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DIGITAL GIGAswitch/FDDI Fast Ethernet Linecard Installation
DEFGF-AA
August 1998

This document contains information critical to the use of the DIGITAL GIGAswitch/FDDI Fast Ethernet linecard (DEFGF-AA).

Fast Ethernet Linecard Description

The Fast Ethernet (XGL-4) is a 4 port module that supports 4 fast ethernet connections to the GIGAswitch/FDDI crossbar. Functionally it is similar to the FGL-4, except it connects to fast ethernet (instead of FDDI) devices. When inserted into a 4 port slot in the GIGAswitch /FDDI chassis it will provide 4 crossbar connections. When inserted into a 2 port slot it will provide only 2 crossbar connections (ports 1 & 2).

From the perspective of a bridge this module is indistinguishable from an FGL-4 module. When a packet is received at an XGL-4 port it is translated (at line rate) to an FDDI packet, and sent through the switch. When a packet is transmitted through an XGL-4 port it is first translated into a fast ethernet packet (s) (at line rate) before being sent on to the fast ethernet link.

FDDI packets whose translations exceed the maximum transmission unit (MTU) size for fast ethernet will be dropped - except in the case of IP packets. IP packets with MTU greater than fast ethernet MTU will be fragmented before transmission. IP fragmentation is done at line rate.

Packets which have been encapsulated according to 802.1q VLAN trunk encapsulation rules will be translated and fragmented properly, with the VLAN header attached to each fragment.

XGL-4 Appearance

The XGL-4 module has a slightly different appearance than FGL-4 modules. The XGL-4 module consists of the following logic cards:

The mother board contains the logic that connects the module to the crossbar.

The cpu card attaches at the top of the mother board, and contains the processor, DRAM and FLASH memory, as well as the leds.

There are 4 packet memory cards (1 per port) that contain the SRAM used to implement packet memory.

There are 4 Fast Ethernet (FE) MAC cards which contain the logic that does the FE-FDDI translation, as well as the FE MAC interface.

The above modules are assembled at the factory. There should never be a time when it is necessary for the customer to disassemble or reassemble these cards.

In addition the XGL-4 requires 1 physical interface for each port. These are front-insertable, but must be inserted <u>prior</u> to powering up the module. They are **not** hot swappable. The four ports can use any of the following physical interfaces:

- 100BASE-FX MMI multimode fiber (MMF) DEXYM-AA

- 100BASE-TX MMI UPT-5 RJ-45 (UTP) DEXYU-AA

Special Switches

On the side of the CPU module facing to the left (as one looks at the XGL handle) there is a series of 6 switches, as shown in the following diagram. For the most, these switches will remain at their factory settings forever. They have the following functions:

LKG-10759-98MF
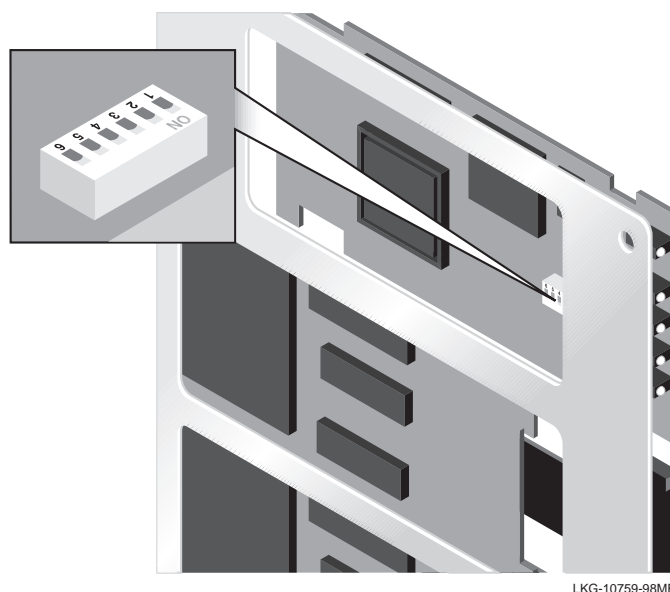
When the module is installed into the chassis the lettering on the switch pack is upside down (switch 6 being the left most)

Switch	Function	Factory Default
6	Write-protect secondary FLASH image, when **up**.	Up
5	Undefined	Down
4	Does not load primary images, when **up**.	Down
3	Load only backup image, when **up**.	*Down
2	Undefined	Down
1	Runs extended test mode, when **up**.	*Down

* Must be down for module to send/receive packets.

