Software Version 7.13.2

GeoProbe® G10

G10 Hardware Maintenance Guide

Tektronix communications

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Tektronix, Inc. Proprietary Information
992-0411-08-002-140228

WHAT'S NEW IN G10 HARDWARE VERSION 7.13.2?

Feature ID	Description	Refer to:
F-02470	**New Applications Blade** G10 probes support a new IAP320 application blade.	**Chapter 1**, G10 Probe Configurations **Chapter 3**, Blades and RTMs

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1 G10 Probe Overview

OVERVIEW

The newest member of the GeoProbe family was designed specifically to address high bandwidth IP interfaces with a distributed architecture optimized to handle larger traffic volumes.

With native IPv4 and IPv6 support, the GeoProbe G10 offers the following benefits:

- Optimized for portions of the operator networks with high volumes of voice and data IP traffic.
- Additional on-board capabilities improve usability and efficiencies: Store to Disk (S2D) supports configurable packet capture rates with expandable storage configurations.

Beyond quantifiable performance metrics, the GeoProbe G10 enables low-touch installation, configuration, and maintenance.

- Automated workflows facilitate installation and configuration tasks.
- Scheduled group downloads streamline maintenance windows with built-in reversibility commands for ensuring upgrade integrity.

G10 Probe Configurations

Table 1.1 describes the different GeoProbe G10 configuration options.

Table 1.1 - G10 Configuration Options

G10 Configuration	Supported HW	Configuration Details	Refer to:
Standalone 8 x 1G	IIC100 + SRM100RTM IAP100 + PRM100 RTM IAP200 + PRM200 RTM IAP320 + PRM300 RTM	Single chassis probe configuration ■ Supports 8 physical 1G connections ■ Can be upgraded in the field to a Mixed Model	Page 13
Standalone Mixed Model (1G and 10G)	IIC100 + TRM100 RTM IIC200 + SRM200 RTM IIC200 + TRM100 RTM[a] IAP100 + PRM100 RTM IAP200 + PRM200 RTM IAP320 + PRM300 RTM	Single chassis probe configuration ■ Provides support for both 1G and 10G Ethernet connections on one probe. ■ Various combinations are supported with the following maximums: - Maximum support of 8 total ports (1G + 10G) - Maximum support of 4 10G ports	Page 13
Media Probe	IIC100 + TRM100 RTM[b] IIC200 + SRM200 RTM IAP100 + PRM100 RTM IAP200 + PRM200 RTM IAP320 + PRM300 RTM	Two-chassis probe configuration for supporting RTP media monitoring ■ Primary Chassis supports: - Maximum of 8 total ports (1G + 10G) - Maximum of 4 10G ports ■ Expansion Chassis provides additional data processing support	Page 18
Control Plane Probe	IIC100 + TRM100 RTM[b,c] IIC200 + SRM200 RTM IAP100 + PRM100 RTM IAP200 + PRM200 RTM IAP320 + PRM300 RTM	Two-chassis probe configuration for supporting Mobility Management Entity (MME) monitoring ■ Primary Chassis supports: - Maximum of 8 total ports (1G + 10G) - Maximum of 4 10G ports ■ Expansion Chassis provides additional data processing support	Page 19

a. This configuration is only supported for standalone probe configurations monitoring eHRPD.

b. Due to the Media probe and Control Plane probe configurations, deployments with IIC100/TRM100 RTM have a maximum of TWO 10G physical ports available to monitor traffic.

c. The control plane probe only supports the IIC100/IAP200 configuration; the IIC100/IAP320 configuration is not supported.

G10 Architecture Overview

As the foundation for Tektronix Communications' Network Intelligence solution, the GeoProbe G10 efficiently and comprehensively handles virtually all data acquisition and processing tasks within the Iris architecture.

- Data is captured directly from the network in a passive and non-intrusive mode, as opposed to information provided in vendor-specific format by individual network elements. As a result, carriers can gain an independent view regardless of which vendor's equipment is deployed in their network.
- Serving as a processing hub, the GeoProbe G10 eliminates the need for external processing equipment-reducing the number of system components required and ultimately conserving LAN/WAN bandwidth between system elements.
- Offering independence from a larger centralized storage server, the GeoProbe G10 facilitates streaming, real-time, programmable record feeds and real-time session traces.

Data Collection and Processing

As illustrated in **Figure 1.1**, the GeoProbe G10 connects to the monitored network via a physical interface at the link port. Raw packets are processed in real time as they reach the Iris Interface Card (line rate processing functions) and forwarded (stream to disk functions) to the Storage Subsystem.

In parallel, the Iris Interface Card sends control plane traffic to the Application Blade for correlation, xDR generation, and KPI aggregation (control-plane processing functions).

After the packets are processed, the resulting xDRs, KPIs, and processed packets are made available for use by the various Iris Network Management applications.

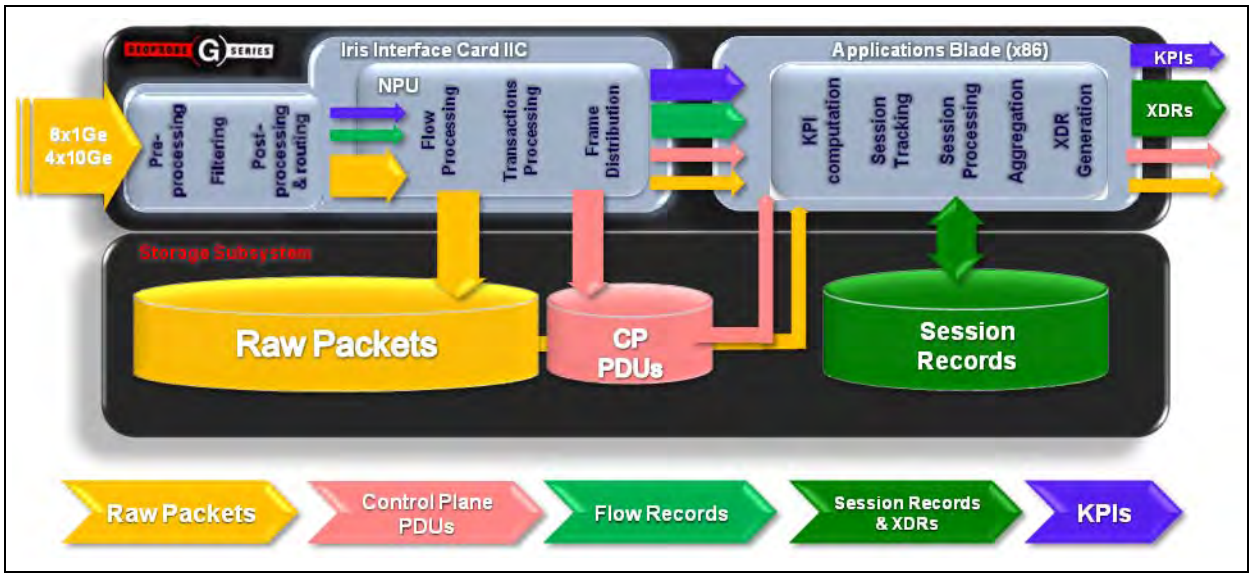


Figure 1.1 - GeoProbe Data Flow

Line Rate Processing—Iris Interface Card (IIC)

Consisting of a tiered pair of NPUs, the Iris Interface Card is able to process raw packets at line rate speed with a distributed internal architecture and purpose-specific processing functions.

- Packet Processor NPU-packet classification with fast processing requirements and lower memory requirements.
- Flow Processor NPU-flow specific criteria processing across multiple packets with higher memory requirements.

The Iris Interface Card's dual NPU architecture allows for independent upgrades of each or either NPU as desired-allowing additional processing power to be added incrementally as needed and available.

User Plane and Control Plane Processing—Iris Interface Card (IIC) and Application Blade

As the GeoProbe G10 architecture can support both User plane and Control plane processing with the same hardware, domain-specific sizing rules have been applied to maximize processing performance for both traffic types.

While the Iris Interface Card handles the majority of the User Plane processing, the Control Plane is forwarded directly to the x86 Application Blade for analysis, correlation and processing functions.

Storage Subsystem—Store to Disk

In addition to I/O ports, interface processors and application boards, the GeoProbe G10 architecture relies upon a storage subsystem to further optimize processing functions.

Native Store to Disk (S2D) capabilities ensure line rate processing performance integrity by capturing and storing monitored packets for use with applications requiring more extensive and expansive data collection.

The incorporation of a RAID dual controller disk array with every GeoProbe G10 installation provides the additional capacity required.

Refer to Storage Subsystem for more details about the storage system hardware components.

G10 Hardware Components

The following sections highlight the G10 hardware components.

G10 Front View

Figure 1.2 shows the front view of the GeoProbe G10.

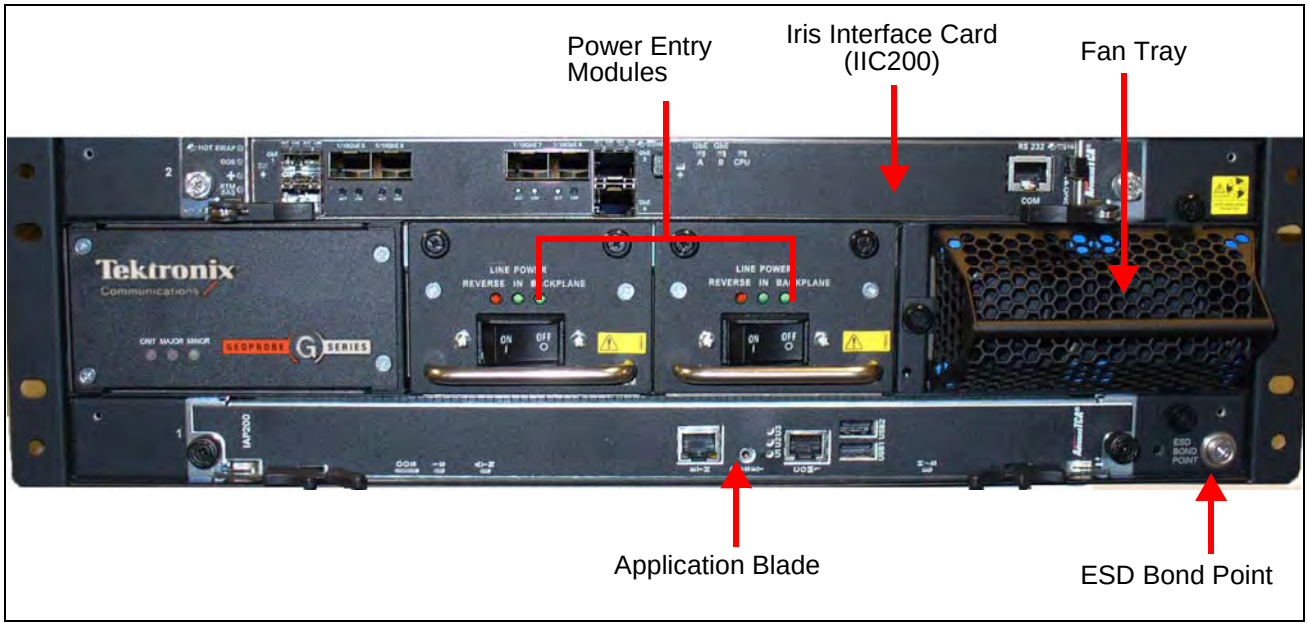


Figure 1.2 - G10 Probe Front View

The front view of the G10 system provides access to the following hardware components:

- Iris Interface Card (IIC200 or IIC100)
- Applications Blade (IAP320/IAP200 or IAP100)
- Two Power Entry Modules (PEMs) (AC or DC)
- Fan Trays (one air inlet fan tray and a second fan tray located on the rear of the G10)
- Electro-Static Discharge Points

G10 Rear View

Figure 1.3 shows rear views of the GeoProbe G10. The IIC RTM installed in Slot 2 (top slot) varies depending on the G10 configuration.

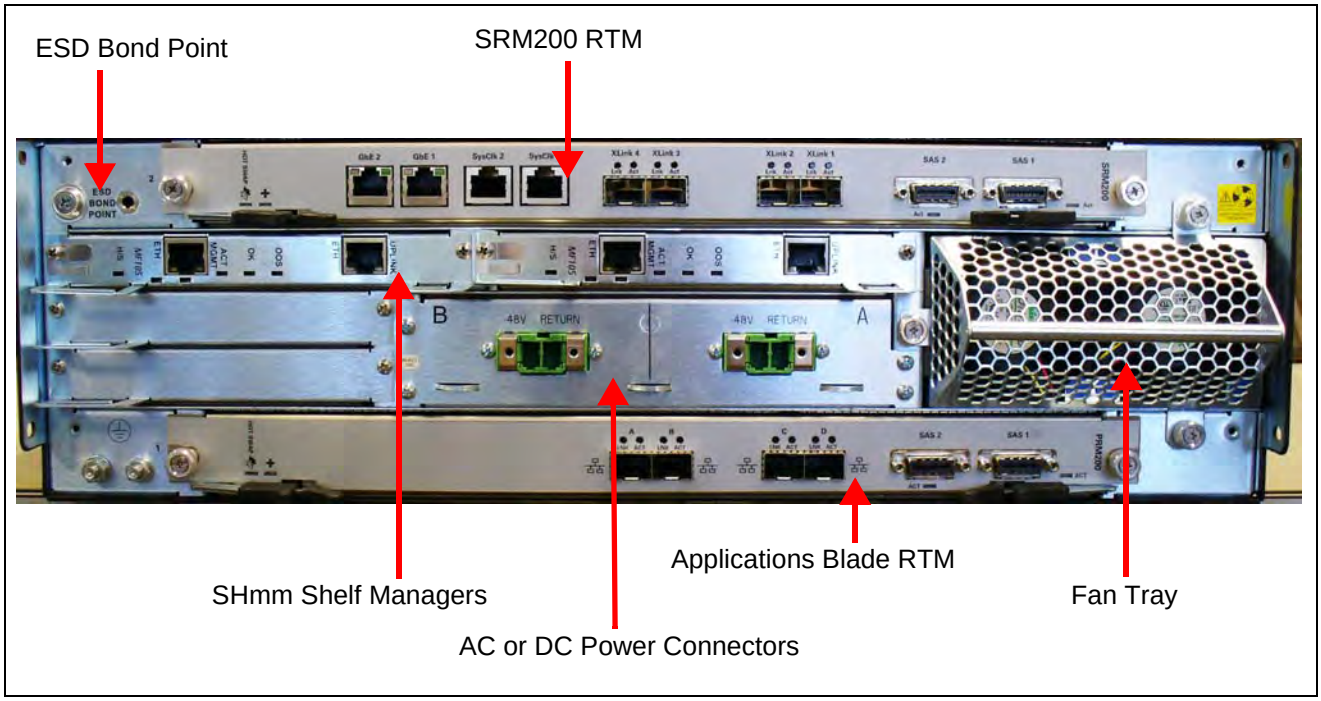


Figure 1.3 - G10 Probe Rear View

The rear view of the GeoProbe G10 system provides access to the following hardware components:

- Slot 2 (Top)—Installed IIC RTM varies per G10 model:
  - **8x1G Model**: SRM100 RTM (Connects to IIC100)
  - **Mixed 1G and 10G Model**: SRM200 RTM (connects to IIC200) or TRM100 RTM (connects to IIC100 or IIC200)
- Slot 1 (Bottom)—Applications Blade RTM (PRM300 RTM/PRM200 RTM or PRM100 RTM)
- Redundant Shelf Manager (SHmm)
- Fan Trays (front to rear air flow)
- Rear connection for power cables
- Electro-Static Discharge Points

NETWORK CONNECTIVITY

A G10 deployment currently requires that the customer provide three Ethernet connections and associated addresses on the same subnet (see **Figure 1.4**):

- **Primary Interface** that connects the G10 to the Iris server. This enables probe maintenance and configuration, as well as delivery of network traffic statistics and detailed data to the server for display in IrisView applications. The Primary Interface supports 100/1000 Mbps (IAP100) and 100/1000/10000 Mbps (PRM200/PRM300 RTM) Ethernet physical connections; it requires at least 100 Mbps connectivity. The primary interface can be configured as non-redundant or redundant. Refer to the ***G10 Installation Guide*** for details.

- **OAM Interfaces (2)** that connect to the Shelf Management Modules (ShMM) on the rear of the chassis. The SHmms provide a central management point for controlling the operation of the chassis, for providing probe status, and for monitoring the alarm conditions. The OAM interfaces support 10/100 Mbps Ethernet physical connections. They require at least 10Mbps connectivity to the Iris server for management.

Figure 1.4 shows a diagram of the required Ethernet connections for G10 configurations using the IAP200/PRM200 RTM or IAP320/PRM300 RTM configurations. Primary Interface 2 (Port B) is optional and only used in redundant configurations.

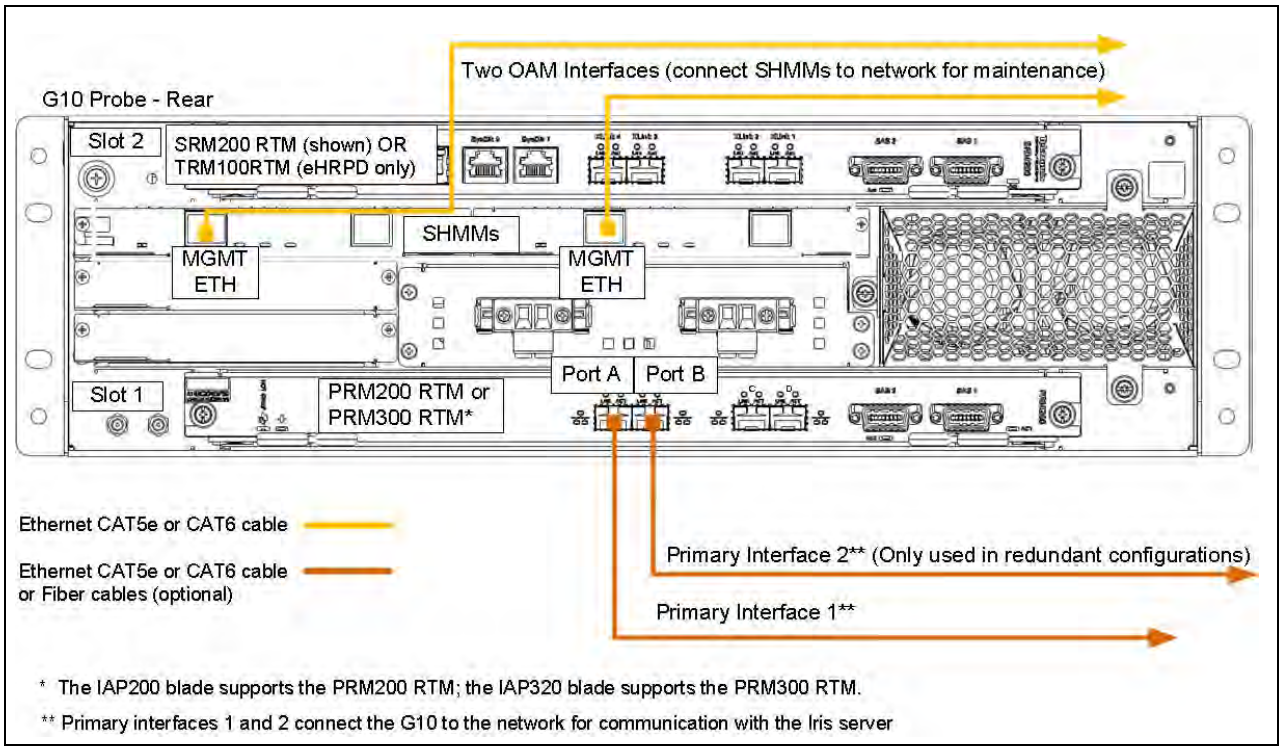


Figure 1.4 - Ethernet Connections

Default Port Settings

Table 1.2 lists the default port settings for the G10 probe.

Table 1.2 - Default Port Settings

G10 Component	Ports	Supported Speeds	Autonegotiation?
LPC200 (IIC200	1G	1G	No
LPC200 (IIC200)	10G/1G	10G/1G	No
LPC100 (IIC100)	All	1G	No
SRM200	10G	10G	No
TRM100	10G	10G	No
PRM300	ETH A-D	10G/1G/100M	Yes
PRM200	ETH A-D	10G/1G/100M	Yes
IAP320	ETH	1G/100M	Yes
IAP200	ETH	1G/100M	Yes
IAP100[a]	ETH A, B	1G/100M	Yes
SHMM	MGMT	100M	Yes

a. Not supported on Control Plane or Media probes.

TIME SYNCHRONIZATION

The GeoProbe G10 system time stamps all captured messages, generated alarms, and events to a common time base, allowing the Iris system to provide detailed, network-wide traces and event occurrence reporting. Inter-node timing and message paths can also be analyzed throughout the network.

The G10 Probe supports NTP timing and IRIG timing as described in **Table 1.1**. G10 probe timing is configured in IrisView OAM; refer to the Admin Online Help for details.

Table 1.1 - G10 Probe Timing

Timing Support	Description
NTP Timing from Defined NTP Servers	G10 probes support multiple NTP servers, defined at the system-level; system admins can define up to 11 servers for the Iris system. G10 probes select the best available NTP server from the list and use it as their timing reference. Customize NTP timing at the probe-level by adding or removing NTP servers for a specific probe
IRIG Timing from Master G10	G10s support IRIG timing references to and between probes allowing for greater monitoring accuracy at facilities with multiple probes. Support for the IRIG timing interface allows G10 probes to share timing with other G10 probes and with 14U and 2U GeoProbes. A G10 probe can operate as an IRIG master or an IRIG slave. The G10 designated as the IRIG timing master to other probes must have a valid timing reference such as NTP. The IRIG slaves use IRIG timing reference from the IRIG master G10; however, the slave G10s also require NTP timing reference for the time of day.
IRIG Timing from Third-Party Source	G10 probes support receiving IRIG timing from a third-party source, such as GPS.

G10 Media Probe Configuration

To support RTP monitoring, Tektronix also provides a multiprobe configuration called the G10 Media Probe. The G10 Media probe consists of two G10 chassis with the supported configurations listed in **Table 1.3**. See **Figure 1.5** and **Figure 1.6** for a graphical view of the media probe configuration.

The IICs within a multiprobe configuration must be the same model, either IIC100 or IIC200. You cannot install mix IIC100s and IIC200s within the same multiprobe configuration.

Table 1.3 - G10 Media Probe Configurations

Chassis		Supported Blades
Primary Chassis	Slot 1 (Bottom)	IAP200 + PRM200 RTM OR IAP320 + PRM300 RTM
	Slot 2 (Top)	IIC200 + SRM200 RTM OR IIC100 + TRM100 RTM
Expansion Chassis	Slot 1 (Bottom)	IIC200 + SRM200 RTM OR IIC100 + TRM100 RTM
	Slot 2 (Top)	IIC200 + SRM200 RTM OR IIC100 + TRM100 RTM

For details about the components of the media probe, refer to the appropriate sections in this guide. For information about installing and cabling the media probe, refer to the ***G10 Media Installation Guide***.

Figure 1.5 shows the front view of the G10 media probe components (IIC200 version).

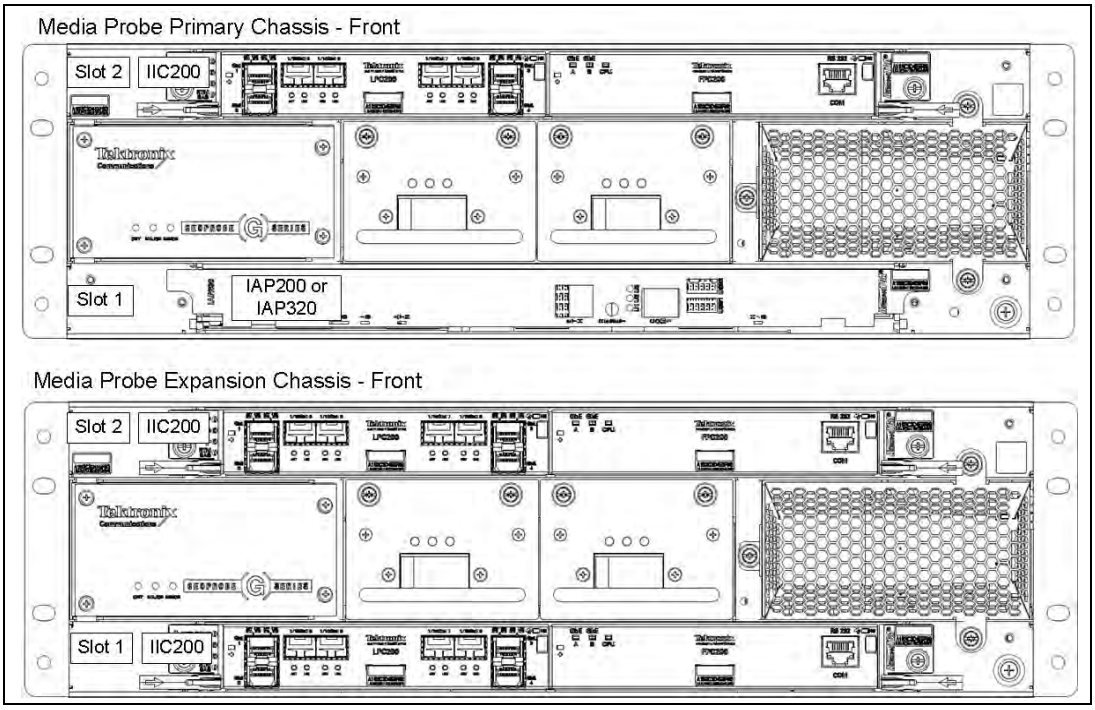


Figure 1.5 - G10 Media Probe Front

Figure 1.6 shows the rear view of the G10 media probe components (IIC200 version).

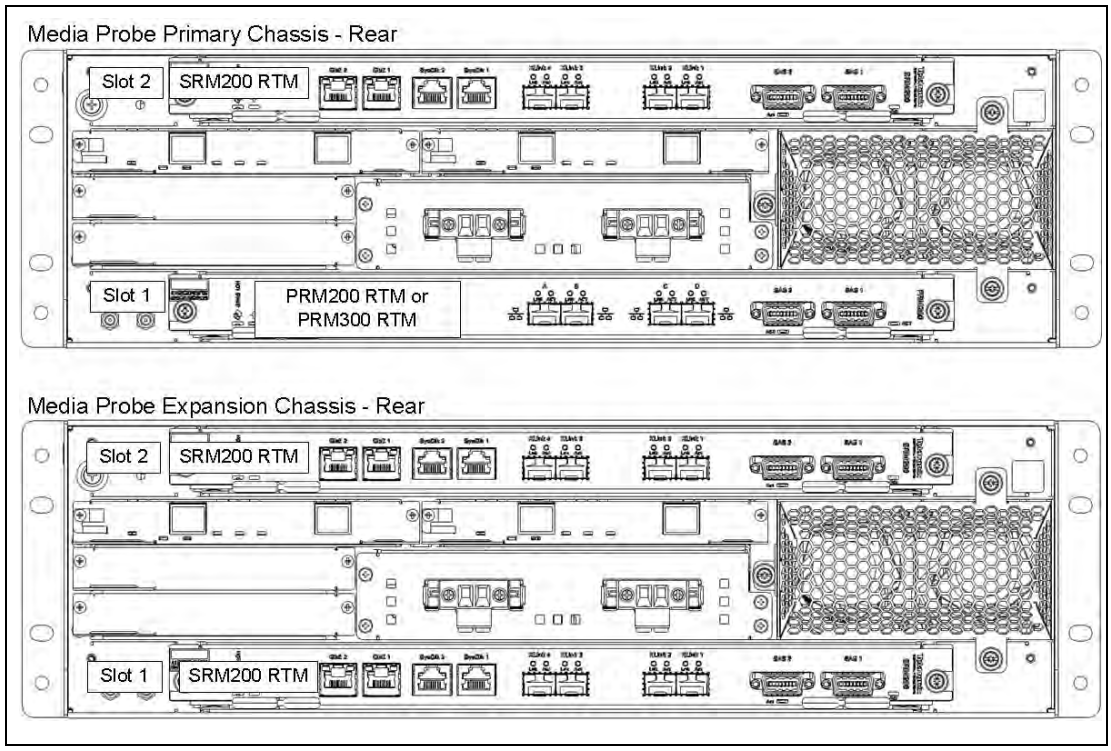


Figure 1.6 - G10 Media Probe Rear

G10 Control Plane Probe Configuration

The G10 Control Plane probe configuration is designed for handling additional control-plane capacity for one Mobility Management Entity (MME) or several pooled MMEs. This probe supports capture of the protocols listed in **Table 1.4**.

Table 1.4 - Control Plane Probe Supported Protocols

VoIP Protocols	LTE Protocols
▪ SIP ▪ MGCP ▪ H.323 ▪ H.248 ▪ DIAMETER ▪ DNS ▪ SIGTRAN	▪ S1AP (S1-MME) ▪ DIAMETER (S6a) ▪ GTPv2-C (S10, inter-MME) ▪ DNS ▪ SgsAP

The G10 Control Plane probe consists of two G10 chassis with the supported configurations listed in **Table 1.5**. Refer to **Figure 1.7** and **Figure 1.8** for a graphical view of the control plane probe configuration.

Table 1.5 - G10 Control Plane Probe Configurations

Chassis		Supported Blades
Primary Chassis	Slot 1 (Bottom)	IAP200 + PRM200 RTM OR IAP320 + PRM300 RTM
	Slot 2 (Top)	IIC200 + SRM200 RTM OR IIC100 + TRM100 RTM[a]
Expansion Chassis	Slot 1 (Bottom)	IAP200 + PRM200 RTM OR IAP320 + PRM300 RTM
	Slot 2 (Top)	IAP200 + PRM200 RTM OR IAP320 + PRM300 RTM

a. The control plane probe only supports the IIC100/IAP200 configuration; the IIC100/IAP320 configuration is not supported.

For details about the components of the control plane probe, refer to the appropriate sections in this guide. For information about installing and cabling the control plane probe, refer to the ***G10 Control Plane Installation Guide***.

Figure 1.7 shows the front view of the G10 Control Plane probe components.

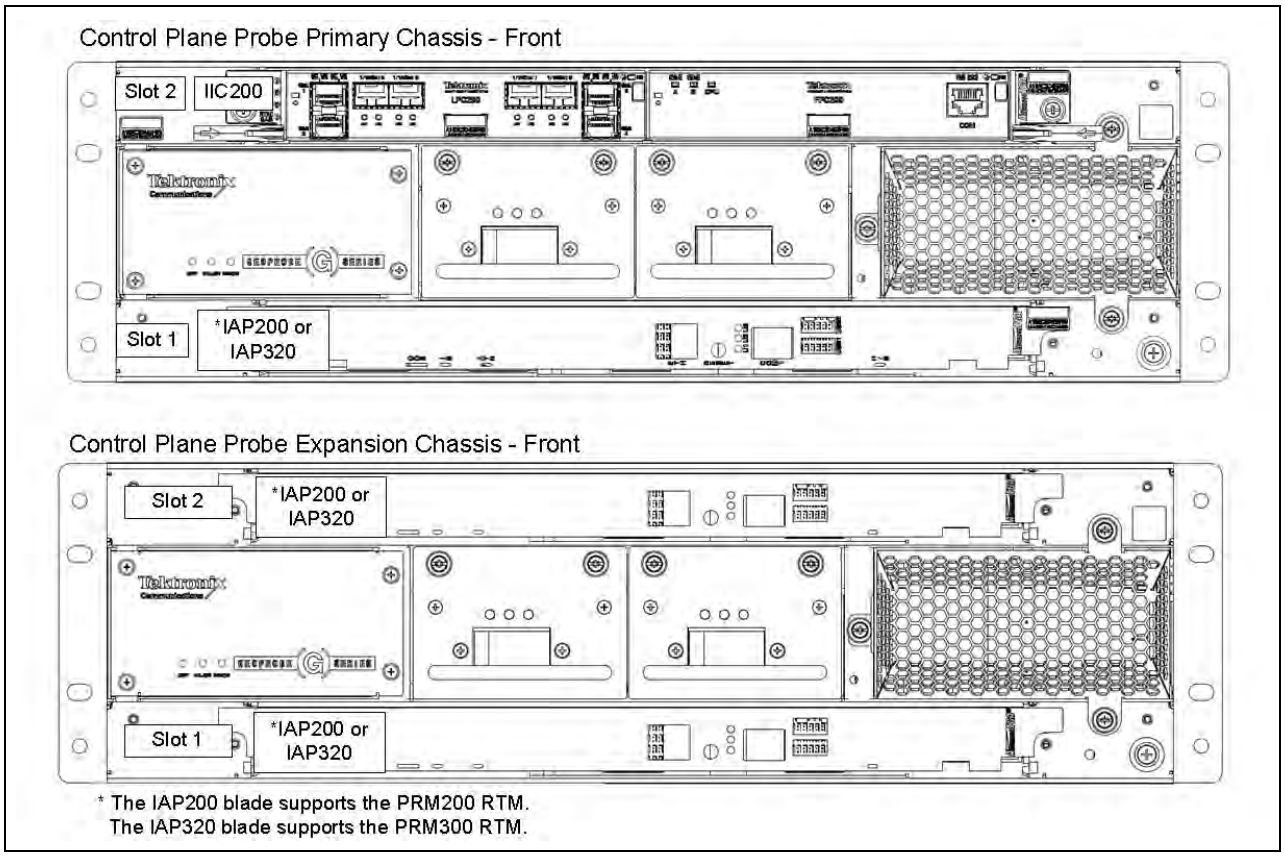


Figure 1.7 - G10 Control Plane Probe (Front)

Figure 1.8 shows the rear view of the G10 Control Plane probe components.

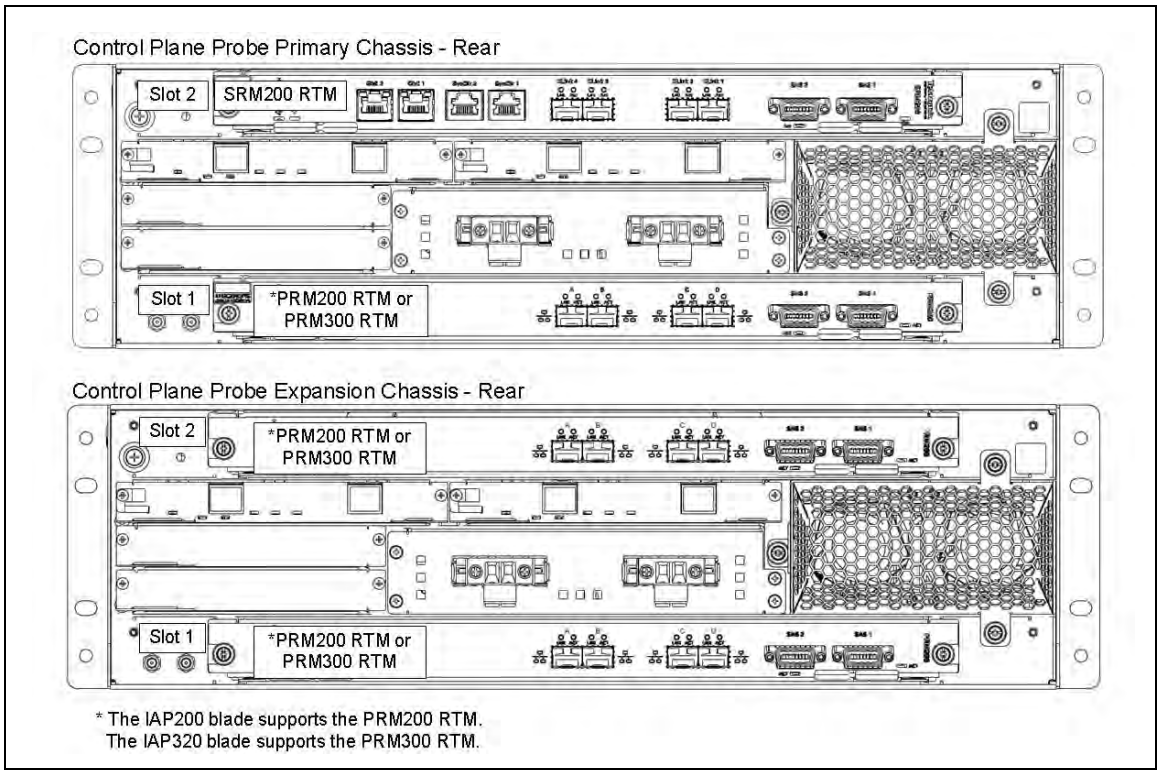


Figure 1.8 - G10 Control Plane Probe (Rear)

2 Chassis Subsystem

Overview

The Chassis subsystem is a high-availability Advanced TCA that integrates cooling, power distribution, and shelf management into an off-the-shelf platform, which allows you to add GeoProbe G10 service-related hardware and software. The Chassis subsystem of the GeoProbe G10 enables scalable reliability through the use of either independent or redundant functions throughout the chassis. Most electronic modules, blades and cards are Field Replaceable Units (FRUs).

The Chassis subsystem contains the following main hardware components:

- Shelf Manager
- Power Entry Modules (PEMs)
- Fan Trays

SHELF MANAGER

The Shelf Manager (SHmm) is the central management unit of the shelf and designed specifically for the AdvancedTCA systems. Its purpose is to monitor, control and ensure proper operation of the shelf and all other components of the Advanced TCA shelf. The shelf manager reports anomalies and errors and takes corrective actions if required (for example, increases the speed of the fans). Alarm states are displayed from the LEDs of the shelf's alarm panel. The shelf manager performs the following functions:

- Retrieve FRU inventory information
- Receive events from sensors of the shelf
- Monitor and control the temperature of the shelf
- Reports errors
- Execute corrective actions
- Manage interconnect resources to prevent damage of the blades due to hot swap

The shelf manager consists of two shelf manager modules (SHmms) located on the back of the GeoProbe G10 (**Figure 2.1**).

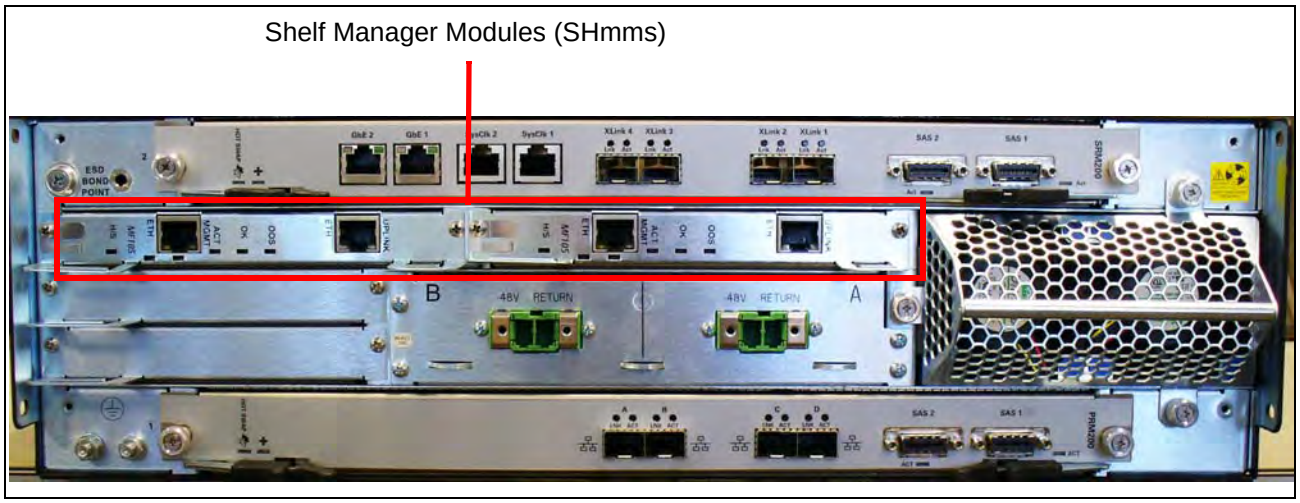


Figure 2.1 - Shelf Manager Modules (SHmms)

The modules have an Ethernet port that connect to the Iris server for maintenance. The ports are RJ45 jacks each capable of connecting to 10/100 Mbps networks. The modules provide redundant shelf management functionality utilizing an active/ standby architecture and is based on a proven shelf management design.

Rear Panel LEDs

Figure 2.2 shows the SHmm LEDs on the rear of the G10.

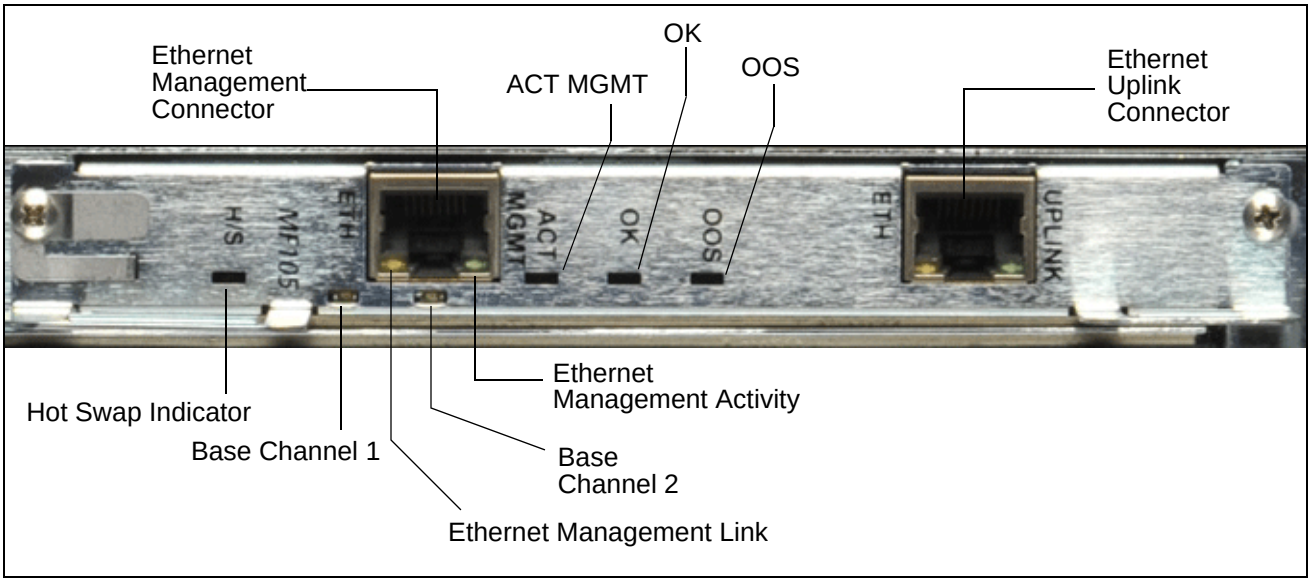


Figure 2.2 - SHmm LEDs

Table 2.1 describes the SHmm LED indicators.

