme. An access level is assigned for each community string used with the probe. The access level is an integer value between one and four, with increasing degrees of authorization granted for higher authorization numbers. Each higher level is granted the rights of all lower levels in addition to the specific privileges of that level. Table 1-1 shows access privileges by level.

Default Community Name	Level	Permissions
public	1	Read access to MIB-II objects.
rmon	2	Read access to MIB-II, RMON* MIB, and the probe MIB objects, excluding the objects in the accessControl group and in the captureBuffer Table.
rmon_admin	3	Write access to RMON* MIB and the probe MIB objects, excluding the objects in the probeAdmin, interface, and accessControl groups. Read access to MIB-II, RMON* MIB (including the captureBuffer Table), and the probe MIB objects, excluding those in the accessControl group
agilent_admin	4	Read and write access to all MIB-II, RMON* MIB, and the probe MIB objects.
* RMON implies RMON-1 and RMON-2.		

Table 1-1: Private MIB Access Security Privileges

Status LEDs

The OC-12 ATMProbe has status LEDs for both the base hardware configuration (the 10Base-T/100Base-TX telemetry interface), and for the OC-12 ATM interface. These LEDs are located on the front and back panels of the probe. (Figure 1-3 on page 12 shows the LEDs on the front of the probe and Figure 1-4 on page 13 shows the LEDs on the back of the probe.)

Front Panel LEDS

The ~ Power, Activity, and Fault LEDs are on the front of the probe.

~ Power. This green LED is turned on when the probe is receiving power.

Activity. This green LED is turned on as data is received from the Ethernet telemetry network or transmitted by the probe. The frequency of flashing indicates the amount of network traffic. During periods of steady traffic, this LED will stay solid green.

Fault. This yellow LED is turned on when the probe needs to be reset, repaired, or replaced, while new firmware is downloaded, during the power-on self-test, or during a cold or warm start.

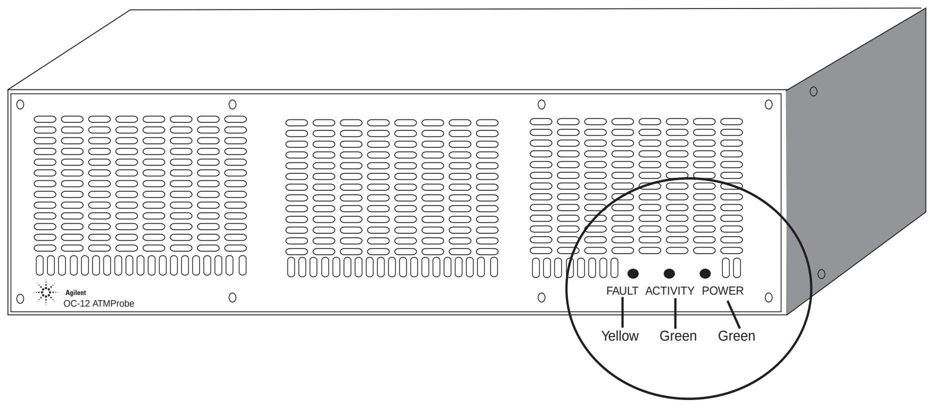

Figure 1-3: Front Panel LEDs

Rear Panel Telemetry LEDs

The telemetry LEDs are located on the back of the probe. There are two LED indicators for each interface/port—LCD (Loss of Cell Delineation) and Activity.

LCD (Loss of Cell Delineation). This red LED is turned on when the probe has lost cell delineation or is unable to find the HEC (Header Error Control) in each ATM cell. The probe is unable to synchronize and cannot properly read the ATM cells.

Activity (Port 1 and Port 2). These green LEDs are turned on as valid cells are received from the network through the OC-12 ATM interface. The frequency of flashing indicates the amount of network traffic. During periods of steady traffic, this LED will stay solid green.

The 10Base-T/100Base-TX telemetry interface has an LED for 10/100 Mbps Link Speed Indication and an LED for Activity.

10/100 Mbps Link Speed Indication. This green LED is turned on when the link is correctly running at 100Mbps.

Activity. This green LED is turned on as data is received from the telemetry interface. The frequency of flashing indicates the amount of network traffic. During periods of steady traffic, this LED will stay solid green.

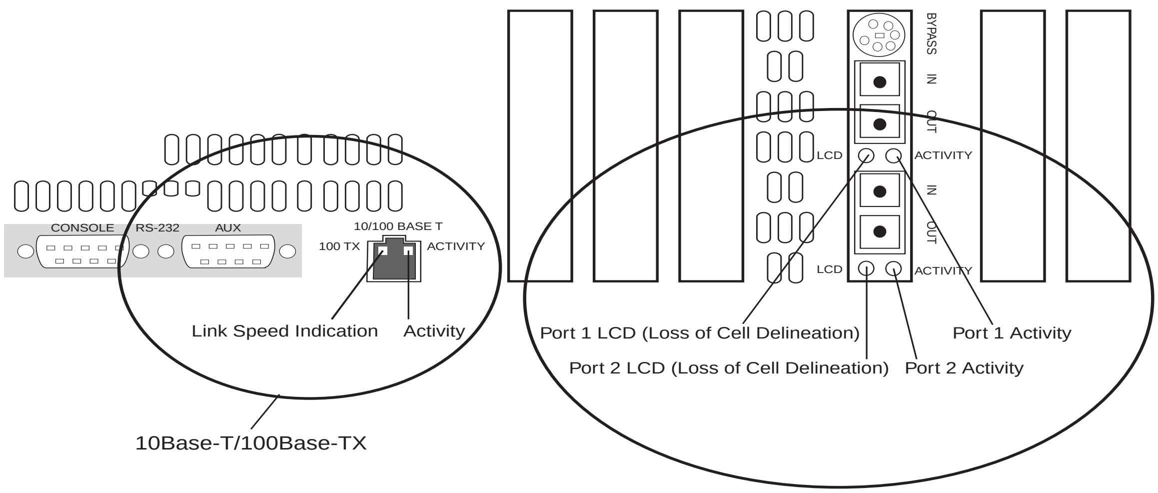

Figure 1-4: Rear Panel LEDs

Included Parts

The following parts are included with the Agilent J3988A OC-12 ATMProbe:

- Agilent J3988A ATMProbe
- *Agilent J3988A OC-12 ATMProbe Installation/User's Guide*—this manual (J3988-99501)
- Hardware Kit (5064-8756)
  - Two Mounting Brackets for the Agilent Probe
  - Four 10-mm #M4 Mounting Screws
  - Four 5/8-in #12-24 Mounting Screws
  - Four Self-Adhesive rubber feet
- Power Cord, one of the following:
  - Australian (8120-1369)
  - Danish (8120-2957)
  - European (8120-1689)
  - Japanese (8120-4753)
  - South Africa (8120-4600)
  - Swiss (8120-2104)
  - United Kingdom (8120-1351)
  - United States/Canada 125 V (8120-1378)
  - United States/Canada 250 V (8120-0698)

Optional Accessories

The following probe accessories can be purchased from Agilent:

- Null Modem Cable—9 pin to 25 pin (Agilent 24542G)
- RS-232 Cable (Agilent 5182-4794)
- External Optical Bypass Switch (Agilent J4615A)
- Single Mode Splitter (Agilent J4613A)
- Multimode Splitter (Agilent J4614A)

2

Local Terminal Configuration

Local Terminal Configuration

This chapter describes how to use a local terminal to configure your Agilent J3988A OC-12 ATMProbe to communicate via a network.

Probe Configuration Using a Local Terminal

An initial configuration of the probe is necessary before it can communicate over the LAN telemetry network interface, serial port, and ATM interface. You perform the configuration by using a series of configuration menus that provide you with a number of options (fields) to choose from.

NOTE

This chapter covers all the information you will need to perform the initial configuration of the probe with the exception of, the **TFTP Download new firmware** and **XMODEM Download new firmware** menu items and the **Warm start and Exit** and **Cold start and Exit** menu items. These topics are explained in Chapter 5, “Download New Firmware” and in Chapter 4, “Probe Operation”, respectively.

The initial configuration of the Ethernet LAN Telemetry network (10Base-T or 100Base-TX) communication includes:

- IP Address
- Default Gateway IP Address (if required)
- Subnet Mask (if required)
- Autodiscovery Echo Interval

The initial configuration of the serial port communication link includes:

- Serial Port IP Address
- Serial Port Subnet Mask (if required)
- Serial Port Speed
- Serial Port Mode
- Modem Control String (if required)

The initial configuration of the OC-12 ATM interface parameters includes:

- Cell Synchronization
- Cell Scrambling
- Network Type (UNI/NNI)

Refer to “OC-12 Interface Configuration—ATM Interface” on page 26 for additional information.

The following configuration parameters are used to display time and date information in the user interface. A separate internal clock is used to time-stamp data collected from the network.

- Date
- Time
- Time Zone

Using the Main Menu

To configure the probe, connect a terminal directly to the probe and use the probe Main Menu.

NOTE The probe is not available to the network when you are using the configuration menus.

To view the probe Main Menu:

1. Connect a terminal or a personal computer (PC) emulating a terminal to the probe RS-232 connector using a null modem cable. Refer to Appendix 1 “Cables and Connectors”, for more information.

2. Configure the terminal for 8 bits/character, 1 stop bit, no parity, Xon/Xoff handshaking, and a baud rate of 9600.

3. Connect the power cord to the probe and to a power source (either 100-120/VAC or 220-240/VAC).

NOTE

The probe does not have a power switch, it turns on when the power is connected and the probe boots (approximately 1 minute).

4. To start configuration, press ENTER. You see the Main Menu (Figure 2-1). If the Main Menu is not displayed, verify the previous set-up steps.

```
Main Menu - Revision 1.00.00


1.Modify/View configuration values ->
2.Modify/View security values ->
3.Modify/View interface values ->
4.Display interface summary
5.TFTP Download new firmware ->
6.XMODEM Download new firmware ->
7.Warm start the probe
8.Cold start the probe
9.Shutdown the device
```

Figure 2-1: Probe Main Menu

NOTE

Item 5 (**TFTP Download new firmware**) is not displayed if the **Allow TFTP firmware downloads** menu item is not enabled. Refer to “Modify/View Security Values” on page 22 for more information on enabling this menu item.

Additionally, if item 5 (**TFTP Download new firmware**) is not displayed, the number used for items 6, 7, and 8 will be different.

Modify/View Configuration Values

To configure items in the Modify/View Configuration Values menu:

1. On the Main Menu, press **1**, **Modify/View Configuration Values**. You see the Modify/View Configuration Values menu (Figure 2-2).

```
Modify/View Configuration Values Menu
Memory configuration
1.Autodiscovery echo interval (sec.)  1800
2.Date                                Mon 07/19/1999
3.Time                                14:17:14
4.Time zone                           MDT
S.Save changes and exit
O.Cancel changes and exit
```

Figure 2-2: Modify/View Configuration Values Menu

2. Press a number to select a field and then type the corresponding values necessary to configure the probe to operate on your network.

Autodiscovery Echo Interval	Press **1** and then type the autodiscovery echo interval, in seconds (optional). This parameter sets the time interval the probe uses to transmit the autodiscovery frame used by HP OpenView to maintain the network map. The default value is 30 minutes (1800 seconds). A value of zero results in no autodiscovery frame transmission.

Date	Press **2** and then type the day of the week and then the date in month/day/year form.
Time	Press **3** and then type the time of day in hours, minutes, seconds (*hh:mm:ss*) format.
Time Zone	Press **4** and then type your time zone in one to 15 characters (optional).
	The Time Zone characters are stored for your convenience and are used to time-stamp probe information.

NOTE The recommended practice is to use the format of Time Zone, hours from Greenwich mean time, and then Daylight Saving Time, such as PST8PDT for Pacific Standard Time (the default). The probe does not automatically update the Time field when your local time changes between standard time and daylight savings time.

The values you enter for date and time take effect as soon as you enter them. All other parameters do not take effect until you select **Save Changes and Exit**.

3. Press **S** to save your configuration changes and return to the Main Menu.

4. Press **0** to cancel your current changes and return to the Main Menu.

Modify/View Security Values

To configure security values for probe access, you use the Modify/View Security Values menu.

1. On the Main Menu, press **2**, **Modify/View Security Values**. You see the Modify/View Security Values menu (Figure 2-3).

```
Modify/View Security Values Menu


1.Allow packet capture                    Yes
2.Allow TFTP downloads                    Yes
S.Save changes and exit
0.Cancel changes and exit
```

Figure 2-3: Modify/View Security Values Menu

2. Press a number to select a field and then type the corresponding values necessary to configure the probe to operate on your network. See "Access Security" on page 9 for more information on security.

Allow Packet Capture	Press **1** and then type `Yes` to allow or `No` to not allow packet capture.
Allow TFTP Firmware Downloads	Press **2** and then type `Yes` to allow or `No` to not allow TFTP firmware downloading.

3. Press **S** to save your changes and return to the Main Menu.

4. Press **0** to cancel your changes and return to the Main Menu.

Modify/View Interface Values

Use the Modify/View Interface Values menu to configure the probe port interface settings. This procedure involves two steps—selecting the port and then setting the configuration. For example, the options for the port configuration are:

- [1] 1.1/Ethernet
- [2] 1.2/Serial
- [3] 2.1/ATM
- [4] 2.1/ATM-AAL5
- [5] 2.1/STS12C-STM4

NOTE Refer to "Display Interface Summary" on page 29 for information on port types and port numbers for the installed interfaces.

NOTE Port 1 is always the Ethernet telemetry interface (the 10Base-T/100Base-TX with RJ-45 connector).

Fast Ethernet Telemetry Interface Configuration

Use the following procedure to configure the Fast Ethernet Telemetry Interface:

1. On the Main Menu, press **3**, **Modify/View Interface Values**. You see the Modify/View Interface Values menu (Figure 2-4).

```
Modify/View Interface Values Menu
MAC Address                       04 00 00 00 20 b3
Interface Type                    Ethernet
1.Port                            1.1/Ethernet
2.Port Type                       Telemetry
3.IP address                      15.6.75.125
4.Default gateway IP address      15.6.72.1
5.Subnet mask                     255.255.248.0
6.Physical Connector              RJ-45
7.Link speed                      Auto Negotiate
S.Save changes and exit
O.Cancel changes and exit
```

Figure 2-4: Modify/View Interface Values Menu (Fast Ethernet)

2. Press a number to select a field and then type the corresponding values necessary to configure the probe to operate on your network.