These switch setting must be changed to downline load a new secondary code image (switch 6) or to force an existing secondary image to take precedence over the existing primary image (switch 4). Ordinarily the primary image will be loaded. If the boot code determines that the primary image is corrupted, then the secondary image will be automatically loaded. If the secondary image is also found to be corrupted, then the backup image is loaded. The linecard will be operational with either the primary or secondary image. When the backup image is running the card can be upgraded, but will not receive or transmit packets on its FE ports.

Supported Firmware Versions

The XGL-4 module uses the GIGAswitch/FDDI V3.45 firmware. Check the firmware release notes for your GIGAswitch/FDDI system to make sure that you have the latest versions of the required firmware.

NOTE

You must have the appropriate versions of firmware required for your GIGAswitch system to use the Fast Ethernet module.

When upgrading from SCP V3.2 or later firmware, no special precautions need to be taken. For upgrades from earlier versions of firmware, see the installation information in the Release Notes. In order for the XGL-4 module to operate properly the CLK and SCP modules must be running the most recent firmware revisions (CLK V3.3 and SCP V3.45).

The following files contain the **new** 3.45 firmware images:

File	Firmware Image
scp-345.ftp	SCP version 3.45
fg2-345.rsx	FGL-2 version 3.45
fg4-345.rsx	FGL-4 version 3.45
ag2p-345.rsx	AGL-2+ version 3.45
xg4-345.rsx	XGL-4 version 3.45
clk-33.rsx	CLK version 3.30

New versions of software images for the GIGAswitch systems are available from the DIGITAL Network Products Business Web Site. The Web Site can be reached from different geographic locations via the following URLs:

Americas   http://www.networks.digital.com

Europe   http://www.networks.europe.digital.com

Asia Pacific   http://www.networks.digital.com.au

To get firmware and MIB information, choose the "Technical Information" link, and from there choose the "Technical Information (Drivers, Manuals, Tech Tips, etc.)" link.

Installing the XGL linecard

To install the XGL-4, place the module in the card guide tracks and slide into place.

NOTE

The linecard mounting baseplate does **not** go into the card guides.

Module LEDs

The following tables list the LEDs and describes the meaning of each LED condition for the Fast Ethernet module.

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LED	Name
Topmost	Module LED
1 through 4	Port LEDs

The Module LED (topmost LED) displays information about the module status as shown in the following table.

LED Condition	Meaning
OFF	No power
Green	Module OK
Flashing green	Down line loading
Amber	Selftest running
Flashing amber	Selftest Failed
Alternate green/amber	Non fatal firmware error

The Port LEDs (1 through 4 LEDs) display the status of each port as shown in the following table.

State	Meaning
Green	Forwarding state
Flashing green	Pre-forwarding state
Amber	Failure on port

The PHY (left most) and FRU LED (right most) on the bottom half display the status of each PHY as shown in the following table. The FRU LEDs are not used.

PHY	Meaning
Off	No link connection
Green	Link active
Flashing green	Port disabled

Known Problems and Restrictions for Fast Ethernet Linecard

SCP Module Minimum Firmware Revision

The SCP firmware revision must be V3.45 or greater.

SNMP Management

This release does not support SNMP functionality.

Setting Linecard Defaults through OBM

This release does not allow changing of default parameters through the OBM.

Full vs Half Duplex, and 10 vs 100 Mb/second Operation

When using UTP, each XGL port will use autonegotiation to create the best possible common settings with its link partner, if the port's target also has this capability. When using a FIBER Physical Medium Device (PMD), the XGL port defaults to 100 Mb/second at Half Duplex. This release does not allow these defaults to be permanently modified. The Power-up defaults of both PMD types are as follows:

- UTP PMD

  Autonegotiation enabled.

  Advertised Capabilities are:

  > 100Mb/sec Full Duplex;
  >
  > 100Mb/sec Half Duplex;
  >
  > 10Mb/sec Full Duplex;
  >
  > 10Mb/sec Half Duplex.

- FIBER PMD

  Autonegotiation disabled.

  100Mb/sec Half Duplex.