Table 2.1 - LED Indicators of the Shmm

LED	LED Color	Description
H/S	BLUE	Hot Swap Indicator. It indicates when it is safe to remove the module. ▪ SOLID BLUE—The module is in standby mode and can be safely extracted. ▪ OFF—The module is operational, and it is unsafe to extract it. ▪ BLINKING—The module is in transition between standby mode and operational mode.
Base Channel 1	GREEN	Indicates the Ethernet connection to the chassis 1G backplane. ▪ GREEN—The link to base channel 1 is available. ▪ BLINKING—Link and activity. ▪ OFF—Otherwise.
Ethernet Management Link	GREEN	Indicates system manager Ethernet link availability. ▪ GREEN—The link is available. ▪ OFF—Otherwise.

Table 2.1 - LED Indicators of the Shmm (Continued)

LED	LED Color	Description
Base Channel 2	GREEN	Indicates the Ethernet connection to the chassis 1G backplane. ▪ GREEN—The link to base channel 2 is available. ▪ BLINKING—Link and activity. ▪ OFF—Otherwise.
Ethernet Management Activity	AMBER	Indicates system manager Ethernet link activity. ▪ AMBER—Activity. ▪ OFF—No activity.
ACT MGMT	AMBER	Indicates which Shmm is active. ▪ AMBER—The SHmm is active. ▪ OFF—The SHmm is in standby mode.
OK	GREEN	Indicates normal system functions. ▪ GREEN—The Shmm is operating properly. ▪ OFF—Otherwise. ▪ BLINKING—The board boots up.
OOS	RED	Indicates SHMM failure. ▪ RED—The Shmm is out-of-service. ▪ OFF—The Shmm is operating properly.

Rear Panel Connectors

Table 2.2 describes the connectors available on the SHmm (**Figure 2.2**).

Table 2.2 - Connectors of the Shmm

LED/Connector	Description
Ethernet Management	This port provides 10/100 Mb connectivity to the customer LAN for Operations, Administration, and Maintenance (OAM).
Ethernet Uplink Connector	In some configurations, this is used to connect to the management port on the disk enclosure.

POWER ENTRY MODULES (PEMS)

The chassis includes two removable PEMs. The dual PEMs allow for two separate AC or DC power feeds to the system. Both power feeds are fully distributed to every module and subassembly within the chassis. Only one of the PEMs must be present for the chassis to be fully operational.

The G10 supports both DC PEMs and AC PEMs. The PEMs are accessible from the front of the shelf and connect to the PEM connectors on the backplane. A removable plastic housing covers the power feeds and returns to prevent accidental shorting. The PEM also features an injector/ejector handle that provides the hot swap mechanism for signaling the state of the PEM prior to removal. The PEM is an Field Replaceable Unit (FRU).

The PEMs are hot-swappable and will not cause a fault when one is removed for replacement. They operate in load sharing where the total load is equal to or less than what one power feed can provide.

DC PEMs

Figure 2.3 shows the G10 DC PEMs front view and back view. Both A and B side power modules operate within the specifications listed in Power and Ground Requirements. Refer to Maintenance Guidelines for replacement details.

G10 Front View

G10 Rear View

Figure 2.3 - DC PEMs

Both A and B side power modules operate within the specifications listed in Power and Ground Requirements. All probe power and chassis ground cabling will use 12AWG cable or larger.

Tektronix equipment, cables, and wiring diagrams comply with industry standard DC electrical color coding. Please ensure proper cabling if your equipment and cabling use nonstandard DC electrical color coding. Improper cabling can cause damage to equipment or personal injury. Contact Tektronix to request specially labeled power cables (-48V = Red, Return = Black) for the G10 chassis and the storage enclosures.

Front Panel LEDs

Figure 2.4 displays the DC Front Panel PEM LEDs and the ON and OFF switch.

Figure 2.4 - DC PEM Front Panel LEDs and ON/OFF Switch

Table 2.3 describes the DC PEM LED indicators.

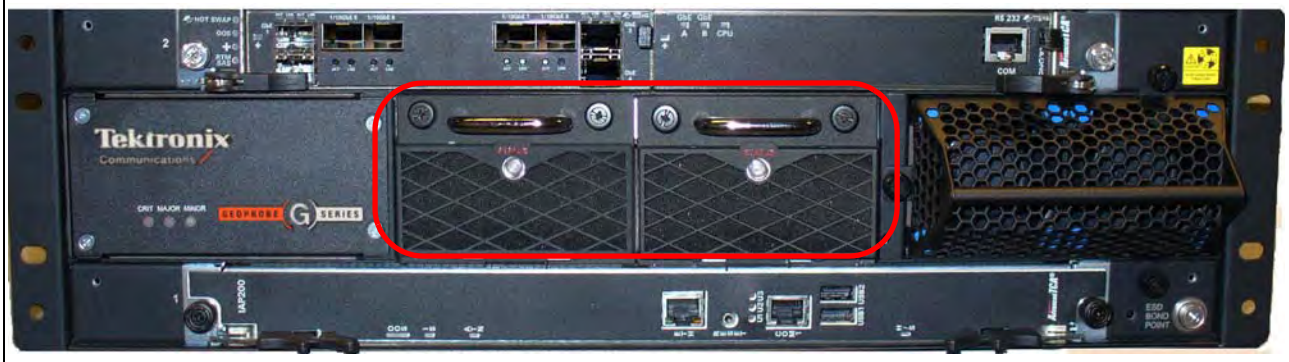
Table 2.3 - DC PEM LED Indicators

LED	LED Color	Description
Line Power Reverse	RED	Indicates the connected power is reversed. ***Do not switch on the breaker while this LED is on***.
Line Power In	GREEN	Indicates the power is connected properly.
Line Power Backplane	GREEN	Indicates the power module is sending power from the backplane.

AC PEMs

Figure 2.5 shows the G10 AC PEMs front view and rear view. Both A and B side power modules operate within the specifications listed in Power and Ground Requirements. Refer to Maintenance Guidelines for replacement details.

G10 Front View



G10 Rear View

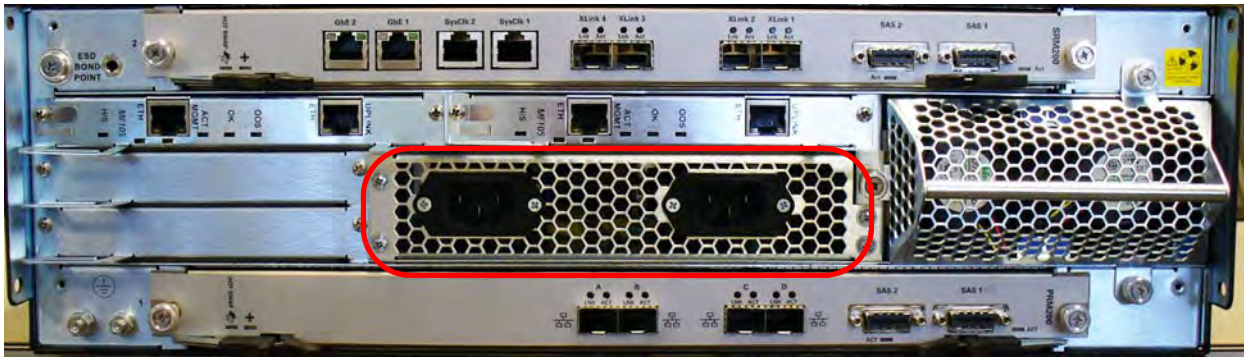


Figure 2.5 - G10 AC PEMs

Front Panel LEDs

Figure 2.6 displays the AC Front Panel PEM LED.

Figure 2.6 - AC PEM Front Panel LED

Table 2.3 displays the AC PEM LED indicators.

Table 2.4 - AC PEM LED Indicators

LED Color	Description
OFF	Power is disconnected.
RED	Power supply is in a failed state.
GREEN	The power is connected correctly.

FAN TRAYS

The Chassis subsystem supports two fan trays in a push/pull configuration:

- One fan tray is accessible from the front of the chassis and contains the replaceable air filter.
- The other fan tray is located in the rear of the chassis.

Figure 2.7 displays the front fan tray. Refer to Replacing the Fan Tray and Replacing G10 Chassis Air Filters for replacement details.

Figure 2.7 - Front Fan Tray

ELECTRO-STATIC DISCHARGE POINTS

The Electro-Static Discharge (ESD) points are locations where you can plug an ESD wrist strap to the chassis to prevent electrical damage when you handle the boards. **Figure 2.8** displays the front ESD point.

Figure 2.8 - Front ESD Point

Figure 2.9 displays the rear ESD point.

Figure 2.9 - Rear ESD Point

3 Blades and RTMs

OVERVIEW

The GeoProbe G10 is a modular device consisting of blades, Rear Transition Modules (RTMs), and other hardware components that allow minimal risk and dependency on other hardware devices. The probe is scalable and includes user-plane monitoring with high IP traffic networks.

This chapter contains the following sections:

- Iris Interface Cards and associated RTMs:
  - IIC200 and SRM200 RTM
  - IIC100 and SRM100 RTM and TRM100 RTM
- Applications Blade and associated RTMs
  - IAP320/IAP200 and PRM300 RTM/PRM200 RTM
  - IAP100 and PRM100 RTM or SSD-3400 RTM
- 10G Interconnect Card (for Deep Packet Classification)

IRIS INTERFACE CARD

The Iris Interface Card (IIC) ships with two Advanced Mezzanine Cards (AMCs) mounted in the ATCA carrier blade (CAB100). The CAB100 is used to provide connectivity between the AMC cards and the ATCA backplane. It also provides management interfaces for the AMCs and the ATCA shelf management modules (ShMM), which are located on the back of the probe.

Iris currently supports two IICs:

- IIC200 (CAB100 + LPC200 AMC + FPC200 AMC)
- IIC100 (CAB100 + LPC100 AMC + FPC100 AMC)

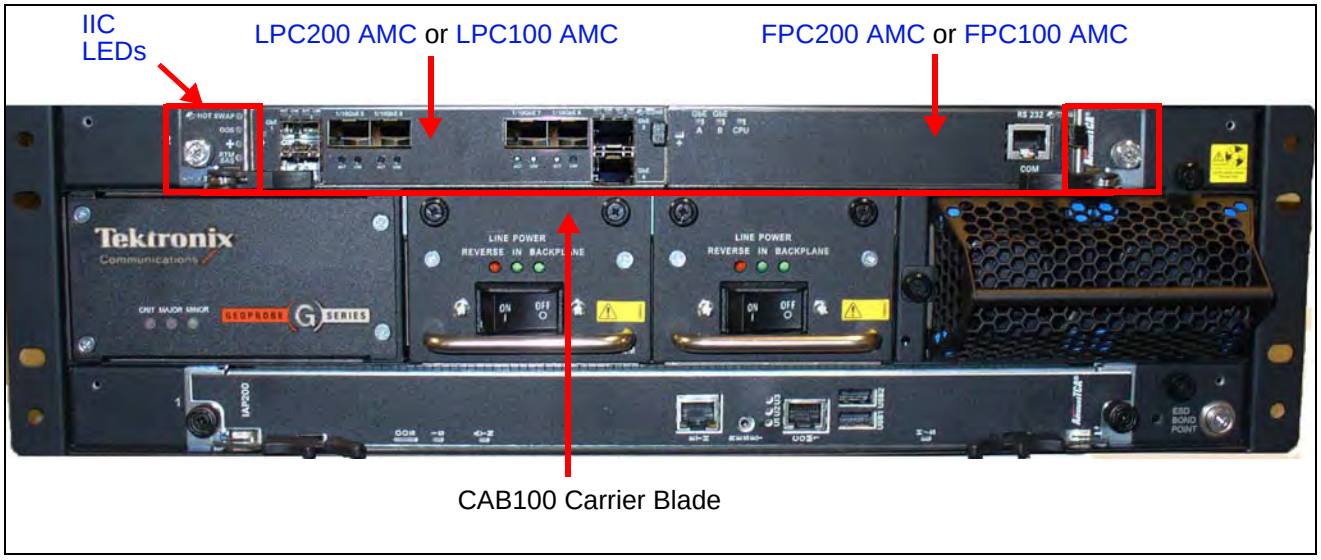


Figure 3.1 - G10 IIC100

IIC LEDs

A total of four LEDs are visible from the left side of the IIC100 or IIC200 front panel that are part of the CAB100 carrier blade (see **Figure 3.2**).

Figure 3.2 - IIC100 or IIC200 Front Panel LEDs

Table 3.1 describes the IIC LEDs.

Table 3.1 - IIC LEDs

LED	LED Color	Description
H/S	BLUE	Hot Swap Indicator which indicates when it is safe to remove the module. ▪ SOLID BLUE—The module is in standby mode and can be safely extracted. ▪ Off—The module is operational and it is unsafe to extract it. ▪ BLINKING BLUE—The module is in transition between standby mode and operational mode. Note: When either AMC needs to be removed, you must power down and remove the entire IIC blade first. Refer to Iris Interface Card (IIC100 or IIC200) and LPC and FPC AMCs (IIC100 or IIC200) for removal/ replacement information.
OOS	RED	Indicates the device is out of service. ▪ SOLID RED—The board is out of service. ▪ OFF—No errors.
+	GREEN	Indicates the health of the device. ▪ SOLID GREEN—Out of Service. ▪ OFF—No errors.
RTM SAS	GREEN	Green LED indicates status of the SAS RTM. ▪ SOLID GREEN—No errors. ▪ OFF—Fault condition.

IIC200

The Iris Interface Card (IIC200) consists of the following components (**Figure 3.3**):

- AMC ATCA carrier card (CAB100)
- FPC200 AMC
- LPC200 AMC

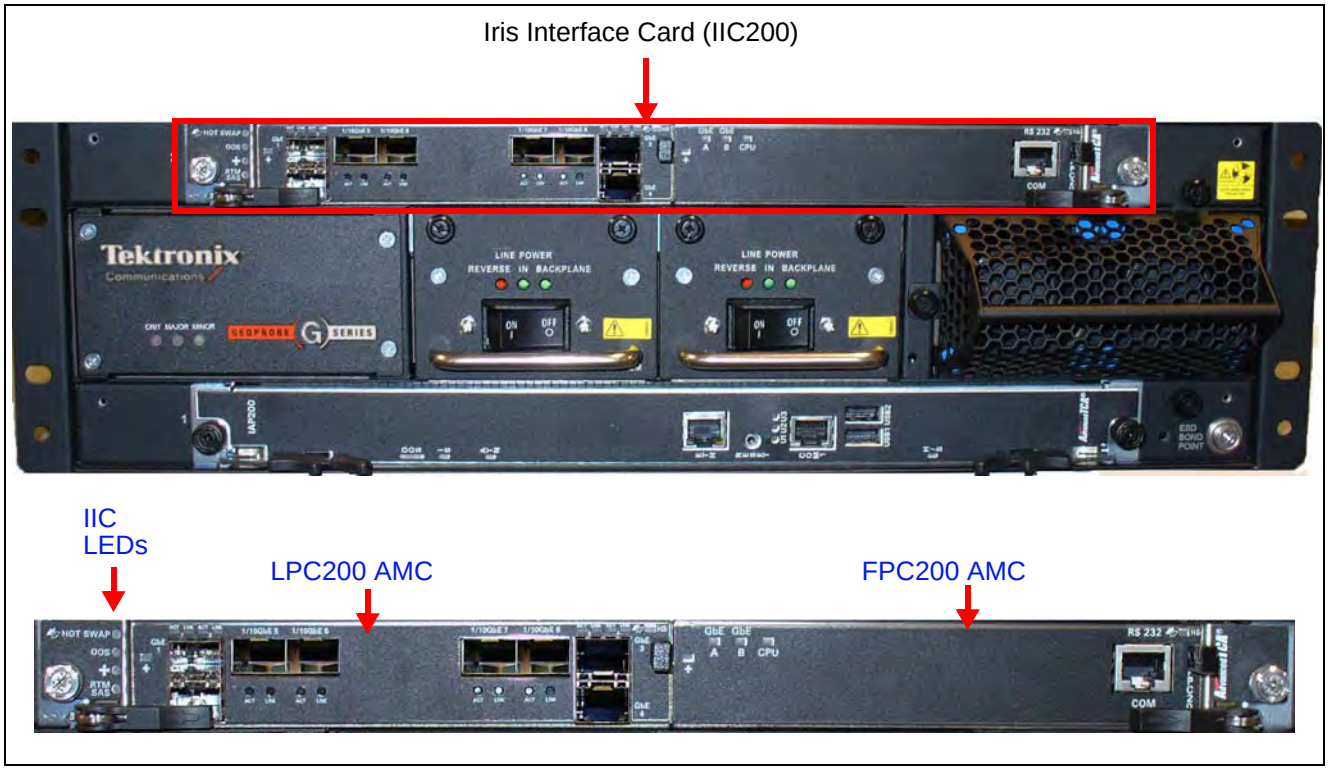


Figure 3.3 - G10 IIC200

IIC200 LEDs

The four LEDs visible from the left side of the IIC200 front panel are part of the CAB100 carrier blade (**Figure 3.3**). Refer to the IIC LEDs section for details.

FPC200 AMC

The FPC200 AMC is located on the right side of the IIC200 (**Figure 3.4**) and serves as the main flow processor. The main components of the FPC200 AMC are:

- Flow Network Processor—includes a multi-core network processing unit (NPU) to provide optimum packet processing
- Memory—includes 16 GB of DRAM
- Two GbE channels—for control plane activity and a 10 Gbps fabric between the IIC200 and Applications blade through the backplane

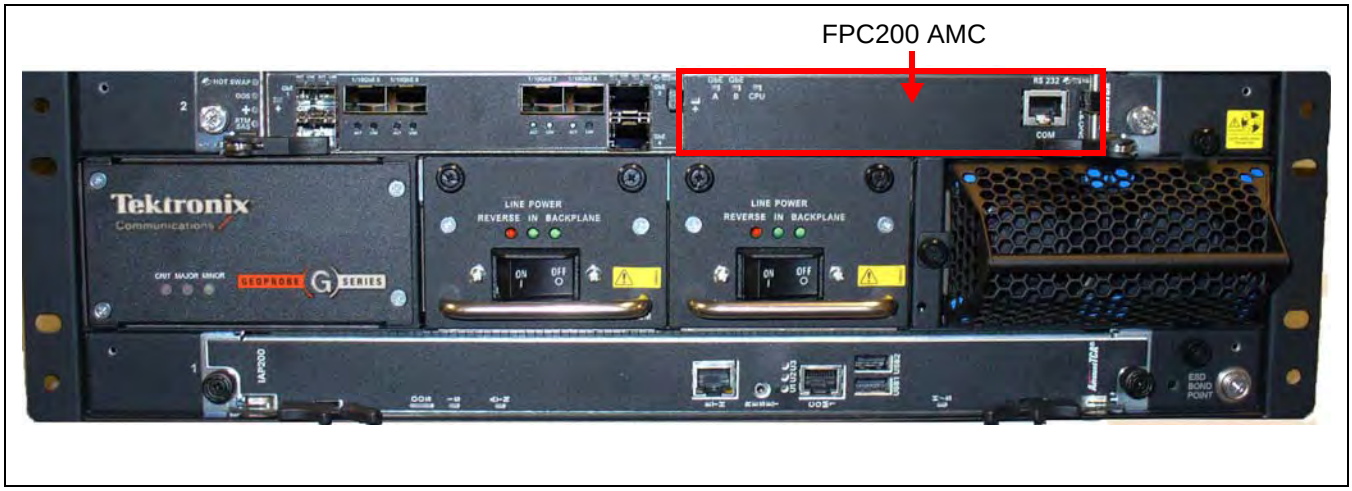


Figure 3.4 - G10 IIC200 - FPC200 AMC

***DO NOT** remove AMCs when the IIC is powered on; refer to LPC and FPC AMCs (IIC100 or IIC200) for removal/replacement details. Call Tektronix Technical Support for any questions about removing AMCs.*

FPC200 AMC LEDs

Figure 3.5 shows the FPC200 AMC LEDs located on the front panel.

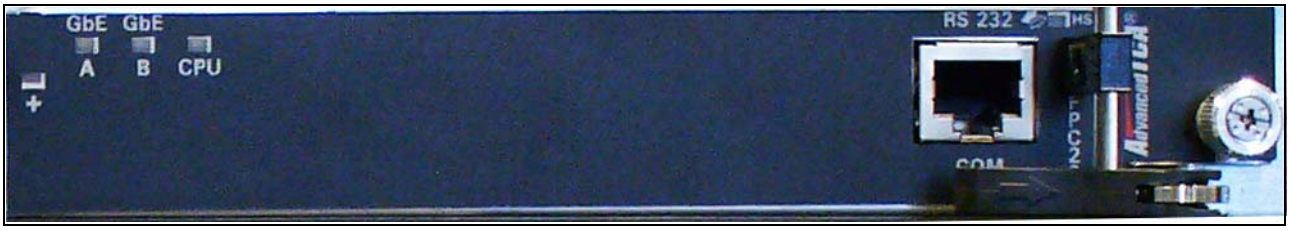


Figure 3.5 - FPC200 AMC LEDs

Table 3.2 displays the LED indicators of the FPC200 AMC.

Table 3.2 - FPC200 AMC LEDs

LED	LED Color	Description
+	GREEN 	Indicates the health of the device. ▪ SOLID GREEN—No errors. ▪ OFF—Out of service.
GbE A	GREEN or AMBER 	Indicates link status and activity for Gigabit Ethernet A connection to carrier blade. ▪ GREEN—The link is up. ▪ BLINKING AMBER/GREEN—Link activity.
GbE B	GREEN or AMBER 	Indicates link status and activity for Gigabit Ethernet B connection to carrier blade. ▪ GREEN—The link is up. ▪ BLINKING AMBER/GREEN—Link activity.
CPU	GREEN 	Indicates health and status of the processor. ▪ GREEN—The processor has normal functions.
RS 232 COM		Not Used.
Hot Swap	BLUE 	Hot Swap Indicator which indicates when it is safe to remove the module. ▪ SOLID BLUE—The module is in standby mode and can be safely extracted. ▪ OFF—The module is operational, and it is unsafe to extract it. ▪ BLINKING BLUE—The module is in transition between standby mode and operational mode. **Note:** When this board needs to be removed, you will be removing the entire IIC200. Refer to Iris Interface Card (IIC100 or IIC200) for more information.

LPC200 AMC

The LPC200 AMC (**Figure 3.6**) is located on the left side of the IIC100 and provides 1G and 10G Ethernet connections on front panel. The Ethernet connections support:

- Optical or electrical Ethernet links
- LC type optical ports provided by Small Form-Factor Pluggable (SFP) transceiver modules. Refer to the SFP Reference appendix for details.

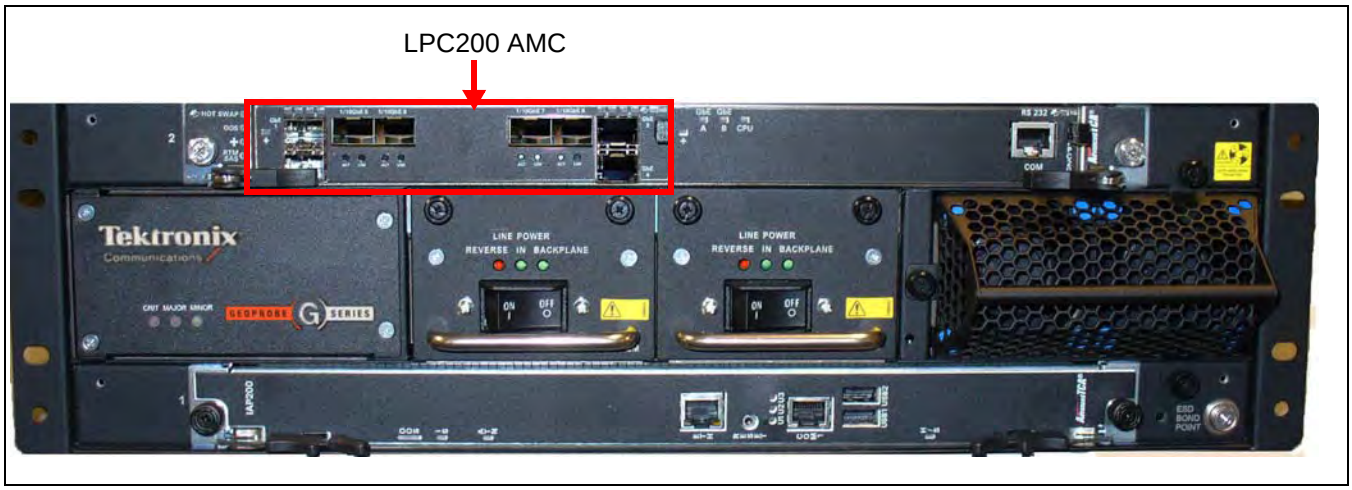


Figure 3.6 - G10 IIC200 - LPC200 AMC

***DO NOT** remove AMCs when the IIC200 is powered on; refer to LPC and FPC AMCs (IIC100 or IIC200) for removal/replacement details. Call Tektronix Technical Support for any questions about removing AMCs.*

LPC200 AMC Connectors

Figure 3.7 displays the LPC200 AMC connectors. The LPC200 AMC supports eight ports, four that support 1G Ethernet traffic, and four that support either 10G or 1G traffic.

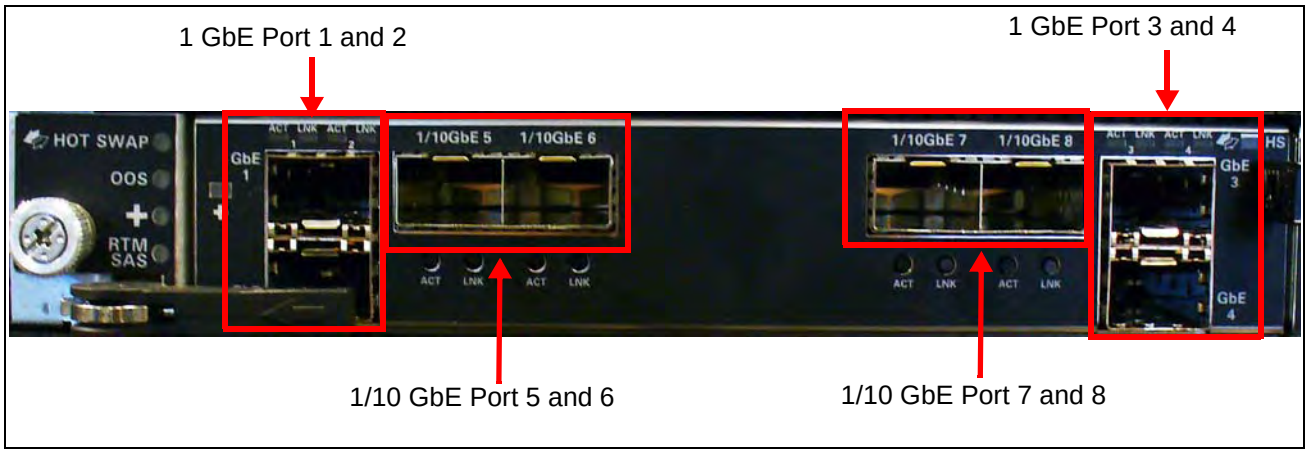


Figure 3.7 - LPC200 AMC Connectors

Table 3.3 describes the LPC200 AMC connectors.

Table 3.3 - LPC200 AMC Connectors

LED	Description
1 GbE Ports 1–4	▪ Support 1G Ethernet traffic ▪ Support copper or fiber SFP/SFP+s
1/10 GbE Ports 5–8	▪ Support 1G or 10G Ethernet traffic ▪ Support fiber SFP/SFP+s

LPC200 AMC LEDs

Figure 3.8 displays the LPC100 AMC LEDs.

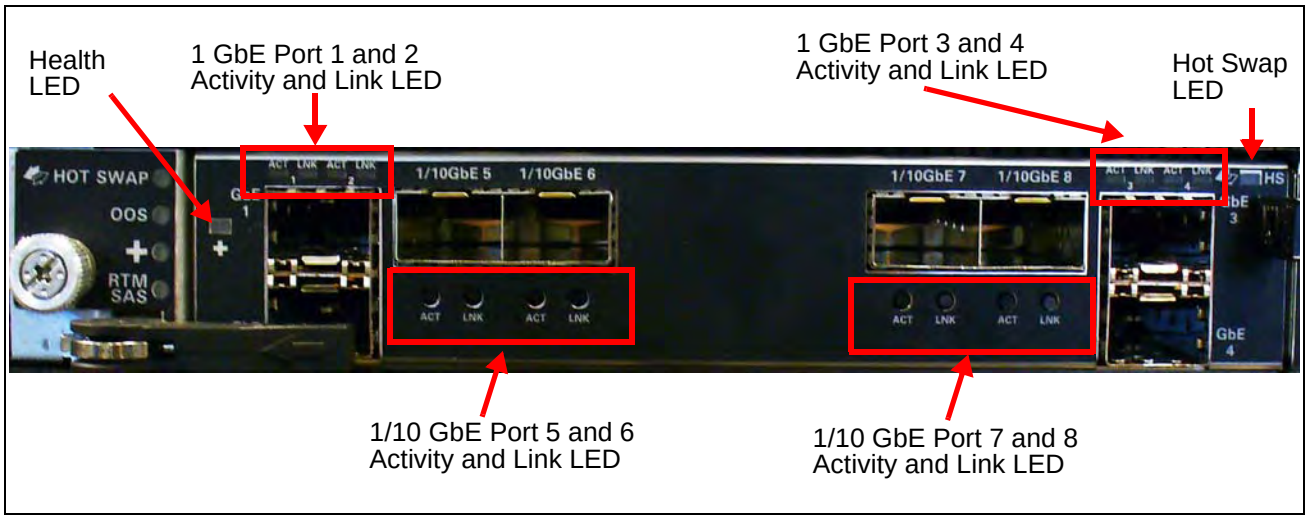


Figure 3.8 - LPC200 AMC LEDs

Table 3.4 describes the LPC200 AMC LEDs.

Table 3.4 - LPC200 AMC LEDs

LED	LED Color	Description
Hot Swap	BLUE	Hot Swap Indicator that indicates when it is safe to remove the module. ▪ SOLID BLUE = The module is in standby mode and can be safely extracted. ▪ Off = The module is operational, and it is unsafe to extract it. ▪ BLINKING BLUE = The module is in transition between standby mode and operational mode.
+	GREEN	Indicates the health of the device. ▪ GREEN = No errors. ▪ OFF = Out of service.

Table 3.4 - LPC200 AMC LEDs (Continued)

LED	LED Color	Description
1 GbE Port 1-4 LNK	GREEN	GbE Port Link Status Indicator ▪ GREEN = The link is up.
1 GbE Port 1-4 ACT	YELLOW	GbE Port Activity Status Indicator ▪ YELLOW = Activity
1/10 GbE LNK	GREEN or AMBER	XGE port link status indicator ▪ AMBER = The 10G Link is up. ▪ GREEN = The 1G link is up.
1/10 GbE ACT	YELLOW	XGE port activity status indicator ▪ YELLOW = Activity

IIC200 RTMs

The IIC200 supports the following RTM configuration options for deployment:

- IIC200 and the SRM200 RTM
- IIC200 and the TRM100 RTM (to support eHRPD Monitoring)

SRM200 RTM

The SRM200 RTM connects to the back of the G10 chassis in the upper slot location. It performs the following functions (**Figure 3.9**):

- Communicates the board's health and configuration status to the IIC200
- Provides two Gigabit Ethernet links for connectivity to controller enclosure
- Sends and receives data to the disk array storage subsystem

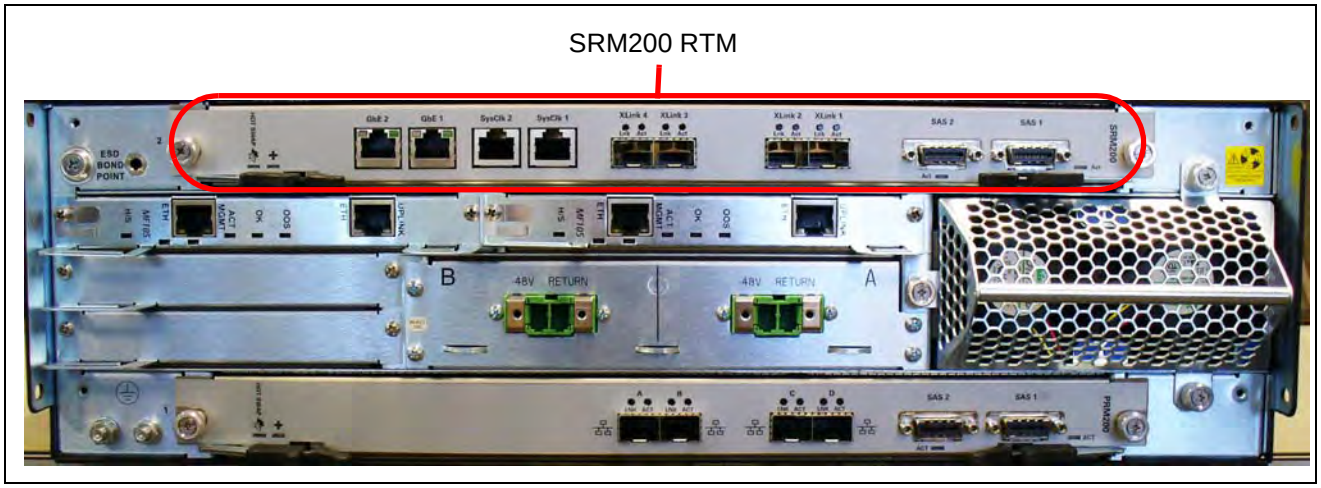


Figure 3.9 - SRM200 RTM

SRM200 RTM Connectors

Figure 3.10 displays the SRM200 RTM connectors.

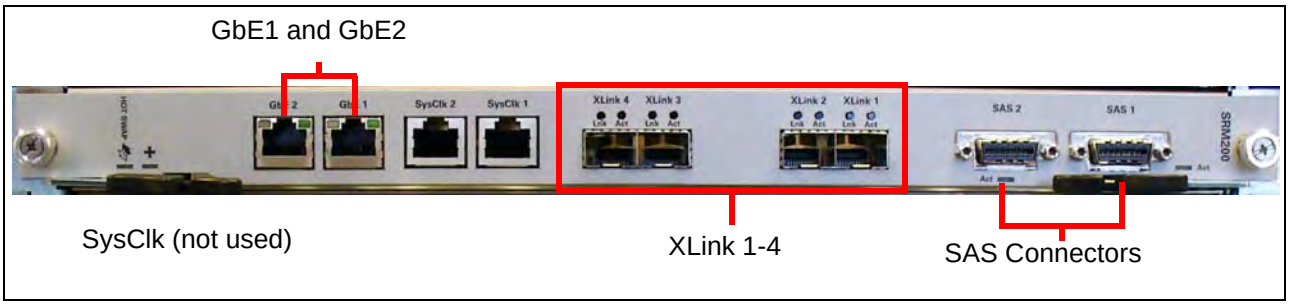


Figure 3.10 - SRM200 RTM Connectors

Table 3.5 describes the SRM200 RTM connectors.

Table 3.5 - SRM200 RTM Connectors

Connector	Description
GbE1–GbE 2	RJ45 Gigabit Ethernet connectors to the second controller enclosure.
SysClk 1–2	Not used.
XLink 1–4	10G Ethernet SFP connections used in multi-cage configurations for intercage communications.
SAS 1–2	Provides connectivity to the external disk array storage system.

SRM200 RTM LEDs

Figure 3.11 displays the SRM200 RTM LEDs.

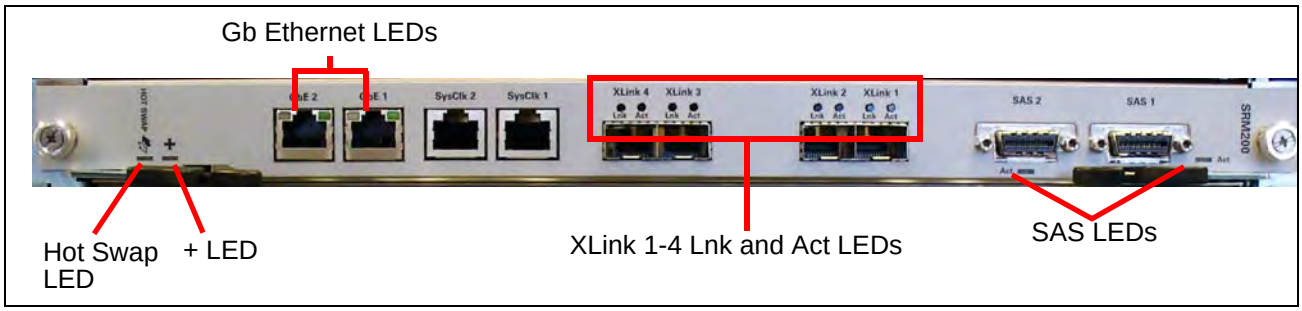


Figure 3.11 - SRM200 RTM Rear Panel LEDs

Table 3.6 describes the SRM200 RTM LED indicators.

Table 3.6 - SRM200 RTM LED Indicators

LED	LED Color	Description
Hot Swap	BLUE	Indicates when it is safe to remove the SRM200 RTM. ▪ BLUE—module is in standby mode and can be safely extracted. ▪ OFF—module is operational and it is unsafe to extract it. ▪ BLINKING BLUE—module is in transition between standby mode and operational mode.
+ (Health)	GREEN or RED	Indicates the health of the SRM200 RTM. ▪ GREEN—no errors. ▪ RED—an error occurred. ▪ OFF—the board is not powered on.
Gb Ethernet LEDs	GREEN	Indicates Gigabit Ethernet link and activity. ▪ BLINKING GREEN—Ethernet Activity is occurring. ▪ SOLID GREEN—Ethernet Link is established. ▪ OFF—no Ethernet Link is established.
XLink 1–4 Lnk LEDs	GREEN	Indicates 10 Gigabit Ethernet link status. ▪ GREEN = Ethernet link is trained at 10 Gb/s speed. ▪ OFF = no Ethernet link established

Table 3.6 - SRM200 RTM LED Indicators (Continued)

LED	LED Color	Description
XLink 1–4 Act LEDs	YELLOW	Indicates 10 Gigabit Ethernet link and activity. ▪ SOLID YELLOW = Ethernet link is trained, no activity. ▪ BLINKING YELLOW = Ethernet activity occurring. ▪ OFF = no Ethernet link established.
SAS LEDs	GREEN or RED	Indicates SAS link connectivity status. ▪ GREEN—no errors, SAS link is established. ▪ BLINKING GREEN—SAS activity occurring. ▪ RED—an error occurred. ▪ OFF—no SAS link is established.

IIC100

The Iris Interface Card (IIC100) consists of the following components (**Figure 3.12**):

- ATCA carrier card (CAB100)
- FPC100 AMC
- LPC100 AMC

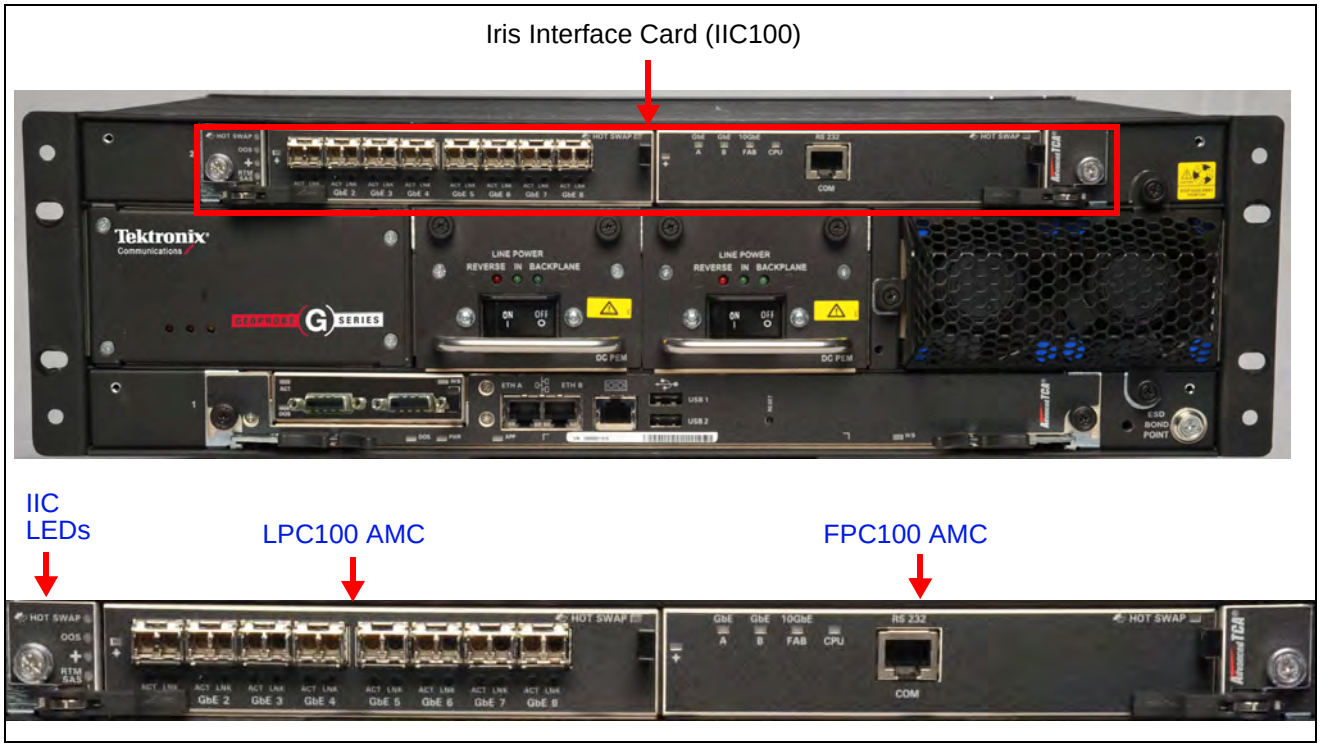


Figure 3.12 - G10 IIC100

FPC100 AMC

The FPC100 AMC is located on the right side of the IIC100 (**Figure 3.13**) and serves as the main flow processor. The main components of the FPC100 AMC are:

- Flow Network Processor—includes a multi-core network processing unit (NPU) to provide optimum packet processing
- Memory—includes 4 GB or 8 GB of DRAM
- Two GbE channels—for control plane activity and a 10 Gbps fabric between the IIC100 and Applications blade through the backplane

The FPC100 AMC supports 4 GB or 8 GB of DRAM (new systems ship with 8 GB of DRAM). The 4 GB FPC100 AMC can be replaced with the 8 GB FPC100 AMC in the field to support Iris applications requiring additional DRAM. Contact Customer Support for details.