Port	Press **1** and then press **1** again to display the current Ethernet port configuration parameters and current settings.
Port Type	The Fast Ethernet interface is always used as a Telemetry port. The telemetry port does not maintain network statistics for the Fast Ethernet interface. The telemetry interface only allows the retrieval of ATM network statistics.

The Telemetry port receives packets through the telemetry port IP address, transmits packets to the network, and is used for SNMP communications to the probe. It requires the IP Address, Subnet Mask, and Default Gateway IP Address fields.

The telemetry port interface:

- Uses HP OpenView to locate the interface.
- Is IP addressable.
- Responds to SNMP Queries or MIB-2.
- Transmits all traps from the probe.
- Transmits all extended RMON packets sampled from the Monitor-only ports and Monitor/Transmit ports.

IP Address	Press **3** and then type the IP address for the probe. (This does not apply to ports configured as Monitor-Only.)
Default Gateway IP Address	Press **4** and then type the default gateway IP address for the probe (optional).
Subnet Mask	Press **5** and then type the subnet mask for the probe.
Physical Connector	Press **6** and choose a physical connector. (The menu displays the physical connectors that are available.)

3. Press **S** to save your configuration changes and return to the Main Menu.

4. Press **0** to cancel your changes and return to the Main Menu.

OC-12 Interface Configuration—ATM Interface

Use the following procedure to configure the OC-12 ATM interface:

1. On the Main Menu, press **3**, **Modify/View Interface Values**. You see the Modify/View Interface Values menu (Figure 2-5).

```
Modify/View Interface Values Menu - Firmware Rev


Interface Type                  ATM

1.Port                          3.1 ATM

2.Port Type                     Monitor only

3.Network Type                  UNI

S.Save changes and exit

O.Cancel changes and exit
```

Figure 2-5: Modify/View Interface Values Menu (OC-12 ATM Interface)

2. Press a number to select a field and then type the corresponding values necessary to configure the probe to operate on your network.

Port	Press **1** and then type `ATM`. You see the port configuration settings. (See “Display Interface Summary” on page 29 for information on port types and port numbers.)
Port Type	Press **2** and type `Monitor only` as the port type.
Network Type	Press **3** and then type the Network Type as UNI (User Network Interface) or NNI (Network to Network Interface or Network to Node Interface).

3. Press **S** to save your configuration changes and return to the Main Menu.

4. Press **0** to cancel your changes and return to the Main Menu.

OC-12 Interface Configuration—STS12C/STM4 Interface

Use the following procedure the OC-12 ATM STS12C/STM4 interface:

1. On the Main Menu, press **3**, **Modify/View Interface Values**. You see the Modify/View Interface Values menu (Figure 2-6).

```
Modify/View Interface Values Menu - Firmware Rev


Interface Type                    STS12C/STM4

1.Port                            3.1 STS12C/STM4

2.Port Type                       Monitor only

3.Cell Synchronization            HEC

4.Cell Scrambling                 ON

S.Save changes and exit

O.Cancel changes and exit
```

Figure 2-6: Modify/View Interface Values Menu (STS12C/STM4 Interface)

2. Press a number to select a field and then type the corresponding values necessary to configure the probe to operate on your network.

Port	Press **1** and then type `STS12C/STM4`. You see the OC-12 ATM port configuration settings. (See “Display Interface Summary” on page 29 for information on port types and port numbers.)
Port Type	Press **2** and then type `Monitor only` as the port type.
Cell Synchronization	Press **3** and then type `HEC.`
Cell Scrambling	Press **4** and then type `On` or `Off` to enable Cell Scrambling.

3. Press **S** to save the configuration changes and return to the Main Menu.

4. Press **0** to cancel your current changes and return to the Main Menu.

OC-12 Interface Configuration—ATM/AAL5 Interface

Use the following procedure the OC-12 ATM/AAL5 interface:

1. On the Main Menu, press **3**, **Modify/View Interface Values**. You see the Modify/View Interface Values menu (Figure 2-7).

```
Modify/View Interface Values Menu - Firmware Rev


Interface Type                  ATM/AAL5

1.Port                          3.1 ATM-AAL5

2.Port Type                     Monitor only

S.Save changes and exit

0.Cancel changes and exit
```

Figure 2-7: Modify/View Interface Values Menu (ATM/AAL5 Interface)

2. Press a number to select a field and then type the corresponding values necessary to configure the probe to operate on your network.

Port	Press **1** and then type `ATM /AAL5`. You see the port configuration settings. (See “Display Interface Summary” on page 29 for information on port types and port numbers.)
Port Type	Press **2** and type `Monitor only` as the port type.

3. Press **S** to save the configuration changes and return to the Main Menu.

4. Press **0** to cancel your current changes and return to the Main Menu.

Display Interface Summary

Use the following procedure to display the Interface Summary screen (Figure 2-8). This screen lists the Interface, Port Type, and IP Address.

1. On the Main Menu, press **4**, **Display Interface Summary**. You see the Display Interface Summary listing Interface, Port Type, and Port IP address.

```
Display Interface Summary

Interface          Port Type          IP Address

----------------   ----------------   ----------------

1.1/Ethernet       Telemetry          15.6.75.133

1.2/Serial         Not Applicable     0.0.0.0

2.1/ATM            Monitor-only       Not Applicable

2.1/ATM-AAL5       Monitor-only       Not Applicable

2.1/STS12C-STM4C   Monitor-only       Not Applicable
```

Figure 2-8: Display Interface Summary

2. Press `Enter` to return to the Main Menu.

Modify/View Serial Port Settings

You use the Modify/View Interface Values Menu to view or modify the serial port settings. Use the following procedure to configure the probe serial port:

1. On the Main Menu, press **3**, **Modify/View Interface Values**. You see the Modify/View Interface Values Menu.
2. Select **Interface Type** and then type `Serial`.
3. Press **1, Port** and then type the `Serial Port Number`. You see the current serial port settings (Figure 2-9).

```
Modify/View Interface Values Menu - Firmware Rev
Interface Type                      Serial
1.Port                              1.2 Serial
2.Port Type                         Not Applicable
3.Serial port IP address            0.0.0.0
4.Serial port subnet mask           0.0.0.0
5.Serial port speed                 9600
6.Serial port mode                  Direct
7.Serial port hardware flow control On
8.Modem Init String                 ^s^M^d1^sATE0Q0V1X4
9.Modem Hangup String               ^d2^s+++^d2^sATH0^M^
10.Modem Connect Responses          /CONNECT/300/CONNECT
11.Modem No-Connect Responses       /NO CARRIER/BUSY/NO
D.Restore default values
S.Save changes and exit
O.Cancel changes and exit
```

Figure 2-9: Modify/View Interface Values Menu (Serial Port)

4. Press a number to select a field and then type the corresponding values necessary to configure the probe to operate on your network.

Serial port IP address	Press **3** and then type the serial port IP address. The default Serial Port IP Address is `0.0.0.0`.

Serial port	Press **4** and then type the serial port subnet mask (optional). It is recommended that you **do not** change the serial port subnet mask unless there is a conflict. The default Serial Port Subnet Mask is `255.255.255.192.`
Serial port speed	Press **5** and then type a serial port speed (300 to 38,400 baud) for the probe's SNMP connection. The default is 9600 baud. This speed is used **only** for Out-of-Band access to the probe using SNMP. It does not affect the serial connection for the local terminal, which is fixed at 9600 baud. Make sure that the serial port speed is set to less than or equal to the maximum speed of the modem to be used.
Serial port mode	Press **6** and then select the serial port mode by pressing **1** for direct connection (the default) or press **2** for modem connection.
Serial port hardware flow control	Press **7** and then type `Off` hardware flow control Off by pressing **1** or hardware flow control On (the default) by pressing **2**.
Modem Init String	Press **8** and type the modem initialization string. Only the first 20 characters of the 256 character maximum will be displayed in the Modify/View Serial Port Settings menu. The default is `^s^M^d1^sATEOQOV1X4 S0=1 S2=43^M`.
Modem Hangup String	Press **9** and type the modem hang-up string. Only the first 20 characters of the 256 character maximum will be displayed in the Modify/View Serial Port Settings menu. The default is `^d2^s+++^d2^sATHO^M^d2`.
Modem Connect Responses	Press **10** and type the modem connect responses. Only the first 20 characters of the 256 character maximum will be displayed in the Modify/View Serial Port Settings menu. The default is `/CONNECT/300/`

`CONNECT 1200/1200/CONNECT 2400/2400/CONNECT 4800/4800/CONNECT 9600/9600/CONNECT 14400/14400/CONNECT 19200/19200/CONNECT 38400/38400/`.

Modem No-Connect Responses	Press **11** and type the modem no-connect responses. Only the first 20 characters of the 256 character maximum will be displayed in the Modify/View Serial Port Settings menu. The default is `/NO CARRIER/BUSY/NO DIALTONE/NO ANSWER/ERROR/`.

5. Press **S** to save the configuration changes and return to the Main Menu.

6. Press **0** to cancel your current changes and return to the Main Menu.

Exiting the Main Menu and Restarting the Probe

1. On the Main Menu, press **7** to execute a warm start or press **8** to execute a cold start.

   A cold start is required if you change the IP Address, Default Gateway, or Subnet Mask. For either menu choice, the probe exits the Main Menu and restarts normal operations.

2. If you are performing the initial probe configuration, prepare the probe for installation by disconnecting the power cord. You will not lose your initial configuration information.

NOTE A warm start resets all data collected by the probe. A cold start resets all data collected by the probe and also resets any user-configuration information, such as history studies, filters, and alarms to their default values. Refer to Chapter 4 “Probe Operation” for more information on what is reset by warm and cold starts.

After the probe restarts (boots), it operates normally using the new configuration information. The warm start or cold start occurs immediately and there is no visual indication of when it finishes.

3

Installation

Installation

This chapter describes how to install the Agilent J3988A OC-12 ATMProbe.

If you plan to configure the probe from a local terminal and have not yet done so, go to Chapter 2 “Local Terminal Configuration”, and perform the configuration now.

Selecting a Location

Select a location for probe installation that takes into consideration the following requirements:

- The probe must be connected to a LAN to retrieve data.
- A flat surface is required that is large enough to support the probe (requires clearance at rear and sides for cooling and access).
- Double-high space in a 19-inch rack or cabinet.
- A grounded power outlet (either 100-120/VAC or 220-240/VAC).
- Access to a Fast Ethernet connection tap.
- Access to the ATM connection.
- Access to an RS-232C connection (required only for Out-of-Band communication).
- Access to a phone line and a modem within 50 feet (required only for Out-of-Band communication using a modem connection).

NOTE

The MAC address for the probe is on the rear panel. It is a good idea to make a note of the interface and address *prior* to installing your probe. Some installations make it difficult to see the rear panel without removing the probe.

Installing the Probe

This section describes how to install your probe. The OC-12 ATMProbe can be installed in two ways—a table installation and a rack or cabinet installation.

CAUTION Do *not* attach the power cord to the probe until the probe is completely installed. If the power cord is already attached to the probe, remove it (you will not lose any configuration parameters). The probe does not have a power switch and becomes operational when attached to the power source.

Table Installation

Use the following procedure to install the probe on a table:

1. Attach the self-adhesive rubber feet to the bottom of the probe at each corner.

2. Place the probe on a flat surface (refer to the requirements as listed in “Selecting a Location” on page 37).

Rack or Cabinet Installation

Install the probe in a rack or cabinet with either the front or rear panel facing out. You may want the rear panel facing out so that you can see the status LEDs for each port.

Use the following procedure to install the probe in a rack or cabinet:

1. Attach the installation brackets to the probe with the 10-mm #M4 screws (included), using a POZIDRIV® #2 or cross-head screwdriver (Figure 3-1).

2. Position the probe in the rack or cabinet and slide it up or down until the rack holes line up with the holes in the brackets.

3. Attach the probe to the rack with the 5/8-in. #12-24 screws (included). Some cabinets require 5/8-in. #10-32 screws (available as Agilent part number 2680-0302) instead of the 5/8-in. #12-24 screws.

Figure 3-1 shows a rack or cabinet installation.

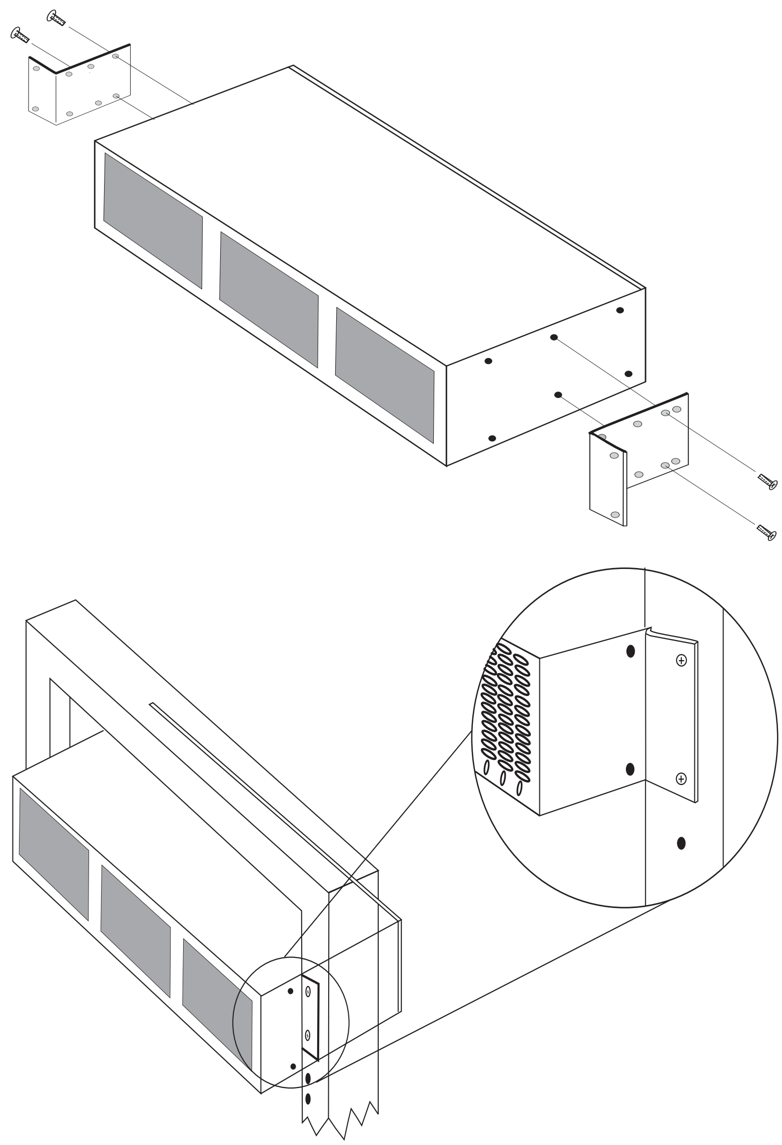

Figure 3-1: Installing the Probe in a Rack or Cabinet

Connecting the Probe

The probe communicates with Agilent NetMetrix through Out-of-Band connections using the 10Base-T/100Base-TX or a serial connection. You connect to an ATM network using the OC-12 ATM interface.

