Using an Optical to UTP5 Converter with the E5200A Broadband Service Analyzer

Introduction

This document describes how to use the Armada Systems Inc. CopperMagic Fiber Converter with the HP E5200A Broadband Service Analyzer and the OC-3/STM-1 Optical Interface Pod.

Use the CopperMagic Fiber Converter to convert UTP5 network traffic to the optical domain so you can analyze it with the HP Broadband Service Analyzer and the OC-3/STM-1 Optical Interface Pod.

The CopperMagic Fiber Converter converts UTP5 network traffic to the optical domain, and optical network traffic to UTP5 format.

The HP E5200A Broadband Service Analyzer OC-3/STM-1 Optical Interface Pod supports both single mode and multimode fiber systems. It incorporates a single mode laser transmitter.

The Appendix at the end of this document describes how the Broadband Service Analyzer handles optical communications, the differences between single mode and multimode operations, and how this relates to operations with the CopperMagic Fiber Converter. The appendix also details some of the basics of fiber operations.

The CopperMagic Fiber Converter

The CopperMagic Fiber converter is manufactured by:

Armada Systems, Inc
385 Oyster Point Blvd,
St. 8A/3-151
South San Francisco, Ca, 94080

Telephone: (415) 631 0748
Fax: (415) 631 0749

What you need

To use the CopperMagic Fiber Converter, with the HP E5200A Broadband Service Analyzer and the OC-3/STM-1 Optical Interface Pod, you need the following cabling components:

To monitor the network:

• multi-mode fiber, to connect the OC-3/STM-1 Optical Interface Pod receive port to the CopperMagic Fiber Converter

To simulate network traffic:

• a 10 dB-1300nm attenuator, to attach to the OC-3/STM-1 Optical Interface Pod transmit port
• single mode fiber, to connect the CopperMagic Fiber Converter to the attenuator attached to the OC-3/STM-1 Optical Interface Pod
To monitor and simulate network traffic, you need all of the above components. To obtain a CopperMagic Fibre Converter, contact the manufacturers. See “CopperMagic Fiber Converter” above for the manufacturer details.

The rest of the listed components are manufactured by Hewlett-Packard. Part number details are listed below. Contact your local Hewlett-Packard sales office to obtain the components:

- single mode fiber section, p/n E5122-64206
- 10 dB-1300nm attenuator, p/n E5200A Option 137
- multimode fiber section. This is widely available. For example, Molex Fiber Optics Part Number MXBAA-FAA-FAA-M001-A000. HP recommend that you use one meter of 62.5/125 mm fiber cable with SC style connectors.

The HP Broadband Service Analyzer’s Optical Interface Pod

The HP E5122A OC-3/STM-1 Optical Interface Pod supports both single mode and multimode fiber systems. The Interface Pod incorporates a high power single mode laser transmitter that enables direct use with single mode fiber systems.

To use the pod transmitter with multimode fiber systems, you need to use an attenuator to reduce the signal power to a level that is compatible with multimode systems.

See the appendix for details on single mode and multimode fiber operations.

Using the CopperMagic Fiber Converter with the HP Broadband Service Analyzer

Use the CopperMagic Fiber Converter to connect your network to the HP Broadband Service Analyzer’s OC-3/STM-1 Optical Interface Pod.

Use the service analyzer as you would normally to analyze network traffic.

Appendix: Optical Fiber Communications

This appendix contains details on:

- single mode and multimode fiber cleaning optical connectors.

Single Mode and Multimode Fiber

Optical fiber is used to transport optical data signals over an optical network. Simply put, an optical fiber consists of the following:

- a high-quality glass core, capable of carrying an optical signal with little loss
- glass cladding, surrounding the core
- a protective jacket, to protect the fiber from mechanical damage

There is a slight difference in the refractive indexes of the glass that makes up the core and the glass that makes up the cladding.

This difference in refractive indexes causes total internal reflection of the light signal at the core-cladding boundary, and is the mechanism by which the light signals are propagated through the fiber core.

In multimode fiber, the light that makes up the signal can follow a number of paths as it travels down the fiber and is reflected at the core-cladding boundary.

Each possible path represents a mode, hence the name “multimode fiber.” In single mode fiber, there is only one possible path, or mode that the light signal can follow.

A signal pulse traveling down a multimode fiber consists of many
components; as many components as there are possible modes for the fiber.

Since each path, or mode is a different distance, the mode components take slightly different times to travel down a fiber.

This leads to pulse spreading, or dispersion. In single mode fiber, as there is one possible path only, there is less dispersion.

Single mode fibers are typically used for applications that require a high degree of signal preservation, such as SONET/SDH communications infrastructure.

Multimode fiber is commonly used where this is not so important, for example a local area network. Single mode fiber is more expensive than multimode fiber.

Cleaning Optical Connectors

Different types of connectors are used to connect optical fiber network elements to testing devices and to equipment such as optical-electrical convertors. It is very important to keep these connectors clean.

Microscopic dust particles, dirt, and grime on optical connectors can cause scratching of optical equipment, and can cause errors or alarms. To eliminate dirty connectors as a possible source of errors, you need to:

- ensure you use the connector caps provided to cap a connector whenever it is disconnected from a network element or test device
- clean connectors every time you use them to connect to a system under test

You need the following items in order to keep your optical connectors clean. In the list below, the items that you can get from your Hewlett-Packard sales office include HP part number details:

- a good quality lens cleaning tissue
- blow brush, HP part number 9300-1131
- cleaning tip, HP part number 9300-1351
- adhesive tape, HP part number 15475-68701
- cleaning fluid, HP part number 8500-5344
- magnifier, for examining the connectors for dirt
HP Sales and Support Offices
For more information, call your local HP sales office listed in your telephone directory or an HP regional office listed below for the location of your nearest sales office.

United States:
Hewlett-Packard Company
Test and Measurement Organization
5301 Stevens Creek Boulevard Building
51L-SC Santa Clara, CA 95052-8059
1-800-452 4844

Canada:
Hewlett-Packard Canada Ltd.
5150 Spectrum Way
Mississauga, Ontario
L4W5G1
(905) 206-4725

Europe:
Hewlett-Packard
European Marketing Centre
P.O Box 999
1180 AZ Amstelveen
The Netherlands
(020) 547-6222

Japan:
Hewlett-Packard Japan Ltd.
Measurement Assistance Centre
9-1, Takakura-Cho, Hachoji-Shi
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