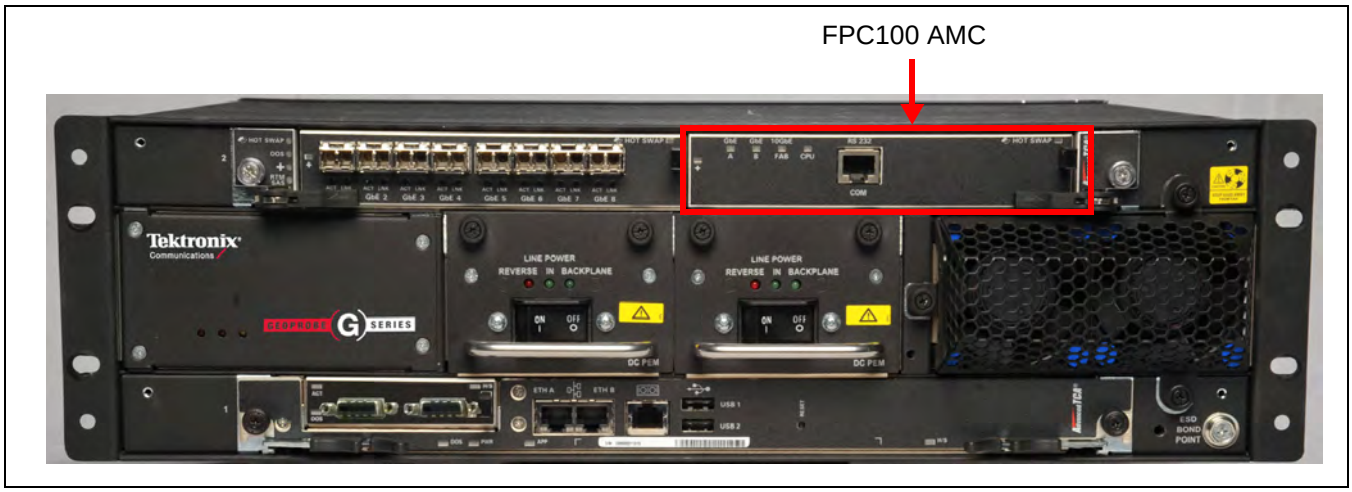


Figure 3.13 - G10 IIC100 - FPC100 AMC

***DO NOT** remove AMCs when the IIC is powered on; refer to LPC and FPC AMCs (IIC100 or IIC200) for removal/replacement details. Call Tektronix Technical Support for any questions about removing AMCs.*

FPC100 AMC LEDs

Figure 3.14 shows the FPC100 AMC LEDs located on the front panel.

Figure 3.14 - FPC100 AMC Front Panel LEDs

Table 3.7 displays the FPC100 AMC LEDs.

Table 3.7 - FPC100 AMC LEDs

LED/Connector	LED Color	Description
+	GREEN 	Indicates the health of the device. ▪ SOLID GREEN—No errors. ▪ OFF—Out of service.
GbE A	GREEN or AMBER 	Indicates link status and activity for Gigabit Ethernet A connection to carrier blade. ▪ GREEN—The link is up. ▪ BLINKING AMBER—Link activity.
GbE B	GREEN or AMBER 	Indicates link status and activity for Gigabit Ethernet B connection to carrier blade. ▪ GREEN—The link is up. ▪ BLINKING AMBER—Link activity.
10GbE FAB	GREEN or AMBER 	10-Gigabit Ethernet Fabric. Indicates status for Ethernet interface to the blade through the backplane. ▪ GREEN—The link is up. ▪ BLINKING AMBER—Link activity.
CPU	AMBER 	Indicates health and status of the processor. ▪ AMBER—The processor has normal functions.
RS 232 COM		Not Used.
Hot Swap	BLUE 	Hot Swap Indicator that indicates when it is safe to remove the module. ▪ SOLID BLUE—The module is in standby mode and can be safely extracted. ▪ OFF—The module is operational, and it is unsafe to extract it. ▪ BLINKING BLUE—The module is in transition between standby mode and operational mode. Note: When this board needs to be removed, you will be removing the entire Iris Interface Controller blade. Refer to Iris Interface Card (IIC100 or IIC200) for more information.

LPC100 AMC

The LPC100 AMC (**Figure 3.15**) is located on the left side of the IIC100 and provides eight 1G Ethernet connections on front panel. The Ethernet connections support:

- Optical or electrical Ethernet links
- LC type optical ports provided by Small Form-Factor Pluggable (SFP) transceiver modules. Refer to the SFP Reference appendix for details.

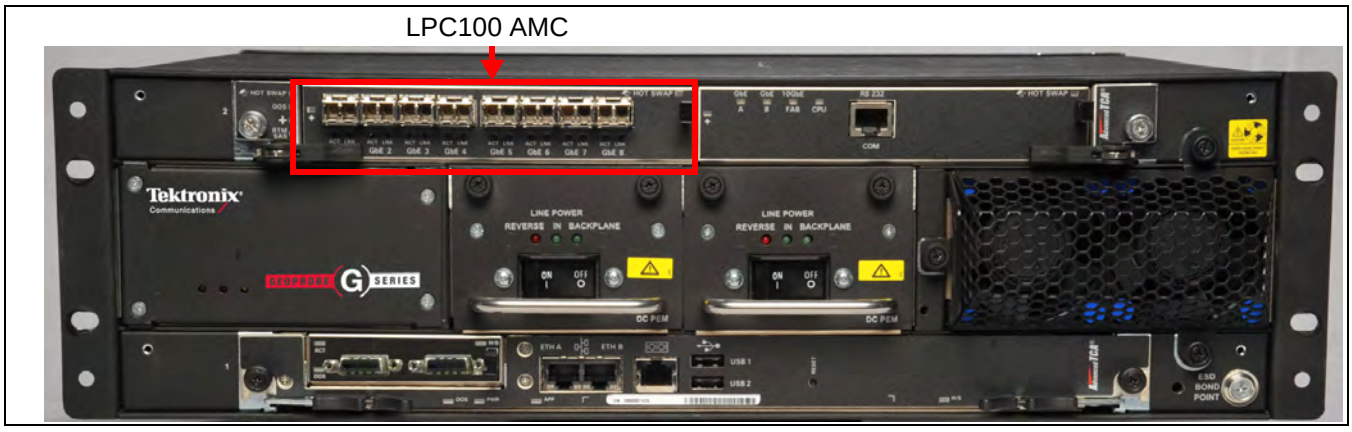


Figure 3.15 - G10 IIC - LPC100 AMC

***DO NOT** remove AMCs when the IIC is powered on; refer to LPC and FPC AMCs (IIC100 or IIC200) for removal/replacement details. Call Tektronix Technical Support for any questions about removing AMCs.*

LPC100 AMC LEDs

Figure 3.16 displays the LPC100 AMC LEDs.

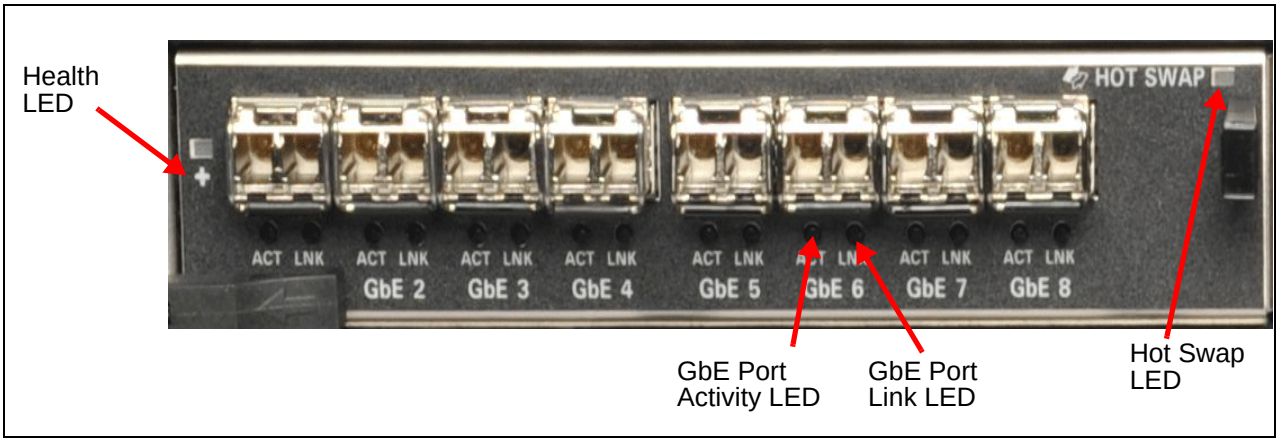


Figure 3.16 - LPC100 AMC LEDs

Table 3.8 describes the LPC100 AMC LEDs.

Table 3.8 - LPC100 AMC LEDs

LED	LED Color	Description
Hot Swap	BLUE	Hot Swap Indicator which indicates when it is safe to remove the module. ▪ SOLID BLUE—The module is in standby mode and can be safely extracted. ▪ Off—The module is operational, and it is unsafe to extract it. ▪ BLINKING BLUE—The module is in transition between standby mode and operational mode.
+	GREEN	Indicates the health of the device. ▪ GREEN—No errors. ▪ OFF—Out of service.
ACT	YELLOW	GbE Port Activity Status Indicator ▪ YELLOW = Activity.
LNK	GREEN	GbE Port Link Status Indicator ▪ GREEN = The link is up.

IIC100 RTMs

The IIC100 supports the following RTM configuration options for deployment:

- 8x1G probe—IIC100 and the SRM100 RTM
- Mixed 1G and 10G probe—IIC100 and the TRM100 RTM

SRM100 RTM

The SRM100 RTM is used in 8X1G installations and connects to the back of the GeoProbe G10 chassis in the upper slot location. It performs the following functions (**Figure 3.17**):

- Communicates the board's health and configuration status to the IIC100
- Provides two Gigabit Ethernet links for connectivity to second controller enclosure
- Sends and receives data to the disk array storage subsystem

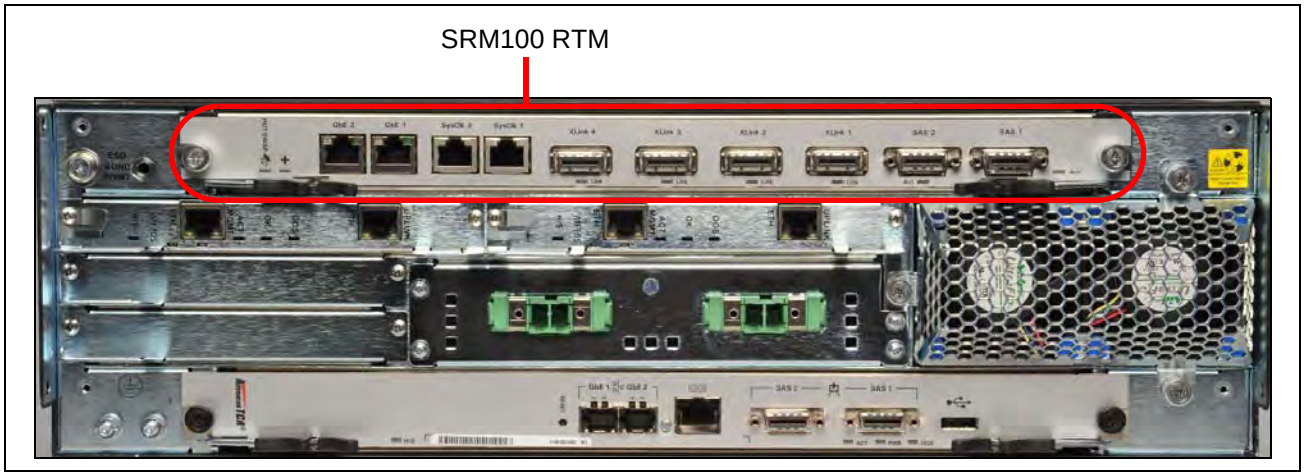


Figure 3.17 - SRM100 RTM

SRM100 RTM Connectors

Figure 3.18 displays the SRM100 RTM connectors.

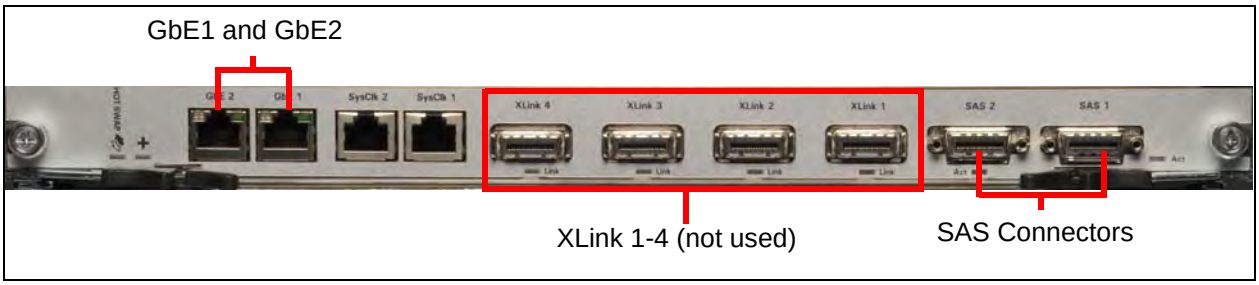


Figure 3.18 - SRM100 RTM Connectors

Table 3.9 describes the SRM100 RTM connectors.

Table 3.9 - SRM100 RTM Connectors

Connector	Description
GbE1–GbE 2	These connectors are the RJ-45 Gigabit Ethernet connectors to the second controller enclosure.
SysClk 1–2	These connectors are not used.
XLink 1–4	These connectors are not used.
SAS 1–2	This connector provides connectivity to the external disk array storage system.

SRM100 RTM LEDs

Figure 3.19 displays the SRM100 RTM LEDs.

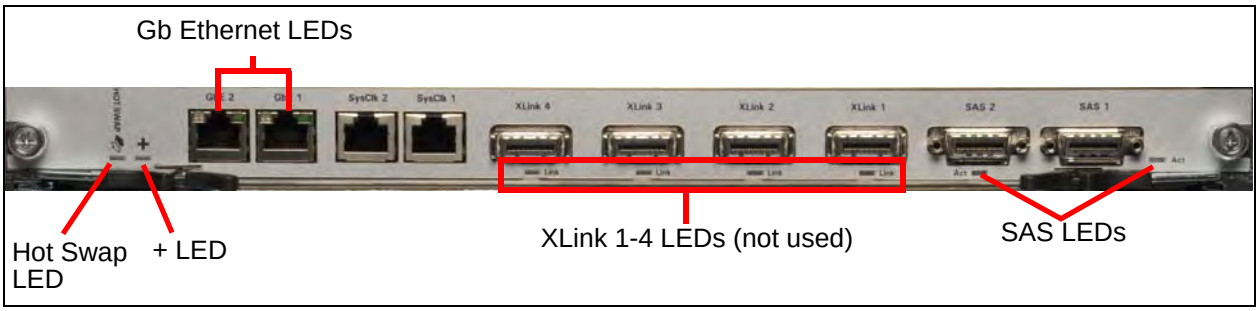


Figure 3.19 - SRM100 RTM Rear Panel LEDs

Table 3.10 describes the SRM100 RTM LED indicators.

Table 3.10 - SRM100 RTM LED Indicators

LED	LED Color	Description
Hot Swap	BLUE	Indicates when it is safe to remove the SRM100. ▪ BLUE—The module is in standby mode and can be safely extracted. ▪ OFF—The module is operational, and it is unsafe to extract it. ▪ BLINKING BLUE—The module is in transition between standby mode and operational mode.
+ (Health)	GREEN or RED	Indicates the health of the SRM100 RTM. ▪ GREEN—No errors. ▪ RED—An error occurred. ▪ OFF—The board is not powered on.
Gb Ethernet LEDs	GREEN	Indicates Gigabit Ethernet link and activity. ▪ BLINKING GREEN—Ethernet activity is occurring. ▪ SOLID GREEN—The Ethernet link is established. ▪ OFF—No Ethernet link is established.
XLink 1–4 LEDs		These LEDs are not used.
SAS LEDs	GREEN or RED	Indicates SAS link connectivity status. ▪ GREEN—No errors; SAS link is established. ▪ RED—An error occurred. ▪ OFF—No SAS link is established.

TRM100 RTM

The TRM100 RTM is used in the following configurations:

- Mixed 1G and 10G Ethernet probe installations with IIC100
- Mixed 1G and 10G Ethernet probe installations with IIC200 supporting eHRPD monitoring

The TRM100 RTM connects to the back of the GeoProbe G10 chassis in the upper slot location and performs the following functions:

- Communicates the board's health and configuration status to its counterpart IPMC on the IIC100 or IIC200
- Serves as the store-to-disk interface to the disk array with 10Gb Ethernet capability.
- Provides four 10G optical inputs for monitored links when used with IIC100. (When used with IIC200, no 10G monitored links are connected to the TRM100 RTM; all 10G monitored traffic is connected to the IIC200 [LPC200].

Figure 3.20 displays the TRM100 RTM.

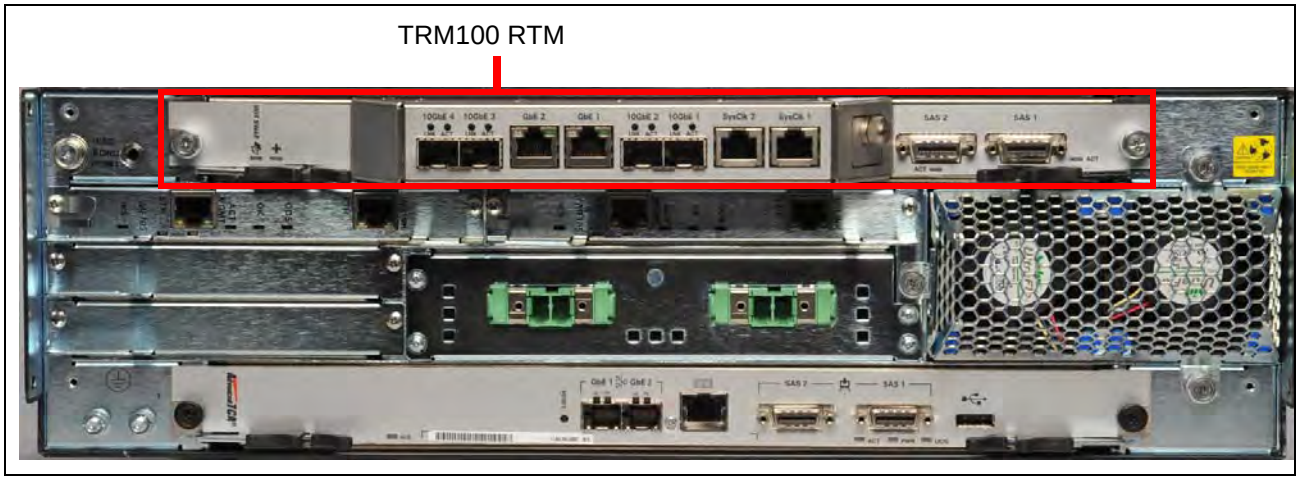


Figure 3.20 - TRM100 RTM

TRM100 RTM Connectors
Figure 3.21 displays the TRM100 RTM connectors.

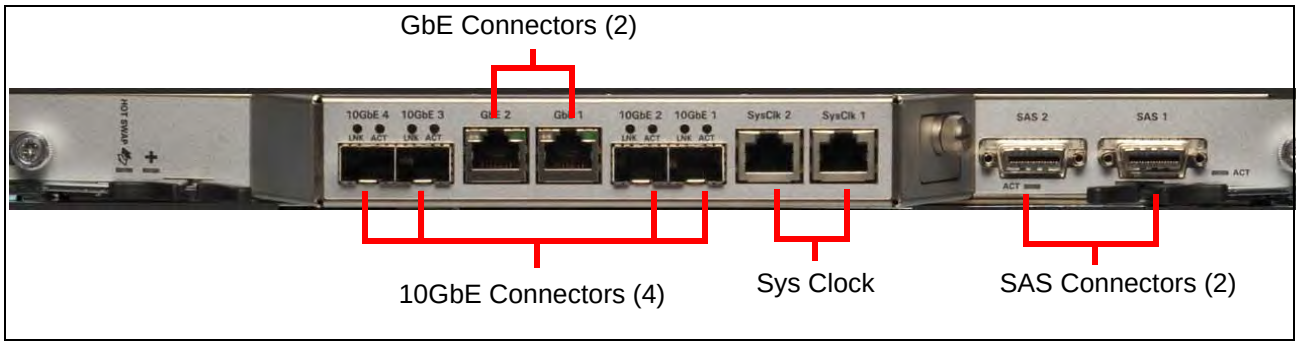


Figure 3.21 - TRM100 RTM Connectors

Table 3.11 describes the TRM100 RTM connectors.

Table 3.11 - TRM100 RTM Connectors

Connector	Description
10GbE (4)	10 GbE SFP+ (fiber) connectors ▪ When used with IIC100, these ports provide inputs for monitored links or intercage communications for multiprobe configurations. ▪ When used with the IIC200, these connectors are not used.
GbE (2)	Two Gb Ethernet connections Provides connections to storage controller(s).
SysClk (2)	System Clock Connectors. ▪ For standalone G10 configurations, these can be used for external SYS CLK connections. ▪ For the Media Probe configuration, these ports are used for chassis-to-chassis timing distribution. Refer to SysClk Termination Switch for more details.
SAS (2)	SAS Connectors Provides connections to external storage subsystem.

Table 3.12 shows the RJ45 pin assignments for the SYSCLK connectors.

Table 3.12 - SYSCLK RJ45 Pin Assignments

Pin	Description
1	CARR_CLK1A+
2	CARR_CLK1A-
3	CARR_CLK2A+
4	no connect
5	no connect
6	CARR_CLK2A-
7	CARR_CLK3A+
8	CARR_CLK3A-

SysClk Termination Switch

Some G10 probe configurations require the use of the SYSCLK 1 and SYSCLK 2 connectors, and you must change settings on the SYSCLK Termination switch. The TRM100 provides access to the SYSCLK termination switch behind a faceplate (**Figure 3.22**).

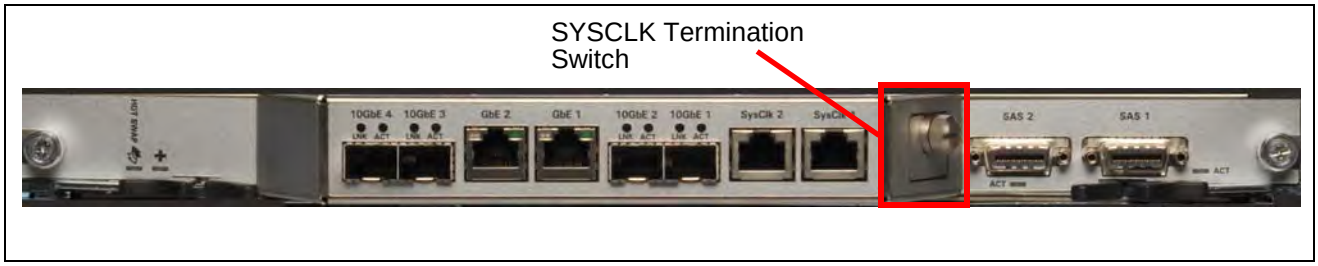


Figure 3.22 - TRM100 SYSCLK Termination Switch

You need to set the SYSCLK DIP switch settings in the following scenarios:

- G10 standalone chassis using external SYSCLK—determine if the SYSCLK signal is terminated or bridged at customer site and set the DIP switches accordingly.
- Media probe two-chassis configuration—the Primary and Expansion Chassis must use the TERMINATED setting on ***ALL THREE*** SYSCLK Termination Switches.

Table 3.13 shows the SYSCLK Dip Switch Settings. *All eight DIP switches must be set to the same setting at any given time; all switches must be set to the up position or all switches must be set to the down position.*

Table 3.13 - SYSCLK Termination Switch Dip Switch Settings

Setting		Description
	**Up (open/off) BRIDGED**	SYSCLK is BRIDGED (not terminated). This is the default switch setting.
	**Down (closed/on) TERMINATED**	SYSCLK is TERMINATED with a 200 Ω pull-down resistor. ***ALL*** TRM100 RTM SYSCLK switches on the Media Probe Primary and Expansion chassis must use this setting.

TRM100 RTM LEDs

Figure 3.23 displays the TRM100 RTM LEDs.

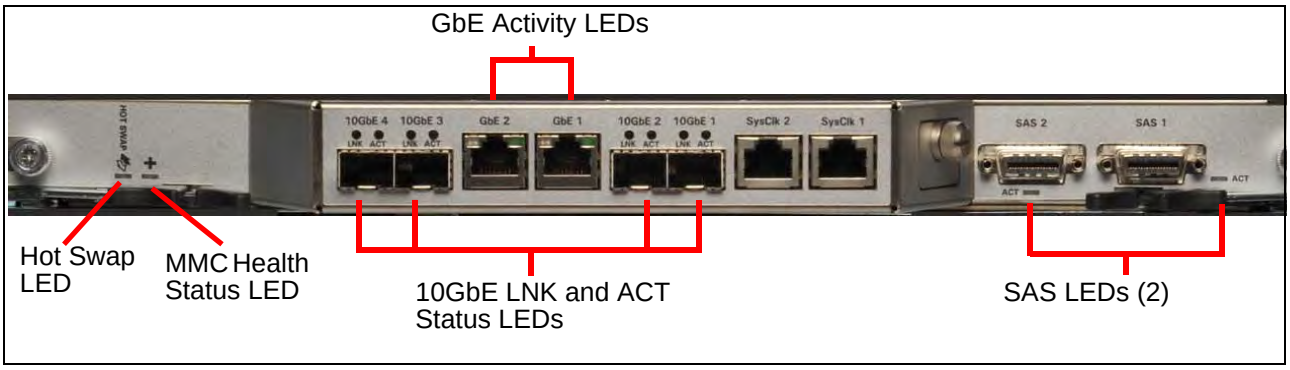


Figure 3.23 - TRM100 RTM LEDs

Table 3.14 describes the TRM100 RTM LEDs.

Table 3.14 - TRM100 RTM LED Indicators

Connector/LED	LED Color	Description
Hot Swap	BLUE	Indicates when it is safe to remove the module. ▪ SOLID BLUE—module is in standby mode and can be safely extracted. ▪ OFF—module is operational and it is unsafe to extract it. ▪ BLINKING BLUE—module is in transition between standby mode and operational mode.
+	GREEN or RED	MMC health LED. ▪ GREEN—no errors. ▪ RED—error occurred. ▪ OFF—board is not powered on.
LNK (10GbE)	GREEN	Four 10-Gb link LEDs; one for each of the SFP+ modules. These indicate the status of the port connectivity. ▪ GREEN—10-Gb link is up. ▪ OFF—no link established.
ACT (10GbE)	YELLOW	Four 10-Gb activity LEDs; one for each of the SFP+ modules. These indicate the status of the traffic running over the connection. ▪ BLINKING YELLOW—10-Gb Ethernet activity occurring. ▪ OFF—no 10-Gb Ethernet activity.

Table 3.14 - TRM100 RTM LED Indicators (Continued)

Connector/LED	LED Color	Description
GbE Activity	GREEN 	Gb Ethernet Activity LEDs which indicate the status of the traffic running over the connection. ▪ BLINKING GREEN—Ethernet activity occurring. ▪ SOLID GREEN—Ethernet link is up. ▪ OFF—no Ethernet link established.
ACT (SAS)	GREEN or RED 	Indicates SAS activity. ▪ GREEN—no errors, SAS link is up. ▪ RED—error occurred. ▪ OFF—no SAS link established.

APPLICATIONS BLADE

The Applications Blade provides the following functions for the G10 probe:

- Performs analysis, correlation, and processing functions
- Controls the OS for GeoProbe G10
- Provides the Ethernet connection to customer LAN
- Enables S2D functionality (LT and ST)

Iris currently supports the following applications blades:

- IAP320/IAP200
- IAP100

IAP320/IAP200

The IAP320 and IAP200 connect to the front of the G10 chassis in Slot 1 (bottom slot). The blades vary based on the configurations described in **Table 3.15**.

Table 3.15 - IAP320/IAP200

Blade	Description
IAP320	▪ Two 10-core Intel Xeon processors (1.9 GHz) ▪ 192 GB DDR3 memory ▪ Supports PRM300 RTM
IAP200	▪ Two 6-core Intel Xeon Processors (2.0 GHz) ▪ 96 GB or 112 GB DDR3 memory. New systems ship with 112 GB DRAM. A G10 can be upgraded to the 112 GB IAP200 to support Iris applications requiring additional DRAM. Contact Customer Support for details. ▪ Supports PRM200 RTM

Figure 3.24 shows an example of the applications blade.

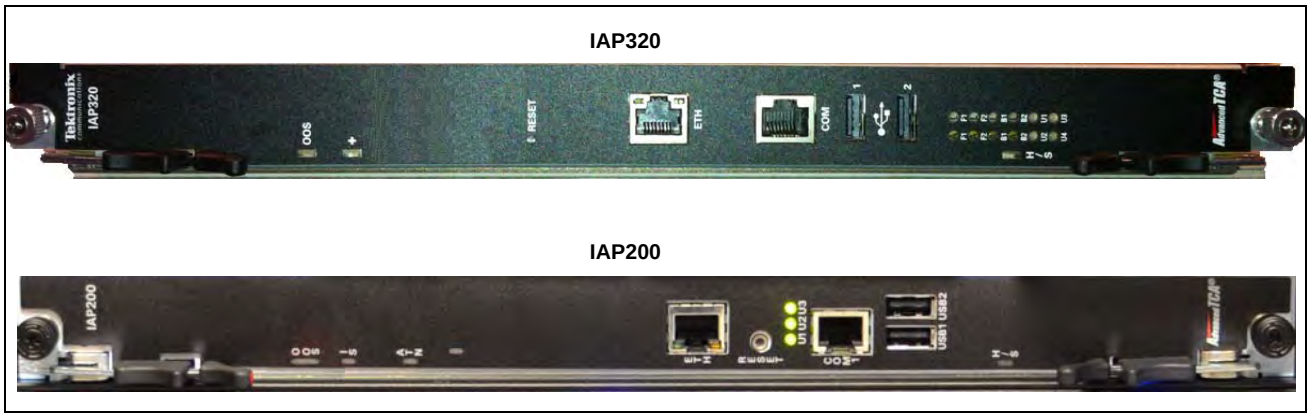


Figure 3.24 - G10 IAP320 and IAP200

IAP320

IAP320 LEDs

The IAP320 indicators provide status and error information. The LED indicators are located on the front panel of the board. **Figure 3.25** displays the front panel LEDs of the IAP320.

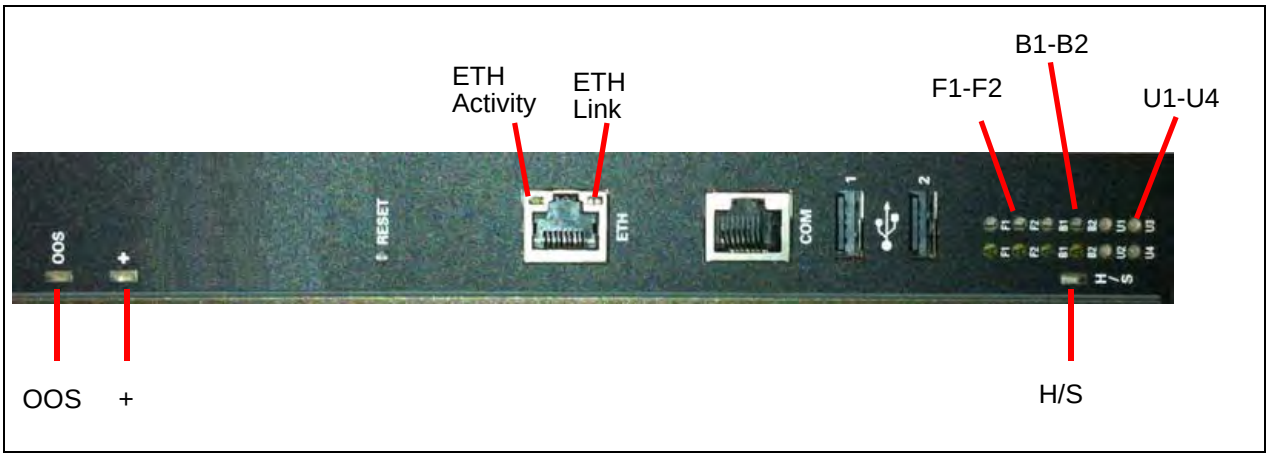


Figure 3.25 - IAP320 Front Panel LEDs

Table 3.16 displays the IAP320 LED indicators.

Table 3.16 - IAP320 LED Indicators

LED	LED Color	Description
OOS	RED or AMBER	Indicates out of service status. ▪ RED or AMBER—The CPM is out of service. ▪ OFF—Normal operation.
Health (+)	GREEN or RED	Indicates the health of the RTM. ▪ GREEN—No errors. ▪ RED—An error occurred. ▪ OFF—The board is not powered on.
ETH Link LED	GREEN	Indicates status of Ethernet connector. ▪ GREEN—The link is available. ▪ OFF—No link established.
ETH Activity LED	YELLOW	Indicates the status of Ethernet traffic on the connection. ▪ YELLOW—Ethernet activity occurring. ▪ OFF—No Ethernet activity occurring.
F1-F2 (L)	GREEN	Fabric Interface Link Indicator ▪ GREEN = The Ethernet link is up. ▪ OFF = No link established.

Table 3.16 - IAP320 LED Indicators (Continued)

LED	LED Color	Description
F1-F2 (A)	YELLOW	Fabric Interface Activity Indicator ▪ YELLOW—Ethernet activity occurring. ▪ OFF—No Ethernet activity occurring.
B1-B2 (L)	GREEN or YELLOW	Base Interface Link Indicator ▪ GREEN = The Ethernet link is up at 1 Gb speed. ▪ YELLOW = The Ethernet link is up at 100M speed. ▪ OFF = No link established.
B1-B2 (A)	YELLOW	Base Interface Activity Indicator ▪ YELLOW—Ethernet activity occurring. ▪ OFF—No Ethernet activity occurring.
U1-U4		Not used.
H/S	BLUE	Indicates blade state machine status and hot swap status. **During blade installation:** ▪ SOLID BLUE—The on-board IPMC powers up. ▪ BLINKING BLUE—The blade communicates with shelf manager. ▪ OFF—The blade is active. **During blade removal:** ▪ SOLID BLUE—The blade is in standby mode and can be safely extracted. ▪ OFF—The blade is operational, and it is unsafe to extract it. ▪ BLINKING BLUE—The module is in a transition between standby mode and operational mode.

IAP320 Connectors

Figure 3.26 displays the IAP320 connectors.

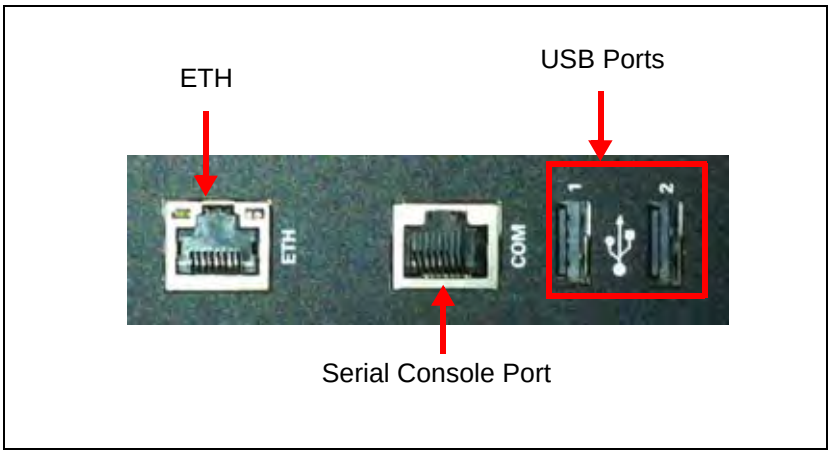


Figure 3.26 - IAP320 Connectors

Table 3.17 provides descriptions of the IAP320 connectors.

Table 3.17 - IAP320 Connectors

Connector	Description
ETH Connector	Used during initial probe configuration; not used during normal probe operation.
Serial Console Port	Enables an RJ-45 cable to connect to an external computer to display and interact with the CPM's software. In order to communicate with the CPM, the terminal emulator on the external computer must match the default settings for the CPM serial port: ▪ 28800 bps ▪ no parity ▪ 8 data bits ▪ 1 stop bit ▪ no flow control For best display results, the terminal should be set to 80 columns by 25 lines.
USB 1–2	These connectors are a standard USB 2.0 used for service and maintenance.

IAP200

IAP200 LEDs

The IAP200 indicators provide status and error information. The LED indicators are located on the front panel of the board. **Figure 3.25** displays the front panel LEDs of the IAP200.

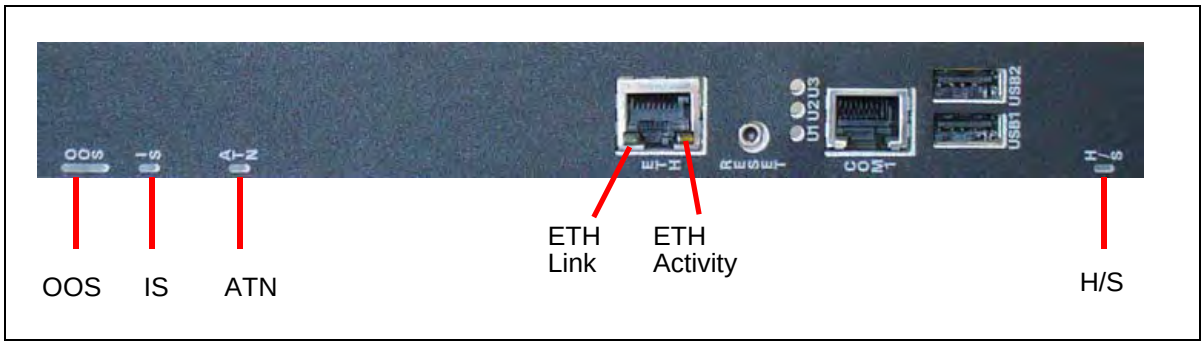


Figure 3.27 - IAP200 Front Panel LEDs

Table 3.16 displays the IAP200 LED indicators.

Table 3.18 - IAP200 LED Indicators

LED	LED Color	Description
OOS	RED or AMBER	Indicates out of service status. ▪ RED or AMBER—The CPM is out of service. ▪ OFF—Normal operation.
IS	GREEN	Indicates Payload Power status. ▪ GREEN—Payload power has been has been enabled by the IPMC. Note that this LED indicates the payload power status both in the early power state and the normal blade operation. ▪ OFF—Payload power is disabled.
ATN		Not Used.
ETH Link LED	GREEN	Indicates status of Ethernet connector. ▪ GREEN—The link is available. ▪ OFF—No link established.
ETH Activity LED	YELLOW	Indicates the status of Ethernet traffic on the connection. ▪ YELLOW—Ethernet activity occurring. ▪ OFF—No Ethernet activity occurring.

Table 3.18 - IAP200 LED Indicators (Continued)

LED	LED Color	Description
U1-U3		Not used.
H/S	BLUE	Indicates blade state machine status and hot swap status. **During blade installation:** ▪ SOLID BLUE—The on-board IPMC powers up. ▪ BLINKING BLUE—The blade communicates with shelf manager. ▪ OFF—The blade is active. **During blade removal:** ▪ SOLID BLUE—The blade is in standby mode and can be safely extracted. ▪ OFF—The blade is operational, and it is unsafe to extract it. ▪ BLINKING BLUE—The module is in a transition between standby mode and operational mode.

IAP200 Connectors

Figure 3.26 displays the IAP200 connectors.