You can establish both telemetry and serial Out-of-Band connections to provide the option of communicating with the probe either over the telemetry network or over the serial link. The ethernet telemetry connection has the advantage of being faster than the serial connection. The disadvantage of using only the telemetry connection is that certain network or component failures can result in a loss of communication with the probe.

The Out-of-Band serial connection is used as the primary means of communication or as a backup link in case of a failure on the telemetry network. The disadvantage of using only the serial connection is that it is a slower means of communication.

You can connect an Optical Bypass switch and cable (optional) to the Bypass Power connector. The bypass switch allows uninterrupted network performance if the probe losses power. Multimode and single mode splitters are available. The use of bypass switches for MMF or splitters for MMF or SMF are strongly recommended.

About the Information in the Following Sections

It is assumed that you understand the basic terminology and concepts of ATM network test interfaces.

Comprehensive coverage of network test connections and physical layer testing is beyond the scope of this Installation/User’s Guide. Consequently, the information provided here covers only the basics, and only very common or generic connection schemes are shown.

CAUTION Do not touch the probe connector pins or the cable connector pins. Static discharge may damage equipment.

Connecting to the Network (In-Band)

You can connect the probe to an In-Band telemetry network.

Connecting to 10Base-T/100Base-TX Telemetry Networks via RJ45 (In-Band)

You can connect the probe via the RJ-45 connector to a 10Base-T/100Base-TX half-duplex or full-duplex network.

Use the following connection procedures to connect the probe RJ-45 connector to a 10MB/s or 100MB/s Ethernet network:

1. On the probe rear panel, connect the 10Base-T/100Base-TX (RJ-45) port to the network using a category 5 cable (Figure 3-2).

2. Select **RJ-45** as the Physical Connector parameter from the Modify/View Interface Values menu. (Refer to Step 1 on page 23 for information on configuring the Physical Connector parameter.)

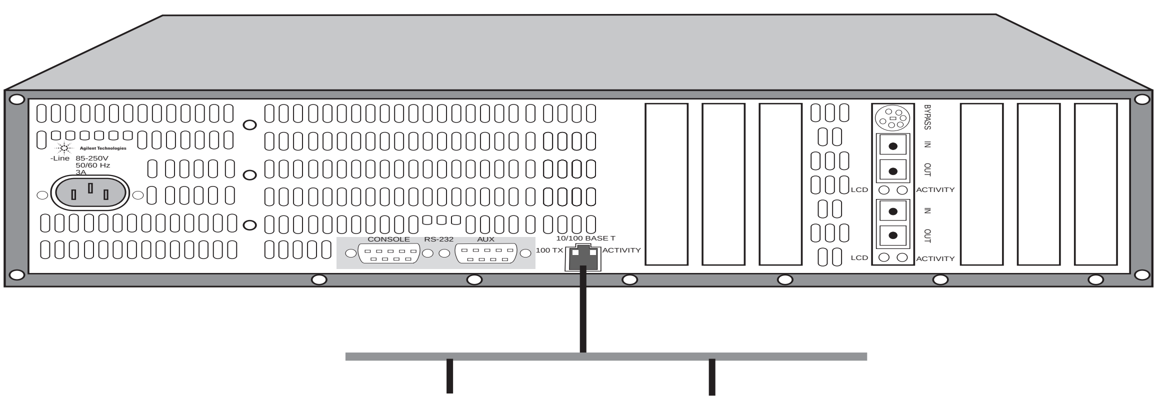

Figure 3-2: Connecting the Probe to a 10Base-T/100Base-T Network via RJ-45 Interface (In-Band)

Figure 3-3 shows the details of the OC-12 ATMProbe interfaces and Figure 3-4 is an overview of the connection scheme.

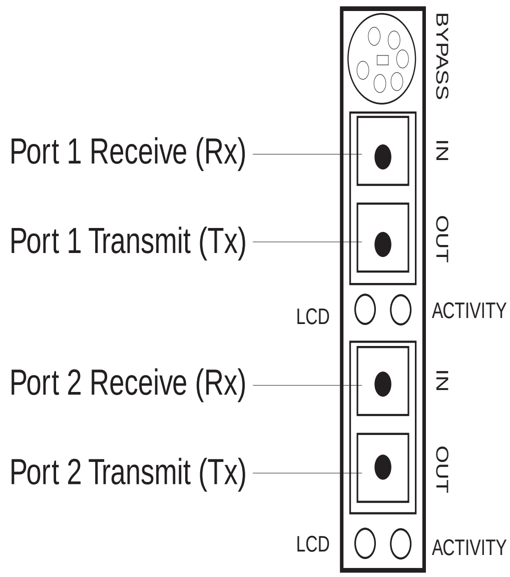

Figure 3-3: OC-12 ATMProbe Interfaces (Rear of Probe)

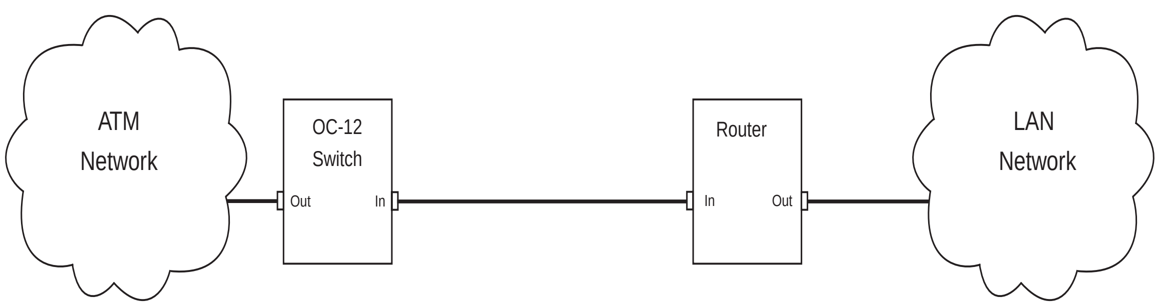

Figure 3-4: OC-12 System

Connecting to an OC-12 ATM Network (In-Band)

To connect the probe to an OC-12 ATM network, you connect the probe in-line with the network connection by using the two fiber-optic connectors and a fiber-optic cable.

Use the following procedure to connect the OC-12 ATMProbe to an OC-12 ATM network. In this connection scheme, the probe monitors network traffic as if the signal between the switch and router is sent straight-through the probe.

WARNING This procedure will interrupt service. It is recommended that you use a splitter or power-up the probe first.

1. Disconnect the cable between the ATM/OC-12 switch and router.
2. Connect Port 1 of the OC-12 ATMProbe to the ATM/OC-12 Switch port (Figure 3-5).
3. Connect Port 2 of the OC-12 ATMProbe to the router port.

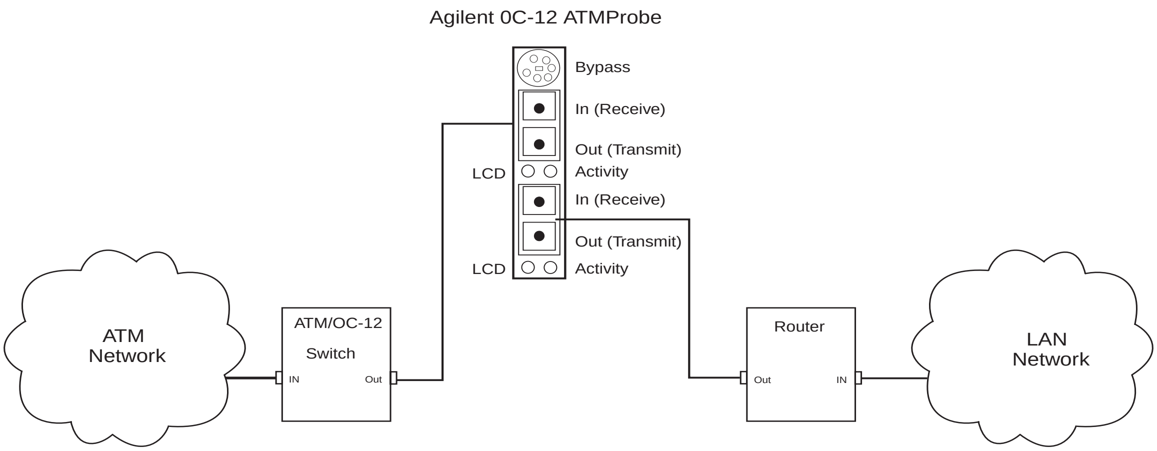

Figure 3-5: Connecting the probe to an OC-12 ATM Network

NOTE

Port 1 of the probe OC-12 ATM Interface connects to an ATM/OC-12 switch and Port 2 connects to a router.

CAUTION

When using a single-mode OC-12 ATM Interface on a multi-mode fiber network line without a 10db attenuator, the receiver's photodiode can become saturated and cause bit errors. To correct this problem, install 10db attenuators. You can order a set of 2 10dB attenuators from Agilent (Agilent J2928A).

OC-12 ATM Interface—Additional Equipment

Under certain circumstances, some of the following equipment is required:

- An Attenuator on the output of the OC-12 ATM Interface or the output of the laser source when connecting to a network. You can order a set of 2 10dB attenuators (Agilent J2928A).
- An Optical Splitter to passively monitor network traffic. You can order a multi-mode and single mode SC-to-SC Optical Power Splitter (Agilent J4613 or J4614).
- An Optical Bypass Switch to insure network integrity even if the probe looses power.

Installing an Optical Splitter

An optical splitter is installed to insure network integrity by passively monitoring network traffic. Figure 3-6 presents an example of the connection scheme for a 50/50 Optical Splitter. In this example, the probe Interface 1 (Port 1) collects statistics for outbound traffic (LAN =>ATM network) and Interface 2 (Port 2) collects statistics for inbound traffic (ATM network => LAN. (The splitter must be 50/50.)

The 50/50 optical splitter is a passive means of monitoring network traffic. The probe pass-through feature is not needed. Figure 3-6 shows the Splitter and ATMProbe connection.

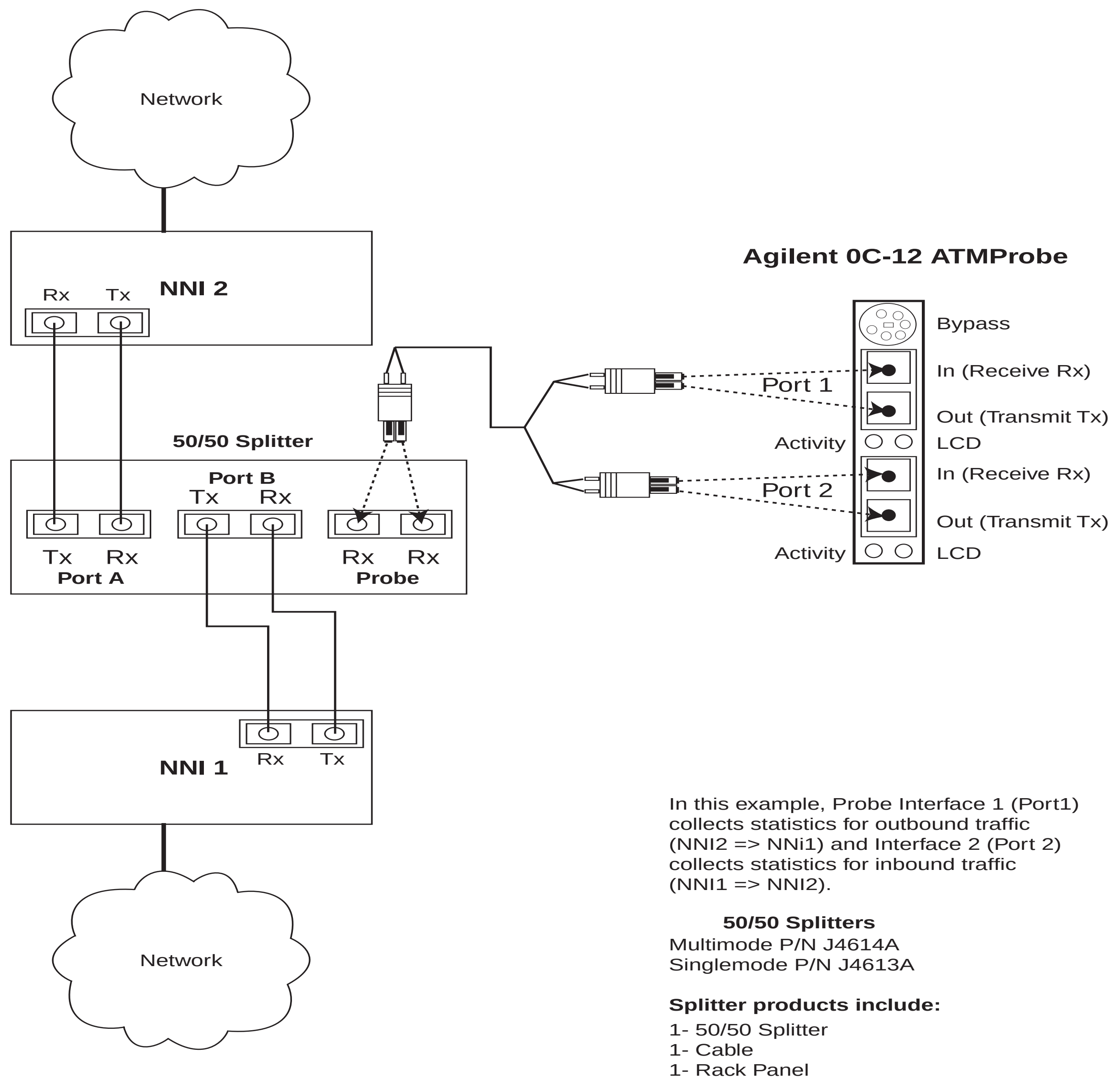

Figure 3-6: Using a Single/Multi-mode 50/50 Optical Splitter

Perform the following steps to install an Optical Splitter.