Alternative Methods for Changing Default Parameters

The GIGA/switch FDDI Fast Ethernet Line Card includes a simple facility to display and manage each port on the Fast Ethernet Line Card. The primary purpose of this facility is to assist with engineering testing, hence the name Design Verification Testing (DVT). The form and content of these tests might change from release to release depending on engineering requirements.

The current release of the Fast Ethernet Line Card firmware doesn't support SNMP (the preferred method to manage the line card), therefore you will need to access DVT if you need to change any power-up defaults or to monitor Fast Ethernet Line Card ports.

To change from the default parameters use the following DVT procedures:

NOTE

These modifications are not saved permanently; a linecard restart or power interruption will re-set the linecard to its default setting.

DVT	Description
DVT test 125	Displays the operating mode, statistics and type of phy(PMD) for the selected port.
DVT test 126	Clears software copies of the counters reported in DVT test 125.
DVT test 128	Allows you to configure the operating mode of the selected port.
DVT test 851	Allows you to select the port
	If you don't select a port then DVT defaults to the second port from the top of the module.

Note: The DVT command RUN and run are both valid.

Instructions for running Fast Ethernet Line Card DVT:

Step	Action
1	From the clock console prompt (CLK>) type ^E
2	Input the slot number (1 to 14) of line card to run DVT
3	Clock card will begin communicating with the line card and the DVT prompt will appear on the screen.
4	You should run DVT test 851 to select the port you wish to monitor or configure.
	You should type RUN test number.
	Example to run DVT test 125:
	RUN 125

You can manipulate the following Fast Ethernet operating modes by running DVT test 128:

- ENABLE/DISABLE Auto-Negotiation Mode

- Set FULL or HALF Duplex

- Set speed to 100Mbs or 10Mbs

- Set Auto-Negotiation Advertise Capabilities

- Restart Auto-Negotiation

- Enable/disable physical layer Isolation Mode

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DVT test 128 outputs a simple menu of choices to allow you to change the operating mode of the selected Fast Ethernet port.

- To Start DVT test 128 at the DVT prompt type:

    RUN 128

DVT test 128 begins execution and prints the following:

   Select a operation mode from the choices presented below.

Type a:	To select:
1	Enable Auto-Neg
2	Disable Auto-Neg
3	Set FULL Duplex
4	Set FULL Duplex and DISABLE Auto-Neg
5	Set HALF Duplex
6	Set HALF Duplex and DISABLE Auto-Neg
7	Set Speed 100MBS
8	Set Speed 100MBS and DISABLE Auto-Neg
9	Set Speed 10MBS
A	Set Speed 10MBS and DISABLE Auto-Neg
B	Set Auto-Neg Advertise Capabilities
C	Restart Auto-Neg
D	Enable Isolation Mode, bring phy DOWN
E	Disable Isolation Mode, bring phy UP

   Please select a operation mode?

   Examples:

   To disable auto-negotiation and set duplex mode to full then you would type:

      4 <cr>

   To restart auto-negotiation then you would type:

      C <cr>

Notes:

- For each parameter changed the DVT test will exit and must be restarted to set another parameter.

- If you type a value that is out of bounds or otherwise invalid then the DVT test doesn't change the value of any parameter but just exits back to the DVT prompt.

- If you attempt to set an illegal parameter then the test will attempt to report why the parameter couldn't be manipulated.

   Example: You cannot set auto-negotiation on a FIBER PMD. It is not supported by hardware. So if you attempt to set auto-negotiation on a FIBER PMD then the test will report the following message:

   Can't Enable Auto-Nego on FIBRE PMD

- When DVT test 128 exits, it attempts to display the new settings but often times the displayed values are stale. To display the correct and current operating mode, you should run DVT test 125.

Setting Auto-Negotiation Advertise Capabilities:

- To modify Auto-Negotiation Advertise Capabilities

    type a B <cr>.

This will cause the auto-negotiation advertise capabilities sub-menu to prompt with the following 4 queries.

- Enable or Disable 100BASETX FULL DUPLEX   [e]/d ?

- Enable or Disable 100BASETX HALF DUPLEX   [e]/d ?

- Enable or Disable 10BASET   FULL DUPLEX   [e]/d ?

- Enable or Disable 10BASET   HALF DUPLEX   [e]/d ?

Terminate each query with a <cr>.
Typing a D or d disables the advertise capability, typing an E or e or just <cr> enables the advertise capability.

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