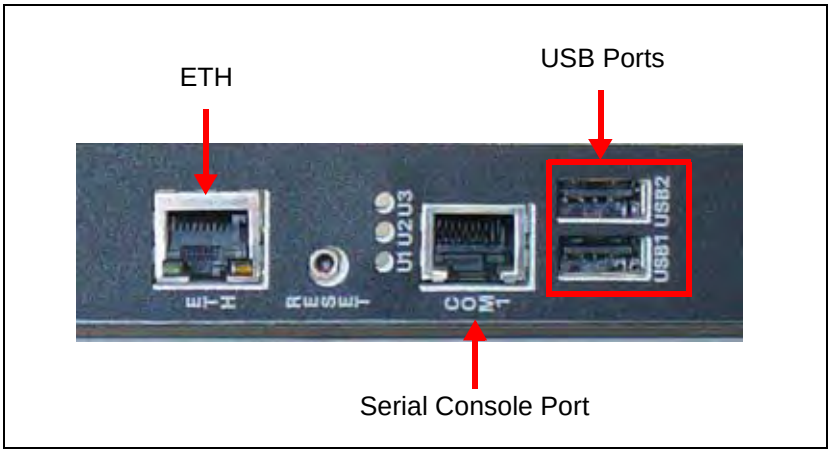


Figure 3.28 - IAP200 Connectors

Table 3.17 provides descriptions of the IAP200 connectors.

Table 3.19 - IAP200 Connectors

Connector	Description
ETH Connector	Used during initial probe configuration; not used during normal probe operation.
Serial Console Port	Enables an RJ-45 cable to connect to an external computer to display and interact with the CPM's software. In order to communicate with the CPM, the terminal emulator on the external computer must match the default settings for the CPM serial port: ▪ 28800 bps ▪ no parity ▪ 8 data bits ▪ 1 stop bit ▪ no flow control For best display results, the terminal should be set to 80 columns by 25 lines.
USB 1–2	These connectors are a standard USB 2.0 used for service and maintenance.

PRM300 RTM/PRM200 RTM

The IAP320 supports the PRM300 RTM; and the IAP200 supports the PRM200 RTM. These RTMs have the same connectors and LEDs.

The RTM provides additional connectivity options and a hard disk used for the operating system. The RTMs connect to the rear of the respective IAP. The RTM performs the following functions:

- Provides cable connections to the disk array
- Provides hard drive for operating system
- Includes an IPMC

Figure 3.29 displays the PRM200/PRM300.

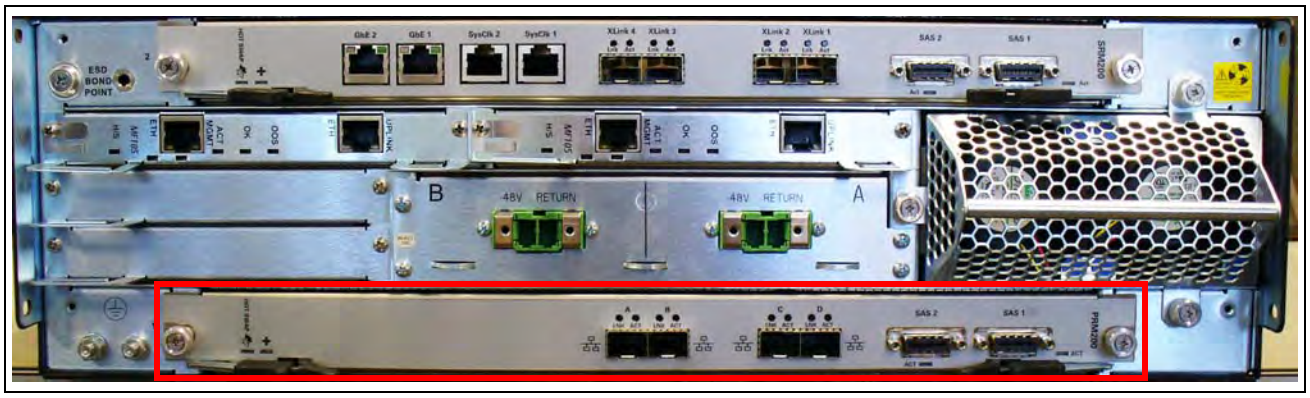


Figure 3.29 - PRM300/PRM200 RTM

PRM300/PRM200 LEDs

Figure 3.30 shows the RTM LED indicators.

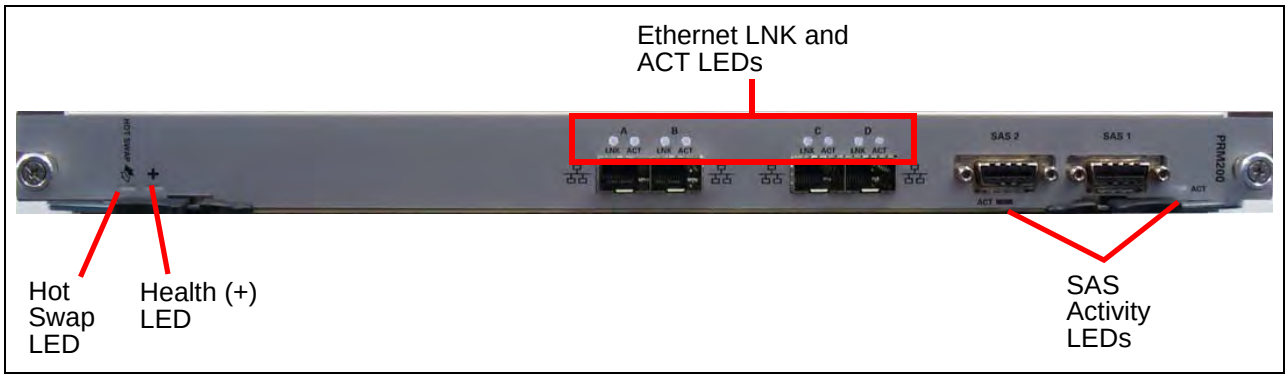


Figure 3.30 - PRM300/PRM200 LEDs

Table 3.20 describes the PRM300/PRM200 LEDs.

Table 3.20 - PRM300/PRM200 RTM LEDs

LED	LED Color	Description
Hot Swap	BLUE	Hot Swap Indicator which indicates when it is safe to remove the RTM. ▪ SOLID BLUE— The blade is in standby mode and can be safely extracted. ▪ BLINKING BLUE—The module is in a transition between standby mode and operational mode. ▪ OFF—The blade is active; do not extract it.
Health (+)	GREEN or RED	Indicates the health of the PRM200 RTM. ▪ GREEN—No errors. ▪ RED—An error occurred. ▪ OFF—The board is not powered on.

Table 3.20 - PRM300/PRM200 RTM LEDs (Continued)

LED	LED Color	Description
Ethernet ACT LEDs	YELLOW	Indicates Ethernet link activity. ▪ SOLID YELLOW = The Ethernet link is up; no activity. ▪ BLINKING YELLOW = Ethernet activity occurring. ▪ OFF = No Ethernet link established.
Ethernet LNK LEDs	GREEN, AMBER, or RED	Indicates Ethernet link status. ▪ GREEN = The Ethernet link is up at 10 Gb speed. ▪ AMBER = The Ethernet link is up at 1 Gb speed. ▪ RED = The Ethernet link is up at 100M speed. ▪ OFF = No link established.
ACT (SAS)	GREEN or RED	SAS activity LED Two SAS activity LEDs, one for each SAS port. ▪ GREEN—No errors; SAS link is up. ▪ RED—Error occurred. ▪ OFF—No SAS link established.

PRM300/PRM200 Connectors

Figure 3.31 shows the RTM LED indicators.

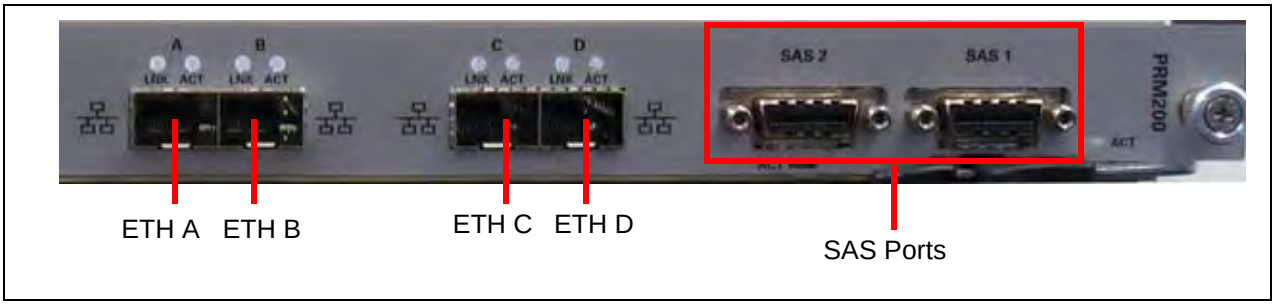


Figure 3.31 - PRM300/PRM200 Connectors

Table 3.21 describes the PRM300/PRM200 connectors.

Table 3.21 - PRM300/PRM200 Connectors

Connector	Description
ETH A (Primary Interface)	Primary 1G Ethernet LAN (uplink to server). Supports 10G/1G/100Mb; normal usage is 1G/100Mb for OAM.
ETH B	Redundant Primary 1G Ethernet LAN (uplink to server). Only used for redundant Primary LAN configuration. Supports 10G/1G/100Mb; normal usage is 1G/100Mb for OAM.

Table 3.21 - PRM300/PRM200 Connectors (Continued)

Connector	Description
ETH C	Ethernet LAN used for inter-cage connection in multicage configuration. Supports 10G/1G/100Mb; normal usage is 10G for inter-cage communication.
ETH D	
SAS Ports (two)	Provides connectivity to storage subsystem.

IAP100

The IAP100 Applications Blade (**Figure 3.32**) consists of a quad-core Intel Core Processor with 32 Gb of DDR3 memory. The IAP100 connects to the front of the G10 chassis in Slot 1 (bottom slot). An SAS AMC with two SAS ports provides connectivity to storage arrays for store-to-disk (S2D) functionality. The blade supports dual 1Gb Ethernet links for the Base interface that are PICMG 3.0 compliant and dual 10Gb Ethernet links for the Fabric interface that are PICMG 3.1 (option 9 or 1) compliant. The IAP100 supports the PRM100 RTM or the SSD-3400 RTM.

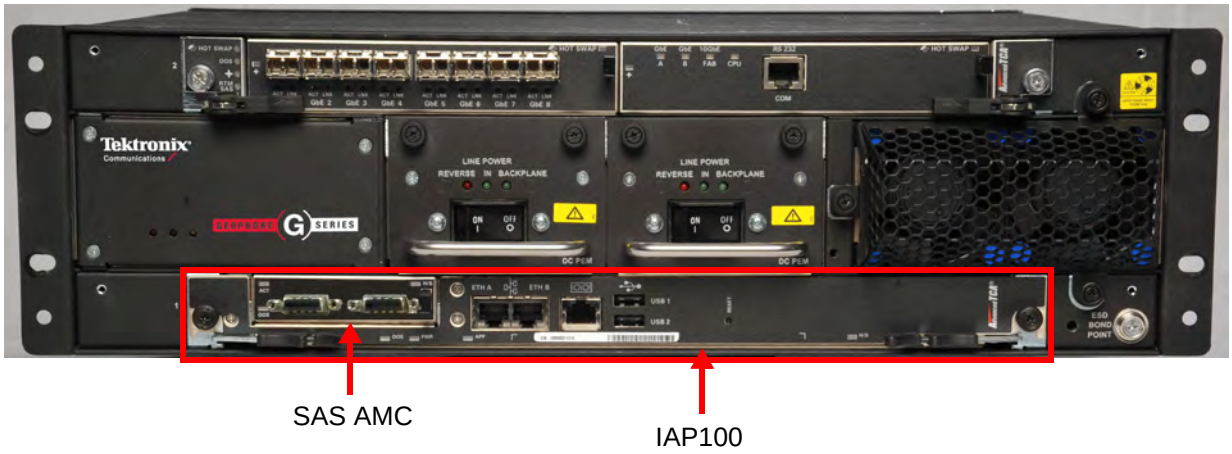


Figure 3.32 - G10 IAP100

IAP100 LEDs

The IAP100 indicators provide status and error information. The LED indicators are located on the front panel of the board (**Figure 3.33**).

Figure 3.33 - IAP100 Front Panel LEDs

Table 3.22 displays the IAP100 LED indicators.

Table 3.22 - IAP100 LED Indicators

LED	LED Color	Description
OOS	RED or AMBER	Indicates the device is out of service and is controlled by the IPMC. ▪ RED or AMBER—The CPM is out of service. ▪ OFF—Normal operation.
PWR	GREEN	Indicates whether the CPM power supplies are within a level of tolerance. ▪ GREEN—All power supplies are good, and power has not been removed. ▪ OFF—The module is not powered on.
APP	AMBER	This LED is application defined and controlled by the IPMC. When the LED is Amber, it is controlled by the IPMC with application-defined functionality.
H/S	BLUE	Hot Swap mode status; indicates when it is safe to remove the module. ▪ SOLID BLUE— The module is in standby mode and can be safely extracted. ▪ OFF—The module is operational, and it is unsafe to extract it. ▪ BLINKING BLUE—The module is in a transition between standby mode and operational mode.

IAP100 Connectors

Figure 3.34 displays the IAP100 connectors.

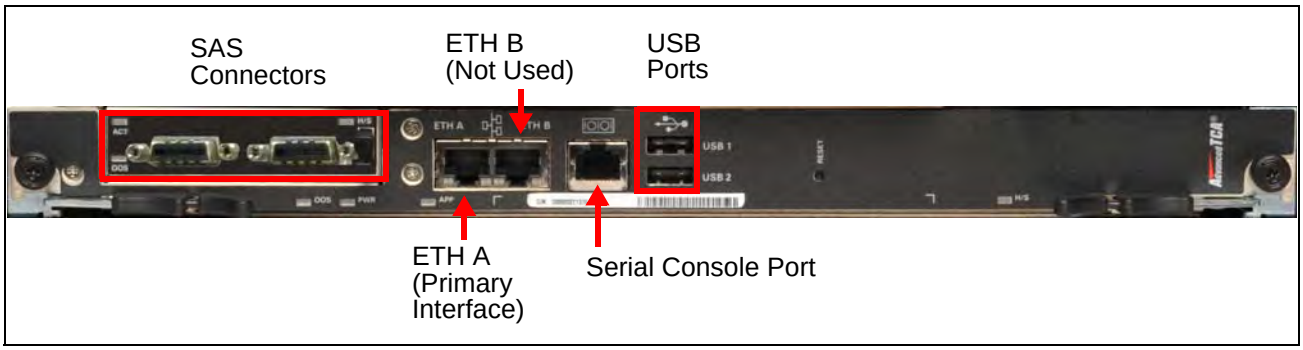


Figure 3.34 - IAP100 Connectors

Table 3.23 provides descriptions of the IAP100 connectors.

Table 3.23 - IAP100 Connectors

Connector	Description
Ethernet A Connector	Provides the interface to connect to the customer LAN (Primary Interface).
Ethernet B Connector	Not used.
Serial Console Port	Enables an RJ-45 cable to connect to an external computer to display and interact with the CPM's software. In order to communicate with the CPM, the terminal emulator on the external computer must match the default settings for the CPM serial port: ▪ 115200 bps ▪ no parity ▪ 8 data bits ▪ 1 stop bit ▪ no flow control For best display results, the terminal should be set to 80 columns by 25 lines.
USB 1–2	Standard USB 2.0 used for service and maintenance.
SAS Connectors	Part of the SAS AMC.

SAS AMC

The SAS AMC on the IAP100 provides connectivity to the disk array via two SAS connectors. **Figure 3.35** displays the SAS AMC. Refer to SAS AMC (IAP100) for removal/replacement procedures.

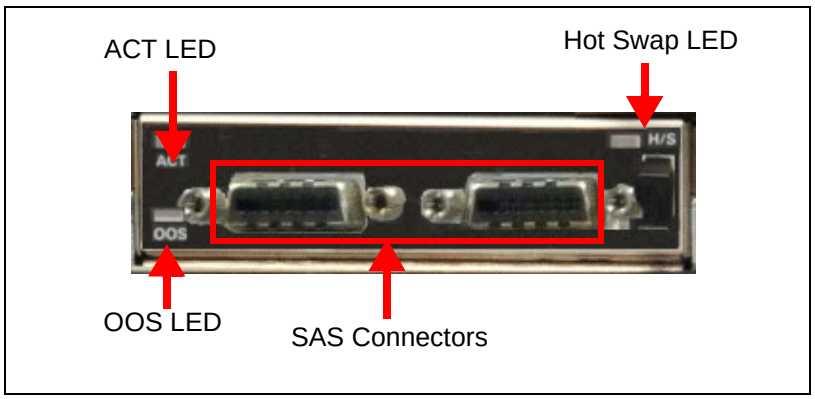


Figure 3.35 - IAP100 SAS AMC Connectors

SAS AMC LEDs

Table 3.24 displays the SAS AMC LED indicators.

Table 3.24 - SAS AMC LEDs

LED	LED Color	Description
ACT	YELLOW	YELLOW—SAS activity on the device.
OOS	RED or AMBER	Indicates the device is out of service and is controlled by the IPMC. Valid options are: ▪ RED or AMBER—The CPM is out of service. ▪ OFF—Normal operation.
H/S	BLUE	Indicates when it is safe to remove the module. Valid options are: ▪ BLUE—The module is in standby mode and can be safely extracted. ▪ OFF—The module is operational, and it is unsafe to extract it. ▪ BLINKING—The module is in a transition between standby mode and operational mode.

SAS AMC Connectors

The SAS AMC contains SAS Port 1 and SAS Port 2 that provide connectivity to the storage enclosures.

IAP100 RTMs

The IAP100 supports the following Rear Transition Modules (RTMs):

- PRM100 RTM
- SSD-3400 RTM

PRM100 RTM

The PRM100 RTM connects to the rear of IAP100. The RTM works in conjunction with the IAP100 and provides additional connectivity options and a hard disk used for the operating system. The PRM100 performs the following functions:

- Provides cable connections to the disk array
- Provides hard drive for operating system
- Includes an IPMC

Figure 3.36 displays the PRM100 RTM.

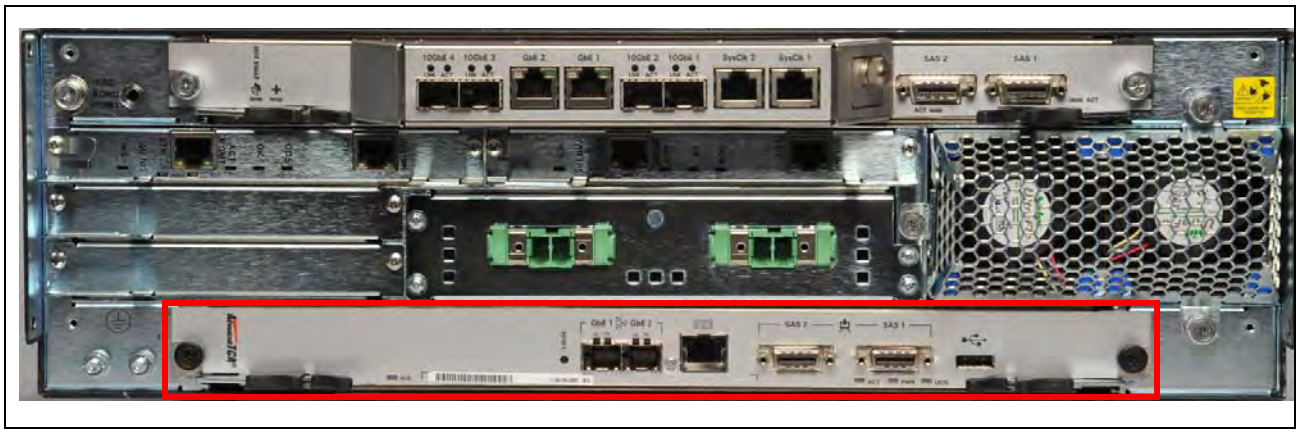


Figure 3.36 - PRM100 RTM

PRM100 LEDs

The PRM100 indicators provide status and error information. The LED indicators are located on the face plate of the board (see **Figure 3.37**).

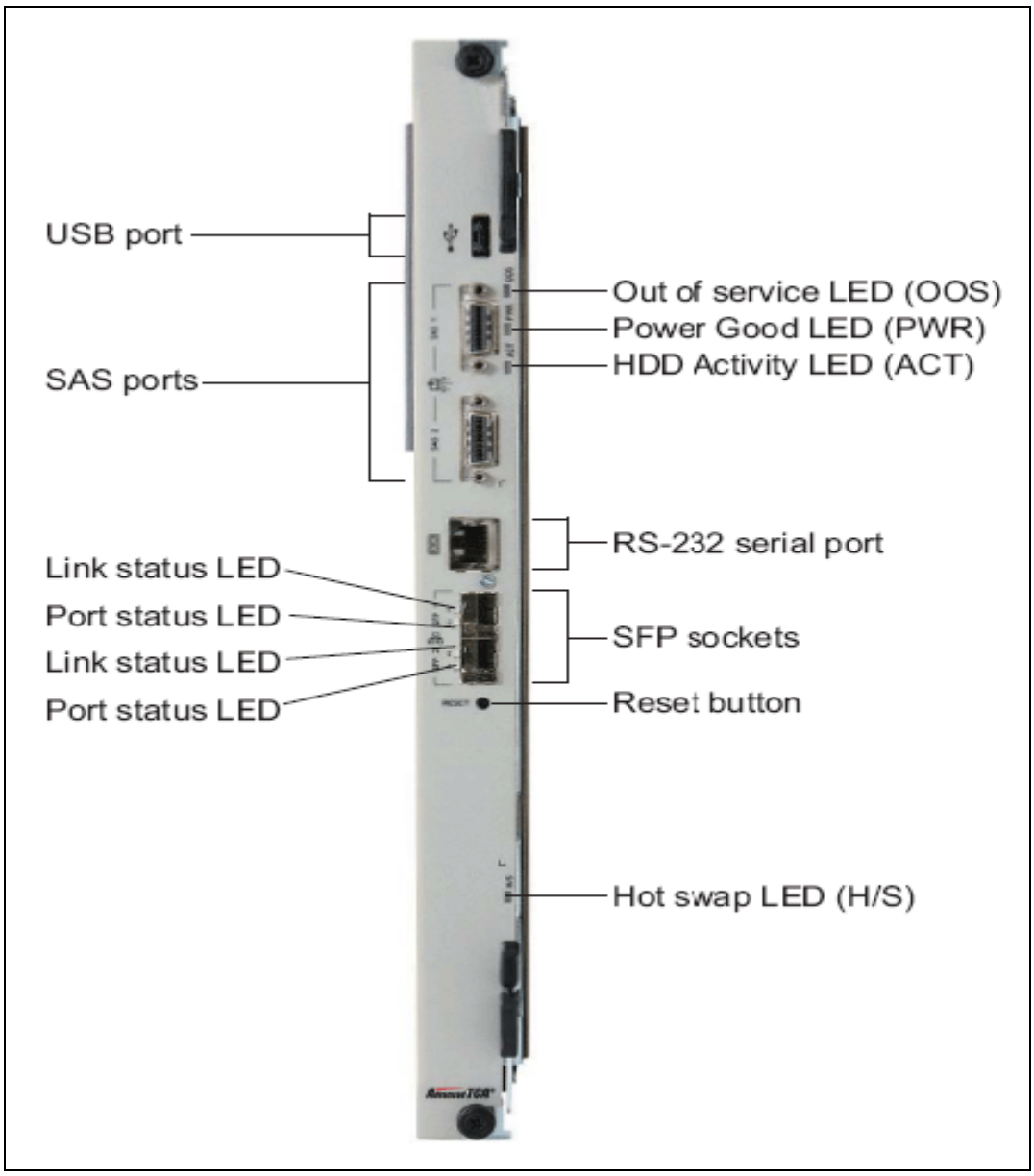


Figure 3.37 - PRM100 LEDs

Table 3.25 describes the PRM100 LEDs.

Table 3.25 - PRM100 LEDs

LED	LED Color	Description
H/S	BLUE	Hot swap indicator. ▪ SOLID BLUE—Ready for hot swap. ▪ LONG BLUE BLINK—Activating the module after insertion short. ▪ BLUE BLINK—Preparing for the hot swap. ▪ OFF—No hot-swap activity is in progress.
ACT	AMBER	Indicates HDD activity. ▪ BLINKING AMBER—HDD activity. ▪ OFF—No activity.
PWR	GREEN	Indicates power status. ▪ GREEN—Power to the RTM is normal. ▪ OFF—The RTM is not powered or is in the hot-swap process.
OOS	RED or AMBER	Indicates the device is out of service. ▪ RED or AMBER—The RTM is out of service. ▪ OFF—The RTM is operating normally.

PRM100 Connectors

Table 3.26 describes the PRM100 connectors.

Table 3.26 - PRM100 Connectors

Connector	Description
SFP Sockets (two)	Not used.
RS-232 Serial Port	Not used.
SAS Ports (two)	Provides connectivity to storage subsystem.
USB Port	Not used.

SSD-3400 RTM

The IAP100 also supports an SSD-3400 RTM. This RTM is the same blade as the PRM100 RTM except it provides an 80 GB SSD system disk (**Figure 3.38**). The RTM supports serial, USB, and SAS ports.

Figure 3.38 - SSD-3400 RTM

10G Interconnect Card

The 10G Interconnect card (**Figure 3.39**) provides additional 10G Ethernet connectivity directly to both of the blades in the cage. Two 10G Interconnect cards are required to support Deep Packet Classification (DPC). Refer to 10G Interconnect Card for installation and removal procedures.

Figure 3.39 - G10 Chassis Rear - 10G Interconnect Cards

10G Interconnect Card LEDs

The 10G Interconnect card contains several LEDs to provide status and error information (**Figure 3.40**).

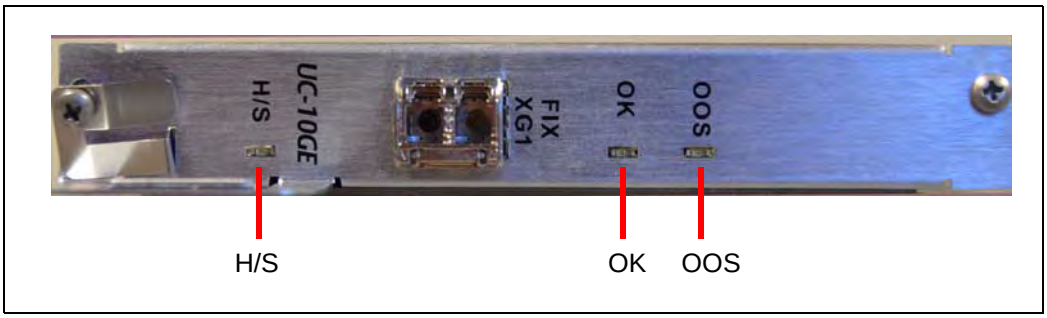


Figure 3.40 - 10G Interconnect Card LEDs

Table 3.27 describes the 10G Interconnect card LEDs.

Table 3.27 - 10G Interconnect Card LEDs

LED	LED Color	Description
H/S	BLUE	Indicates card hot swap status. ▪ SOLID BLUE—The card is in standby mode and can be safely extracted. ▪ BLINKING BLUE—The card is powering up or down; DO NOT extract the card. ▪ OFF—The card is operational, and it is unsafe to extract it.
OK (power)	GREEN	Indicates power status. ▪ GREEN—The card is operating properly. ▪ BLINKING GREEN—The card is booting up. ▪ OFF—An error has occurred, and the card is not operating properly.
OOS (failure)	RED	Indicates card status. ▪ RED—The card is out of service. ▪ OFF—The card is working properly.

10G Interconnect Card Connectors

The 10G Interconnect card provides an SFP+ 10G Ethernet interface on the front panel (**Figure 3.41**). The card supports:

- Fiber connections using an SFP+ module Ethernet cable
- Copper connections using Direct Attach SFP+ copper cable

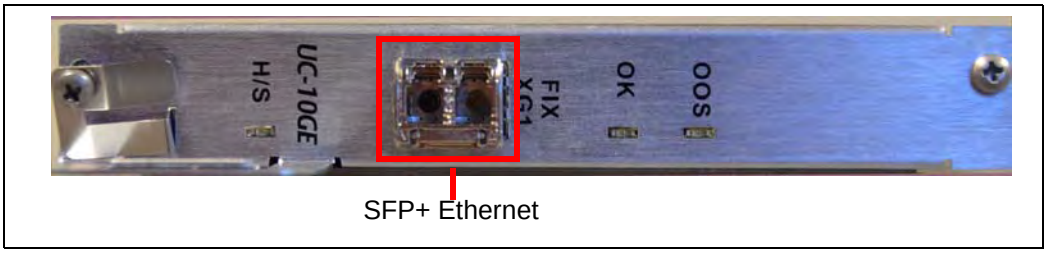


Figure 3.41 - 10G Interconnect Card Connector (Shown with Fiber SFP module)

G10 Hardware Component Name Reference

Table 3.28 lists the naming conventions used to identify the various G10 components.

Table 3.28 - G10 Component Names

Component	Current Name
Blades	
Carrier Blade (see Iris Interface Cards)	CAB100
Iris Interface Cards	IIC100
	IIC200
Applications Blades	IAP100
	IAP200
	IAP320
Advanced Mezzanine Cards (AMCs)	
IIC100 AMCs	LPC100 AMC
	FPC100 AMC
IIC200 AMCs	LPC200 AMC
	FPC200 AMC
IAP100 AMC	SAS AMC
Rear Transition Modules (RTMs)	
IIC100 RTMs	SRM100 RTM
	TRM100 RTM

Table 3.28 - G10 Component Names (Continued)

Component	Current Name
IIC200 RTMs	SRM200 RTM
	TRM100 RTM
IAP100 RTMs	PRM100 RTM
	SSD-3400 RTM
IAP200 RTM	PRM200 RTM
IAP320 RTM	PRM300 RTM
Storage Enclosures	
RAID Storage Enclosure	SA100R
	SA200R
JBOD Storage Enclosure	SA100J
	SA200J

4 Storage Subsystem

SAS Storage Arrays

All G10 systems support disk arrays to provide disk space for applications requiring extensive data storage. The storage subsystem consists of controller enclosures and expansion enclosures for expandable storage configurations. The controller enclosure manages the physical disk drives and provides communication between the expansion enclosures and the G10 probe. Expansion enclosures are JBOD (Just a Bunch of Disks) and contain no controller mechanism. Expansion enclosures allow you to add twenty-four more drives of capacity to the existing disk array configuration.

The disk arrays contain the following built-in redundancy configurations to improve system reliability and availability:

- Redundant, hot swappable fans and AC and DC power units
- Dual, hot-swappable IO modules or controller modules
- Hot-swappable disk drives

Figure 4.1 displays a SAS 24-disk enclosure and a Near-Line SAS 12-disk enclosure.

SAS 24 Disk Enclosure
(SA100R/SA100J, SA200R/SA200J

Near-Line SAS 12-Disk Enclosure
(SA210J)

Figure 4.1 - Disk Enclosure Views

Supported Models

The G10 supports the following storage enclosures:

- Controller Enclosure
  - 24-disk SA100R or SA200R (300 GB, 600 GB, or 900 GB drives)
- Expansion Enclosure
  - 24-disk SA100J or SA200J (300 GB, 600 GB, or 900 GB drives)
  - 12-disk SA210J (4 TB drives)

Storage Enclosure Features

The disk enclosure contains the following hardware features:

- Requires 2 rack units (2U) of space
- SAS connectors
  - SA200R/ SA200J/SA210J support 6 Gbps connectors
  - SA100R/SA100J support 3 Gbps connectors

- RAID 0 or RAID 5 support
- Controller enclosure JBOD support:
  - SA200R—supports seven SA200J/SA210J JBOD expansion enclosures. *SA200R controller enclosures support both SA200J and SA210J expansion enclosures. If both expansion enclosure models are used, connect the SA200J expansion enclosures first, then connect SA210J expansion enclosures.*
  - SA100R—supports three SA100J JBOD expansion enclosures
- Controller enclosures support configurable raw packet capture rates:
  - Two SA100R controllers - up to 6 Gbps
  - One SA200R controller - up to 10 Gbps

DISK ENCLOSURE FRONT PANELS

SA100R, SA100J, SA200R, and SA200J Front Panel

The disk enclosure front panel looks the same for the SA100R, SA100J, SA200R, and SA200J controller and expansion enclosures. The front panel houses the disks and provides activity status. The disks are numbered 0 to 23 from left to right. **Figure 4.2** shows the disk enclosure front panel and LEDs.

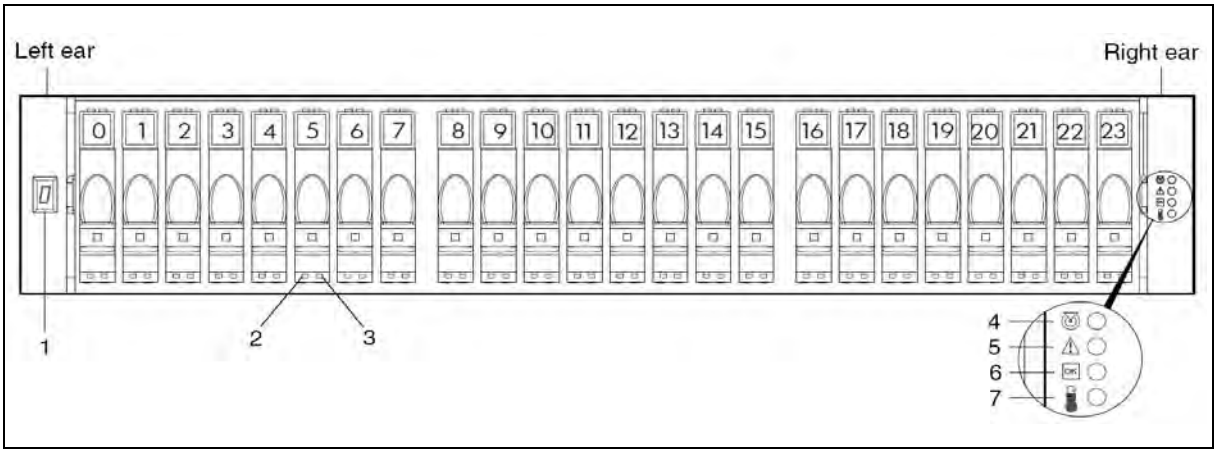


Figure 4.2 - Disk Enclosure Front Panel (SA100R, SA100J, SA200R, and SA200J)

SA210J Front Panel

Figure 4.3 shows the disk enclosure front panel and LEDs for the SA210J. The disks are numbered 0 to 11 from left to right as shown in the graphic.

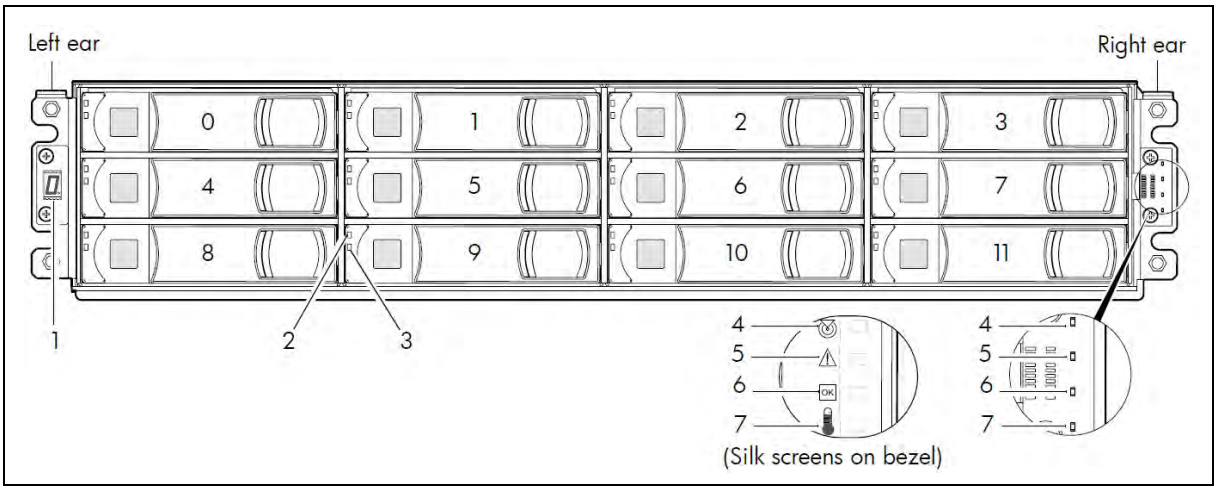


Figure 4.3 - Near-Line SAS Disk Enclosure Front Panel (SA210J)

Front Panel LEDs

Table 4.1 describes the LEDs for these enclosures.

Table 4.1 - Disk Enclosure LEDs

LED	Description	Definition
1	Enclosure ID	This indicator enables you to correlate the enclosure with logical views presented by management software. The sequential enclosure ID numbering of controller enclosures begins with the integer 0. The enclosure ID for an attached drive enclosure is nonzero. When the LED is Green, it is ON.
2	Power/Activity/Fault	This LED displays GREEN or YELLOW, depending on the following states: ▪ GREEN ON—the drive module is operating normally. ▪ GREEN BLINKING—the drive module is active and processing I/O or is performing a media scan. ▪ GREEN OFF—if neither green nor yellow, the drive module is not powered on. ▪ YELLOW ON—the drive has experienced a fault or has failed. The vdisk is initializing or rebuilding or the vdisk is down. ▪ YELLOW BLINKING—physically identifies the drive module. ▪ YELLOW OFF—if neither green nor yellow, the drive module is not powered on.
3	OK to Remove	This LED displays BLUE in the following states: ▪ ON—the drive module has been removed from any active virtual disk, spun down, and prepared for removal. ▪ OFF—the drive module is not prepared for removal.
4	Unit Identification (UID)	This LED displays the color WHITE. Valid options are: ▪ BLINKING—enclosure is identified. ▪ OFF—normal operation.
5	Fault/Service Required ID	This LED displays the color AMBER. Valid options are: ▪ ON—an enclosure-level fault condition exists. The event has been acknowledged but the problem needs attention. ▪ OFF—no fault condition exists.
6	FRU OK—Heartbeat	This LED displays the color GREEN. Valid options are: ▪ ON—the enclosure is powered on with at least one power supply operating normally. ▪ OFF—both power supplies are off; the system is powered off.
7	Temperature Fault	Valid options are: ▪ GREEN ON—the enclosure temperature is normal. ▪ YELLOW ON—the enclosure temperature is above threshold.

DISK ENCLOSURE REAR PANEL

The components and LEDs on the disk enclosure rear panel vary depending on whether it is a controller enclosure or an expansion enclosure.

Tektronix equipment, cables, and wiring diagrams comply with industry standard DC electrical color coding. Please ensure proper cabling if your equipment and cabling use nonstandard DC electrical color coding. Improper cabling can cause damage to equipment or personal injury. Contact Tektronix to request specially labeled power cables (-48V = Red, Return = Black) for the G10 chassis and the storage enclosures.

SA200R Controller Enclosure Rear Panel

The controller enclosure rear panel houses SAS and Ethernet port connectors, power supplies, and power switches (see **Figure 4.4**).

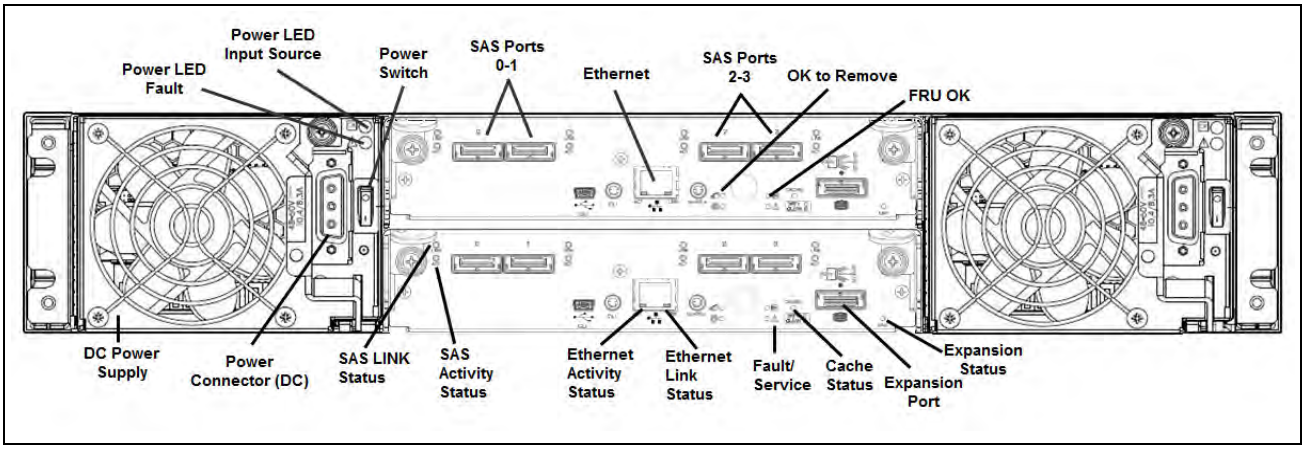


Figure 4.4 - SA200R Controller Enclosure Rear Panel (DC Power Supplies Shown)

Table 4.2 displays the SA200R Controller Enclosure Rear Panel LEDs.

Table 4.2 - SA200R Controller Enclosure Rear Panel LEDs

LED	Description
Power Supply Input Source	This LED displays the color GREEN and indicates whether the input source power is good. Valid options are: ▪ ON—The power is on, and input voltage is normal. ▪ OFF—The power is off, or input voltage is below the minimum threshold.
Power Supply Fault	This LED displays the color YELLOW and indicates the DC Voltage/Fan Fault/ Service Required. Valid options are: ▪ ON—The DC output voltage is out of range, or a fan is operating below the minimum required RPM. ▪ OFF—The DC output voltage is normal.