1. Connect the splitter A-Tx cable to the NNI 2 Rx slot.
2. Connect the splitter A-Rx cable to the NNI 2 Tx slot.
3. Connect the splitter B-Tx cable to the NNI 1 Rx slot.
4. Connect the splitter B-Rx cable to the NNI 1 Tx slot.

NOTE The splitter cable is keyed to ensure that the connectors use the correct orientation.

5. Connect the splitter cable connector labeled DCE to the ATMProbe Port 1 slot.
6. Connect the splitter cable connector labeled DTE to the ATMProbe Port 2 slot.
7. Connect the remaining splitter cable connector to the probe port on the splitter.

Installing an Optical Bypass Switch

The probe has a 6-pin mini-DIN connector that provides a connection point for an external optical bypass. The optical bypass is optional and only functions with fiber SC connectors. An optical bypass is used to maintain the network link even if the probe experiences a power interruption. Additionally, an Optical Bypass Switch is required to create a fault tolerant application with fiber networks.

Perform the following three step procedure to install an Optical Bypass Switch. Figure 3-7 shows the Optical Bypass Switch and ATMProbe connection port configuration.

Step 1—Connect the NON-ENERGIZED Bypass Switch to the Network

Make the following connections:

1. Connect NNI 1 Tx cable to the A-PI slot on the Bypass Switch.
2. Connect NNI 1 Rx cable to the A-S0 slot on the Bypass Switch.
3. Connect the NNI 2-Tx cable to the B-SI slot at the Bypass Switch.
4. Connect the NNI 2-Rx cable to the B-P0 slot at the Bypass Switch.

Step 2—Connect the NON-ENERGIZED Bypass Switch to the Probe

To connect the Optical Bypass Switch SC cables to the ATMProbe:

1. Connect the PRx cable from the Bypass Switch to the Port 1-Rx slot on the ATMProbe.
2. Connect the STx cable from the Bypass Switch to the Port 1-Tx slot on the ATMProbe.
3. Connect the SRx cable from the Bypass Switch to the Port 2-Rx slot on the ATMProbe.
4. Connect the PTx cable from the Bypass Switch to the Port 2-Tx slot on the ATMProbe.

Step 3—Connect to the Power Source

1. Connect the power cable from the Bypass Switch RJ-45 connector to the Bypass DIN connector on the ATM Probe.

WARNING Do not energize if the probe is not connected to the network. This will cause the network to fail.

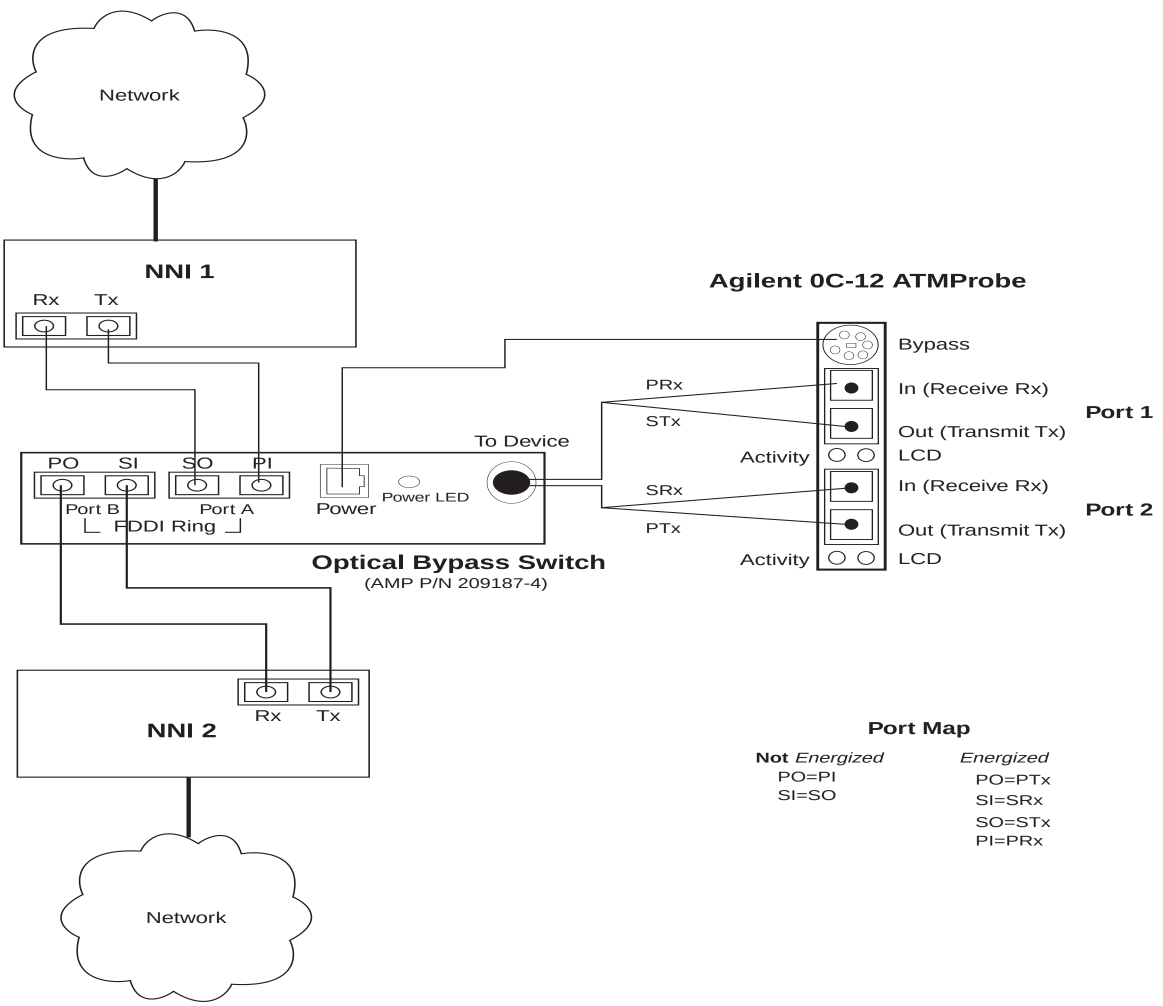

Figure 3-7: Bypass Switch and ATMProbe Port Configurations

Connecting to the Serial Port (Out-of-Band)

Out-of-Band communications with the probe are handled through the serial port, not over the network. This mode of communications is optional.

Direct Connection

To make a direct connection to the probe, connect the NetMetrix management station's serial port to the probe RS-232C AUX port using a null modem cable (Agilent part number 24542G—9-to-25 pin, or Agilent part number 5182-4794—9 to 9 pin). Figure 3-8 shows the direct connection to the probe.

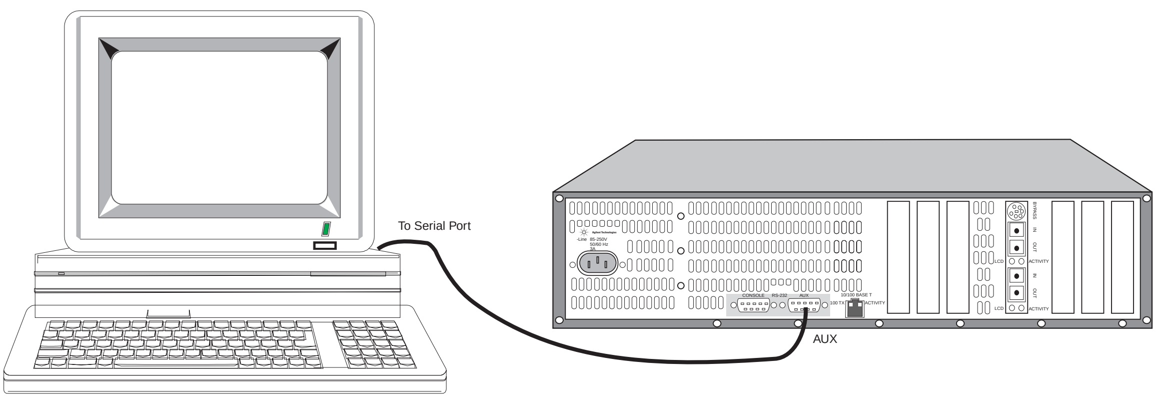

Figure 3-8: The Probe Direct Connection

Modem Connection

You can use a modem connection to increase the distance between the probe and the NetMetrix management station. Perform the following tasks to make a modem connection between a NetMetrix management station and the probe (Figure 3-9).

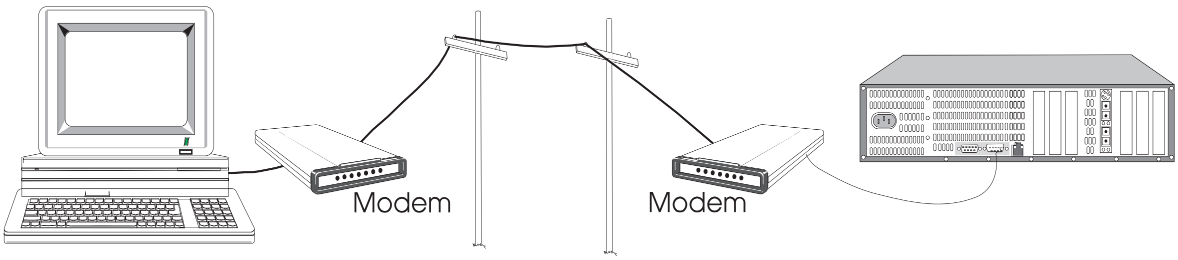

Figure 3-9: The Probe Modem Connection

Installing a Management Station Modem

You need the following equipment:

- Hayes-compatible 300 to 38.4 K baud modem
- RS-232C (straight through) modem cable
- Modular phone cable with RJ-11 connectors or equivalent

Use the following procedure to install a management station modem:

CAUTION Turn off all equipment prior to making cable connections.

1. Place the modem within 50 feet of the management station. Remember, there is a 50-foot RS-232C distance limitation.

2. Connect the RS-232C cable from the modem RS-232C port to the management station serial port.

3. Connect the RJ-11 modular phone cable from the modem **To Line** port to the telephone jack.

4. Connect power to the modem and turn on the modem power switch (not required for a PC internal modem).

5. Perform any other tasks required by the modem manufacturer. If you have any problems with the modem, contact the modem manufacturer for assistance.

Installing a Probe Modem

You need the following equipment:

- Hayes-compatible 300 to 56 K baud modem
- RS-232C (straight through) modem cable
- Modular phone cable with RJ-11 connectors or equivalent

Use the following procedure to install a probe modem:

1. Place the modem within 50 feet of the management station. Remember, there is a 50-foot RS-232C distance limitation.

2. Connect an RS-232C cable from the modem's RS-232C port to the probe's RS-232 port. A null modem cable **cannot** be used for this connection.

3. Connect the RJ-11 modular phone cable from the modem **To Line** port to the telephone jack.

4. Connect power to the modem and place the modem power switch to on.

5. Perform any other tasks required by the modem manufacturer. If you have any problems with the modem, contact the modem manufacturer for assistance.

Configure the Management Station and the Probe

Refer to your NetMetrix documentation for information on configuring the management station for use with a modem. Verify that the packet retransmission timeout is set appropriately. For example, a 1500-byte SNMP packet requires about one second to transmit over a 9600 baud connection, with another one second for the reply. A packet retransmission timeout of three to five seconds is appropriate for this example.

The probe can be configured for PPP link communications either by using a local terminal through the serial port or by using a NetMetrix management station over the network.

If you use the network to configure the probe, make the network connection (refer to “Do not touch the probe connector pins or the cable connector pins. Static discharge may damage equipment.” on page 42). Next, refer to your NetMetrix documentation to configure the following probe parameters:

- Serial Port IP Address
- Serial Port Subnet Mask
- Serial Port Speed
- Hardware Flow Control (if unsure, consult your modem’s documentation)
- Modem Init String
- Modem Conn String

If you use an ASCII terminal to configure the probe, attach the terminal and configure the following probe parameters:

- Serial Port IP Address
- Serial Port Subnet Mask
- Serial Port Speed
- Hardware Flow Control (if unsure, ask your local network administrator)
- Modem Init String
- Modem Conn String

The **Serial Port IP Address** must be on the same IP subnet as the management station serial IP address.

Normally, each company has one subnet mask that is used for all machines on their network. Enter this subnet mask value into the **Serial Port Subnet Mask** field. The Serial Subnet Mask used for the probe should match the subnet mask used for the PPP port on the management station.

Set the **Serial Port Speed** to a value that is less than or equal to the maximum modem speed.

Set the **Hardware Flow Control** to Off (On is the default), unless you are using a high speed modem (14.4K baud or faster) with advanced features, such as error correction and data compression. If the Hardware Flow Control is set to On, you can set it to Off by using the probe Main Menu or over the network from a NetMetrix management station (refer to your NetMetrix documentation for details).

The **Modem Init String** is the ppp dial-up phone number. Change the phone number for the management station modem and add any other Hayes compatible modem initialization parameters required for this ATDT string.

The **Modem Conn String** is used to enter the login password sequence for the getty handshake on the management station. Modify the default string for your particular login and password to initiate the PPP connection. Configure the login shell on the management station (see NetMetrix/MorningStar PPP manual) to accept a login that has as a shell, a script to start the pppd daemon on the receiving modem serial line. Once started, the pppd in the probe will negotiate with the management pppd and start a PPP link that can be verified by pinging the IP address specified for the probe. Be sure to set the management station packet timeout and MTU. (See “Configure the Management Station and the Probe” on page 54.)

After modifying the various modem initialization string commands, warm start your probe.

Refer to your NetMetrix documentation for information on how to establish communications with the probe over the PPP link.

Starting the Probe

Attach the power cord to the probe. The probe does not have a power switch, it is turned on when power is provided. When powered on or reset, the probe runs a self-test program.

Verifying the Installation

You can verify probe installation by looking at the status LEDs on the front or back of the probe. LEDs on the back of the probe show the status of each port. The LEDs on the front of the probe indicate the status of the probe and network connection.

The ~Power LED indicates that power is on.

After the probe restarts (boots), it runs a power-on self-test (POST) and then starts normal operations.

You can view the POST through a terminal emulator attached to the 9-pin console port. Attach the terminal after power is supplied. If the main menu appears after the POST, operation is normal.

The Fault LED is briefly turned on during the POST. After the probe passes the POST, the Fault LED turns off.

The Activity LED flashes during network activity.

When the probe is running, the status LEDs are in the following states:

LED	**State**
Activity	Flashing, if connected to a network with traffic, or may appear to stay on solid during periods of steady traffic.
~ Power	On solid
Fault	Off

Out-of-Band Troubleshooting

At the Ethernet telemetry interface, if the Activity LED is off, verify that:

- The probe is properly connected to the telemetry network.
- There is network traffic.
- You have selected the correct Physical Connector from the Modify/View Interface Values menu (see “Fast Ethernet Telemetry Interface Configuration” on page 23).

If you still experience trouble communicating with the probe, check

- The configuration screens to ensure that you are using the correct IP address, subnet mask, and default gateway.
- That the Activity LED on the 10/100 base T Telemetry port is green.
- That you are communicating with the probe at the same rate that the 100 TX LED senses.

If the ~ Power LED is off, verify that power is properly connected to the probe and to the correct power source.

If the Fault LED is on, the probe failed the self-test. Repeat the installation procedures and verification of installation.

OC-12 ATM Troubleshooting

There should be a cable connected to both interface connectors.

Both Activity LEDs (from network and from equipment) should turn on when there are cells present on the network —the Cell Sync LED should be off.

If both the Cell Sync LED and the Activity LED are turned on, the ATMProbe is sensing traffic on the network but is not able to synchronize on the cell stream. Verify the configuration of the probe’s OC-12 interface as described in “OC-12 Interface Configuration—ATM Interface” on page 26.

If the Cell Sync LED is turned on and the activity LED is turned off, and you know that there is data on the network, try switching the connectors as they are attached to the ATMProbe. Each connector has a specific purpose. If the cables are attached to the wrong connectors, the probe will not receive data.

4

Probe Operation

Probe Operation

The Agilent J3988A is designed to operate unattended after installation, configuration, and it successful self-testing. This chapter describes probe operation and restart.

Restarting the Probe

The probe is restarted by performing a *warm start* or a *cold start*. With either method, the probe performs a series of self-tests and re-initializes.

- A warm start resets probe measurement data only.
- A cold start resets, back to the default values, all of the probe measurement data, filters, alarms, and user-defined statistics studies (excluding communications configuration parameters).

Table 4-1 shows which data and parameters are reset during a warm start and during a cold start of a probe.

Category	Probe Memory Contents	Warm Start Status	Cold Start Status
Measurement Data	Current ATM signaling statistics	Reset	Reset
	Historical ATM signaling statistics	Reset	Reset
	Current AAL-5 protocol statistics	Reset	Reset
	Historical AAL-5 protocol statistics	Reset	Reset
	Current AAL-5 per-PVC statistics	Reset	Reset
	Historical AAL-5 per-PVC statistics	Reset	Reset
	Current AAL-5 SVC aggregate statistics	Reset	Reset
	Historical AAL-5 SVC aggregate statistics	Reset	Reset
	Logs	Reset	Reset
Measurement Configuration Parameters	Alarm table	Saved	Reset
	Filter table	Saved	Reset
	Channel table	Saved	Reset
	Buffer control table	Saved	Reset
	Event table	Saved	Reset
	Community access table	Saved	Reset
	Client tables	Saved	Reset
	Historical study configuration	Saved	Reset
	PVC configuration table	Reset	Reset

Table 4-1: Probe Data and Parameters Reset by Warm or Cold Start

Category	Probe Memory Contents	Warm Start Status	Cold Start Status
Probe Configuration Parameters	Trap destination table		
	Serial connection table	Saved	Saved
	Serial configuration information for outgoing connections, such as: dial strings	Saved	Saved
	Time period for utilization calculations	Saved	Saved
	Other Serial configuration information, such as: PPP address and subnet mask serial port speed, modem initialization string, and Flow Control	Saved	Saved
	Probe configuration information, such as: IP address, default gateway, subnet mask	Saved	Saved
	TFTP server address	Saved	Saved
	Download filename	Saved	Saved
	Time zone	Saved	Saved
	Security Settings	Saved	Saved
	Interface Status	Saved	Saved
	Crash data (used by Agilent support)	Saved	Saved

Table 4-1: Probe Data and Parameters Reset by Warm or Cold Start (Continued)

Warm Start

A warm start resets probe measurement data only. The probe will perform a warm start when:

- The power is cycled, either by unplugging the probe or via a power outage.
- **Warm start and Exit** is selected from the probe Main Menu (See Step 3 on page 69).
- Using NetMetrix to execute a probe warm start. Refer to your NetMetrix documentation for details.

Selecting the Warm Start Menu Item

Use the following procedure to warm start the probe using the Main Menu:

1. Connect a local terminal (or a PC emulating a terminal) to the probe. Refer to “Local Terminal Configuration and Installation” on page 5 for information on connecting a local terminal.

2. Press ENTER. You see the Main Menu (Figure 4-1).

```
Main Menu - Revision 1.0
1.Modify/View configuration values ->
2.Modify/View security values ->
3.Modify/View interface values ->
4.Display interface summary
5.TFTP Download new firmware ->
6.XMODEM Download new firmware ->
7.Warm start the probe
8.Cold start the probe
9.Shutdown the device
```

Figure 4-1: Probe Main Menu

3. On the main Menu, Press **7-Warm start the probe,** to execute a warm start and exit the probe Main Menu.

   The warm start occurs immediately. The Activity and Fault LEDs are turned on. When the warm start is completed, the Activity LED flashes to indicate traffic (if present), the Fault LED turns off, and the ~ Power LED is on.

Cold Start

A cold start resets all of the probe's measurement data as well as all alarm, event, filter, and user-defined statistics configuration to the default values. Communications configuration (IP address, default gateway IP address, and subnet mask) is not reset.

You can cold start the probe through of the following:

- Selecting the menu item **Cold start and Exit** from the Main Menu (See page 70).
- Using Agilent NetMetrix to execute a probe cold start. Refer to your NetMetrix documentation for details.

Selecting the Cold Start Menu Item

Use the following procedure to cold start the probe using the Main Menu:

1. Connect a local terminal (or a PC emulating a terminal) to the probe. Refer to “Probe Operation” on page 63 for information on connecting a local terminal.

2. Press ENTER. You see the Main Menu (Figure 4-1).

3. On the Main Menu, Press **8-Cold start the probe,** to execute a cold start and to exit the Main Menu.

   The cold start occurs immediately. The Activity and Fault LEDs are turned on. When the cold start is completed, the Activity LED flashes to indicate traffic (if present), the Fault LED turns off, and the ~ Power LED is on.

5

Download New Firmware

Download New Firmware

This chapter describes how to download new firmware to the Agilent J3988A ATMProbe.

This download procedure is necessary to upgrade the probe firmware with a new release.

New firmware for the probe comes as a binary file. You obtain this file in one of several ways:

- Sent to you electronically by an Agilent Support Representative.
- Included with Agilent NetMetrix.
- Via anonymous ftp from `col.hp.com (15.255.240.16)`. The `/dist/netmetrix/firmware` directory contains the latest firmware versions for Agilent probes. A README file in this directory provides more details about the files contained in the `lpfirmware` directory.

CAUTION Downloading new probe firmware resets stored probe data and some probe configuration information (like filters, traps, and channels). It can affect the IP address, subnet mask, or default gateway IP address in some situations. Refer to the README file on the new firmware media for more information.

Downloading Firmware using a UX Workstation and a Terminal

The following instructions assume you are using UX 9.0, or later.

Before upgrading the firmware, you must first establish an IP connection between your UX workstation and the probe.

NOTE The UX workstation can be a UX 9.x or later, however, the NetMetrix/UX application is only supported on UX 10.20 and 11.0, or later.

Install New Download Firmware on a UX Workstation

To download a new firmware file to the probe using an UX workstation and a terminal, the new firmware file must be copied to the **~tftp** directory on your UX workstation, and the file must be readable by **tftp**. Typically, the **~tftp** directory is **/home/tftpdir**.

For more information on configuration and usage of **tftp**, refer to your UX **tftp** documentation (found in an ARPA Services manual).

Download Firmware to the Probe

Once the new firmware is installed on the UX workstation, you can download it to the probe.

Verify the following before you start the download procedure:

- The probe is connected to the network.
- The IP address, subnet mask, and default gateway of the probe are configured correctly.
- A terminal (or a PC running terminal emulator software) is attached to the probe’s RS-232 port (using a null modem cable). Configure the communication link for 8 bits per character, 1 stop bit, no parity, Xon/Xoff handshaking, and a baud rate of 9600.
- You will also need the IP address of the UX workstation.

Use the following procedure to download firmware to your probe from the UX workstation using a terminal:

1. Press ENTER. You see the Main Menu (Figure 5-1).

```
Main Menu - Revision 1.0

1.Modify/View configuration values ->

2.Modify/View security values ->

3.Modify/View interface values ->

4.Display interface summary

5.TFTP Download new firmware ->

6.XMODEM Download new firmware ->

7.Warm start the probe

8.Cold start the probe

9.Shutdown the device
```

Figure 5-1: Probe Main Menu (UX Workstation)

NOTE

Item 5 in Figure 5-1 is not available if the **Allow TFTP firmware downloads** menu item is disabled (the selection will read "TFTP Download new firmware is not available"). Refer to "Modify/View Security Values" on page 22 for more information on enabling this menu item.

2. On the Main Menu, press **5-TFTP Download new firmware,** to display the Download Menu (Figure 5-2).

```
TFTP Download Menu

1.Filename to download                 mapps.tgz

2.TFTP Server IP address               0.0.0.0

3.Download Firmware


0.Return to Main Menu


Probe IP Address:                      15.6.75.23

Default Gateway IP Address:            15.6.72.1

Subnet Mask:                           255.255.248.0


Last Download Status:                  SUCCESS
```

Figure 5-2: TFTP Download Menu (UX Workstation)

3. Verify that the IP address, subnet mask, and default gateway address are correct.

NOTE

If you need to change the configuration information, press **0- Return to Main Menu,** to return to the Main Menu and then press **1- Modify/View configuration values,** to modify the configuration options.

4. On the Download Menu, press **1- Filename to download,** and type the filename of the file you want to download.

5. On the Download Menu, press **2- TFTP Server IP address,** and type the IP address of the UX workstation that is acting as the tftp server.

6. On the Download Menu, press **3- Download firmware,** new firmware is downloaded and the probe restarts. This process takes about 2 minutes.

NOTE After the download process is complete, there is a brief period (approximately 1 minute) while the probe copies the firmware to the flash EPROM.

CAUTION Do not reset, unplug the probe, or restart the probe immediately after the download process. Doing this may damage the probe.

If an error occurs during the download process, the probe returns to the Main Menu without copying any of the new firmware to memory.

The probe takes several minutes to download new firmware and to restart. If this process takes an unusually long time (more than 10 minutes), verify that your setup is correct, and restart `inetd` by entering and running the following commands:

```
ps -ef | grep inetd
/etc/inetd -k
/etc/inetd
```

TFTP Transfer Timeouts or Read Errors

If you experience tftp transfer timeouts or read errors, use the following procedure to verify that tftp is configured correctly:

1. Verify tftpd by copying the firmware file to another directory using the tftp command:

```
# cd /tmp
  tftp 127.0.0.1
  get firmware
  quit
```

If the previous step fails, the problem is due to the tftp configuration.

2. Verify the tftp configuration.

   The problem is most likely the result of a configuration problem with the TFTP server. Note the following:

   - On a HP-UX server, verify the existence of a non-commented line in `/etc/inetd.conf` that indicates the TFTP daemon is running and serving files from the proper TFTP directory (usually `/usr/tftpdir`).
   - Check the comments in `/etc/inetd.conf` regarding a tftp user account in `/etc/passwd`.
   - To determine if there is a network or server problem, use another machine to run the TFTP client to retrieve a file from the server.

Downloading Firmware using a Network PC and a Terminal

You can download new firmware to your probe using a network personal computer (PC) and a dumb terminal. Before upgrading firmware, you must first establish an IP connection between your networked PC and the probe.

Setup TFTP Server for Downloading

Refer to your TFTP application manuals for information on how to setup your server for downloading a file.

Download Firmware to the Probe

Once your TFTP server is setup for downloading a file, you can download the new firmware file to the probe.

Verify the following before you start the download procedure:

- The probe is connected to the network.
- The IP address, subnet mask, and default gateway of the probe are configured correctly.
- A terminal (or a PC running terminal emulator software) is attached to the probe RS-232 port (using a null modem cable). Configure the communication link for 8 bits per character, 1 stop bit, no parity, Xon/Xoff handshaking, and a baud rate of 9600.
- You know the IP address of the networked PC.

Use the following procedure to download firmware to the probe from the networked PC using a terminal:

1. Press ENTER. You see the Main Menu (Figure 5-3).

```
Main Menu - Revision 1.0

1.Modify/View configuration values ->

2.Modify/View security values ->

3.Modify/View interface values ->

4.Display interface summary

5.TFTP Download new firmware ->

6.XMODEM Download new firmware ->

7.Warm start the probe

8.Cold start the probe

9.Shutdown the device
```

Figure 5-3: Probe Main Menu (Networked PC)

NOTE

Item 5 on the Main Menu is not displayed if the **Allow TFTP firmware downloads** menu item is not enabled. Refer to “Modify/View Security Values” on page 22 for more information on enabling this menu item.

If item 5 (TFTP Download new firmware) is not displayed, the number used to access items 6, 7, and 8 will be different.

2. On the Main Menu, press **5- TFTP Download Menu,** to display the Download menu (Figure 5-4).

```
TFTP Download Menu

1.Filename to download                  mapps.tgz

2.TFTP Server IP address                0.0.0.0

3.Download Firmware


0.Return to Main Menu


Probe IP Address:                       15.6.75.23

Default Gateway IP Address:             15.6.72.1

Subnet Mask:                            255.255.248.0


Last Download Status:                   SUCCESS
```

Figure 5-4: TFTP Download Menu (Networked PC)

3. Verify that the probe IP address, subnet mask, and default gateway address, are correct.

NOTE

If you need to change the configuration information, press **0** to return to the Main Menu and then press **1- Modify/View configuration Values** to modify configuration options.