Table 4.2 - SA200R Controller Enclosure Rear Panel LEDs (Continued)

LED	Description
6 Gb SAS Activity Status	These LEDs display the color GREEN. Valid options are: ■ BLINKING—The link has I/O activity. ■ OFF—The link is idle.
6Gb SAS Link Status	These LEDs display the color GREEN. Valid options are: ■ ON—The port is connected, and the link is up. ■ OFF—The port is empty, or the link is down.
OK to Remove	This LED displays the color BLUE. Valid options are: ■ ON—The controller module can be removed. ■ OFF—The controller module is not prepared for removal.
FRU OK	This LED displays the color GREEN. Valid options are: ■ ON—The controller module is operating normally. ■ OFF—The controller module is not OK. ■ BLINKING—The system is booting.
Fault/Service Required	This LED displays the color AMBER. Valid options are: ■ ON—A fault is detected, or a service action is required. ■ BLINKING—A hardware-controlled power-up, cache flush, or restore error.
Ethernet LNK Status	This LED displays the color GREEN. Valid options are: ■ ON—The Ethernet link is up. ■ OFF—The Ethernet port is not connected or the link is down.
Ethernet ACT Status	This LED displays the color GREEN. Valid options are: ■ OFF—The Ethernet link has no I/O activity. ■ BLINKING—The Ethernet link has I/O activity.
Cache Status	This LED displays the color GREEN. Valid options are: ■ ON—The cache is dirty, and operation is normal. ■ OFF—The cache is clean and contains no unwritten data. ■ BLINKING—A compactFlash flush or cache self-refresh is in progress, indicating cache activity.
Expansion Port Status	This LED displays the color GREEN. Valid options are: ■ ON—The port is connected, and the link is up. ■ OFF—The port is empty, or the link is down.

SA200R Controller Enclosure Connectors

Table 4.3 lists the controller enclosure connectors. Refer to the ***G10 Installation Guide*** for more information about how the G10 connects to the storage arrays.

Table 4.3 - Controller Disk Enclosure Connectors

Connector	Description
SAS 0-SAS 3 Ports	SAS Ports 0 and 1 connect to G10. SAS Ports 2 and 3 are not used.
Ethernet Port	Connects to G10.
Service Ports	Used only by service personnel.
SAS Expansion Port	Connects to another expansion enclosure.

SA100R Controller Enclosure Rear Panel

The controller enclosure rear panel houses the SAS and Ethernet port connectors, power supplies, and power switches (see Figure 4.5).

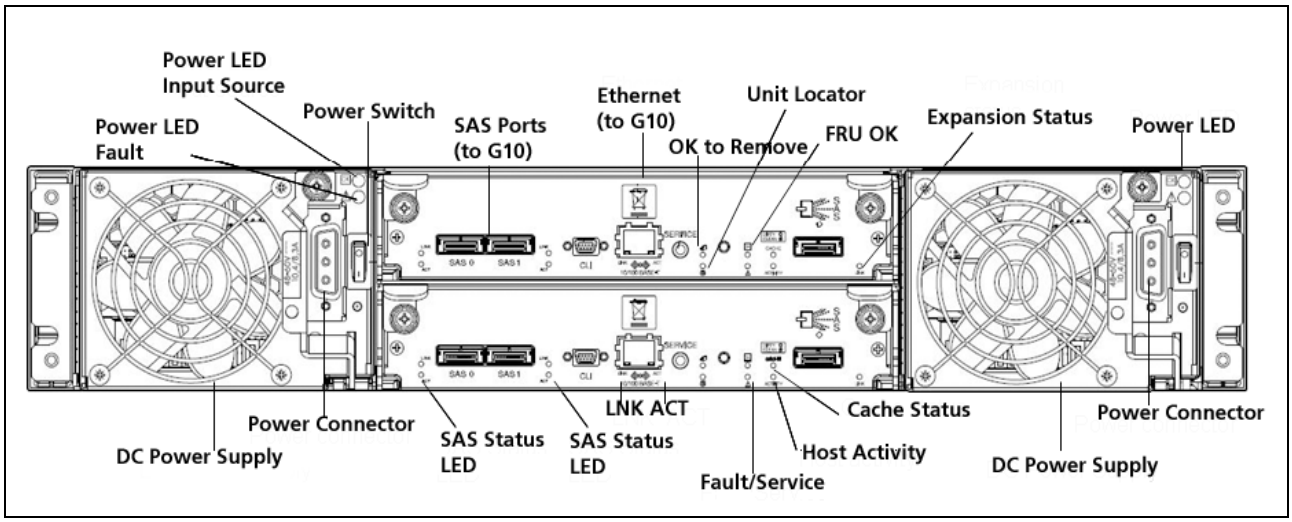


Figure 4.5 - SA100R Controller Enclosure Rear Panel (DC Power Supplies Shown)

Table 4.4 displays the SA100R Controller Enclosure Rear Panel LEDs.

Table 4.4 - SA100R Controller Enclosure Rear Panel LEDs

LED	Description
Power Supply Input Source	This LED displays the color GREEN and indicates whether the input source power is good. Valid options are: ▪ ON—The power is on, and input voltage is normal. ▪ OFF—The power is off, or input voltage is below the minimum threshold.
Power Supply Fault	This LED displays the color YELLOW and indicates the DC Voltage/Fan Fault/ Service Required. Valid options are: ▪ ON—The DC output voltage is out of range, or a fan is operating below the minimum required RPM. ▪ OFF—The DC output voltage is normal.
3 Gb SAS Activity Status	These LEDs display the color GREEN. Valid options are: ▪ BLINKING—The link has I/O activity. ▪ OFF—The link is idle.
3 Gb SAS Link Status	These LEDs display the color GREEN. Valid options are: ▪ ON—The port is connected, and the link is up. ▪ OFF—The port is empty, or the link is down.
OK to Remove	This LED displays the color BLUE. Valid options are: ▪ ON—The controller module can be removed. ▪ OFF—The controller module is not prepared for removal.
Unit Locator	This LED displays the color WHITE. Valid options are: ▪ OFF—Normal operation. ▪ BLINKING—Physically identifies the controller module.
FRU OK	This LED displays the color GREEN. Valid options are: ▪ ON—The controller module is operating normally. ▪ OFF—The controller module is not OK. ▪ BLINKING—The system is booting.
Fault/Service Required	This LED displays the color AMBER. Valid options are: ▪ ON—A fault is detected or a service action is required. ▪ BLINKING—A hardware-controlled power-up, cache flush, or restore error.
Ethernet LNK Status	This LED displays the color GREEN. Valid options are: ▪ ON—The Ethernet link is up. ▪ OFF—The Ethernet port is not connected, or the link is down.

Table 4.4 - SA100R Controller Enclosure Rear Panel LEDs (Continued)

LED	Description
Ethernet ACT Status	This LED displays the color GREEN. Valid options are: ▪ OFF—The Ethernet link has no I/O activity. ▪ BLINKING—The Ethernet link has I/O activity.
Cache Status	This LED displays the color GREEN. Valid options are: ▪ ON—The cache is dirty, and operation is normal. ▪ OFF—The cache is clean and contains no unwritten data. ▪ BLINKING—A compactFlash flush or cache self-refresh is in progress, indicating cache activity.
Host Activity	This LED displays the color GREEN. Valid options are: ▪ OFF—The host ports have no I/O activity. ▪ BLINKING—At least one host port has I/O activity.
Expansion Port Status	This LED displays the color GREEN. Valid options are: ▪ ON—The port is connected, and the link is up. ▪ OFF—The port is empty, or the link is down.

SA100R Controller Enclosure Connectors

Table 4.5 displays the controller enclosure connectors. Refer to the ***G10 Installation Guide*** for more information about how the G10 connects to the storage arrays.

Table 4.5 - Controller Disk Enclosure Connectors

Connector	Description
SAS 0 and SAS 1 Ports	Connects to G10.
Ethernet Port	Connects to G10.
Service Ports	Used only by service personnel.
SAS Expansion Ports	Connects to another expansion enclosure.

SA100J, SA200J, and SA210J Expansion Enclosure Rear Panel

The expansion enclosure rear panel houses SAS IN/OUT port connectors, the power supplies, and power switches (**Figure 4.6**).

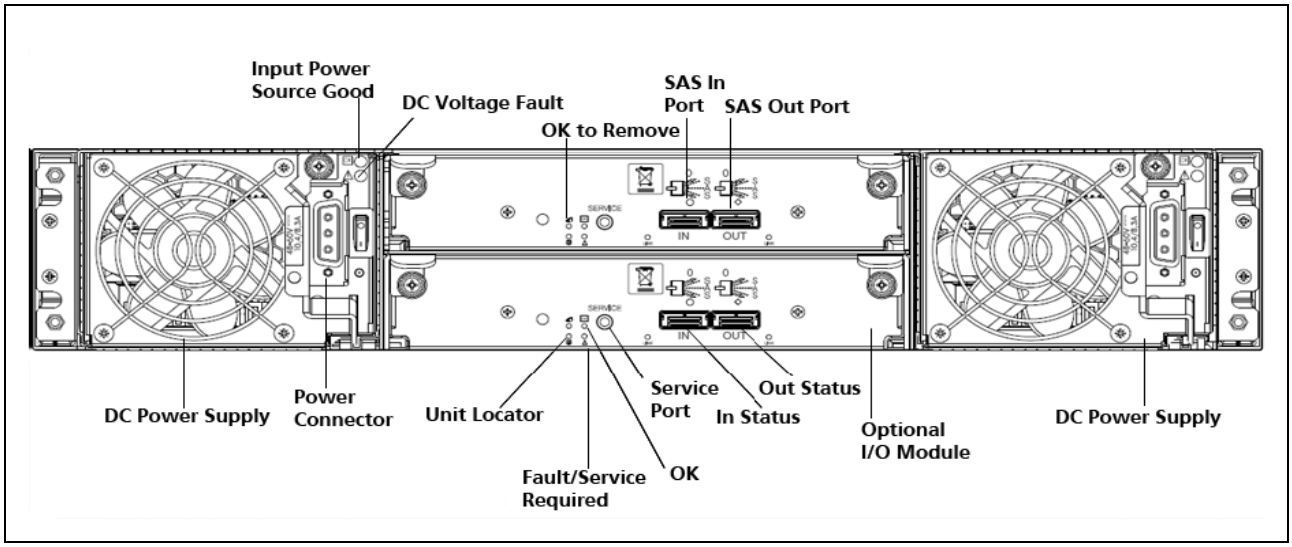


Figure 4.6 - Expansion Disk Enclosure Rear Panel (DC Power Supplies Shown)

Table 4.6 displays the expansion disk enclosure LEDs.

Table 4.6 - Expansion Disk Enclosure LEDs

LED	Description
Power Supply Input Source	This LED displays the color GREEN and indicates whether the input source power is good. Valid options are: ▪ ON—The power is on, and input voltage is normal. ▪ OFF—The power is off, or input voltage is below the minimum threshold.
Power Supply Fault	This LED displays the color YELLOW and indicates the DC Voltage/ Fan Fault/Service Required. Valid options are: ▪ ON—The DC output voltage is out of range, or a fan is operating below the minimum required RPM. ▪ OFF—The DC output voltage is normal.
Unit Locator	This LED displays the color WHITE. Valid options are: ▪ OFF—Normal operation. ▪ BLINKING—Physically identifies the controller module.

Table 4.6 - Expansion Disk Enclosure LEDs (Continued)

LED	Description
Fault/Service Required	This LED displays the color AMBER. A fault is detected or a service action is required. Hardware controlled power-up or a cache flush or restore error. Valid options are: ■ ON—A fault has been detected or a service action is required. ■ BLINKING—A hardware-controlled power-up, cache flush, or restore error.
OK to Remove	Not Implemented
OK	This LED displays the color GREEN. Valid options are: ■ ON—The expansion module is operating normally. ■ BLINKING—The system is booting. ■ OFF—The expansion module is not OK.
Service Port	Used only by service personnel.
SAS in Status	This LED displays the color GREEN. Valid options are: ■ ON—The port is connected, and the link is up. ■ OFF—The port is empty, or the link is down.
SAS out Status	This LED displays the color GREEN. Valid options are: ■ ON—The port is connected, and the link is up. ■ OFF—The port is empty, or the link is down.

Expansion Enclosure Connectors

Table 4.7 displays the expansion disk enclosure connectors. Refer to the ***G10 Installation Guide*** for more information about how the G10 connects to the storage enclosures.

Table 4.7 - Expansion Disk Enclosure Connectors

Connector	Description
Service Port	Used only by service personnel.
SAS Out Port	Connects to another drive enclosure.
SAS In Port	Connects to another drive enclosure.

5 Maintenance Guidelines

OVERVIEW

This chapter provides the following sections:

G10 Maintenance Procedures

This section contains the following information:

Field Replaceable Units

The following tables lists the Field Replaceable Units (FRUs) for the G10 and storage array.

Chassis
3U DC Chassis with Shelf Manager
G10 SHMMs (replaced in pairs)
G10 DC Power Entry Module (PEM)
AC Power Entry Module (PEM)
G10 Fan Tray (Front)
G10 Fan Tray (Rear)
G10 Air Filters
Blades and RTMs
IIC100 8x 1GB Blade set includes the following: ▪ AMC Carrier Blade CAB100 ▪ LPC100 AMC ▪ FPC100 AMC ▪ SRM100 RTM

IIC100 4 x 10GB Blade set includes the following: ▪ AMC Carrier Blade CAB100 ▪ LPC100 AMC ▪ FPC100 AMC ▪ TRM100 RTM
IIC200 Blade set includes the following: ▪ AMC Carrier Blade CAB100 ▪ LPC200 AMC ▪ FPC200 AMC ▪ SRM200 RTM
IIC200e Blade set (for eHRPD monitoring) includes the following: ▪ AMC Carrier Blade CAB100 ▪ LPC200 AMC ▪ FPC200 AMC ▪ TRM200 RTM
IAP100
IAP200
IAP320
SRM100 RTM
SRM200 RTM
TRM100 RTM
PRM100 RTM
PRM200 RTM
PRM300 RTM
LPC100 AMC
FPC100 AMC
LPC200 AMC
FPC200 AMC
SAS AMC
Storage Enclosures
Storage Enclosure Air Filters
Storage Enclosure Power Supplies
SAS RAID Storage Enclosure SA100R or SA200R
SAS Expansion Enclosure SA100J, SA200J, SA210J

Controller or Expansion Module
SAS 300 GB, 600 GB, and 900 GB Disk Drives
NLS SAS 4T Disk Drives (SA210J)

Removing and Replacing a PEM

This section provides the information needed to remove and replace the Power Entry Modules (PEMs). The G10 chassis is equipped with two AC or DC PEMs. They are installed in the middle of the shelf's front. Before replacing a PEM, verify that a second PEM is present with both of its green notification LEDs lit. This second PEM will provide a single power supply path during the replacement process.

Replacing a DC PEM

Hot power supplies may cause injury. Allow the PEM to cool before servicing.

Perform the following steps to replace a DC PEM.

Step	Action
1.	Put on an ESD wrist strap.

Electrostatic discharge can damage circuits or shorten their life. Before touching the blade or electronic components, ensure that you are working in an ESD-safe environment.

2.	Connect the strap to the shelf by attaching the front or rear ESD jack/ESD snap.
3.	Switch the breaker of the PEM to be replaced to the OFF (tripped) position, if it is not already in this position.
4.	Remove the power connection cables from the PEM.
5.	Unfasten the two captive screws of the PEM.
6.	Remove the PEM from the shelf bay by pulling the PEM handle.
7.	Switch the breaker on the replacement PEM to the OFF (tripped) position, if it is not in this position already.

Inserting or extracting the PEM with the PEM breaker in the ON position may damage your system. If power is connected to the shelf, ensure that the breaker is in the OFF position before you insert or extract a PEM.

8. Insert the replacement PEM (see **Figure 5.1**).

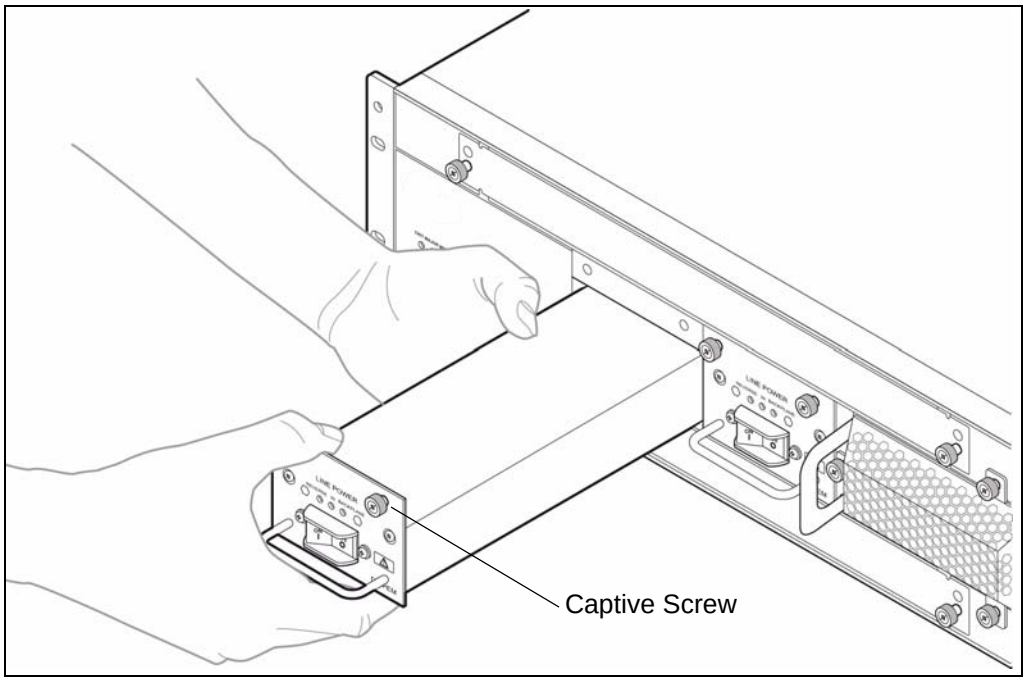


Figure 5.1 - Inserting the Replacement DC PEM

9. Fasten the two PEM captive screws.

10. Reconnect the power cables to the PEM.

Tektronix equipment, cables, and wiring diagrams comply with industry standard DC electrical color coding. Please ensure proper cabling if your equipment and cabling uses nonstandard DC electrical color coding. Improper cabling can cause damage to equipment or personal injury. Contact Tektronix to request specially labeled power cables (-48V = Red, Return = Black) for the G10 chassis and the storage enclosures.

11. Turn on the feed power if it is not already turned on.

12. Check the PEM LEDs (see **Figure 5.2**) and take the appropriate actions as listed in **Table 5.1**.

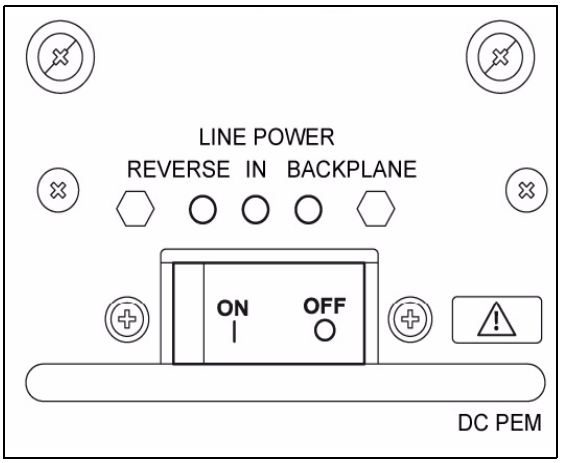


Figure 5.2 - PEM LEDs

Applying reverse power causes damage to the electrolytic capacitors of the filter. Therefore, switch on the breakers only if no red light is visible.

Table 5.1 - G10 DC PEM LEDs

PEM LEDs	Status
Reverse LED (red) ON **In** LED (green) OFF	Do not switch on the breaker while the Reverse LED is on. ▪ **Reason**—the power connected is reversed. ▪ **Action**—turn off the feed power and attach the power cables at the power connector with the correct orientation (-48V, Return).
Reverse LED (red) OFF **In** LED (green) OFF	Do not switch on the breaker while the **In** LED stays off.
Reverse LED (red) OFF **In** LED (green) ON	The power is connected correctly. You may switch on the breaker now.

13. Switch the breaker to the ON position.

14. Verify that the green BP LED (on the right) is lit.

Replacing an AC PEM

Perform the following steps to replace an AC PEM.

Step	Action
1.	Put on an ESD wrist strap.

Electrostatic discharge can damage circuits or shorten their life. Before touching the blade or electronic components, ensure that you are working in an ESD-safe environment.

2. Connect the strap to the shelf by attaching the front or rear ESD jack / ESD snap.

3. Disconnect the AC power cord from the rack power supply for the AC PEM that you want to replace.

4. Disconnect the AC power cord from the back of the AC PEM. Allow the PEM to cool before removing it.

5. Loosen the two captive screws on the front of the PEM.

6. Remove the PEM from the front of the chassis by pulling the PEM handle.

7. Insert the replacement PEM (**Figure 5.3**).

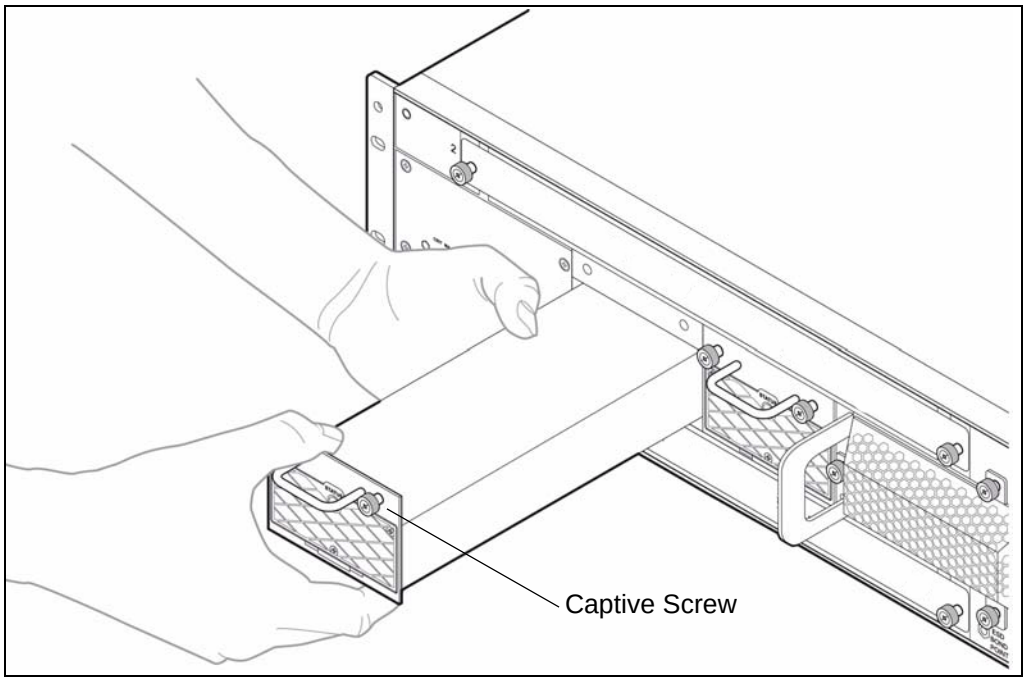


Figure 5.3 - Inserting the Replacement AC PEM

8. Tighten the two PEM captive screws.

9. Connect the AC power cord to the back of the AC PEM.

10. Connect the AC power cord to the rack power supply.

11. Check the PEM Status LED (**Figure 5.4**) and take the appropriate actions as listed in **Table 5.2**.

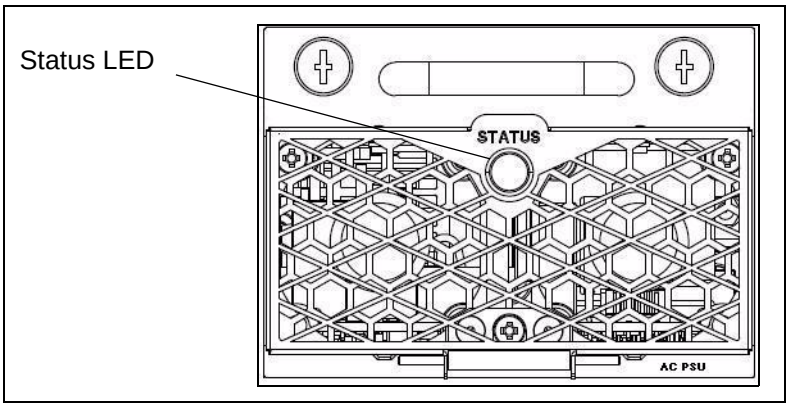


Figure 5.4 - AC PEM Status LED

Table 5.2 - G10 AC PEM LEDs

PEM LEDs	Status
LED OFF	The power is disconnected.
	Action: Check the AC power cable connections.
LED RED	The power supply is in a failed state.
	Action: Disconnect the AC power cord from the PEM. Remove and insert the PEM again to be sure that it is properly seated and secure. If the LED lights again, contact Tektronix Communications Customer Support.
LED GREEN	The power is connected correctly.

Replacing the Fan Tray

The following section provides the information needed to remove and replace the fan trays. The fan trays are located on the right-hand side of the shelf's front and on the right-hand side of the rear. If you want to check or replace an air filter, you must remove the front fan tray first.

Removing the single operating fan tray leads to overheating very quickly. Ensure that one operating fan tray is present in the system at all times.

Perform the following steps to replace the fan tray. These steps are the same for the front and rear fan trays.

Step	Action
1.	Put on an ESD wrist strap.

Electrostatic discharge can damage circuits or shorten their life. Before touching the blade or electronic components, ensure that you are working in an ESD-safe environment.

2. Remove the replacement fan tray from the shipping box and ensure that it is the correct model for the shelf and the required front or rear fan tray.

When a fan tray is taken out of operation or is removed during a replacement procedure, the system manager compensates for the loss by increasing the speed of the remaining fans. Running a fan on high speed for a long time can shorten the fan's life and can exceed the allowable acoustic noise limits. Replace the fan tray as soon as possible.

3. Loosen the three mounting screws of the tray (see **Figure 5.5**).

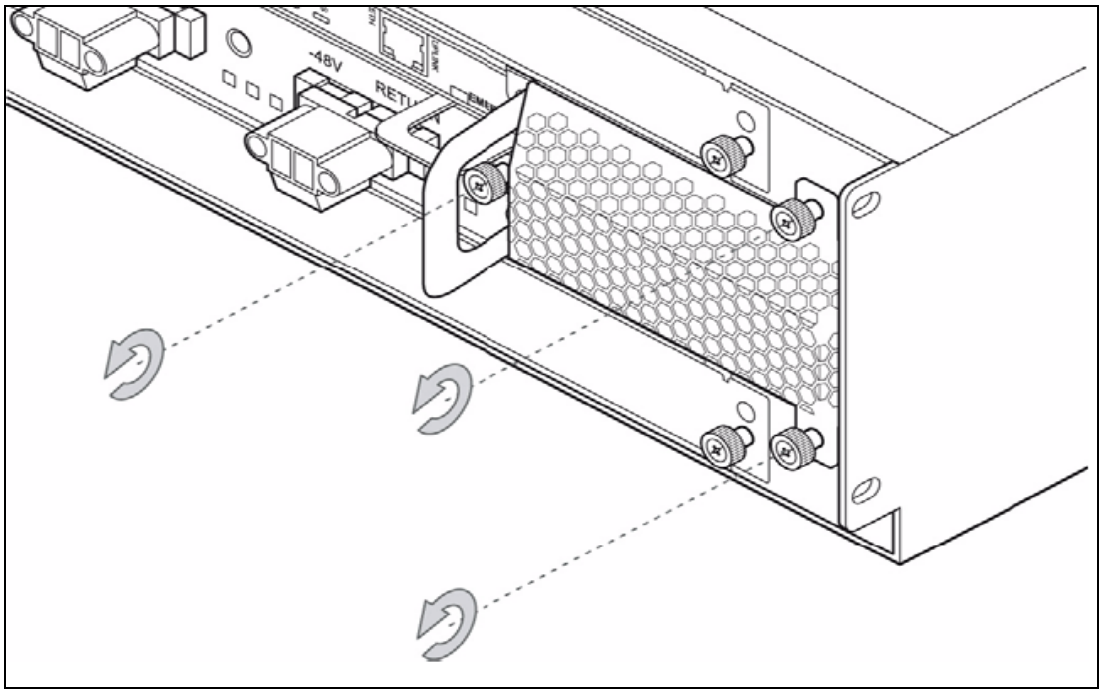


Figure 5.5 - Fan Tray Mounting Screws (Rear)

Please use caution because there are rotating fans. Inserting tools or fingers into operational fans can cause injuries. Keep clear of the fans as long as they are rotating.

4. Grasp the handle and pull the tray carefully out of the shelf (see **Figure 5.6**).

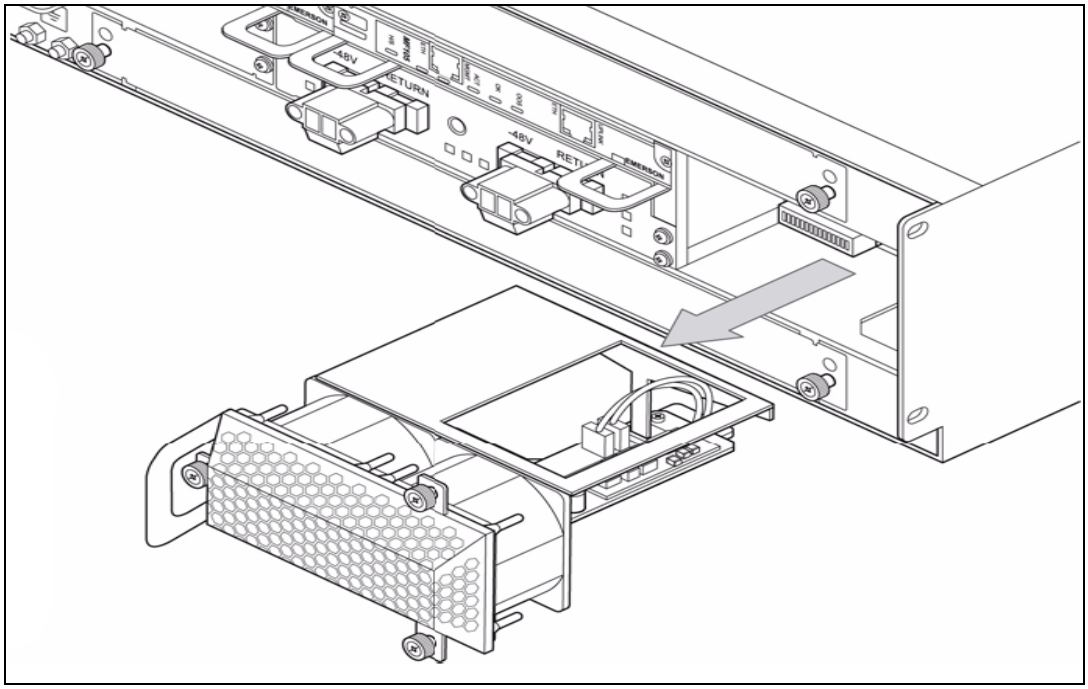


Figure 5.6 - Pulling Out the Fan Tray (Rear)

5. Take the replacement fan tray and insert it into the shelf (see **Figure 5.7**).

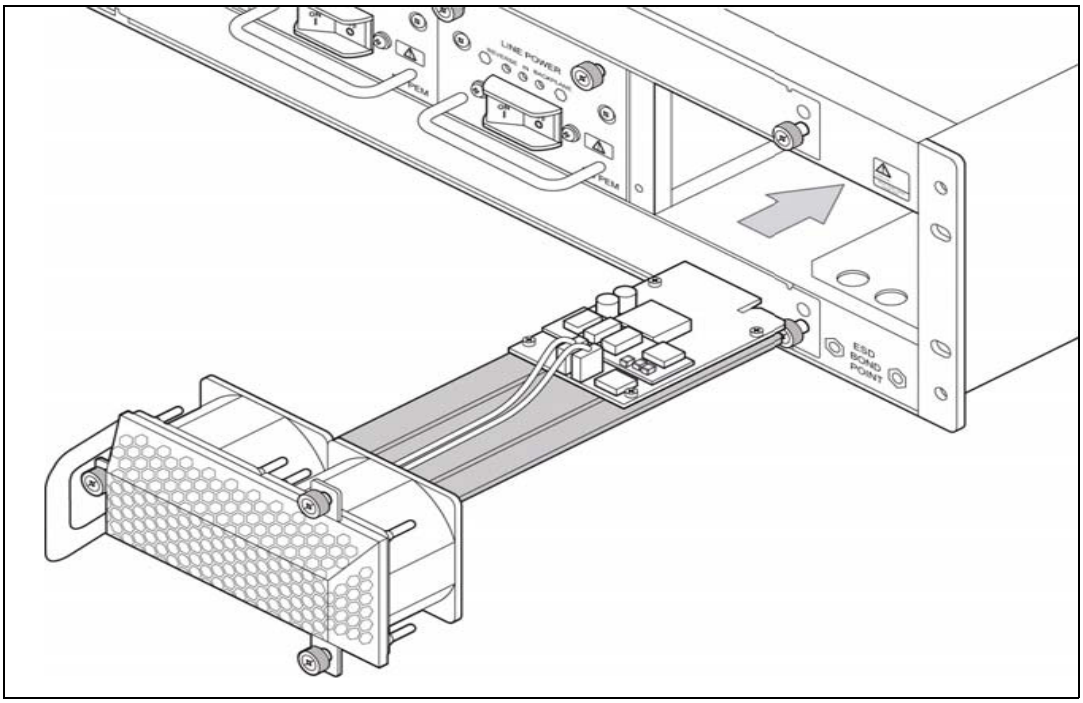


Figure 5.7 - Front Fan Tray (Front)

6. Slide the tray into the slot until you feel resistance (see **Figure 5.8**). The fans start rotating during this step.

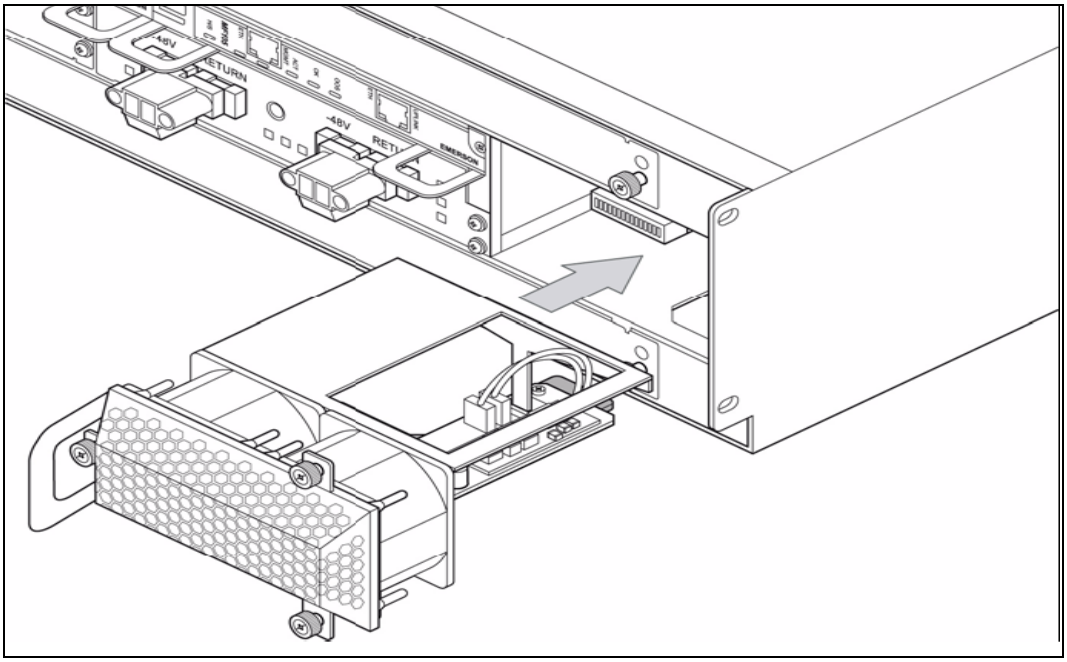


Figure 5.8 - Rear Fan Tray

7. Fasten the three mounting screws of the tray.

Replacing G10 Chassis Air Filters

The G10 chassis is equipped with two air filters located below and above the front fan tray. If you want to replace both filters at the same time, replace the top filter first. Otherwise, dust may fall and soil the new bottom filter when you remove the top filter.

To ensure that the G10 probe operates efficiently, Tektronix requires the air filters to be changed every 3 months.

Replacing the Top Air Filter

Perform the following steps to replace the top air filter.

Step	Action
1.	Put on an ESD wrist strap.

Electrostatic discharge can damage circuits or shorten their life. Before touching the blade or electronic components, ensure that you are working in an ESD-safe environment.

2. Ensure that you have a new replacement filter available.

3. Remove the front fan tray if it is not removed already (refer to Replacing the Fan Tray.)

4. After the fan tray is removed, use compressed air to remove dust from the front fan tray if necessary.

5. Insert two fingers in the round holes at the front of the air filter frame and pull it downward and out of its compartment (**Figure 5.9**). If you cannot remove the frame with your fingers, you can also use a tool such as a screwdriver.

When using a tool to remove the air filter frame, be careful not to damage the frame or the G10 chassis.

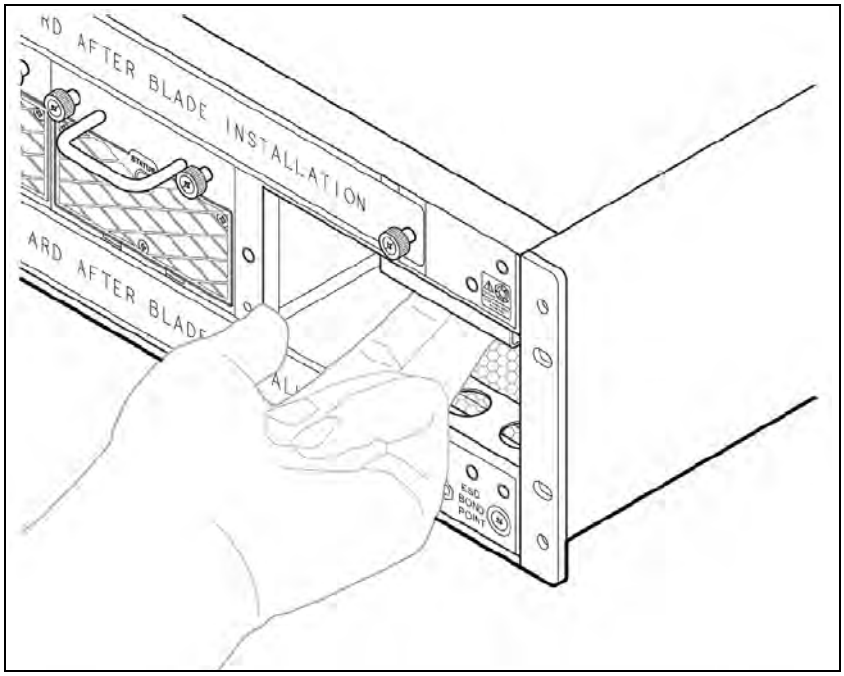


Figure 5.9 - Top Air Filter Frame Removal

6. Pull the frame carefully out of the chassis (**Figure 5.10**).

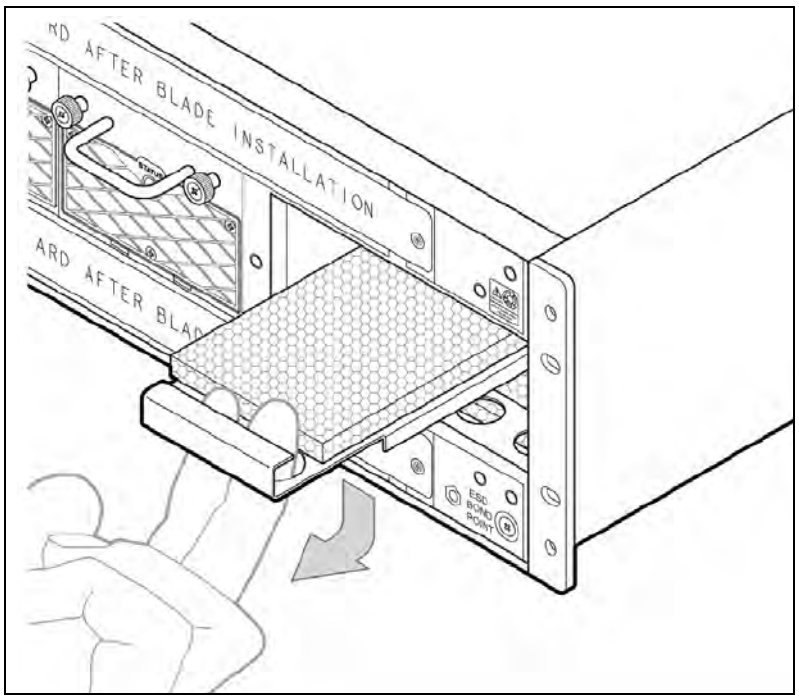


Figure 5.10 - Top Air Filter Frame Removal

7. Detach the air filter from its frame.

8. Attach the new filter to the frame (**Figure 5.11**). Ensure that it is aligned with the frame.

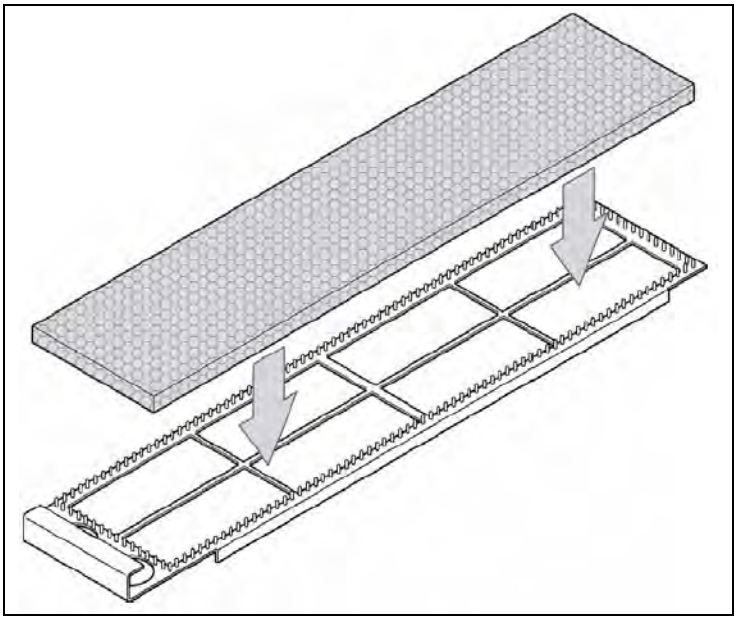


Figure 5.11 - Top Air Filter Replacement

9. Press the air filter to the hook-and-loop fastener on the frame.

10. Insert the frame into the shelf by placing the right edge in the guide.

11. Slide the frame into the slot until you feel resistance.

12. Push the frame upward until it snaps in place.

13. Perform one of the following actions:

    - Replace the bottom air filter (refer to Replacing the Bottom Air Filter).
    - Replace Fan Trays (refer to Replacing the Fan Tray).