4. On the Download Menu, press **1- Filename to download,** and type the filename of the file you want to download.

5. On the Download Menu, press **2-TFTP Server IP address,** and type the IP address of the networked PC that is acting as the tftp server.

6. On the Download Menu, press **3- Download firmware,** new firmware is downloaded and the probe restarts. This process takes about 2 minutes. The probe relays will click at the end of the restart process.

If an error occurs during the download process, the probe returns to the Main Menu without storing the new firmware to memory.

NOTE

After the download process is complete, there is a brief period (approximately 1 minute) while the probe copies the firmware to the flash EPROM.

CAUTION

Do not reset, unplug the probe, or restart the probe immediately after the download process. Doing this may damage the probe.

The probe takes several minutes to download new firmware and to restart. If this process seems to be taking an unusually long time (more than 10 minutes), verify that your setup is correct, and restart `inetd` by entering and running the following commands:

```
ps -ef | grep inetd
/etc/inetd -k
/etc/inetd
```

Xmodem Download of Firmware

You can download firmware from your PC to the probe via Xmodem by using the following procedure:

1. Access the HyperTerminal Windows 95 application or a similar communications program that supports Xmodem file transfer.

2. Connect your PC to the probe's RS-232 connector using a null modem cable. Refer to Appendix 1 "Cables and Connectors" for more information on cables.

3. Configure the terminal emulator for 8 bits/character, 1 stop bit, no parity, no flow control, and a baud rate of 9600.

4. Connect the power cord to the probe and to a power source (either 100-120/VAC or 220-240/VAC). The probe does not have a power switch, but is turned on by connecting power.

5. Press ENTER, you see the Main Menu (Figure 5-5).

```
Main Menu - Revision 1.0

1.Modify/View configuration values ->

2.Modify/View security values ->

3.Modify/View interface values ->

4.Display interface summary

5.TFTP Download new firmware ->

6.XMODEM Download new firmware ->

7.Warm start the probe

8.Cold start the probe

9.Shutdown the device
```

Figure 5-5: Probe Main Menu (XMODEM)

6. On the Main Menu, press **6- XMODEM Download new firmware,** to display the XMODEM download menu (Figure 5-6).

```
XMODEM Download Menu
1.Download at 115200 baud
2.Download at 57600 baud
3.Download at 38400 baud
4.Download at 19200 baud
5.Download at 9600 baud
0.Return to Main Menu
```

Figure 5-6: XMODEM Download Menu

7. Press **1-5** to select the download baud rate. When the baud rate is set to 9600, you see the following message:

   Downloading to Flash: Receiving File at 9600 bps. . .

NOTE If you select a different baud rate, no message is displayed.

8. If you select a baud rate other than 9600, you will need to change the baud rate of your terminal emulator to match the download speed that you selected. If you are using the HyperTerminal application, select File -> Properties -> Configure. You must select the **Disconnect** icon followed by the **Connect** icon to get the baud rate changes to take effect.

9. Select **Transfer** and then **Send File** menu items from your PC's Windows application. You will be prompted to select the file to download.

   The HyperTerminal application is configured for Zmodem by default. You need to make sure that you select Xmodem from the **Send File** dialog box.

CAUTION If you selected a baud rate other than 9600, the message following the successful download will not be displayed correctly. In this case, wait approximately 2 minutes before power cycling the probe to ensure that the new firmware is written to FLASH memory correctly.

If your download was not successful, it is recommended that you repeat the process using 9600 baud so that all error messages are displayed correctly.

After the download process is complete, the probe restarts.

If an error occurs during the download process, the probe returns to the Main Menu without copying the new firmware to memory.

The probe takes several minutes to download new firmware and to restart. If this process seems to be taking an unusually long time (longer than 10 minutes), verify that your setup is correct.

TFTP Transfer Timeouts or Read Errors

If you experience tftp transfer timeouts or read errors, use the following procedure to verify that tftp is configured correctly:

1. Verify tftpd by copying the firmware file to another directory using the tftp command:

```
# cd /tmp
   tftp 127.0.0.1
   get firmware
   quit
```

If the previous step fails, the problem is due to the tftpd configuration.

2. Verify the tftp configuration.

Restoring or Upgrading the Hard Drive File System

This section describes how to:

- Restore the root file system if it becomes damaged.
- Perform an upgrade of the root file system.

The OC-12 hard drive file system contains two partitions. The first partition contains the "root file system" from which the operating system loads. The second partition is a backup and data partition. This partition contains a compressed backup image of the root file system that can be used to restore a damaged file.

NOTE The root file system backup image is different from the "Firmware" image. The "Firmware" image represents the OC-12 and SNMP application software.

If you need to restore or upgrade the OC-12 hard drive file system, use the following procedure.

WARNING Before proceeding, be certain that a system restoration is called for and that you have an understanding of which TFTP facilities are required.

1. Connect a terminal to the console port of the OC-12 probe.
2. Set the baud rate to 9600.
3. Turn on the OC-12 probe.
4. You see the following message:

   Restore or Upgrade File System (Defaults to 'N' in 10 Seconds) [Y,N]?

5. Type Y (Yes) or N (No). You have 10 seconds to respond. After 10 seconds the system will default to No.

If you type Y, you see the following menu.

```
1.Verify Hard Drive Partitions And Root File System
  Backup Image

2.Restore Root File System From Backup Image On Hard
  Drive

3.Retrieve Backup Image Of Root File System From
  Network Via TFTP

4.Restore Application Fileset From Network Via TFTP

5.Restore Hard Drive From Parallel Port ZIP Drive

6.Exit

Choice (1-6)?
```

6. Press **1- Verify Hard Drive Partitions And Root File system Backup Image**. This choice checks the validity of the hard drive partition information the validity and integrity of the backup copy of the root file system.

7. Press **2- Restore Root File System From Backup Image On Hard Drive.** This choice restores the root file system partition from the backup image on the backup and data partition.

```
Download Root File System Backup Image:

WARNING: THIS IS A SERIOUS OPERATION. BE SURE YOU
WANT TO DO THIS BEFORE PROCEEDING!

1.Probe Address: 0.0.0.0

2.Subnet Mask: 255.255.255.0

3.Default Gateway: 0.0.0.0

4.TFTP Server Address: 0.0.0.0

5.Image file Name: rootfs.tgz

6.Perform Download

7.Previous Screen
```

8. Press **3- Retrieve Backup Image Of Root File System From Network Via TFTP.** This choice allows a new backup image of the root file system to be retrieved from a TFTP server. This operation does not place the retrieved root file system in to operation. It only retrieves a backup image of the root file system. To put the retrieved root file system in to operation, it is recommended that **Choice 1** be used first to verify the integrity of the image and then that **Choice 2** be performed to place the new image in operation.

CAUTION These menu selections allow you to download a new backup image of the hard drive file system from a TFTP server. This is a very serious operation, if the download can not be successfully performed, you may need a service representative to repair the probe.

WARNING Choosing to proceed with this operation will destroy any existing application (OC-12 SNMP agent firmware).

9. Review the information in items 1-5.

10. Press **6- Perform download**.

NOTE The download process could take up to 5 minutes to complete.

After the system completes the download process, you are prompted to choose to download an application or firmware file set from the same TFTP server.

11. Type Y or N.

    If you type Y, you will see an additional download menu as shown above.

    If you type N, proceed to Step 13 below.

12. Perform the same operation as above.

13. Press **7- Previous Screen.** You will see the restore menu.

```
1.Verify Hard Drive Partitions And Root File System
  Backup Image

2.Restore Root File System From Backup Image On Hard
  Drive

3.Retrieve Backup Image Of Root File System From
  Network Via TFTP

4.Restore Application Fileset From Network Via TFTP

5.Restore Hard Drive From Parallel Port ZIP Drive

6.Exit

Choice (1-6)?
```

14. Press **4- Restore Application Fileset From Network Via TFTP.** This choice allows a user to retrieve an application or “firmware” file set and place it in to operation after the root file system is replaced. This is the same process as the “TFTP Download New Firmware” choice on the Maim Configuration Screen.

15. Press **5- Restore Hard Drive From Parallel Port ZIP Drive.** This choice allows for a complete restore of the entire hard drive system from an Iomega parallel port Zip© drive. This choice is intended for use by Agilent field service personnel.

16. If all restores and downloads are complete, press **6- Exit**.

17. Restart the probe.

A

Cables and Connectors

Cables and Connectors

This appendix lists the Agilent J3988A ATMProbe cables and the minimum connector pin-out for unlisted cables.

NOTE

Each connector pin-out does not necessarily match the pin-out for the corresponding Agilent cable, however, cables manufactured using at least the minimum pin-out will function correctly.

OC-12 ATM Interface Cables

The OC-12 ATM circuit connection is made using two Fiber SC connectors that support 622.08 Mbps ATM traffic. Optional transceivers support multimode and single-mode.

Fiber-optic cables come in many different configurations depending on the equipment you are connecting and the power levels of the network you are monitoring.

Table A-1 lists some OC-12 ATM cables and their part numbers. The OC-12 ATMProbe connectors are type SC. The (1) at the end of each AMP part number indicates that the cable length is one meter.

Cable Type	Mode	AMP Part Number
FC ---> SC	Multi-mode	503780-1
FC ---> SC	Single mode	502792-1
ST ---> SC	Multi-mode	503773-1
ST ---> SC	Single mode	502793-1
SC ---> SC	Single mode	503166-1
SC ---> SC	Multi-mode	503165-1

Table A-1: OC-12 ATM Cable Types

The following is the industry standard for the color coding of fiber-optic cable:

- Yellow for Single Mode
- Orange for Multi-mode (AMP cables can be black or tan)

Serial Port Interface Cables

The following table shows the recommended cables for connecting the probe's serial port interface to a terminal or modem.

Cable Function	Cable Type	Connectors	Agilent/HP Product Number
Connect a terminal or PC to the probe port for configuring the probe.	RS-232 "Crossover" or "null modem" cable	25-pin male to 25-pin male	13242G
		25-pin male to 25-pin female	13242H
		9-pin female to 25-pin male	24542G
		9-pin female to 9-pin female	5182-4794

Table A-2: Serial Port Interface Cable

B

Specifications

Specifications

This appendix lists the specifications for the Agilent J3988A ATMProbe.

Network Compatibility

Agilent J3988A Base Hardware:	10Base-T/100Base-TX RJ-45, Telemetry Interface.
Option 210	1 OC-12 Single Mode Interface
Option 212	1 OC-12 Multimode Interface
J4613A	SMF Splitter
J4614A	MMF Splitter
J4615A	Multimode Bypass Optical Switch

The probe can use either a Fast Ethernet network connection or the PPP link to communicate with a management station.

Network Connection

The network connection is made using the standard RJ45 connector for 10Base-T or 100Base-TX half-duplex connections.

The OC-12 ATM circuit connection is made using two fiber SC connectors that support 622.08 Mbps ATM traffic. Optional transceivers support multimode and single-mode.

The 6-pin DIN connector is used for an Optical Bypass Switch (optional).

Software Standards

Remote Network Monitoring Management Information Base (RFC 1757), RMON-2 (RFC 2021 and 2074), SNMP MIB-II (RFC 1213 and 2233), SNMP (RFC 1157), and Agilent Probe Private MIBs.

Modem

Supports external Hayes-compatible modems from 300 to 56 K baud.

Dimensions

H x W x D: 5.25 x 17.0 x 12.0 in)

Weight

17.0 lbs without options

Power Requirements

~85-250 V, 50/60 Hz, 3A max.

Environment

	Operating	Non-Operating
Temperature	0°C to 45°C (32°F to 113°F)	-40°C to 70°C (-40°F to 158°F)
Relative Humidity (non-condensing)	15% to 95% at 40°C (104°F)	15% to 90% at 65°C (149°F)
Maximum Altitude	4.6 km (15,000 ft)	4.6 km (15,000 ft)

General

This is a Pollution Degree 2 product.

This is an Installation Category II product.

Protocol Encapsulation

Table B-1 shows various encapsulations over AAL-5.

aal5Bridged8023(16)	encapsulated IEEE 802.3
aal5Bridged8025(17)	encapsulated IEEE 802.5
aal5Bridged8026(18)	encapsulated IEEE 802.6
aal5Llc(19)	encapsulated LLC
aal5Mpoa(20)	multi-protocol over ATM (MPOA)

Table B-1: Protocols Over AAL-5

Probe Memory Allocation

The memory allocated to each parameter depends on how much memory is installed in the probe. The memory parameter values relate to the various items in the RMON or the Agilent private MIBs.

NOTE These parameters were valid at the time of publication.

Table B-2 shows the memory allocated to each parameter for the probe memory configurations. The memory allocation shown for each memory amount column assumes that all of the available memory within the probe is allocated to each parameter.

NOTE The parameter values shown below are approximate and subject to change without notice.

Network Statistics and Trace buffers (packet capture buffers) are allocated dynamically from the same memory allocation. The values shown for Network Statistics assume that no Trace buffers are configured. If Trace buffers are configured, the number of Network Statistics are reduced.

Parameter	64MB	128MB
Total number of history buckets for all studies (AAL-5)	428,500	885,700
Total number of history buckets for all studies (PVC)	428,500	885,700
Total number of history buckets for all studies (ATM)	205,400	424,657
nlMatrixTable/alMatrixTableEntries	1,070,000	2,140,000
nlHostTable/alHostTableEntries	428,000	857,000
Maximum number of alarms	120,900	250,000
Maximum number of events	1,000,000	2,066,600
Log table entries	1,024	1,024
Maximum number of filters	32	32
Maximum number of channels	32	32
Maximum number of packet capture buffers	32	32
Trace buffer packet capacity	N/A	N/A
Trace buffer octet capacity	16-62MB	32-126MB
Maximum number of community names in Community Access Table	20	20
Maximum number of IP address entries in Client Table	20	20
Maximum number of trap destination entries (Agilent private MIB)	30	30
Maximum PPP connection entries	20	20

Table B-2: Probe Memory Allocation

Open Source Operating System

This product uses open source software for the embedded operating system kernel. The source for the kernel is available on the NetMetrix/UX application CDROM, as a gzipped tar image, in the directories:

For HP-UX and Solaris Installations	/linux-src.tar.gz

If you uncompress the image found here, the instructions for installing and building the kernel are available in the README file in the top-level directory.