Replacing the Bottom Air Filter

Perform the following steps to replace the bottom air filter.

Step	Action

1. Put on an ESD wrist strap.

Electrostatic discharge can damage circuits or shorten their life. Before touching the blade or electronic components, ensure that you are working in an ESD-safe environment.

2. Ensure that a new replacement filter is available.

3. Remove the front fan tray if it is not removed already (refer to Replacing the Fan Tray).

4. Insert two fingers in the round holes at the front of the bottom air filter frame and pull the frame upward and out of its compartment (**Figure 5.12**). If you cannot remove the frame with your fingers, you can also use a tool such as a screwdriver.

When using a tool to remove the air filter frame, be careful not to damage the frame or the G10 chassis.

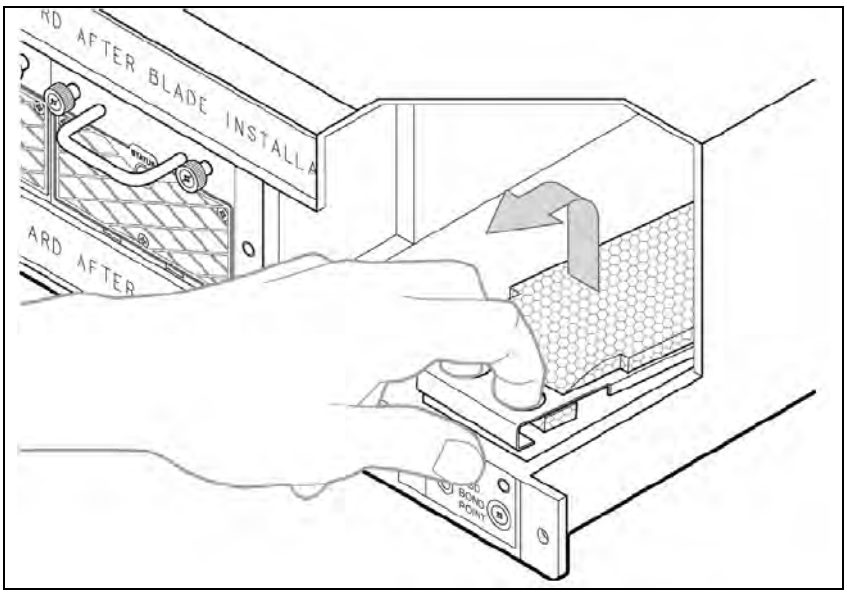


Figure 5.12 - Bottom Air Filter Removal

5. Pull the frame carefully out of the chassis.

6. Detach the air filter from its frame.

7. Attach the new filter to the frame. Ensure that it is aligned with the frame.

8. Pull the front end of the filter through the frame to the bottom of the frame as shown in **Figure 5.13**.

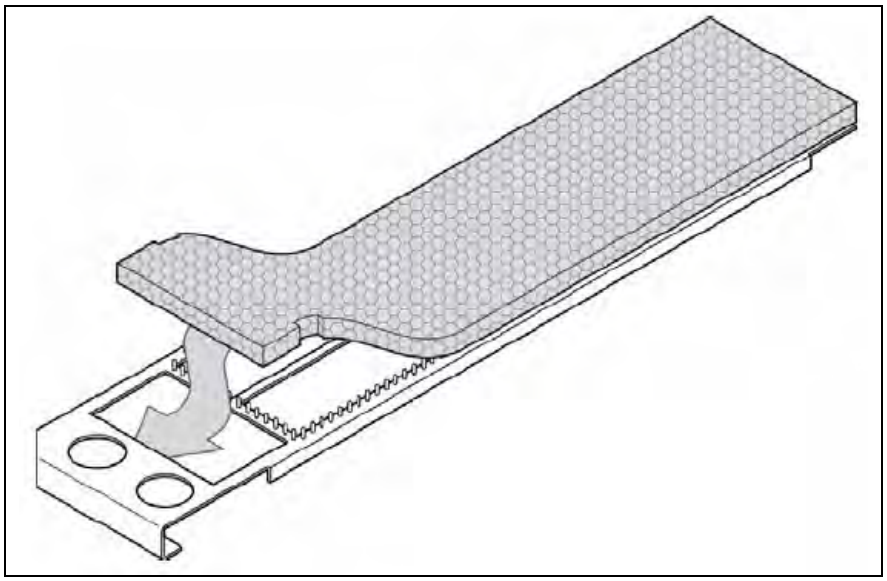


Figure 5.13 - Bottom Air Filter Replacement

9. Press the air filter to the hook-and-loop fastener on the frame.

10. Insert the frame into the shelf by placing the right edge in the guide.

11. Slide the frame into the slot until you feel resistance.

12. Push the frame downward until it snaps in place.

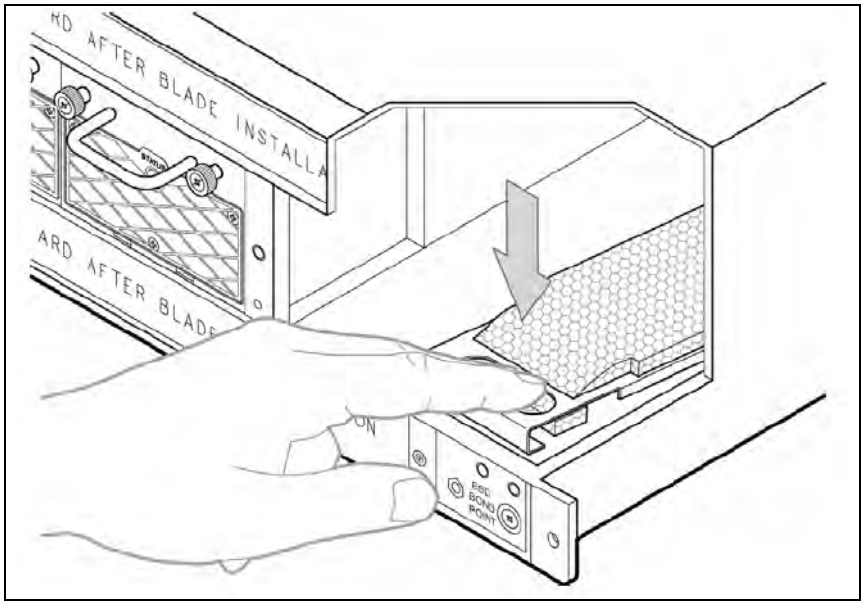


Figure 5.14 - Bottom Air Filter Replacement

13. Insert the front fan tray (refer to Replacing the Fan Tray).

G10 Blade Removal/Replacement Procedures

Before removing any G10 blades or RTMs, contact Tektronix Communications Customer Support.

Prior to hardware upgrades/downgrades, the Iris server and G10 probe MUST:

- ***Have the minimum software version required for the installed blades. Contact Tektronix Communications Customer Support for assistance.***
- ***Be on the same version of software; Iris server version must match G10 probe version.***

This section provides procedures for the following G10 blades and RTMs.

IAP100

This section contains the following procedures for the IAP100.

- Removing or Resetting the IAP100
- Installing the IAP100

Removing or Resetting the IAP100

Perform the following to reset or remove the IAP100.

Step	Action
1.	Pinch the latch and lever on the right ejector handle and pull the handle outward slightly as shown (**Figure 5.15**).

2. The blue Hot Swap LED starts to blink, indicating that the blade is shutting down the OS.

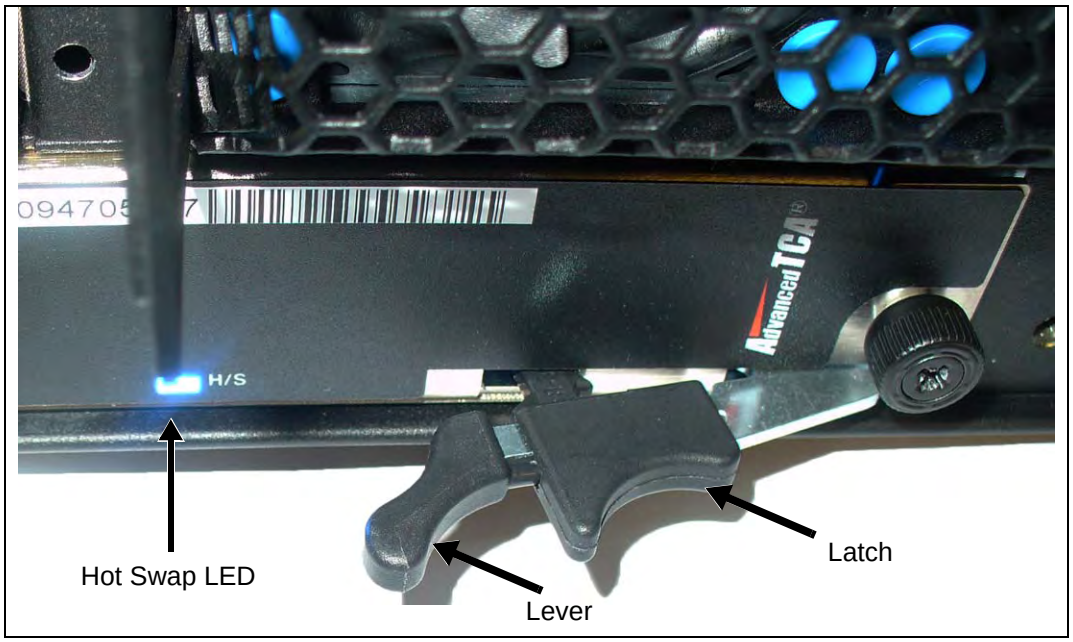


Figure 5.15 - IAP100 Right Ejector Handle - Hot Swap Position

3. Wait until the Hot Swap LED is solid blue. This indicates that the blade's OS has powered down completely.

4. If you are resetting the board, pinch the latch and lever together and push the ejector handle back in toward the chassis until the Hot Swap LED turns off. The PWR LED turns GREEN. Wait about 10 minutes for the IAP100 to boot up.

5. If you are removing the blade, perform the following:

   - Loosen the thumbscrews on each side of the blade.
   - Pinch the latch and lever on each ejector handle and rotate the ejector handles outward.
   - Gently remove the blade from the chassis.

6. To reinstall the blade or install a new blade, refer to Installing the IAP100.

Installing the IAP100

Perform the following to install the IAP100 until it is completely seated.

Step	Action
1.	Guide the positioning pins of the blade until they are inserted in the positioning holes in the chassis (**Figure 5.16**).

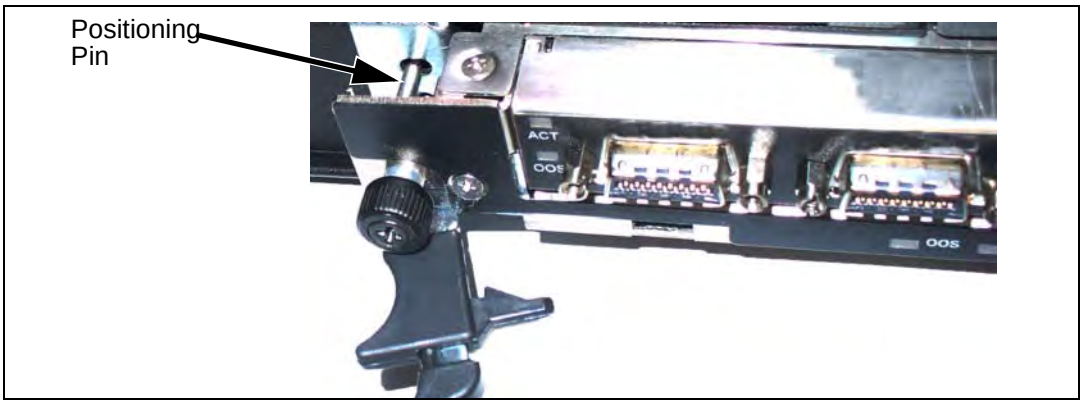


Figure 5.16 - IAP100 Alignment

2.	While squeezing the handle's lever and latch together, close the left and right ejector handles until the inner sides of the ejector handles are attached to the faceplate (**Figure 5.17**).

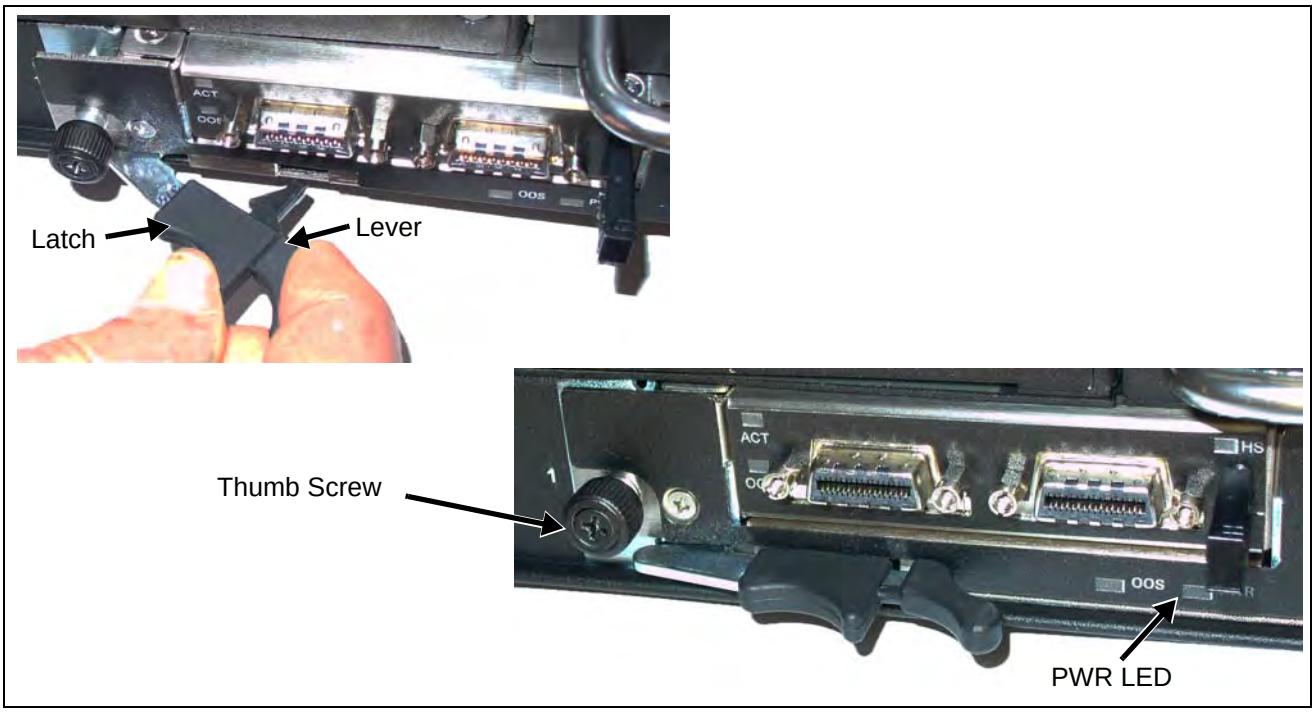


Figure 5.17 - IAP100 Insertion

3. Verify that the PWR LED is GREEN, indicating that the IAP100 is receiving power (**Figure 5.17**).

4. Tighten the two thumbscrews.

SAS AMC (IAP100)

Remove the SAS AMC only after the IAP100 has been powered OFF. The G10 does not support removing the SAS AMC while the IAP100 is powered ON.

Figure 5.18 - G10 IAP100 Blade SAS AMC

Removing/Replacing the SAS AMC

Perform the following steps to remove the SAS AMC.

Step	Action
1.	Initiate the hot-swap mode for the IAP100 blade and wait until the hot-swap LED (**Figure 5.18**) is solid blue (indicating that the OS is shut down). Refer to Removing or Resetting the IAP100 for details.
2.	Unseat the IAP100 blade 2 inches from the backplane.
3.	Pull the SAS AMC handle out (**Figure 5.18**) until the latching mechanism is released and remove the AMC.
4.	Insert the replacement AMC and carefully align the edges with the rail guides in the IAP100.
5.	Apply equal and steady pressure and slide the module in until the fingers of the module snap into the internal AMC connector. ***DO NOT force the board into the slot.***
6.	Push the AMC handle to the IN position.
7.	Perform the steps in the procedure Installing the IAP100 to reinsert the IAP100.

IAP200/IAP320

This section contains the following procedures for the applications blade:

- Removing or Resetting the IAP200/IAP320
- Installing the IAP200/IAP320

Removing or Resetting the IAP200/IAP320

Perform the following to reset or remove the applications blade.

Step	Action
1.	Pinch the latch and lever on the right ejector handle and pull the handle outward slightly as shown (**Figure 5.19**).
2.	The blue Hot Swap LED starts to blink, indicating that the blade is shutting down the OS.

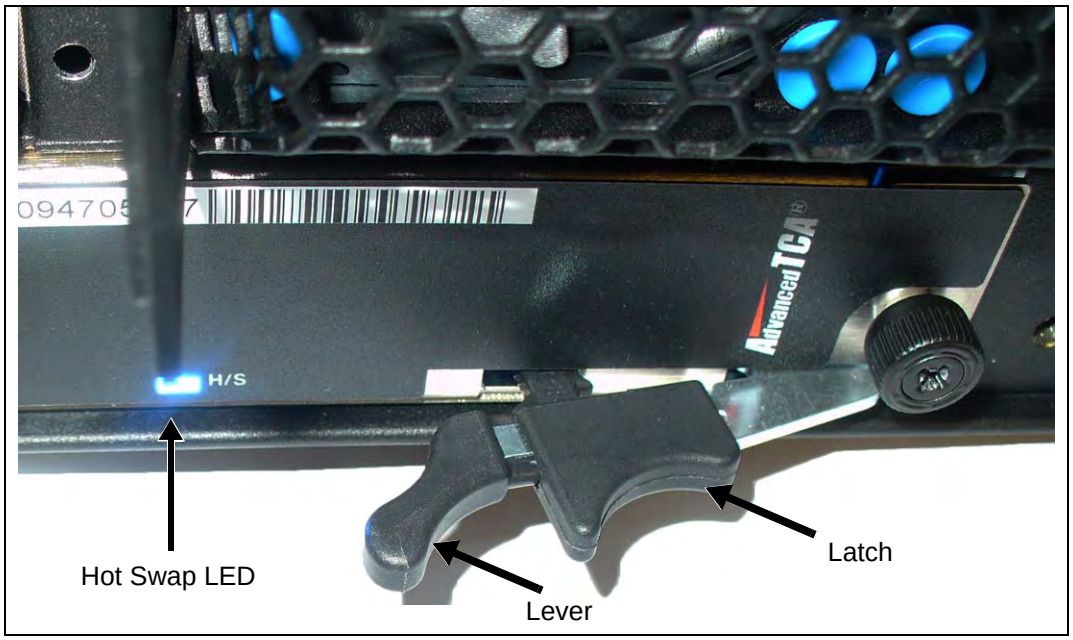


Figure 5.19 - IAP Right Ejector Handle - Hot Swap Position

Step	Action
3.	Wait until the Hot Swap LED is solid blue. This indicates that the blade's OS has powered down completely.

If you are resetting the board, pinch the latch and lever together and push the ejector handle back in toward the chassis until the Hot Swap LED turns off. When the LED turns off, this indicates that the blade's payload has been powered up and that the blade is active.

4. If you are removing the blade perform the following:

   - Loosen the thumbscrews on each side of the blade.
   - Pinch the latch and lever on each ejector handle and rotate the ejector handles outward.
   - Gently remove the blade from the chassis.

5. To reinstall the blade or install a new blade, refer to Installing the IAP200/IAP320.

Installing the IAP200/IAP320

Perform the following to install the blade until it is completely seated.

If you are upgrading a probe by replacing the IAP100 with the IAP200 or IAP320, refer to the upgrade workflows.

Step	Action

1. Ensure that the left and right ejector handles are in the outward position by squeezing the lever and the latch together.
2. Insert the blade into the shelf by placing the top and bottom edges of the blade in the card guides of the shelf. Ensure that the guiding module of shelf and blade are aligned properly.
3. Guide the positioning pins of the blade until they are inserted in the positioning holes in the chassis (**Figure 5.20**).

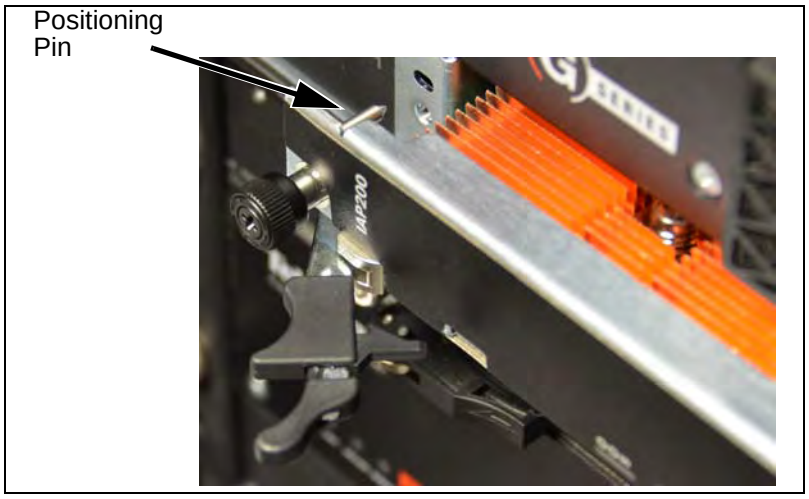


Figure 5.20 - IAP Alignment

4. While squeezing the handle's lever and latch together, close the left and right ejector handles until the inner sides of the ejector handles are attached to the faceplate (**Figure 5.21**).

If your shelf is powered on, the blue Hot Swap LED illuminates as soon as the blade is connected to the backplane power pins. When the blade is completely installed, the blue LED starts to blink. This indicates that the blade announces its presence to the shelf management controller.

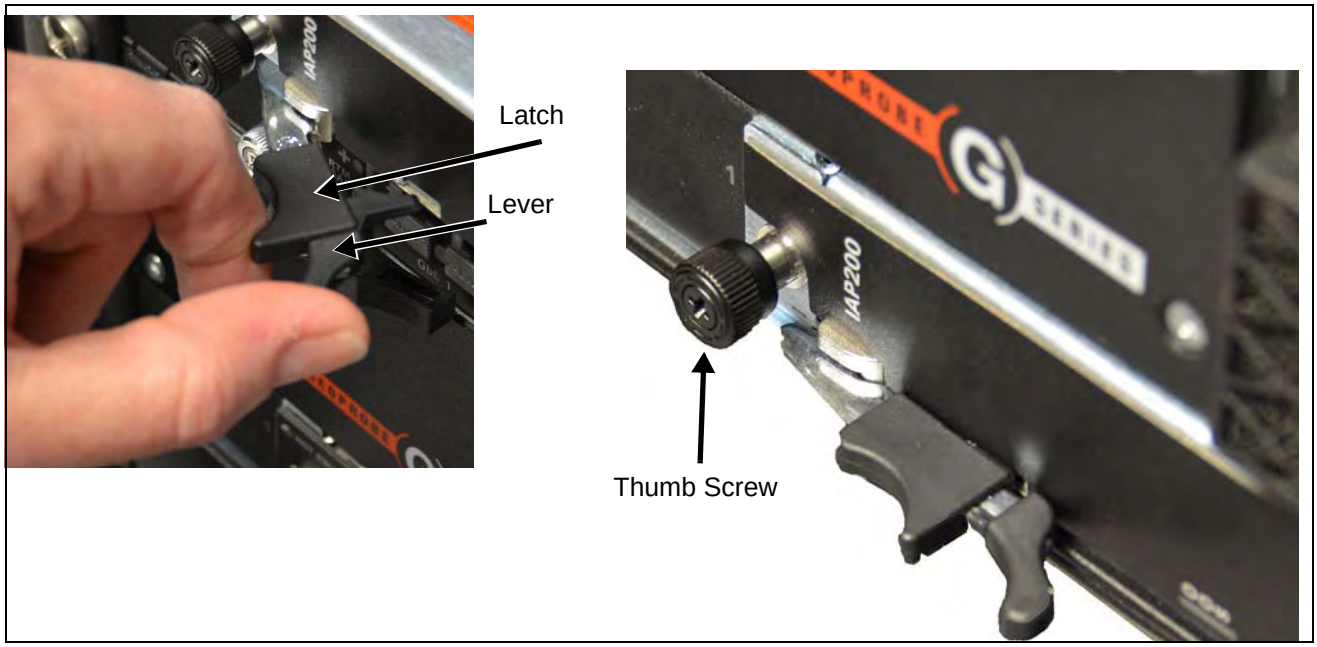


Figure 5.21 - IAP Insertion

5. Wait until the blue LED is switched off and then tighten the faceplate screws that secure the blade to the shelf.

   When the LED turns off, this indicates the blade's payload has been powered up and that the blade is active.

Iris Interface Card (IIC100 or IIC200)

This section contains the following procedures for the IIC.

- Removing or Resetting the IIC100 or IIC200
- Installing the IIC100 or IIC200

*If you are upgrading a probe by replacing the IIC100 with the IIC200, refer to the **G10 Installation Guide** for a detailed procedure.*

Removing or Resetting the IIC100 or IIC200

Perform the following to reset or remove the IIC.

Step	Action

1. Rotate the IIC's right ejector handle outward as shown in (**Figure 5.22**).

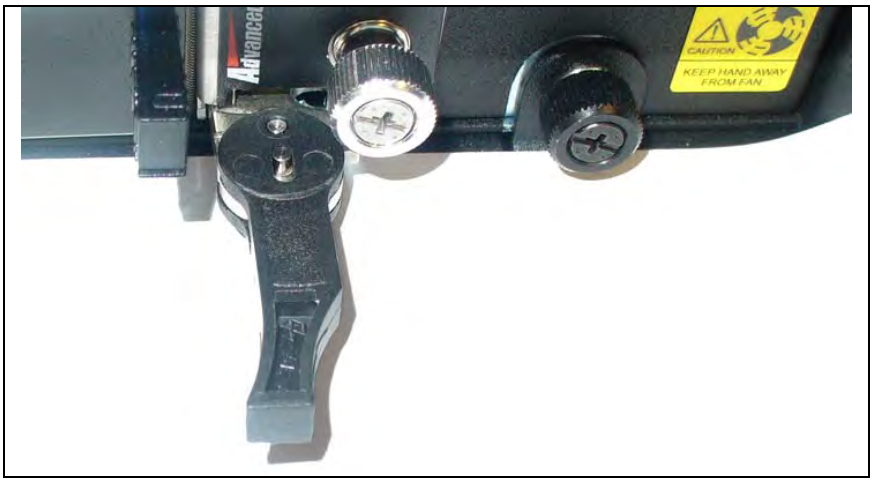


Figure 5.22 - IIC Right Ejector Handle

2. Push and **hold** the ejector handle in the forward position and then rotate it outward slightly until it cannot rotate any farther (**Figure 5.23**). The blue Hot Swap LED starts to blink, indicating that the blade is shutting down the OS.

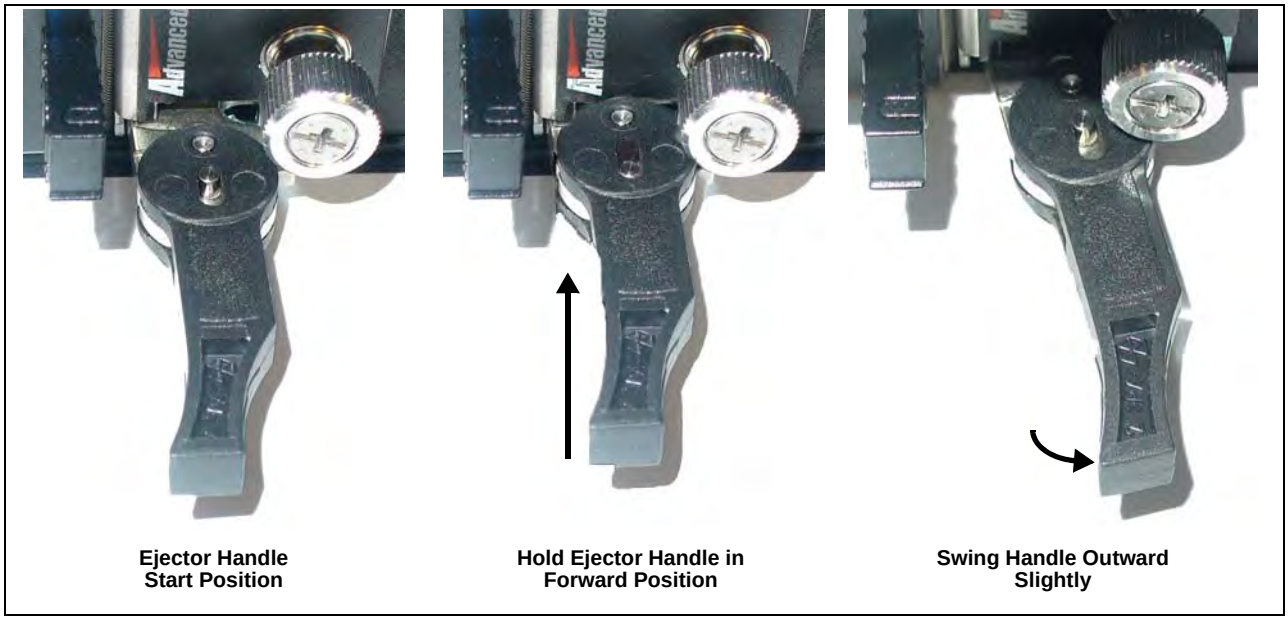


Figure 5.23 - IIC Right Ejector Handle Hot Swap Positioning

3. Wait until the IIC Hot Swap LED is solid blue (**Figure 5.24**). This indicates the card's OS has powered down completely.

The LPC AMC and the FPC AMC Hot Swap LEDs also blink and turn solid blue. Do NOT remove the AMCs individually. Only the entire IIC100 or IIC200 should be removed or replaced.

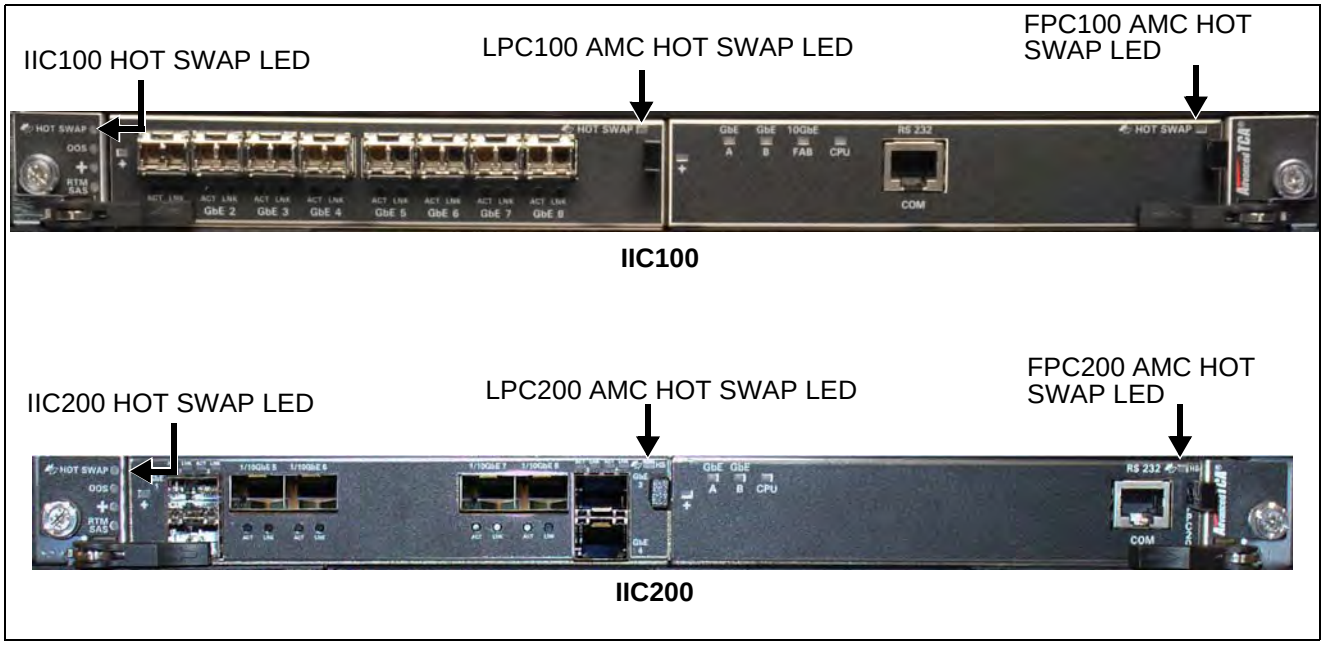


Figure 5.24 - G10 IIC Hot Swap LEDs

4. You can perform one of the following:

- Remove the IIC100 or IIC200. To reinstall the blade or install a new blade, refer to Installing the IIC100 or IIC200.
- Push and hold the ejector handle in the forward position and rotate it inward until flush with the front of the chassis (**Figure 5.25**). The IIC Hot Swap LED turns off.

Figure 5.25 - G10 IIC Ejector Handle Closed

Installing the IIC100 or IIC200

*If you are upgrading a probe by replacing the IIC100 with the IIC200, refer to the **G10 Installation Guide** for a detailed procedure.*

Perform the following to install the IIC until it is completely seated.

Step	Action
1.	Position the left and right ejector handles as shown in **Figure 5.26**.

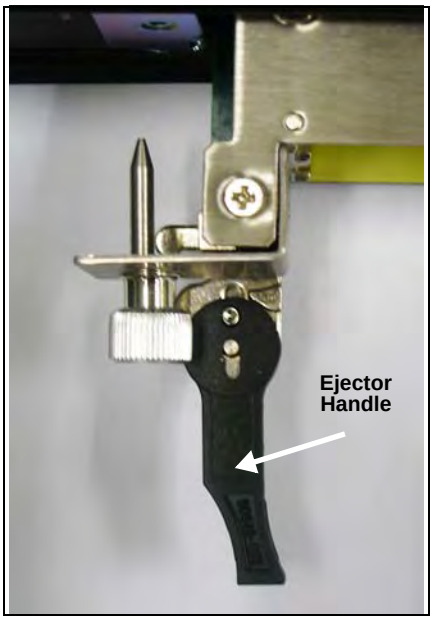


Figure 5.26 - G10 IIC Ejector Handle (Left)

2. While keeping the blade still, push and **hold** the ejector handles in the forward position (they will click into place). While continuing to hold the handles in the forward position, swing the handles outward to open the blade latches (**Figure 5.27**).

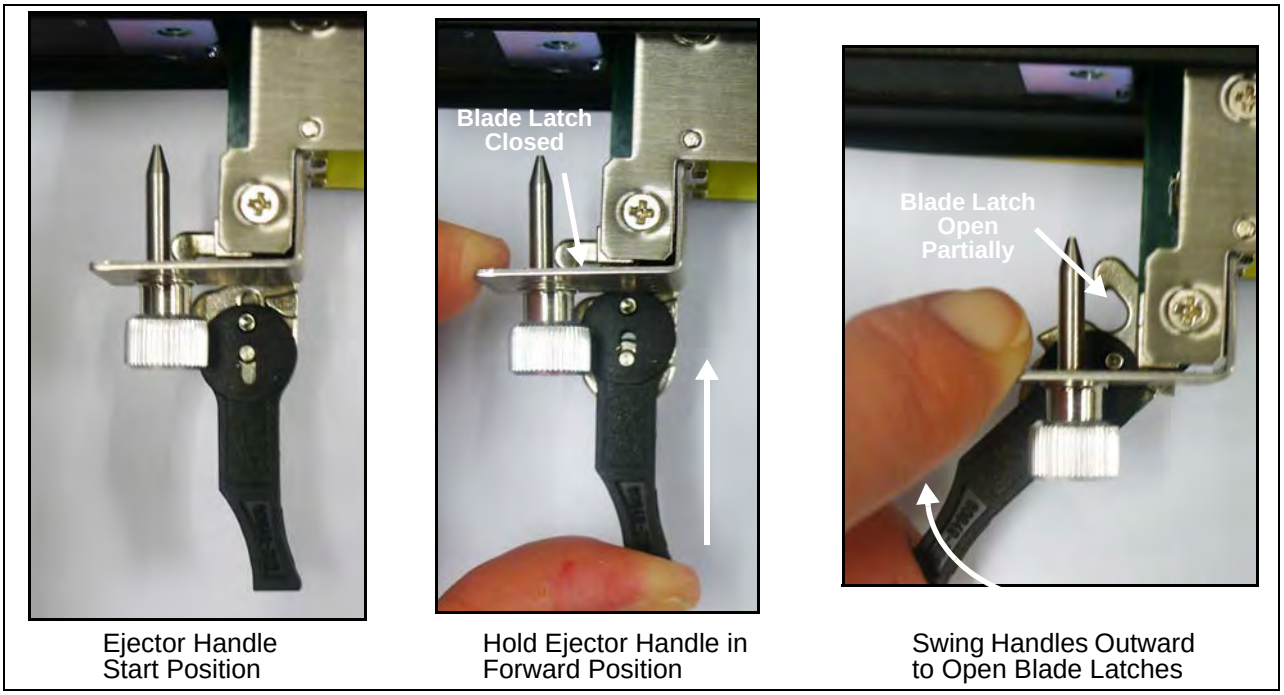


Figure 5.27 - G10 IIC Ejector Handle (Left) - Opening Blade Latch

3. Swing the handles outward until the blade latch is open fully (**Figure 5.28**) and then release the ejector handle.

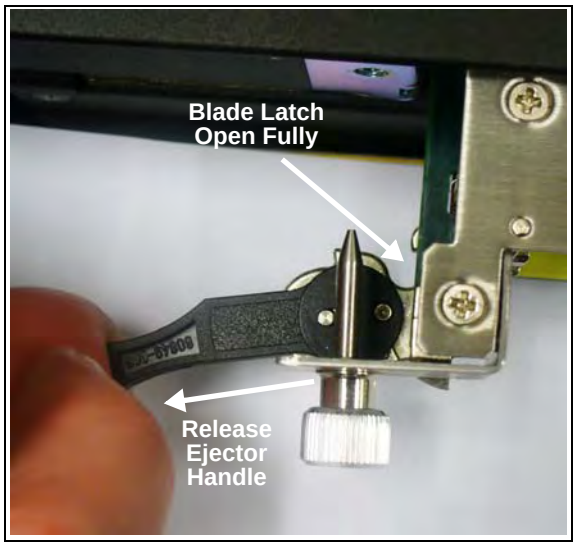


Figure 5.28 - G10 IIC Ejector Handle - Open Blade Latch

4. Swing the ejector handles inward until they snap into place just beneath the blade screws (**Figure 5.29**). Be sure to release the ejector handles before swinging them inward so the blade latches remain in the open position.

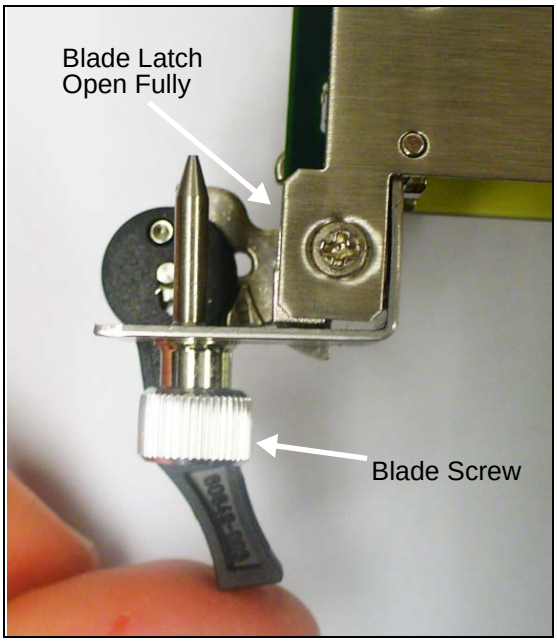


Figure 5.29 - G10 IIC Ejector Handle - Open Blade Latch

5. Position your thumbs and forefingers as shown in **Figure 5.30** and slide the blade into the chassis until the positioning pins are inserted in the positioning holes in the shelf.

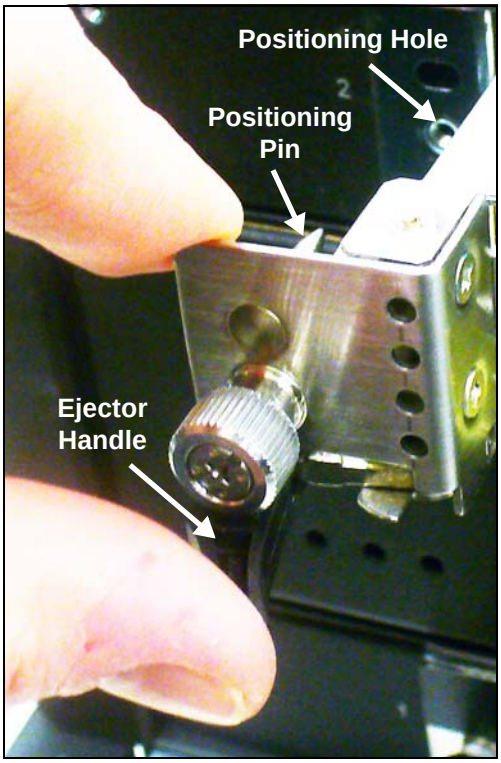


Figure 5.30 - G10 IIC Positioning Pin Alignment

6. Push the ejector handles inward until they are flush with the front of the chassis and the blade is inserted fully (**Figure 5.31**).

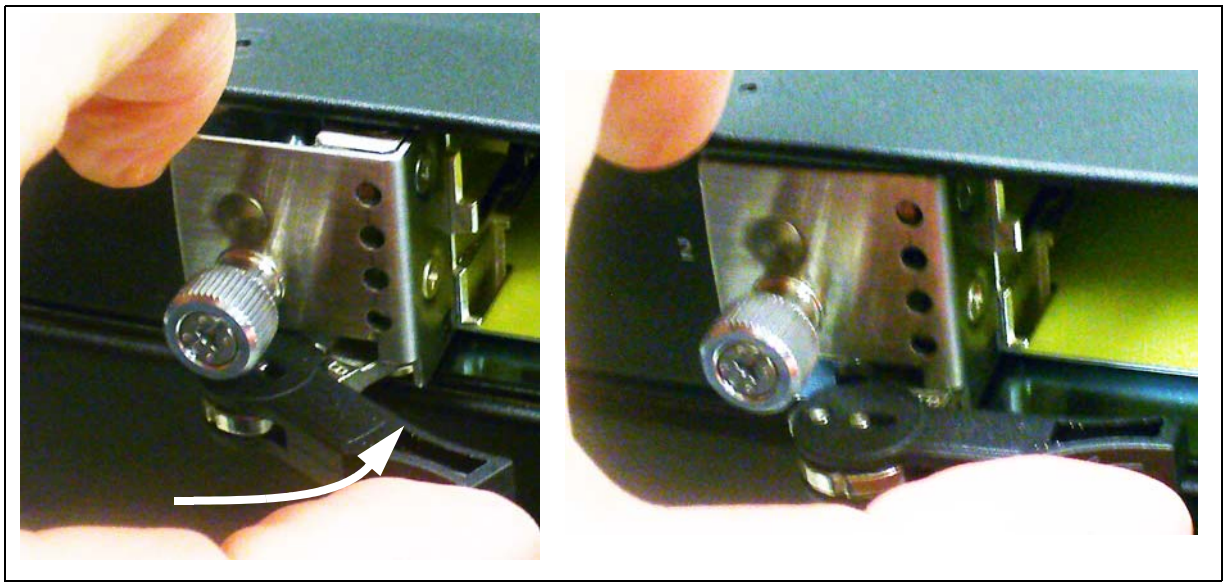


Figure 5.31 - G10 IIC Ejector Handle - Seating the Board

7. Verify the following LEDs on the front of the IIC (**Figure 5.32**):

   - The CPU LED is AMBER on the FPC100 AMC and GREEN on the FPC200 AMC, indicating that the processor is functioning normally.
   - The + LED on IIC100 or IIC200 is GREEN, indicating that there are no errors in overall health.

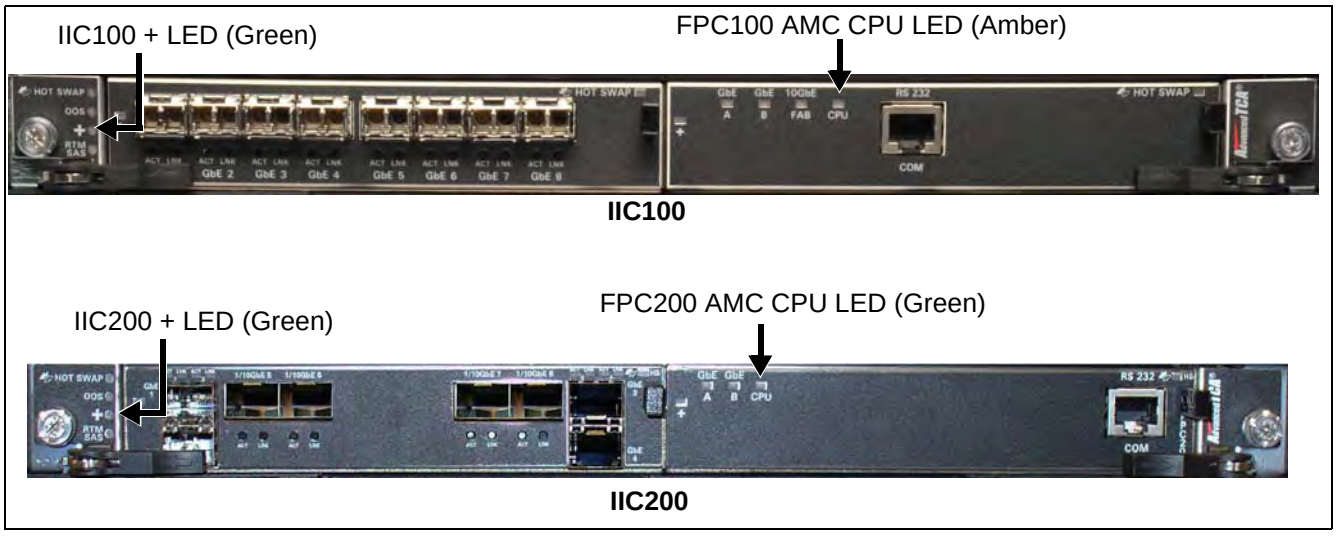


Figure 5.32 - G10 IIC100 and IIC200 LED Verification

LPC and FPC AMCs (IIC100 or IIC200)

The LPC100 and FPC100 are located on the IIC100 (**Figure 5.33**). The LPC200 and FPC200 AMCs are located on the IIC200.

These AMCs are NOT hot swappable and can be removed ONLY after the IIC has powered down. The G10 does not support removing these AMCs while the IIC is powered on.

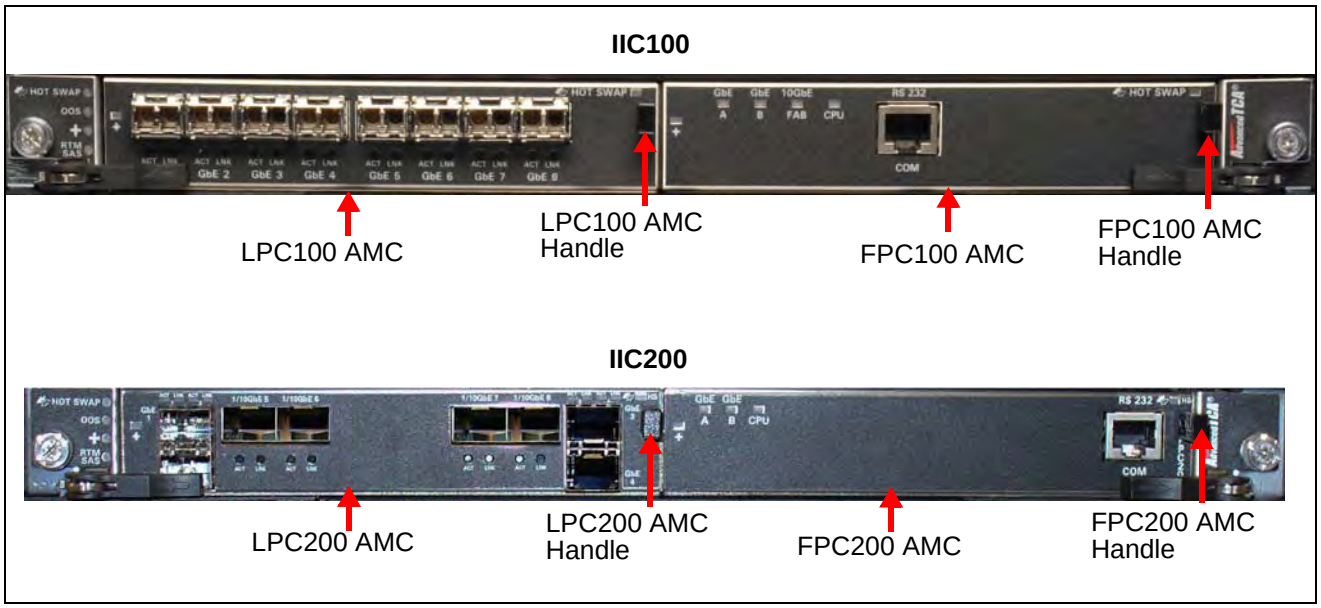


Figure 5.33 - G10 IIC100 and IIC200 AMCs

Perform the following steps to remove or replace the LPC AMCs or the FPC AMCs. The procedure is the same for the IIC100 and the IIC200.

Step	Action
1.	Power down the IIC. Refer to Removing or Resetting the IIC100 or IIC200 for details.
2.	Unseat the IIC approximately 2 inches from the backplane.
3.	Pull the AMC handle out until the latching mechanism is released and remove the AMC.
4.	Insert the replacement AMC and carefully align the edges with the rail guides in the IIC.
5.	Apply equal and steady pressure and slide the module in until the fingers of the module snap into the internal AMC connector. ***DO NOT force the board into the slot.***
6.	Push the AMC handle to the IN position.
7.	Reinsert the IIC. Refer to Installing the IIC100 or IIC200 for details.

RTMs

Perform the following to reset or remove an RTM.

Step	Action
1.	Depending on which RTM you are removing, power down the associated blade first: ▪ SRM200 RTM—Power down the IIC200 first. Refer to Removing or Resetting the IIC100 or IIC200.

Media Probe Configurations Only: If replacing an SRM200 RTM during maintenance, you must verify the J8 jumper setting is TERMINATED prior to installation (see the* Media Probe Installation Guide *for details).

- SRM100 RTM—Power down the IIC100 first. Refer to Removing or Resetting the IIC100 or IIC200.
- TRM100 RTM—Power down the IIC100 first. Refer to Removing or Resetting the IIC100 or IIC200.
- PRM100—Power down the IAP100 first. Refer to Removing or Resetting the IAP100.
- PRM200—Power down the IAP200 first. Refer to Removing or Resetting the IAP200/IAP320.
- PRM300—Power down the IAP320 first. Refer to Removing or Resetting the IAP200/IAP320.

2. When the associated blade's Hot Swap LED is solid blue, its OS has powered down completely.

3. Pinch the latch and lever on the RTM right ejector handle and pull the handle outward slightly. The blue Hot Swap LED starts to blink.

4. Wait until the Hot Swap LED is solid blue. This indicates that the RTM has powered down completely.

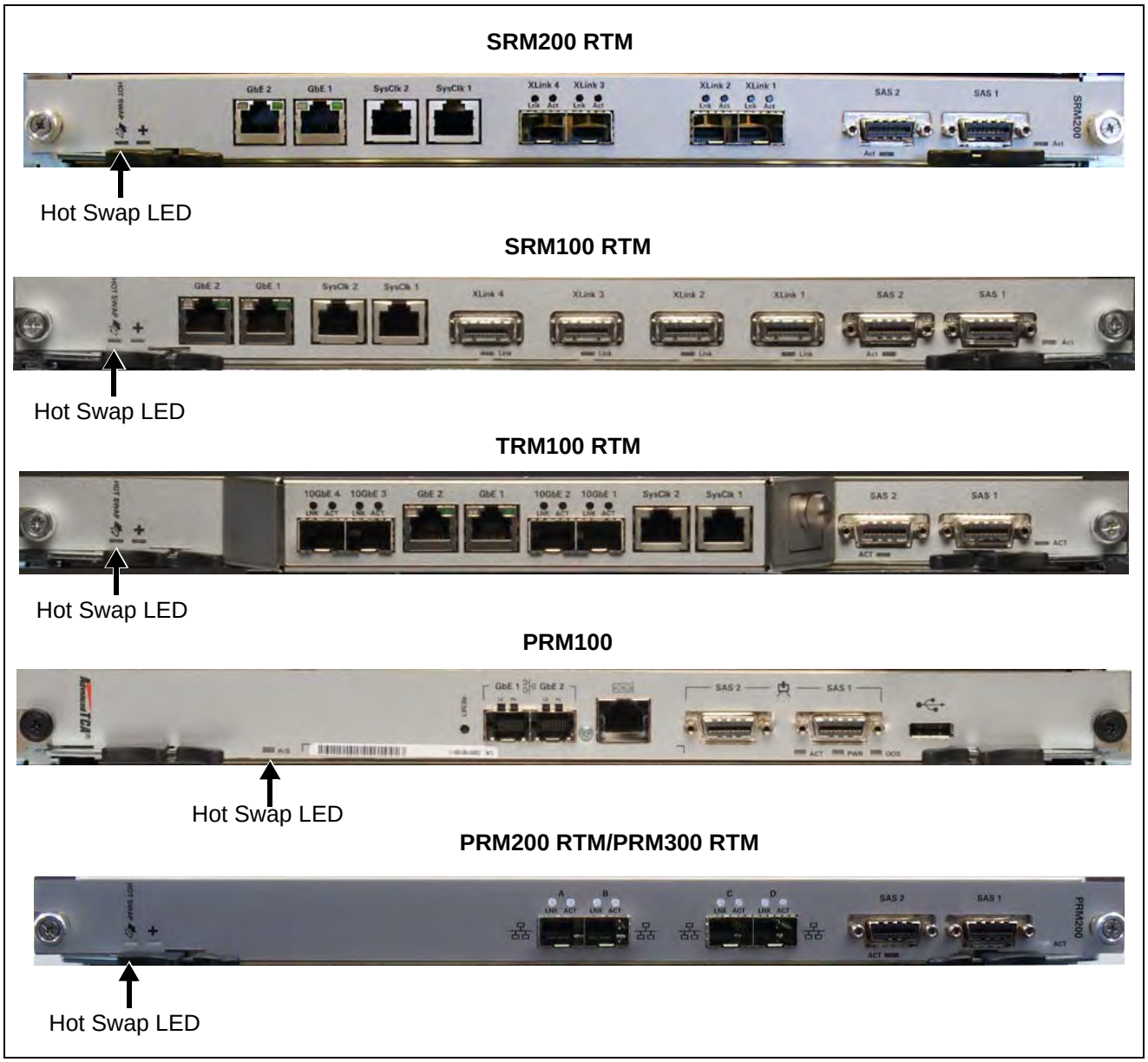


Figure 5.34 - RTM Hot Swap LEDs

5. You can perform one of the following:

   - Remove the RTM.
   - Push the latch and lever back in until the Hot Swap LED turns off.

10G Interconnect Card

The 10G Interconnect card is required to support the Deep Packet Classification (DPC) feature. Two 10G interconnect cards must be installed on the rear of the G10 chassis. Tektronix installs the DPC license and enables the DPC feature.

The 10G Interface card requires the IAP200 or the IAP320. If the G10 is deployed with the IAP100, you must first upgrade it to the IAP200 or IAP320 before installing the 10G Interconnect cards. Refer to the upgrade workflows for details.

Installing the 10G Interconnect Card

The following procedure describes the installation of the card. It assumes that your system is powered. If your system is not powered, you can disregard the steps that refer to the blue Hot Swap (H/S) LED.

Step	Action
1.	Put on an ESD wrist strap or appropriate ESD grounding device.
2.	Connect the strap to the shelf by attaching the front or rear ESD jack / ESD snap.
3.	At the rear of the G10, remove the two filler panels by removing the two screws from each panel (**Figure 5.35**).

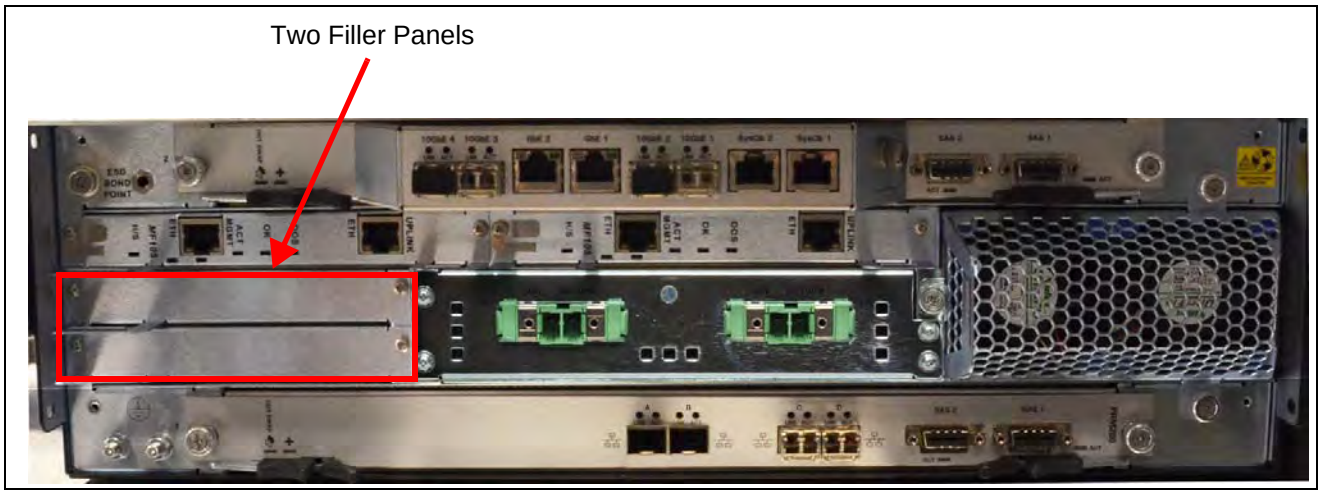


Figure 5.35 - G10 Probe Rear View

4.	Insert a card into the shelf by placing the left and right edges of the card in the card guides of the shelf. Ensure that the guiding module of the shelf and the card are aligned properly. The alignment pin facilitates insertion and prevents bent pins.
5.	Slide the card into the shelf by using the extraction handles until you feel resistance.
6.	Wait until the blue LED is illuminated.

7. Tighten the screws on the left and on the right of the card. The blue Hot Swap LED blinks, indicating that the card is powering up.

8. Wait until the blue Hot Swap LED turns off, indicating that the board is activated.

9. Repeat **Step 4** through **Step 8** to insert the second 10G Interconnect Card.

10. Perform the following actions, depending on the type of cable that you are connecting:

Cable Type	Instructions
Fiber	▪ Verify that the SFP modules are inserted in the 10G interface cards. ▪ Attach each end of the Ethernet cable to the SFP module in each card, connecting the two cards. Be sure to connect the Tx in one card to the Rx in the other card: - Card 1 Tx connects to Card 2 Rx. - Card 2 Tx connects to Card 1 Rx.
Copper	▪ Verify that the SFP modules are NOT inserted in the 10G interface cards. ▪ Attach each end of the Direct Attach SFP+ copper cable directly into the SFP socket in each card, connecting the two cards.

11. Tektronix installs the DPC license and enables the DPC feature.

Removing the 10G Interconnect Card

The following procedure describes how to remove the card from a system if you need to replace it. It assumes that the system is powered. If the system is not powered, you can disregard the steps referencing the blue Hot Swap LED.

Step Action

1. Put on an ESD wrist strap or appropriate ESD grounding device.

2. Connect the strap to the shelf by attaching it to the front or rear ESD jack / ESD snap.

3. Remove the Ethernet cable (copper or multi-mode fiber) that is attached to the card. If removing fiber cable, also remove the SFP module to use in the replacement card.

4. Unfasten the screws of the faceplate until the handle is detached from the front panel of the card and the blue Hot Swap LED starts to blink.

5. Wait until the blue LED illuminates solid blue.

6. Remove the card from the shelf using the extraction handles.

7. Insert a replacement card; refer to Installing the 10G Interconnect Card.

Replacing G10 Shelf Managers (SHMMs)

CAUTION: SHMMs must always be replaced in pairs.

Failure to follow these steps can lead to corrupted shelf FRU information (such as part number and serial number), which can render the probe offline and require complete chassis replacement. Contact Tektronix Communications Customer Support for assistance with G10 SHMM replacement.

Replacing the First (Standby) SHMM

DO NOT power off the probe to swap SHMMs. The probe MUST remain powered ON.

A Tektronix Communications Customer Support representative will assist you with the following steps to remove the SHMM from the G10.

Step	Action
1.	Log in to the **active** SHMM and verify that it is “active” or “running alone.”
2.	Remove the Ethernet cables from the **standby** SHMM.
3.	Unfasten the screws of the faceplate until the handle is detached from the front panel of the board (**Figure 5.36**). The blue Hot Swap LED starts to blink. WAIT until the blue LED stops blinking and is solid blue.

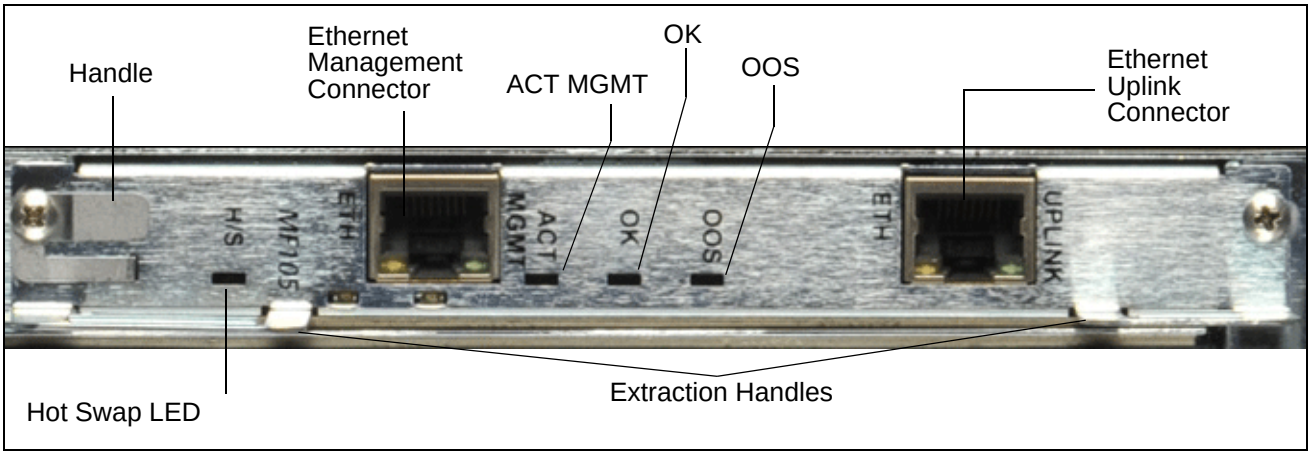


Figure 5.36 - SHMM Faceplate

4.	Remove the SHMM from the shelf using the extraction handles (**Figure 5.36**).
5.	Insert the replacement SHMM into the shelf by placing the left and right edges of the board in the card guides of the shelf.
6.	Slide the board into the shelf by using the extraction handles until you feel resistance.
7.	Wait until the blue Hot Swap LED is illuminated.

8. Tighten the screws on the left and right sides of the board so the handle switch activator is closed and the board can be powered. The blue Hot Swap LED blinks.

9. Wait until the blue Hot Swap LED turns off, indicating that the board is activated.

10. Run the status on the active SHMM until it reports “active” status. It will report “running alone” immediately after swapping the standby SHMM. Continue running the status every few seconds until the board reports “active” status.

11. Reattach the Ethernet cables to the front panel connectors as necessary.

Replacing the Second (Active) SHMM

Step	Action

1. Remove the Ethernet cables from the **active** SHMM.

2. Unfasten the screws of the faceplate until the handle is detached from the front panel of the board (**Figure 5.36**). The blue Hot Swap LED starts to blink. WAIT until the blue LED stops blinking and is solid blue.

This causes the active SHMM to failover to the newly replaced SHMM.

3. To confirm a successful failover, log in to the first SHMM (that you just replaced) and verify that it is “running alone.”

4. Remove the second SHMM from the shelf using the extraction handles (**Figure 5.36**).

5. Insert the replacement SHMM into the shelf by placing the left and right edges of the board in the card guides of the shelf.

6. Slide the board into the shelf by using the extraction handles until you feel resistance.

7. Wait until the blue Hot Swap LED is illuminated.

8. Tighten the screws on the left and on the right of the board so the handle switch activator is closed and the board can be powered. The blue Hot Swap LED blinks.

9. Wait until the blue Hot Swap LED turns off, indicating that the board is activated.

10. Reattach the Ethernet cables to the front panel connectors as necessary.

11. Run the status on the both SHMMs to verify the “active” status.

12. Tektronix Communications Customer Support will complete the probe setup to provision the IP addresses of the new SHMMs.

Serial Over LAN (SOL) Support

The G10 probe provides Serial Over LAN (SOL) support that enables administrators to access remote serial console ports securely on the IAP and IIC blades. The SOL access helps administrators troubleshoot and debug hardware issues, view console messages, and monitor blade boot-up sequences. Use of Serial Over LAN eliminates the need to maintain a terminal server with the probes.

Perform the following to launch an SOL session:

Step	Action
1.	From any workstation, open a Command window.
2.	Type `ssh <Public IP address of either G10 SHMM>` to log in to the G10 probe.
3.	Perform one of the following at the SHMM command line prompt: ▪ To log in to the IAP blade, type `iconsole 1.1`. ▪ To log in to the IIC blade, type `iconsole 1.2`. A console window opens from which you can view console messages and blade activities.

G10 Probe and Array Start Up/Shut Down Sequence

Tektronix recommends powering the probes and associated arrays on and off in a specific sequence. The equipment can withstand unexpected power outages; but a proper power on/off sequence should be followed whenever possible.

Start Up Procedure

Perform the following steps in the specific order listed to properly power up the G10 probe(s) and storage enclosures.

Step	Action
1.	**G10 AC Units only: Ensure that the G10 AC power cables are NOT connected to the rack power outlet.**
2.	Turn on the circuit breakers at the power distribution panel.
3.	Power on the storage arrays. Power on the expansion enclosures first and then the controller enclosures. a. Press the power switches to the ON position on both power modules at the back of each enclosure.

b. Verify the following storage enclosure LEDs:

- The Unit Locator ID LED is OFF, indicating normal operation.
- The Fault/Service Required LED is OFF, indicating that there are no fault conditions.
- The FRU OK (Heartbeat) LED is GREEN, indicating that the enclosure is powered on with at least one power supply operating normally.
- The Temperature Fault LED is GREEN, indicating that the enclosure temperatures are normal.
- All disk module Power LEDs are GREEN, indicating that the module is operating normally.

Ensure that all storage enclosures are powered on and operating normally before continuing with this procedure.

4. Turn on the power to the **G10 Primary or Standalone chassis.** ***In multiprobe configurations, do NOT power on the expansion chassis yet***.

   - **AC Units:** Connect the AC power cables into the rack power outlets.
   - **DC Units:** Press the ON/OFF switch to the ON position on both PEMs on the front of the G10 chassis.

5. Verify the following LEDs on the front of the G10 chassis:

   - **DC Chassis Front**
     - The IN LEDs are GREEN, indicating that the power is connected properly
     - The BACKPLANE LEDs are GREEN, indicating that the PEM is sending power through the backplane
   - **AC Chassis Front**
     - The Status LED is GREEN.

6. Verify the following LEDs on the front of the IIC:

   - The + LED on IIC100/IIC200 is OFF, indicating that there are no errors in overall health.
   - The CPU LED is AMBER on the FPC100 AMC and GREEN on the FPC200 AMC, indicating that the processor is functioning normally.

7. Verify that the SHmm OK LEDs on the rear of the chassis are GREEN.

8. Verify that the + LED is GREEN on the SRM200 RTM, SRM100 RTM, or TRM100 RTM, indicating that there are no errors.

9. Verify that the + LED on PRM200/PRM300 RTM is GREEN, indicating that there are no errors.

10. Wait about 10 minutes for the IAP blade to boot up. The OOS LED transitions from RED (board booting) to AMBER (applications starting) to OFF, indicating that the probe is up.

If LEDs are behaving differently than described in this procedure, contact Tektronix Communications Customer Support.

11. For multiprobe configurations, after the G10 Primary Chassis is powered up successfully, turn on the power to the G10 Expansion Chassis. Verify the LEDs on the expansion chassis as described in **Step 6** through **Step 9** in this procedure.

Shut Down Procedure

Perform the following steps in the specific order listed to properly power down the G10 probe(s) and storage enclosures.

Step	Action

1. In multiprobe configurations, start the power down procedure with the **expansion** chassis by performing the following:
   - Initiate the hot-swap mode for both IIC or IAP blades. Refer to Removing or Resetting the IIC100 or IIC200 or Removing or Resetting the IAP200/ IAP320 for details. *Note that no action is required for the Rear-Transition Modules.*
   - **Wait** until the hot-swap LED is solid blue.
   - Unseat both blades approximately 2 inches from the backplane.
2. On the **primary** or **standalone** chassis, initiate hot-swap mode for the IIC and wait until the hot-swap LED is solid blue. *Note that no action is required for the Rear-Transition Module.*
3. On the **primary** or **standalone** chassis, initiate the hot-swap mode for the IAP blade and wait until the hot-swap LED is solid blue.
4. Unseat the IIC and IAP on the **primary** or **standalone** chassis approximately 2 inches from the backplane.
5. Turn off the power to the **expansion** chassis:
   - **AC Units:** Disconnect the AC power cables from the rack power outlets.
   - **DC Units:** Press the ON/OFF switch to the OFF position on both PEMs on the front of the G10 chassis.
6. Turn off the power to the **primary** or **standalone** chassis:
   - **AC Units:** Disconnect the AC power cables from the rack power outlets.
   - **DC Units:** Press the ON/OFF switch to the OFF position on both PEMs on the front of the G10 chassis.

7. Power off the storage arrays:

   - Power off the **controller** enclosure first and then the **expansion** enclosures.
   - Press the power switches to the OFF position on both power modules at the back of each enclosure.

Storage Array Maintenance Procedures

This section contains the following procedures:

- Replacing a Power Supply
- Bezel (Air Filter) Procedures
- Replacing a Controller or Expansion Module
- Replacing a Drive Module
- Replacing the Disk Array Chassis

Electrostatic discharge can damage circuits or shorten their life. Before touching blade or electronic components, make sure that you are working in an ESD-safe environment and wearing an ESD wrist or foot strap.

Storage Array Maintenance Guidelines

The G10 supports the following storage enclosures:

- RAID: SA100R or SA200R
- JBOD: SA100J, SA200J, SA210J

Please note the following guidelines when maintaining the storage arrays:

- An SA200 part must be replaced with an SA200 part.
- SA100 controllers can be replaced by SA200 controllers in an SA100 enclosure. Both controllers must be replaced; you cannot mix controller models (one enclosure cannot have one SA100 controller and one SA200 controller).
- SA100 parts are not compatible with the SA200 enclosure.

Replacing a Power Supply

This section details procedures for removing and replacing a failed AC or DC power supply unit (PSU).

Removing the Power Supply

Be careful when replacing the power supply so as not to disconnect other cables causing the disks to go offline. It is recommended that you perform this procedure during a maintenance window; however, if immediate replacement is necessary, ensure that all cables are secured, and carefully proceed.

Step	Action
1.	Verify the failed component; the PSU's status LED color changes to amber to indicate a fault condition.

Removing a PSU disrupts the enclosure's airflow significantly; therefore, do not remove it until you have the replacement module ready.

2. Press the power switch on the power supply module to the OFF position. Note that some new AC units do not have an on/off switch.

3. Remove power:

   - DC: Shut off the main circuit breaker to the failed power supply and remove power cables:
     - Loosen the cable-locking screws attaching the connector to the PSU.
     - Disconnect the power cable from the PSU.
   - AC: Unplug the AC cable from the power supply unit.

4. Turn the thumbscrew at the top of the latch counterclockwise to loosen and disengage it from the module; however, do not remove the thumbscrew from the latch (**Figure 5.37**).

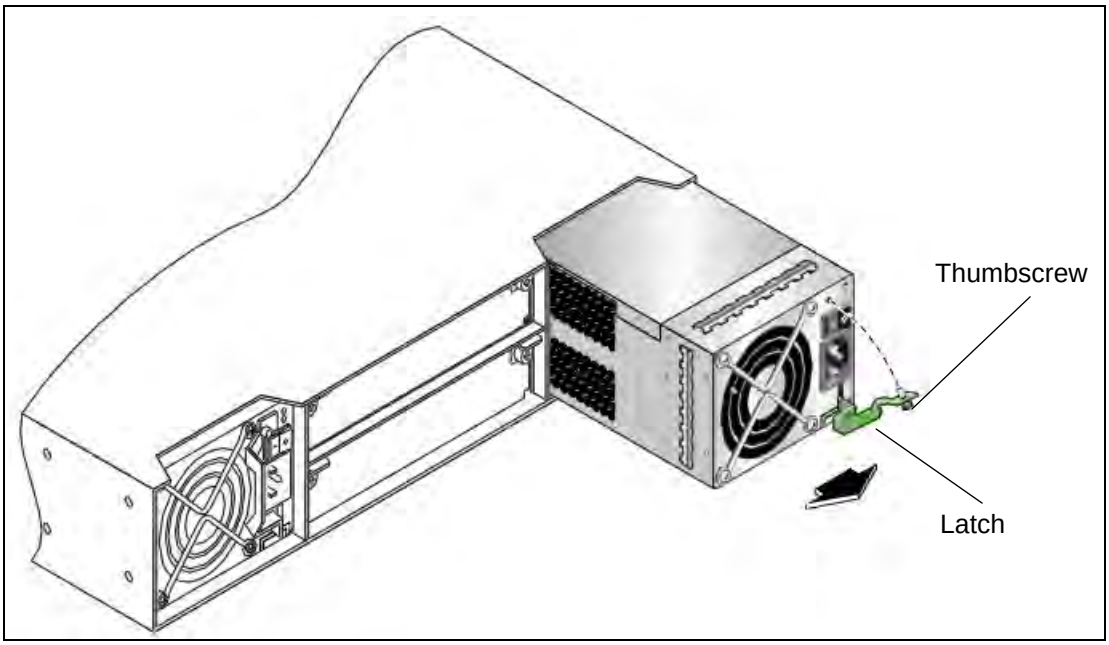


Figure 5.37 - Remove PSU Module

5. Rotate the latch downward to 45 degrees, supplying leverage to disconnect the module from the internal connector.

6. Use the latch to pull the module straight out of the chassis.

Do not lift the module by its latch; doing so can break the latch. Lift and carry the module using its metal casing.

Installing the Power Supply

To install a power supply module, perform the following steps:

Step	Action

1. Orient the PSU with the AC or DC connector and power switch toward the right, as shown in **Figure 5.38**.

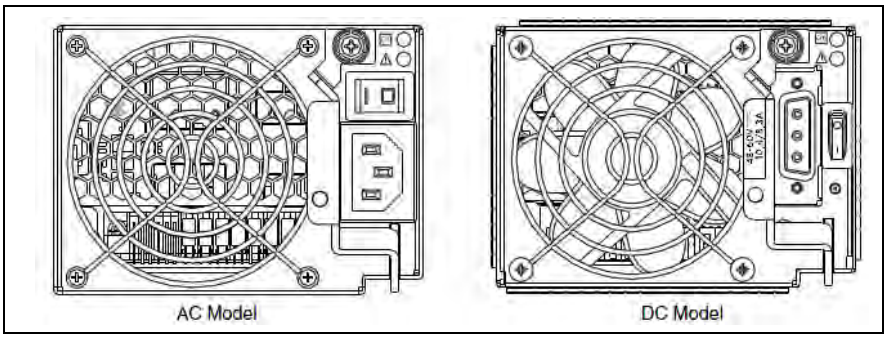


Figure 5.38 - Power Supply Module

2. Verify that the latch is rotated downward to 45 degrees.
3. Slide the module into the power supply slot as far as it will go.
4. Rotate the PSU latch upward until it is flush against the PSU face, ensuring that the connector on the PSU engages the connector inside the chassis.
5. Turn the thumbscrew located at the top of the power supply latch clockwise, until it is finger-tight, to secure the latch to the power supply unit within the enclosure.
6. Ensure that the main circuit breaker in the rack is shut off.
7. Reconnect the power cables:
   - For DC power cables:
     - Ensure that the DC Module power switches are in the OFF position.
     - Attach the cable connector to the DC PSU cable connector and tighten the screws to attach the cable securely to the DC PSU.

Be sure the DC Plugs do not touch the Grounding Posts (located under the power switches) to minimize risk of electrical hazard.

   - For AC power cables:
     - Ensure that the AC Module power switches are in the OFF position (if applicable).

- Connect the AC power cables to the AC power connectors on the rear of the storage enclosure.

Enclosures are shipped with a grounding-type (three-wire) power cord. To reduce the risk of electric shock, always plug the cord into a grounded power outlet. Site wiring must include an earth ground connection to the AC power source. Grounding must comply with local, national, or other applicable government codes and regulations.

Bezel (Air Filter) Procedures

The storage enclosure has a bezel assembly that attaches to the front of the storage array and contains the air filter. Refer to the following procedures for details about the bezel assembly:

- Installing the Bezel
- Removing the Air Filter
- Replacing the Air Filter

General guidelines concerning air filters in inventory:

- Replacement air filter storage:
  Air filters in inventory should be stored in an environment that is cool, dry, and dark. Heat, humidity, and ultraviolet light can damage air filters.
- Replacement air filter inventory on hand:
  Purchase a cost-effective quantity of replacement air filters to maintain a sufficient inventories for no more than a few months. This approach enables you to avoid stock-outs and mitigate inventory loss due to shrinkage.

Installing the Bezel

Perform the following steps to install the storage enclosure bezel assembly.

Step	Action
1.	Put on an ESD wrist strap.

Electrostatic discharge can damage circuits or shorten their life. Before touching the blade or electronic components, ensure that you are working in an ESD-safe environment.

2. Remove the bezel assembly from its box and verify that it includes the installed air filter subassembly.
3. Align the bezel assembly with the front of the enclosure so the integrated ear covers slide onto the push-fit ball studs, while taking care to guide the LED indicators through ear-cover openings (**Figure 5.39**).

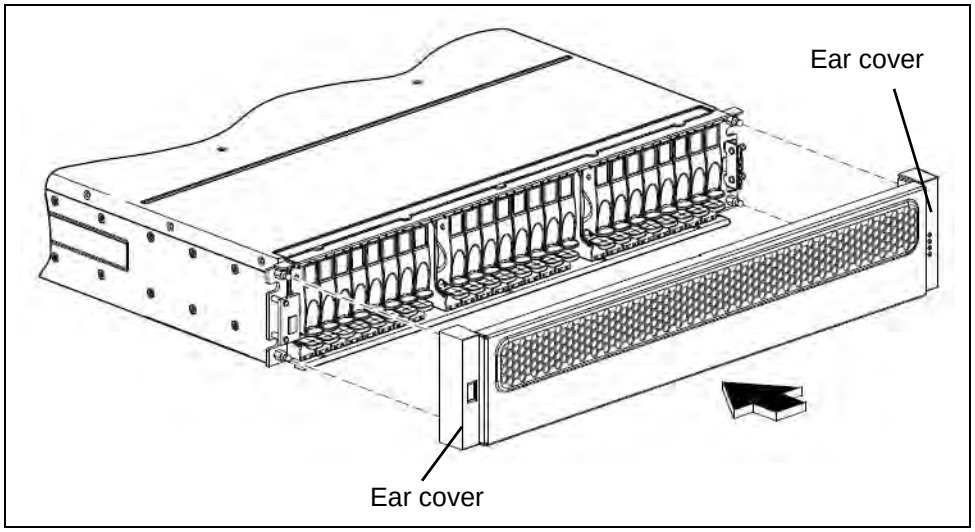


Figure 5.39 - Bezel Assembly Installation

4. Gently push-fit the ear caps onto the ball studs to secure the bezel in place.

Removing the Air Filter

To replace the bezel's dust-filtration air filter, first remove the bezel assembly from the enclosure. After the bezel is detached from the enclosure, you can remove its air filter.

To ensure that the storage enclosures operate efficiently, Tektronix Communications requires the air filters to be changed every 3 months.

Perform the following steps to remove the air filter.

Step	Action
1.	Put on an ESD wrist strap.

Electrostatic discharge can damage circuits or shorten their life. Before touching the blade or electronic components, ensure that you are working in an ESD-safe environment.

2. While facing the front of the enclosure, place your index and middle fingers of each hand on the top of the bezel with your thumbs on the bezel's bottom. To release the bezel from the ball studs, pull the top of the bezel gently, while applying slight inward pressure below (**Figure 5.40**).

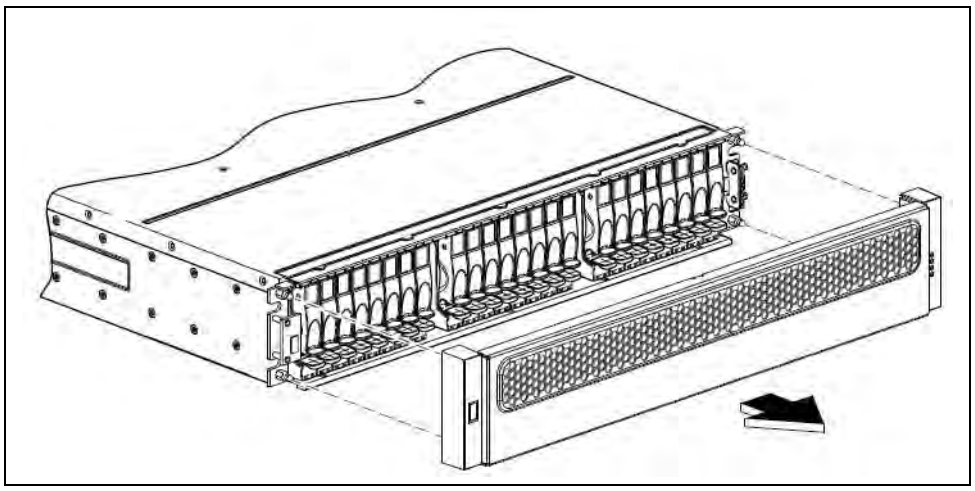


Figure 5.40 - Bezel Assembly Removal

3. While holding the bezel in one hand, slip your thumb or index finger gently between the top of the filter frame and its foam insert on the back side of the bezel.