Glossary

Glossary

This glossary contains definitions of terms, abbreviations, and acronyms that are used in this manual. The terms are not necessarily Agilent specific, but are for data communications in general.

10Base-T
10 Mbps, BASEband operation, unshielded Twisted-pair wiring used for Ethernet networks.

100Base-FX
100Base-FX uses multimode fiber-optic cable to carry traffic ten times faster than 10Base-T. It is used primarily to connect Hubs and switches together on Fast Ethernet networks.

100Base-TX
100 Mbps, BASEband operation, unshielded Twisted-pair wiring used for Fast Ethernet networks. 100Base-TX is ten times faster than 10Base-T.

Adaptation Layer
The adaptation layer maps services from their original format (such as variable length frames) into fixed-size cells. Different adaptation layers are needed for different services.

Address Resolution Protocol (ARP)
The Address Resolution Protocol is at the Network Layer in the OSI model. ARP provides a mechanism for finding the physical address (Internet Address) of a target host on the same physical network, given only the target's Internet address.

Admin Tool
A Sun Solaris system administration program with a graphical user interface.

Agent
A node (or software/hardware on a node) that supplies network management information.

ANSI (American National Standards Institute)
The United States coordinating organization for voluntary standards.

ASCII (American Standard Code for Information Interchange)
Seven bit code providing a total of 128 upper and lower case letters, numerals, punctuation marks, and control characters. Also referred to as CCITT Alphabet Number 5.

Asynchronous
A transmission process such that there is always an integer number of units between any two significant instances in the same signal but there is not always an integer number of units between significant instances in two independent signals.

Asynchronous Transfer Mode (ATM)
Asynchronous Transfer Mode (ATM) is a fast packet-switched technology based on fixed length cells. Data is divided into individual units and routed across an ATM network in a constant stream. Unused packets are filled with idle cells. Flexible bandwidth is possible with ATM - a service can use as many ATM cells as it needs. Voice, video, and data can be sent in a consistent manner over an ATM network, making ATM a valuable solution for many different services.

ATM Adaptation Layer (AAL)
The ATM Adaptation Layer isolates the higher layers from the specific characteristics of the ATM Layer and provides a way to map data from variable length frames into the fixed size of ATM cells. Different Adaptation layers are used (AAL-1, AAL-3/4, and AAL-5) to implement different types of service.

ATM Adaptation Layer 0 (AAL-0)
ATM Adaptation Layer 0 (AAL-0) supports raw cell transport. It has an SAR-PDU header or trailer.

ATM Adaptation Layer 1 (AAL-1)
ATM Adaptation Layer 1 (AAL-1) supports constant bit rate data such as voice, video, or other continuous user data. AAL-1 transfers data at a fixed speed. AAL-1 contains a 47-byte payload and a 1-byte header.

ATM Adaptation Layer 3/4 (AAL-3/4)
ATM Adaptation Layer 3/4 (AAL-3/4) supports variable bit rate data with connection oriented (type 3) or connectionless (type 4) data services. AAL-3/4 supports two modes of operation - Message Mode which is used for framed data, and Stream Mode which is used for low-speed continuous data. AAL-3/4 contains a 44-byte payload with a 2-byte header and a 2-byte trailer.

ATM Adaptation Layer 5 (AAL-5)
ATM Adaptation Layer 5 (AAL-5) supports variable bit rate data with connection oriented or connectionless data services. AAL-5 was designed as a simple protocol that assumes some of the functions such as error detection, timing and other overhead information is accomplished by the next level protocol. AAL-5 contains a 48-byte payload with control information in the normal ATM 5-byte header.

ATM Cell
An ATM Cell is a 53-byte protocol data unit made up of a 5-byte cell header and a 48-byte payload (information field).

ATM Layer
The layer in ATM that switches cells to their correct destinations within the network.

ATMProbe
See probe.

Auto-Negotiation
The process by which a probe determines the network speed and automatically sets its own configuration to match that speed.

bps
Bits per second.

Bridge
A device providing an intelligent connection between two otherwise independent LANs. Bridges operate at layer 2 of the ISO OSI reference model. A bridge inspects every packet originating on either LAN and creates a table of nodes and their locations. It isolates the LANs from each other, allowing both sides to pass traffic internally. If a transmission from one LAN is addressed to a node on the other LAN, the bridge transmits it onto the other LAN for the destination node.

Broadcast address
The station address FFFFFF-FFFFFF. Packets intended for all nodes on a LAN use this address as the destination address.

Broadcast packet
A packet sent to all nodes on a LAN.

CBR (Constant Bit Rate Service)
A type of telecommunication service characterized by a service bit rate of a constant value. Used for services requiring a constant, repetitive, or uniform transfer of information.

Cell
A cell is a fixed-length packet of bytes.

Cell Delineation
Cell delineation is the process of identifying the beginning of cells. This can be based on the HEC byte of individual ATM cells.

Cell Layer
A cell layer is the layer where cell level management, routing, traffic control and multiplexing happen.

Cell Loss Priority (CLP)
CLP is a 1-bit field in the fourth byte in the header of an ATM cell. It is used to set priorities for cell discarding. A CLP value of 0 gives the cell a 'higher priority' telling the network this cell should not be discarded. A CLP value of 1 assigns the cell a 'lower' priority informing the network that this cell can be discarded depending on traffic conditions.

Cell Payload
A field of 44, 47, or 48 bytes in an ATM cell that carries service data.

Cell Segmentation
The process of mapping a service into an ATM cell stream.

Cell Stream
A continuous signal of ATM cells. Also known as stream.

CLIP (Classical IP)
IP over ATM conforming to RFC 1577.

CLP
Cell Loss Priority

Collision
The result of two or more nodes on a LAN transmitting at the same time, producing a garbled transmission.

Common Part Convergence Sublayer (CPCS)
The Common Part Convergence Sublayer (CPCS) is a part of the ATM Adaptation layer and provides message identification and error detection depending on the AAL type being used.

Congestion
Exceeding the bandwidth of a virtual path or network capacity.

Console
The ASCII terminal, or PC emulating an ASCII terminal that is connected to the probe and used to configure, monitor, and troubleshoot the probe.

Control field
Field used to identify an I-frame, S-frame, and U-frame and control the behavior of the frame.

Convergence Layer
The Convergence Layer maps ATM cells into the transmission medium being used. It is responsible for identifying the beginning of cells (cell delineation), and for some simple management functions corresponding to the cell mapping. It also manages the rate of cell transmissions from the physical media by inserting and removing idle cells.

Convergence Sublayer
The AAL is divided into two sub-layers: the convergence sublayer and the segmentation and reassembly sublayer (SAR). These two sub-layers convert whatever user data is to be transmitted into 48-byte cell payloads while maintaining the integrity and a certain amount of identity of the data involved. The result of each sublayer process is a Protocol Data Unit (PDU). The CS-PDU is variable in length and is determined by the particular AAL and the length of the higher layer data block passed to it. The SAR-PDU is always 48 bytes long to fit in the payload of an ATM cell.

Convergence Sublayer Indicator (CSI)
The Convergence Sublayer Indicator (CSI) is a 1-bit field in the AAL-1 cell format that handles clock recovery.

Convergence Sublayer Protocol Data Unit (CS-PDU)
A Convergence Sublayer Protocol Data Unit (CS-PDU) is a sublayer of the AAL. See also Convergence Sublayer.

CRC (Cyclic Redundancy Check)
A mathematical algorithm to derive the frame check sequence (FCS) in bit-oriented link protocols or the block check characters in character-oriented protocols.

CSMA/CD (Carrier Sense Multiple Access/Collision Detection)
The network access-control mechanism that is based on collisions and utilized by Ethernet networks. On contention-based networks, like Ethernet networks, each station must detect an idle network prior to transmitting. If more than one station transmits simultaneously, a collision occurs, all stations are notified, and the colliding stations try retransmitting after waiting a random amount of time.

Customer Premises Equipment (CPE)
Customer owned equipment used to terminate or process information from the public network. For example, a T1 multiplexer or a PBX.

Cycle/Stuff Counter (C1)
The Cycle/Stuff Counter (C1) is a 1-byte field in a PLCP frame that controls bit stuffing and length indication. The C1 byte occurs in the P0 (12th) cell of a PLCP frame. The value of C1 and its corresponding Trailer length is:

C1	Frame Cycle	Trailer Length (in nibbles)
11111111	1	13
00000000	2	14
01100110	3 (no stuff)	13
10011001	3 (stuff)	14

Data Link Layer
Level 2 of the seven level OSI reference model defined by ISO. This layer provides the link access control and reliability to networks.

Default Gateway Address
The address of the gateway which is closest to the probe.

DRAM
Dynamic Random Access Memory, which is the main memory of a probe.

Ethernet
A LAN developed by Xerox Corp., Digital Equipment Corp., and Intel Corp. It uses the CSMA/CD method of access and transmits at 10 Mbit/s on a bus topology. The IEEE 802.3 standard evolved from Ethernet, but they are not exactly the same. Network devices based on both standards can co-exist on the same medium, but they cannot exchange data directly without special, bilingual software that can decode packets of both types.

EtherTwist
The Agilent Company’s version of 10Base-T.

Extended LAN
A network consisting of two or more LANs that are connected by bridges, routers, or other similar devices. Resources on the LANs can be accessed by users on any of the LANs. See also LAN.

Far End Block Error (FEBE)
The Far End Block Error (FEBE) is a 4-bit field in the Path Status octet (G1) of a PLCP frame. The value in the FEBE field is the count of BIP-8 errors received in the previous frame (0000 through 1000). If FEBE checking is not implemented, the field is set to all 1s (1111).

FCS (Frame Check Sequence)
An algorithmically derived representation of a frame. (Typically 16 bits.) The FCS provides error-checking capability. It is computed and appended at the time of transmission and regenerated and compared upon reception.

Fill Cell
An empty or null ATM cell. This type of cell is a place holder inserted into the signal stream to occupy bandwidth not allocated to a service. Fill cells are in either the Idle format (ITU-T) or Unassigned format (ATM Forum).

Flow Control
A method used to assure that the source does not overwhelm the destination by sending data faster than it can be processed and absorbed.

Flash EPROM
EPROM that can be erased and reprogrammed while installed in a circuit.

Frame
A frame is a unit of information transferred on a network which contains control and data information.

Frame Check Sequence (FCS)
An error checking character that is appended to a bit-oriented protocol by the transmitter.

Full-duplex
A form of communication between two devices where packets flow in both directions simultaneously. See also Half-duplex.

Gateway
A dedicated computer that is used to route frames from one dissimilar network to another.

Generic Flow Control (GFC)
The Generic Flow Control is a 4-bit field in the first byte in the header of an ATM UNI cell. The GFC field is used for flow control in various ATM applications. Two modes of operation have been designed for the GFC field - Controlled and Uncontrolled. A GFC field set to all zeros denotes no flow control or uncontrolled transmission. A GFC field set to some non-zero value indicates a flow control condition or controlled transmission.

Half-duplex
A form of communication where information can only travel one direction at a time. See also Full-duplex.

Header
Information at the beginning of a cell, frame or packet normally used for alignment, routing, operations or similar purposes.

Header Error Control (HEC)
The Header Error Control (HEC) is an 8-bit field and the fifth byte in the header of an ATM cell. The HEC value is calculated from the first four bytes of the cell header. If an error occurs in an ATM Cell header, it will be detected in the HEC field. Cells with HEC errors that cannot be corrected are discarded by the receiving node. The HEC field can also be used to determine the boundaries of a packet for cell delineation.

Idle Cell
An empty or null ATM cell. This type of cell is a place holder inserted into the signal stream to occupy bandwidth not allocated to a service. Fill cells are in either the Idle format (ITU-T) or Unassigned format (ATM Forum).

IEEE 802.3 standard
Part of the Institute of Electrical and Electronics Engineers 802 family of LAN standards. The 802.3 standard defines the physical layer (layer 1) and part of the data link layer (layer 2) of the ISO OSI reference model for a CSMA/CD LAN. The IEEE 802.3 standard evolved from Ethernet, but the two networks are not fully compatible with each other.

IEEE 802.5 Standard
Part of the Institute of Electrical and Electronics Engineers 802 family of LAN standards. The 802.5 standard defines the physical layer (layer 1) and part of the data link layer (layer 2) of the ISO OSI reference model for a Token-Ring LAN.

Information Field
A field of 44, 47, or 48 bytes in an ATM cell that carries service data.

Integration Period
Period used for statistics measurements.

Interarrival Time
A measurement based on the difference between the time stamps of successive cells.

IP Address (Internet Protocol Address)
A 32-bit address that is divided into network-identifier and host-identifier fields, which are used to identify a particular physical network or a particular device attached to that physical network (respectively).

LAN (Local Area Network)
A general-purpose communications network that interconnects a variety of devices within a limited geographical area. Two common LANs, IEEE 802.3 and Ethernet, have compatible cabling requirements, and can co-exist on a common installation, but have different protocols. A LAN might connect computers on adjacent desks, within a building, or within several buildings of a campus. See also extended LAN.

LANE (LAN Emulation)
An emulation program on the local host that controls the execution of LAN Emulation Servers (LES), Broadcast/Unknown Servers (BUS), and LAN Emulation Configuration Servers (LECS).

LAN cable
A short distance network (up to a few thousand meters) used to connect many network devices using a communication standard. LAN cables come in many types. For example, thick (10 mm) coaxial cable, thin (5 mm) coaxial cable, fiber-optic cable, and twisted-pair cable.

Layer
A level in the hierarchy of telecommunications protocols. Protocols in the higher layers inter-operate with those in the lower layers.

Leased Line
Permanent connection for private use within a data communication network independent of the public switching and signalling equipment.

LOCS
Loss Of Cell Synchronization

LOSS
Loss Of Scrambler Synchronization

Loss of Signal (LOS)
LOS is a loss of signal.

MAC address
A 12-digit (48 bit) hexadecimal number that identifies a specific network station and allows messages to be directed to that station only. Because the IEEE has assigned identifiers for each hardware manufacturer, no two pieces of equipment have the same address. The address assigned according to the IEEE plan is referred to as a device's globally-administered station address. Some devices provide an option for the user to assign a different station address that will override the original. This type of address is referred to as a locally-administered station address. The station address is also commonly called a MAC address, Ethernet address, Token-Ring address, or physical address.

Manager
A node that collects network management information from agents.

Management station
A station that collects network management information from probes.

MAU (Medium Attachment Unit)
The assembly used to provide the physical connection and access to a LAN. It is the device on the LAN that detects collisions. (A transceiver is also called a MAU in the IEEE 802.3 standard.)

Mbps
Megabits per second.

Metropolitan Area Network (MAN)
A network linking together LANs and other networks at many sites within a city area.

MIB (Management Information Base)
A data structure used for communication and control of the probe.

Monitor
Passive data capture of both sides of a digital communication.

MPOA (Multiprotocol over ATM)
A standardization of protocols for running multiple network layer protocols over ATM.

Multiplexer
A network element (NE) that performs multiplexing of several signals into one, or separates out the individual signals at the receiving end. An add-drop multiplexer can insert a tributary signal into a signal stream at a node, or extract a tributary signal from a stream at a node.

Multiplexing
Merging several different signals into one at the source, and separating them at the destination, for example, the sound and video of a television signal are multiplexed (modulated) onto a single carrier. In ATM telecommunications, multiplexing refers to the merging of several service signals consisting of ATM cells with different VPI and VCI values into a single cell stream modulated onto an optical carrier at a particular line rate (for example, 155.52 Mb/s).

NetMetrix
NetMetrix refers to the Agilent OpenView NetMetrix/UX software suite for Agilent-UX and Solaris.

Network Equipment
A collection of bridges, routers and switches which comprise the network infrastructure.

Network Layer
Level 3 of the seven level OSI reference model defined by ISO. This layer provides the routing of data through the network based on global addresses. Typical examples are IP and X.25.

Network to Network Interface (NNI)
The Network to Network interface (or Network to Node Interface) is similar to the UNI but there is no 4-bit GFC field. The 4 extra bits are used as part of the VPI.

Nibble
A nibble is four bits.

NNI
Network to Network interface (or Network to Node Interface)

Node
A computer or other addressable device on a network, including PCs, terminals, probes, routers, and mainframes. Usually, a node has a station address.

Object
Any device that can be monitored or controlled by use of the SNMP protocol.

Octet
8 bits considered as a transmission element. Octets in general are not equivalent to user's data bytes. "Octet" is more general than "Byte," allowing for smaller elements to be contained (1 bit fields, 2 bit fields, and so forth.)

OC-12 (Optical Carrier level-12)
The optical derivation of STS-3. The SONET standard for OC-12 or STS-12c has a basic rate of 622.08 Mbps. See also STS.

Octet
The common term used for a collection of 8 bits is a byte. In some cases, the term used is an octet. Although many people use these terms interchangeably, there are a few differences. The bits of a byte are normally numbered from 0 to 7. The bits of an octet are generally numbered from 1 to 8. While the 4th bit of both a byte and an octet are the same, bit 4 of each is a different bit.

Open Systems Interconnection (OSI)
Open Systems Interconnection is the internationally accepted standard for communications between different systems by different manufacturers. Most commonly known as the OSI Model - the 7-layer network architecture.

Operations, Administration and Maintenance (OAM)
OAM is a cell type dedicated to carrying administrative information for the network.

Optical Bypass
An optical bypass switch that works in conjunction with a probe's Bypass Power connector to maintain the network link even when a probe has an interruption in power.

OSI
Open Systems Interconnect. The 7 level communications structure promoted by ISO.

Packet
A bit stream consisting of predefined fields that contain data, addresses, and control information. In the IEEE 802.3 environment, this structure is often referred to as the **MAC frame**. Packet is used in the Ethernet environment and is used in this guide because it is the more commonly understood term. Different protocols have different packet and frame specifications.

Pass-Through
The method of connecting Agilent Probes so that additional hub ports or an additional hub is not required to monitor a connection. Some probe options are designed to support the pass-through mode and allow the probe to be connected between a server and a switch or between two switches without requiring an extra hub.

Path
A logical connection between the point at which a standard frame format for the signal at the given rate is assembled, and the point at which the standard frame format for the signal is disassembled.

Path Overhead Identifier (POI)
The Path Overhead Identifier (POI) is the label for the function of each Path Overhead byte in a PLCP frame.

POI - POI Value (8 bit)	POH
P11- 00101100	Z6
P10- 00101001	Z5
P9 - 00100101	Z4
P8 - 01000000	Z3
P7 - 00011100	Z2
P6 - 00011001	Z1
P5 - 00010101	X
P4 - 00010000	B1
P3 - 00001101	G1
P2 - 00001000	X
P1 - 00000100	X
P0 - 00000001	C1

Payload
The payload of an ATM cell is the 48 bytes available for data. This field is also called the Cell Payload or Data Payload.

Payload Type (PT)
A field in the header of an ATM cell used to identify the type of information being transported that may require different handling by the network or terminating equipment.

Payload Type Indicator (PTI)
The Payload Type Indicator (PTI) is a 3-bit field that defines the contents of an ATM cell. The first bit determines if the cell is user data (0) or network signaling information (1). The second bit determines if there is no congestion (0) or congestion (1). The third bit identifies the SDU type (if it is a user cell) or the OAM type (if it is a control cell).

PTI - Explanation

000 - User data cell - no congestion - SDU Type 0
001 - User data cell - no congestion - SDU Type 1
010 - User data cell - congestion - SDU Type 0
011 - User data cell - congestion - SDU Type 1
100 - Segmented OAM F5 flow related cell
101 - End-to-End OAM F5 flow related cell
110 - reserved for future use
111 - reserved for future use

PDH
Plesiochronous Digital Hierarchy

PFEBE
Path Far End Block Error

Physical Layer (PL)
Level 1 of the seven level OSI reference model defined by ISO. The physical layer provides for the physical transportation of cells across the network. It consists of physical medium dependent (PMD) and transmission convergence (TC) sublayers. Important categories are PDH, SDH and the physical media used on local premises for LANs.

Physical Layer Convergence Protocol (PLCP)
The Physical Layer Convergence Protocol (PLCP) is used to map cells into the DS3 bit stream. There are 12 cells in a PLCP frame. Each cell is preceded by a 2-byte framing pattern (A1,A2) to enable the receiver to synchronize to the cells. After the framing pattern is an indicator consisting of one of 12 fixed bit patterns used to identify the cell location within the frame (POI). This is followed by a byte of overhead information used for path management. The entire frame is padded with either 13 or 14 nibbles of trailer to bring the transmission up to the exact bit rate used.

DS3 was intended to accommodate clock slips so PLCP frames have to be padded with variable amounts to accommodate the extra “stuff” bits DS3 needs inserted for this clock slip feature. The C1 overhead byte indicates the length of the padding.

The payload and the overhead functions are checked by a Bit Interleaved Parity (BIP) function to measure errors and performance degradation. This performance information is transmitted in the overhead.

Physical Medium Dependent (PMD)
This sublayer of the physical layer is concerned with bit timing, line coding and electrical or optical transmission functions.

PL-OAM
Physical Layer Operations and Maintenance

PLCP BIP
Physical Layer Convergence Protocol Bit Interleaved Parity

PLCP FEBE
Physical Layer Convergence Protocol Far End Block Error

Private MIB
A proprietary MIB that has variables which are used for probe configuration and control options.

Probe
A device on the LAN that monitors all frames and produces network management information including current and historical traffic statistics and snapshots of selected frames. Probes are also known as monitors.

Protocol
A set of rules that governs data transfer among devices on a network. A protocol identifies the handshake type, frame size and format, timing, error recovery scheme, word size or other characteristics of each transfer, depending on the system.

Protocol Data Unit (PDU)
A segment of data generated by a specific layer of a protocol stack; usually contains information from the next higher layer encapsulated with header and trailer data generated by the later in question.

Ring
See Token-Ring.

RMON MIB (Remote Network Monitoring MIB)
The collection of objects defined by the Internet Engineering Task Force in RFC 1757, RFC 1213, RFC 1157, RFC 2021, RFC 2074, Token-Ring RMON Extensions, and Agilent probe private MIB that are used for network monitoring.

RS-232 port
A serial interface connector on a computer or peripheral that adheres to the current RS-232 standard. The probe's RS-232 port adheres to this standard.

RS-232C/D (EIA-232D)
Common, inexpensive level 1 interface with a specified 20 kbps top speed and 50 feet maximum distance.

SAM (System Administration Manager)
A configuration tool provided by Agilent-UX for managing system resources and changing configuration parameters.

SAR-PDU
Segmentation and Reassembly Protocol Data Unit

Scrambling
An algorithm applied to a digital signal to eliminate long runs of all zeros or and ones which would make it difficult to recover the clock. The signal is unscrambled at the receiver to restore the original. Scrambling also eliminates the possibility of payload bit patterns accidentally mimicking an alignment or synchronization pattern at the start of a frame. Scrambling is only applied to the payload of ATM cells.

SDU
Service Data Unit

Segmentation
The process of partitioning a network message so that it fits within an integral number of ATM cells consisting of a header and a payload containing a part of the original network message.

Segmentation and Reassembly (SAR)
Segmentation and Reassembly (SAR) is the process used to map user data to and from ATM cells. At the transmitting end, information is segmented and sent out in separate cells (adding padding if necessary). At the receiving end, the AAL takes the information from the individual cells and reassembles it into its original form.

Sequence number (SN)
A number located in byte 6 of an AAL-1 ATM cell with a value in the range 1 through 7. This sequence number is used to identify the relative position of cells in a cell stream.

Server
A device on the network that is dedicated to specific functions.

Service
A single call or transmission, such as a telephone conversation, a computer-data transmission, or a television signal. A multimedia service is a single call carrying different types of information such as text, graphics, sound and video.

Service Specific Convergence Sublayer (SSCS)
The Service Specific Convergence Sublayer (SSCS) is a part of the ATM Adaptation layer and handles timing and message identification depending on the AAL type being used.

Services Layer
The layer immediately above the adaptation layer in the hierarchy of telecommunications protocols. It is occupied by a particular client information service which is to be mapped into the cell layer by the adaptation layer. Different adaptation layers are needed for different services.

Session Control
The function of the Data Flow Control (DFC) layer is to control the responses between FMDS pairs within sessions. The chief control block of the DFC is the Session Control Block (SCB).

Setup
Setting up the bandwidth and permissible cell delay times at the beginning of a call.

SLIP (Serial Line Internet Protocol)
A protocol used for serial communications.

Slot
A position in the ATM cell stream. Vacant slots are padded with idle (or fill) cells.

(SNMP) Simple Network Management Protocol
The Simple Network Management Protocol provides requests and responses between SNMP managers and SNMP agents. These transactions work with network management information from Management Information Bases (MIBs)

Station
A computer or other addressable device on a network, including PCs, terminals, probes, routers, and mainframes. A station must have an IP address.

STM-1 (Synchronous Transfer Mode)
Information being transported or switched in regular and fixed patterns with respect to a frame pattern reference (or some other reference).

STS (Synchronous Transport Signal)
The electrical signal rate defined by SONET. See also OC-12.

Subnet Mask
Identifies the subnet field of a network address and is a 32-bit Internet address written in dotted-decimal notation. A subnet mask is used to divide a network into sub networks.

SVC (Switched Virtual Circuit)
A virtual circuit which is dynamically created and torn down when no longer active.

Switch
A network element (NE) that reroutes incoming cells into an outgoing cell stream based on each cell's VPI and VCI.

Synchronous
Signals that are sourced from the same timing reference and hence are identical in frequency.

TC
Transmission Convergence Sublayer

TE
Terminal Equipment.

Telemetry Port
The Telemetry port only receives packets destined for the port's IP address, can transmit packets onto the network, and is used for SNMP communications to the probe. It requires the IP Address, Subnet Mask, and Default Gateway IP Address fields. The following apply to Monitor/Transmit ports:

- Agilent OpenView can discover the interface
- The interface is IP addressable
- The interface responds to RMON groups 1 through 9 queries
- The interface will transmit all traps from the probe
- The interface will transmit all extended RMON packet samples from Monitor-only ports, Monitor/Transmit ports, and itself.

Terminal
An input/output device that permits interaction with a probe or computer. The device can be a display and keyboard, or a personal computer. An ASCII terminal, or PC emulating an ASCII terminal, can be connected to the probe for configuration, monitoring, and troubleshooting the probe.

Topology
The organization of network devices in a network. FDDI uses a ring topology, Ethernet uses a bus Topology, and Token-Ring uses a ring topology.

Trailer
The last few octets or nibbles of a frame that fall outside the column and row view of the frame structure.

Transmission Convergence Sublayer (TC)
This sublayer of the physical layer maps ATM cells to and from the physical transmission medium with three key processes: cell delineation, cell synchronization, and cell rate de-coupling.

U-frame
Unnumbered frames (level 2) to initialize and disconnect the DTE/DCE link.

Unassigned Cell
A cell used to fill unused bandwidth. Unassigned cells are similar to Idle or Fill cells. See also Idle Cell or Fill Cell.

User Network Interface (UNI)
The physical and electrical demarcation point between the user and the public network service provider.

UTP (Unshielded Twisted Pair)
A cable that is twisted in pairs. Pair twisting reduces crosstalk by canceling the magnetic fields generated in each of the twisted wires.

Virtual Channel (VC)
A communications path between two nodes identified by label rather than a fixed physical path.

Virtual Channel Identifier (VCI)
A Virtual Channel Identifier is a 16-bit field in the ATM header. The VPI and VCI are used together to determine the destination address of the ATM cell.

Virtual Circuit
An end-to-end logical connection of users without specific paths defined. It is not a direct connection, but a logical communication path. The Frame Relay and X.25 technique of routing user data through the network.

Virtual Path (VP)
A collection of virtual channels grouped together for routing purposes sharing a common VPI.

Virtual Path Identifier (VPI)
The Virtual Path Identifier is an 8-bit field in the ATM header.The VPI and VCI are used together to determine the destination address of the ATM cell.

WAN (Wide Area Network)
A data network engineered for relatively lower speed data transfers over unlimited distances. Often the links in a WAN are provided by a third party.

WanProbe
See probe.

Wide Area Network (WAN)
A communications network that uses public and/or private telecommunications facilities to link computing devices that are spread over a wide geographic area.

Index

Symbols

Numerics

A

B

C

D

E

M

N

O

P

R

S

Agilent Technologies, Inc. Offices

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