4. As indicated by the large arrow in **Figure 5.41**, pull the top of the filter frame downward and outward gently to dislodge its laminated external foam pads from the bezel's interior walls.

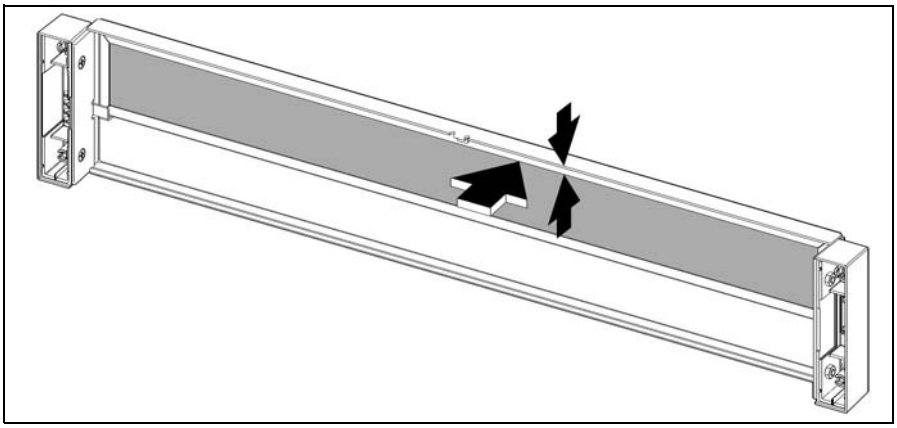


Figure 5.41 - Air Filter Removal

5. Tug the top of the filter frame gently to revolve it away from its vertical position and then pull upward to release the filter from the bezel's two mounting channels (**Figure 5.42**).

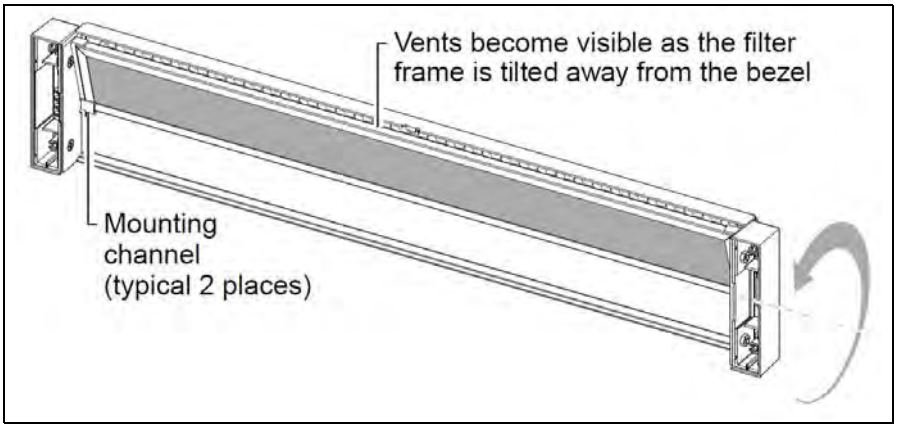


Figure 5.42 - Air Filter Removal

*Only one of the mounting channels is shown in **Figure 5.42**. The other channel is hidden by the ear cover on the right.*

6. Extract the air filter carefully from the bezel.

7. See Replacing the Air Filter for details about the next steps.

Replacing the Air Filter

Whether replacing an air filter or reusing one that has been reconditioned, you need to install the air filter into the bezel before attaching the bezel to the front of the enclosure.

To ensure that the storage enclosures operate efficiently, Tektronix Communications requires the air filters to be changed every 3 months.

Perform the following steps to replace the air filter.

Step	Action

1. Put on an ESD wrist strap.

Electrostatic discharge can damage circuits or shorten their life. Before touching the blade or electronic components, ensure that you are working in an ESD-safe environment.

2. On the back side of the bezel, insert the air filter with the foam facing toward the bezel's vents. Align the bottom corners of the air filter per the thrust lines as (**Figure 5.43**).

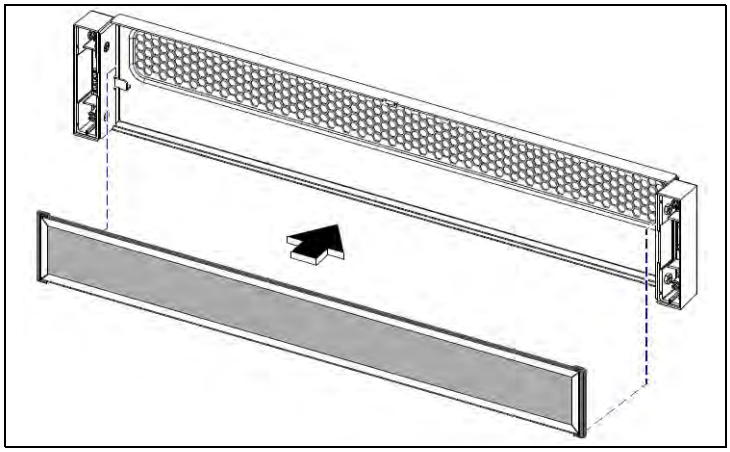


Figure 5.43 - Air Filter Replacement

3. Insert the bottom edge of the air filter frame into the two mounting channels.

4. While tilting the air filter frame slightly away from the bezel, slip its bottom edge into the mounting channels as far as the filter will go.

5. Revolve the air filter gently into its vertical position, while taking care to ensure that the filter frame's exterior foam pads seat snugly against the bezel's interior walls (**Figure 5.44**).

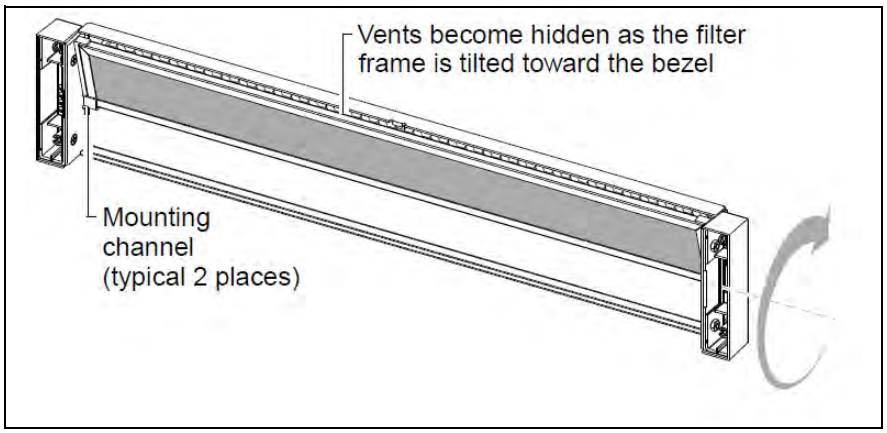


Figure 5.44 - Air Filter Replacement

Figure 5.45 shows a properly seated air filter.

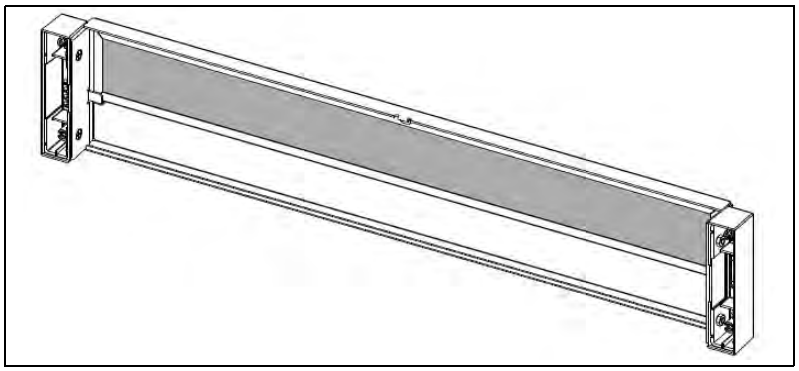


Figure 5.45 - Air Filter Replacement

6. After the filter is installed successfully within the bezel, you can re-attach the bezel to the front of the enclosure. Refer to Installing the Bezel for details.

Replacing a Controller or Expansion Module

Prior to replacing a controller module, you MUST power down the probe. See the Power Down Procedure for details on powering down the probe.

If you are replacing both controllers, special commands must be performed before and after hardware replacement. Contact Tektronix Communications Customer Support for assistance.

Be sure to review Storage Array Maintenance Guidelines before proceeding to ensure component compatibility.

Removing the Controller Module

Perform the following actions to remove a controller or expansion module.

Step	Action
1.	Contact Tektronix Communications Customer Support for assistance in troubleshooting storage array issues. Storage Array Maintenance (SAMTCE) alarms can be monitored in the IrisView Alarm Browser to help isolate failed components.
2.	Disconnect any cables from the failed enclosure module.

3. Turn the thumbscrews counterclockwise until they disengage from the module (**Figure 5.46**).

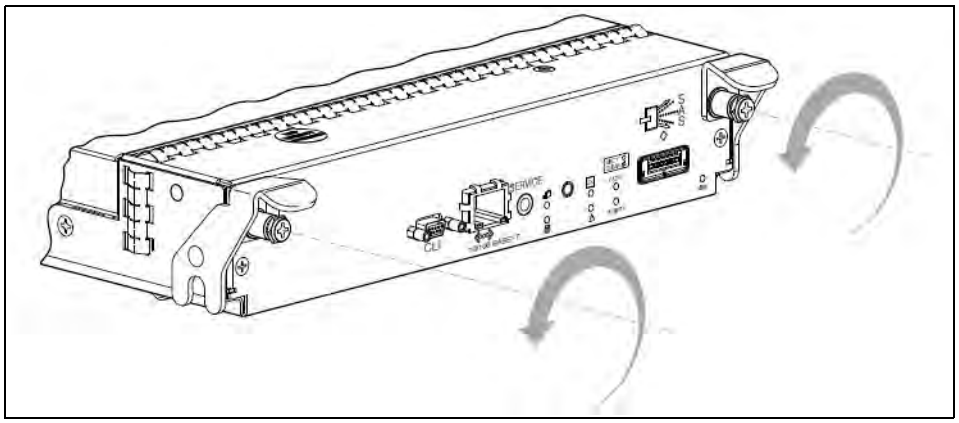


Figure 5.46 - Disengaging a Controller Module

4. Press both latches downward to disconnect the module from the midplane (**Figure 5.47**).

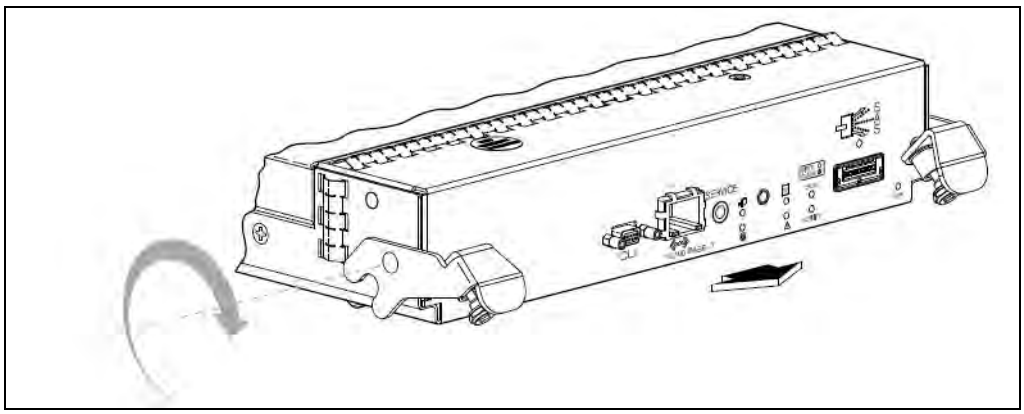


Figure 5.47 - Extracting a Controller Module

5. Pull the module straight out of the enclosure (**Figure 5.48**).

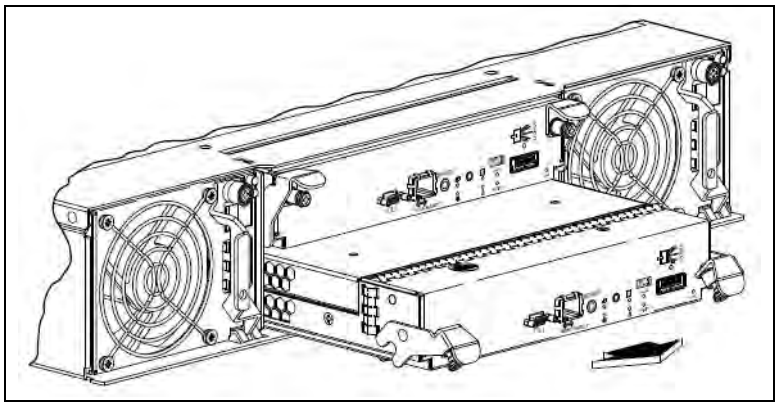


Figure 5.48 - Removing a Controller Module

Installing the Controller Module

Prior to replacing a controller module, you MUST power down the probe. See the Power Down Procedure for details on powering down the probe.

If you are replacing both controllers, special commands must be performed before and after hardware replacement. Contact Tektronix Communications Customer Support for assistance.

Be sure to review Storage Array Maintenance Guidelines before proceeding to ensure component compatibility.

Step	Action

1. Loosen the thumbscrews and press the latches downward (**Figure 5.49**).

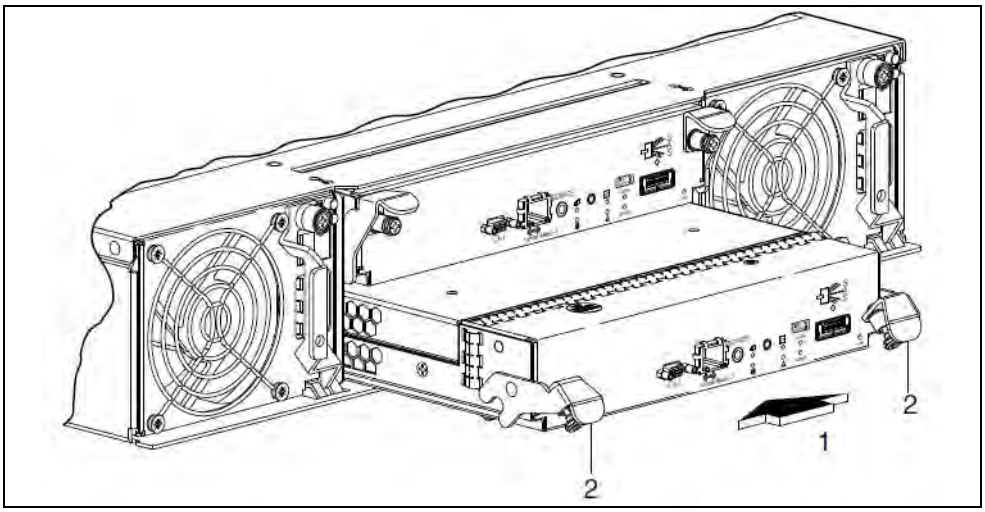


Figure 5.49 - Inserting a Controller Module

2. Slide the controller module into the enclosure as far as it will go. See (1) in **Figure 5.49**.

3. Press the latches upward to engage the controller module. See (2) in **Figure 5.49**. Turn the thumbscrews clockwise until finger tight.

4. Reconnect the cables.

5. Power on the probe. See the probe start up procedure for details on powering up the probe.

6. Check that the FRU OK LED (back) is green, indicating that the controller has completed initializing, is online, and is operating normally.

7. Contact Tektronix Communications Customer Support to complete the controller/expansion module installation.

Replacing a Drive Module

A drive module consists of a disk drive in a sled. Drive modules are hot swappable, which means that they can be replaced without halting I/O to the vdisks or powering off the enclosure. The new drive module must be of the same type and possess a capacity equal to or greater than the one being replaced.

Removing Air Management Modules

Step	Action
1.	Squeeze the latch release flanges inward to disengage the drive module (**Figure 5.50**).

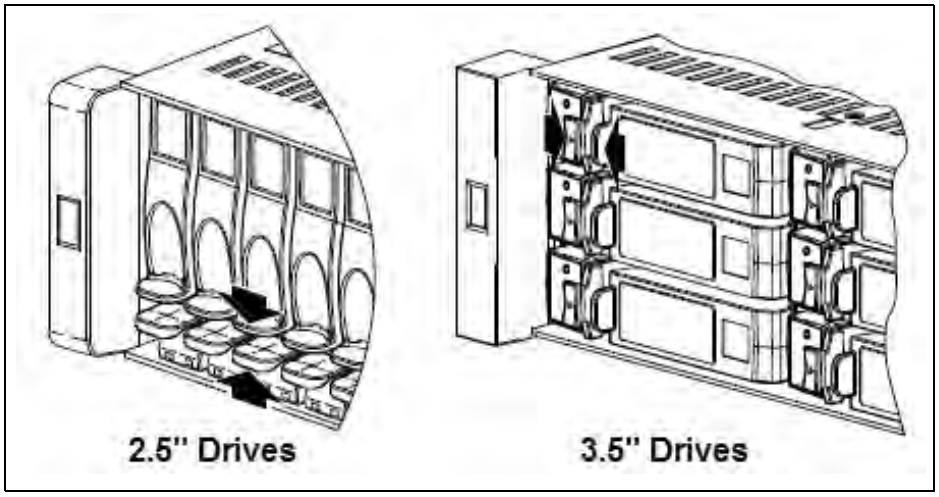


Figure 5.50 - Disengaging an Air Management Sled (AMS)

Step	Action
2.	Wait 20 seconds for the internal disks to stop spinning.

3. Pull the drive module straight out of the chassis (see **Figure 5.51**). Return the failed disk and carrier to Tektronix Communications.

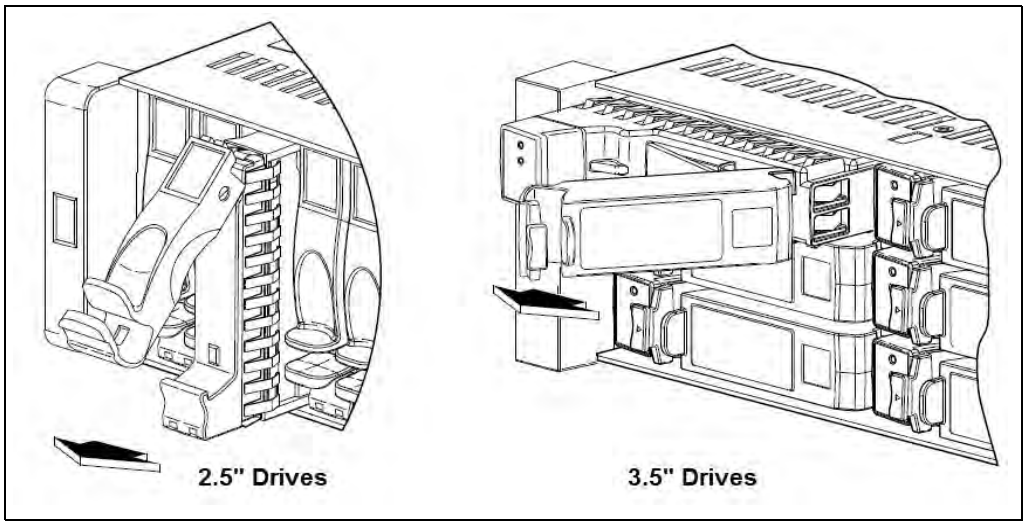


Figure 5.51 - Removing an AMS

Installing Drive Modules

Step	Action

1. On new drive, prior to inserting, squeeze the latch release flanges together, and then pull the latch, rotating it outward until it is fully open.

2. Perform one of the following steps, according to your product's drive type (see **Figure 5.52**):

   - 2.5" Drives—With the LEDs oriented to the bottom, slide the drive module into the drive slot as far as it will go.
   - 3.5" Drives — with the LEDs oriented to the left, slide the drive module into the drive slot as far as it will go (see **Figure 5.52**).

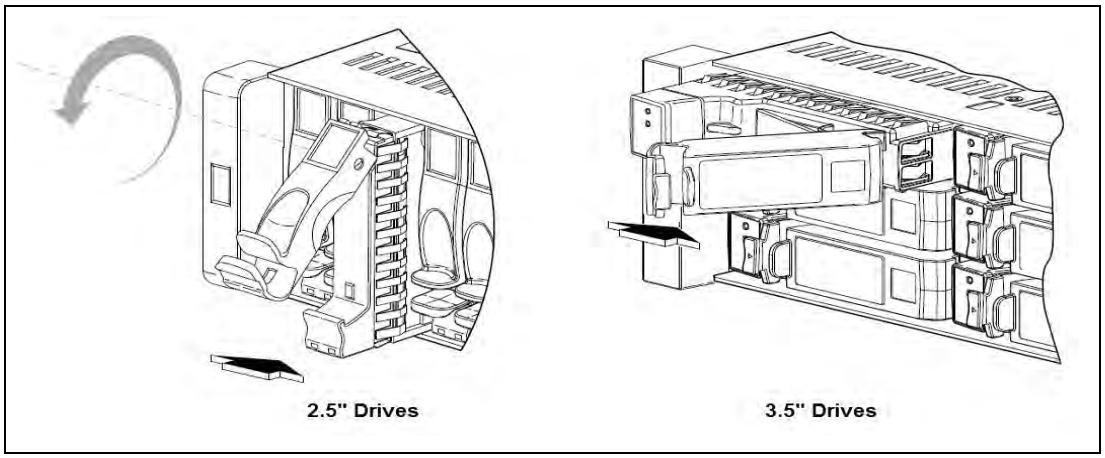


Figure 5.52 - Installing a Drive Module

3. Rotate the latch inward until it clicks closed to firmly seat the drive module in the enclosure's midplane.

4. Check that the Power/Activity LED located on the drive is illuminated green (see **Figure 5.53**).

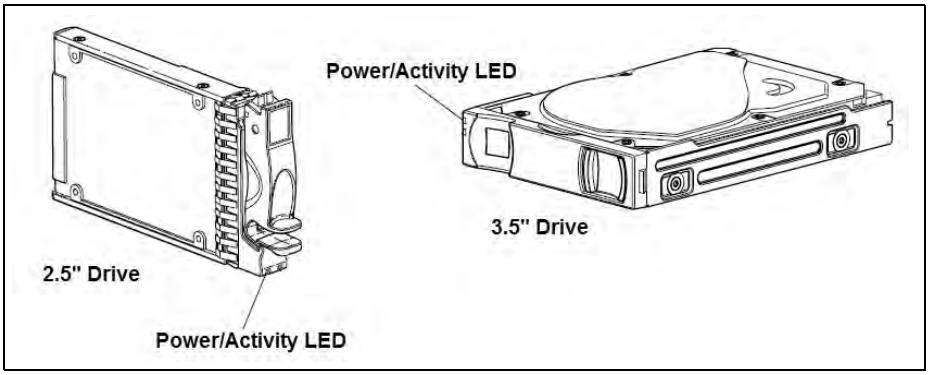


Figure 5.53 - Drive Module LEDs

5. Contact Tektronix Communications Customer Support for assistance in bringing the disk drive into service.

Replacing the Disk Array Chassis

Prior to replacing the disk array chassis, you MUST power down the probe. See the Power Down Procedure for details on powering down the probe.

Prior to replacing the disk array chassis, see the Iris Installation and Upgrade Guide to perform the required G10 Probe Health Check. Contact Tektronix Communications Customer Support for assistance.

Identify which disk array is being replaced (Controller 0, Controller 1, or an Expansion Disk array {JBOD}).

If you are replacing both controllers, special commands must be performed before and after hardware replacement. Contact Tektronix Communications Customer Support for assistance.

Verify that all cables, terminating at the disk array, are properly labeled. Record the cable connections, for use when reconnecting the cables.

Be sure to review Storage Array Maintenance Guidelines before proceeding to ensure component compatibility.

Removing the Disk Array Chassis

Perform the following actions to remove the disk array chassis.

Step	Action
1.	Contact Tektronix Communications Customer Support for assistance in troubleshooting storage array issues. Storage Array Maintenance (SAMTCE) alarms can be monitored in the IrisView Alarm Browser to help isolate failed components.
2.	Power down the faulty disk array. Press the power switch, on both power supply units, to the OFF position. (**Figure 5.54**) Note that some new AC power units do not have an on/off switch.

Figure 5.54 - DC Power Switch on Disk Array

3. Remove power:

   - DC: Shut off the main circuit breakers to the power supply units and remove the power cables:
     - Loosen the cable-locking screws attaching the connectors to the PSUs.
     - Disconnect the power cables from the PSUs.
   - AC: Unplug the AC cables from the power supply units.

4. Verify that all cables (power, Ethernet and SAS) are properly labeled and then disconnect all cables from the disk array.

5. Unscrew the disk array from the brackets and using two people, slide the disk array out from the brackets.

6. If the new disk array shipped with all new components (RAID controllers, expansion controllers, and disks [HDDs]), then skip this step. Otherwise, the working components from the original disk array will be reused for any components not shipped.

   - Extract all of the disks (HDDs) from the original disk array and slot them, in the same order, into the new disk array.

- Extract the RAID controllers or expansion controllers from the back of the original disk array and slot them, in the same order, into the new disk array.

Installing the Disk Array Chassis

Prior to replacing the disk array chassis, you MUST power down the probe. See the Power Down Procedure for details on powering down the probe.

Identify which disk array is being replaced (Controller 0, Controller 1, or an Expansion Disk array {JBOD}).

If you are replacing both controllers, special commands must be performed before and after hardware replacement. Contact Tektronix Communications Customer Support for assistance.

Verify that all cables, terminating at the disk array, are properly labeled. Record the cable connections, for use when reconnecting the cables.

Be sure to review Storage Array Maintenance Guidelines before proceeding to ensure component compatibility.

Step	Action
1.	Using two people, slide the disk array into the brackets in the same position as the original disk array chassis and secure the new disk array chassis using the same screws from the original disk array.
2.	Reconnect the power, Ethernet, and SAS cables according to what was recorded previously. For detailed cabling information, see the cabling section of the installation guide for your specific probe type and configuration.
3.	Restore power: ▪ DC: Connect the power cables to the PSUs. - Tighten the cable-locking screws attaching the connectors to the PSUs. - Open the main circuit breakers to the power supply units. ▪ AC: Plug in the AC cables to the power supply units.
4.	Power up the new disk array. Press the power switch, on both power supply units, to the ON position. (**Figure 5.55**)

Note that some new AC power units do not have an on/off switch.

Figure 5.55 - DC Power Switch on Disk Array

5. Reconnect the cables.

6. Power on the probe. See the probe start up procedure for details on powering up the probe.

7. Check that the FRU OK LED (back) is green, indicating that the controller has completed initializing, is online, and is operating normally.

8. See the *Iris Installation and Upgrade Guide* to configure the G10 Probe and complete the disk array replacement. Contact Tektronix Communications Customer Support for assistance.

6 System Operating Specifications

OVERVIEW

The design of the G10 probe enables you to install it in common switching, or other equipment frame lineups found in telecommunications central office environments. The following sections list the physical specifications, power and ground requirements, and appropriate specifications to which the G10 probe conforms.

Refer to the following sections for details:

PHYSICAL SPECIFICATIONS

All equipment is suitable for mounting in a standard 19- or 23-inch wide equipment rack or cabinet. G10 installation varies depending on the type of rack configuration in which it is installed:

- Two-Post Rack—G10 must be mid-mounted
- Four-Post Rack—G10 must be front-mounted

	G10 Probe	Fuse Panel	SAS Storage Enclosure[a]
Height (space required)	3U 132 mm (5.20 inches)	1U 44.45 mm (1.75 inches)	2U 88.90 mm (3.50 inches)
Width	445 mm (17.52 inches)	431.80 mm (17.0 inches)	447.04 mm (17.6 inches)
Depth	420 mm (16.54 inches)	304.80 mm (12.0 inches)	502.92 mm (19.8 inches)
Weight	22 kg (47 lbs.)	4.09 kg (9.0 lbs.)	29 kg (64 lbs.)
Heat Dissipation	2048 BTU/hr max 1808 BTU/hr typical	Per 100A bus @% load 1.0W (3.4 Btu/hr) @ 0% 1.2W (4.1 Btu/hr) @ 25% 4.8W (16.5 Btu/hr) @ 50% 11.4W (38.7 Btu/hr) @ 75% 21.3W (72.6 Btu/hr) @ 100%	**SA100R (24 300 GB disks)** 956 BTU/hr typical 1706 BTU/hr max **SA200R (24 900 GB disks)** 1433 BTU/hr typical 1706 BTU/hr max **SA200J (24 900 GB disks)** 870 BTU/hr typical 1706 BTU/hr max

a. For IAP100/PRM100 RTM configurations, you must leave 1U of space below the G10 to allow for SAS cabling from the SAS AMC on the front of the G10 to the back of the controller enclosure(s).

A switch or circuit-breaker must be included in the building installation and it must be in close proximity to the equipment and within easy reach of the operator. It must be marked as the disconnecting device for the equipment.

Note the following information regarding rackmount ventilation:

- Do not block or cover ventilation openings at the front and rear of an enclosure. Never place an enclosure near a radiator or heating vent. Failure to follow these guidelines can cause overheating and affect the reliability and warranty of your enclosure.
- Leave a minimum of 6 inches (15 cm) at the front and back of each enclosure to ensure adequate airflow for cooling. No cooling clearance is required on the sides, top, or bottom of enclosures.
- Leave enough space in front and in back of an enclosure to allow access to enclosure components for servicing. Removing a component requires a clearance of at least 15 inches (37 cm) in front of and behind the enclosure.

POWER AND GROUND REQUIREMENTS

The following sections list the power and ground requirements for the GeoProbe G10 and storage enclosures.

Both units will require individual connections to earth ground for safety. The GeoProbe G10 provides dual-post connection for this purpose. The disk enclosure power cable includes an earth ground connection. All cables with the exception of the Power and Fiber Optics cables shall be shielded. Make sure that a suitable -40.0 to -72 VDC power source is within reach of the system. Two power entry modules (PEMs) can be installed in the system.

The system is supplied by a TNV-2 voltage. This voltage is considered hazardous. Make sure that the external power supply meets the relevant safety standards. Ensure that TNV-2 is separated from dangerous voltages (mains) through double or reinforced insulation.

DC Power Requirements

Table 6.1 lists the DC power requirements for the GeoProbe G10 and SAS storage enclosures. All probe and disk enclosure power and chassis ground cabling use 12AWG cable or larger.

Table 6.1 - DC Power Requirements

Equipment	VDC	Fuse	Watts
G10 (IIC100 and IAP100)	-40 to -72VDC	15A max	430W typical, 600W max
G10 (IIC100 and IAP200)	-40 to -72VDC	15A max	470W typical, 600W max
G10 (IIC100 and IAP320)[a]	-40 to -72VDC	15A max	495W typical, 600W max
G10 (IIC200 and IAP200)	-40 to -72VDC	15A max	495W typical, 600W max
G10 (IIC200 and IAP320)	-40 to -72VDC	15A max	495W typical, 600W max
G10 Media Expansion Chassis (2 IIC100s and 2 TRM100 RTMs)	-40 to -72VDC	15A max	460W typical, 600W max
G10 Media Expansion Chassis (2 IIC200s and 2 SRM200 RTMs)	-40 to -72VDC	15A max	460W typical, 600W max
G10 Control Plane Expansion Chassis (2 IAP200s and 2 PRM200 RTMs)	-40 to -72VDC	15A max	470W typical, 600W max
G10 Control Plane Expansion Chassis (2 IAP320s and 2 PRM300 RTMs)	-40 to -72VDC	15A max	530W typical, 600W max
SA100R RAID Storage Enclosure	-40 to -72VDC	15A max	280W typical, 500W max
SA100J JBOD Storage Enclosure	-40 to -72VDC	15A max	280W typical, 500W max
SA200R RAID Storage Enclosure[b]	-40 to -72VDC	15A max	420W typical, 500W max
SA200J/SA210J JBOD Storage Enclosure[b]	-40 to -72VDC	15A max	255W typical, 500W max

a. The control plane probe does not support the IIC100/IAP320 configuration.

b. For Storage Enclosure and 24 900G drives (SA200J) or 12 4TB drives (SA210J).

Tektronix equipment, cables, and wiring diagrams comply with industry standard DC electrical color coding. Please ensure proper cabling if your equipment and cabling uses nonstandard DC electrical color coding. Improper cabling can cause damage to equipment or personal injury. Contact Tektronix to request specially labeled power cables (-48V = Red, Return = Black) for the G10 chassis and the storage enclosures.

AC Power Requirements

Table 6.2 lists the AC power requirements for the GeoProbe G10 and SAS storage enclosures. All probe and disk enclosure power and chassis ground cabling will use 12AWG cable or larger.

Table 6.2 - AC Power Requirements

Equipment	VAC	Fuse	Watts
G10 (IIC100 and IAP100)	100 to 240 VAC	6A max	470W typical, 600W max
G10 (IIC100 and IAP200)	100 to 240 VAC	6A max	520W typical, 600W max
G10 (IIC100 and IAP320)[a]	100 to 240 VAC	6A max	545W typical, 600W max
G10 (IIC200 and IAP200)	100 to 240 VAC	6A max	545W typical, 600W max
G10 (IIC200 and IAP320)	100 to 240 VAC	6A max	545W typical, 600W max
G10 Media Expansion Chassis (2 IIC100s and 2 TRM100 RTMs)	100 to 240 VAC	6A max	510W typical, 600W max
G10 Media Expansion Chassis (2 IIC200s and 2 SRM200 RTMs)	100 to 240 VAC	6A max	506W typical, 600W max
G10 Control Plane Expansion Chassis (2 IAP200s and 2 PRM200 RTMs)	100 to 240 VAC	6A max	520W typical, 600W max
G10 Control Plane Expansion Chassis (2 IAP320s and 2 PRM300 RTMs)	100 to 240 VAC	6A max	585W typical, 600W max
SA100R RAID Storage Enclosure	100 to 240 VAC	5A max	280W typical, 500W max
SA100J JBOD Storage Enclosure	100 to 240 VAC	5A max	280W typical, 500W max
SA200R RAID Storage Enclosure[b]	100 to 240 VAC	5A max	420W typical, 500W max
SA200J/SA210J JBOD Storage Enclosure[b]	100 to 240 VAC	5A max	255W typical, 500W max

a. The control plane probe does not support the IIC100/IAP320 configuration.

b. For Storage Enclosure and 24 900G drives (SA200J) or 12 4TB drives (SA210J).

Environmental Specifications

Table 6.3 defines the environmental specifications as outlined in GR-63-CORE, Issue 3, March 2006 and GR-1089-CORE, Issue 6, May 2011.

Table 6.3 - G10 Environmental Specifications

Environmental	Specification/Limits
Operating Temperature	5°C to 40°C (41°F to 104°F)
Storage Temperature	70°C (158°F)
Rate of Temperature Change	30°C/hr (54°F/hr)
Relative Humidity, Operating	5% to 85%
Vibration, Operating	Swept sine survey at an acceleration amplitude of 0.1 g from 5 to 100 Hz and back to 5 Hz at a rate of 0.1 octave/minute. The duration of this sweep is approximately 90 minutes.
Shock, Operating	Tested to GR-63-CORE, Issue 4, April 2012, Zone 4
Electrostatic Discharge (ESD)	Tested to ESD levels up to 15 kilovolts (kV) air discharge and up to 8 kV contact discharge without physical damage.
Acoustic Noise - Sound Pressure	Sound Power Level (L_{wad}): <78 dB at 27°C

REGULATORY SPECIFICATIONS

The GeoProbe G10 is fully compliant with the following Safety and Electromagnetic Compatibility (EMC) specifications.

Safety Compliance

Table 6.4 lists the safety standards for which the GeoProbe G10 is fully compliant.

Table 6.4 - G10 Safety Standards

Standard	Title	Date	Edition	Amendment
IEC60950-1	International Standard, Information Technology Equipment - Safety - Part 1: General Requirements	2005	Second	AM1: 2009
EN60950-1	British Standards - Information Technology Equipment - Safety - Part 1: General Requirements	2006	N/A	A11: 2009 A1: 2010 A12: 2011
CAN/CSA C22.2 No. 60950-1	Canadian Standard - Information Technology Equipment - Safety - Part 1: General Requirements	2007	Second	N/A

Table 6.4 - G10 Safety Standards (Continued)

Standard	Title	Date	Edition	Amendment
ANSI/UL No. 60950-1	U.S. Standard - Information Technology Equipment - Safety - Part 1: General Requirements	2007	Second	N/A
IEC61010-1	International Standard, Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use - Part 1: General Requirements	2010	Third	N/A
CAN/CSA C22.2 No. 61010-1	Canadian Standard, Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use - Part 1: General Requirements	2012	Third	N/A
UL Std. No. 61010-1	U.S. Standard, Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use - Part 1: General Requirements	2012	Third	N/A

EMC Standards

Table 6.5 lists the fully compliant EMC standards for the GeoProbe G10.

Table 6.5 - G10 EMC Standards

Standard	Title	Date	Amend.
CFR 47 Part 15, Subpart B, Class A	Federal Communication Commission (FCC) Code of Federal Regulations - Telecommunication	2011	N/A
ICES-003, Issue 5, Class A	Interference-Causing Equipment Standard - Digital Apparatus	2012	N/A
AS/NZS CISPR 22, Class A	Australian/New Zealand Standard - Information Technology Equipment - Radio Disturbance Characteristics - Limits and Methods of Measurement	2009	N/A
VCCI Technical Requirements, Class A	Voluntary Control Council for Interference (VCCI) Technical Requirements - Information Technology Equipment - Disturbance Characteristics - Limits and Methods of Measurements	2012	N/A
EN55022, Class A	British Standards - Information Technology Equipment - Radio Disturbance Characteristics - Limits and Method of Measurement	2010	CISPR 22: 2008

Table 6.5 - G10 EMC Standards (Continued)

Standard	Title	Date	Amend.
EN55024, Class A	British Standards - Information Technology Equipment - Immunity Characteristics - Limits and Method of Measurement	2010	A1: 2001
EN61326-2-1, Class A	British Standards - Electrical Equipment for Measurement, Control, and Laboratory Use - EMC Requirements - Part -1: General Requirements	2006	N/A

CE Mark

The CE Marking on the GeoProbe G10 indicates that it is in compliance with the European Union's EMC Directive, 2004/108/EC, and Low Voltage Directive 2006/95/EC.

NEBS

The G10 probe is compliant with NEBS level 3 per Bellcore GR-63-CORE and GR-1089-CORE (DC units). Since the hardware platform is continuously evolving, updated systems are periodically submitted for NEBS certification testing. For current certification status, contact Tektronix Communications Customer Service Support.

ETSI Compliance

The G10 probe is compliant with the following specifications. Since the hardware platform is continuously evolving, updated systems are periodically submitted for testing. For current certification status, contact Tektronix Communications Customer Service Support.

- ETSI EN 300 386 - Telecommunication network equipment; Electromagnetic Compatibility (EMC)
- ETSI EN 300 132-2 - Power Supply Interface to Telecommunications Equipment; Operated by Direct Current (DC)
- ETSI EN 300 019-2-1 (Storage), 2-2 (Transportation), 2-3 (weather-protected locations, not to exceed 85% relative humidity)
- ETSI EN 300 753 - Acoustic Noise

SAFETY GUIDELINES

Tektronix recommends the following safety guidelines when working with the G10 probe.

Equipment Use

Use this product only in the manner described in this manual. If the equipment is used in a manner not specified by Tektronix, the protection provided by the equipment may be impaired.

Handling the GeoProbe G10

The system is heavy and improper handling may lead to muscle strain or back injury. Have two people lift the system or use lifting aids and proper lifting techniques when handling the system. Do not use the FRU handles to lift the shelf.

Damage to Circuits

Electrostatic discharge and incorrect installation and removal of the product can damage circuits or shorten their life. Before touching the product make sure that your are working in an ESD-safe environment or wear an ESD wrist strap or ESD shoes. Hold the product by its edges and do not touch any components or circuits.

GeoProbe G10 Power Disconnect

Always ensure you disconnect power to the GeoProbe G10 prior to servicing the unit. To disconnect power to the GeoProbe G10 DC unit, set the breakers on the PEM face plates to the OFF position (**Figure 6.1**).

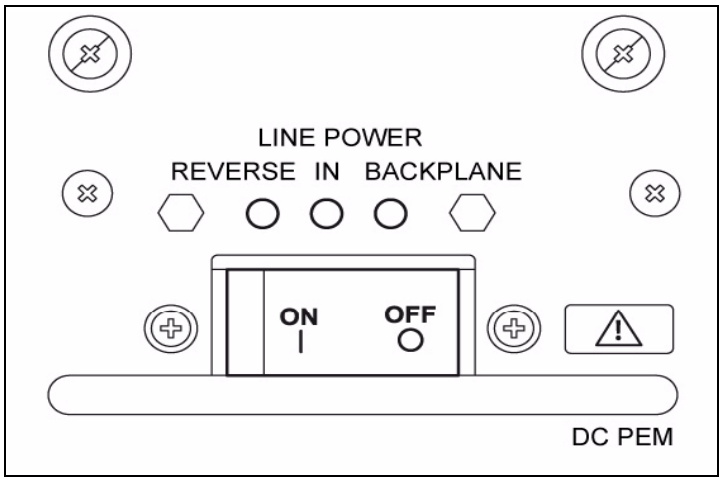


Figure 6.1 - GeoProbe G10 Power Entry Module (PEM)

G10 AC units do not have on/off switches; you must disconnect the AC plug from the rack power supply.

A switch or circuit-breaker must be included in the building installation and it must be in close proximity to the equipment and within easy reach of the operator. It must be marked as the disconnecting device for the equipment.

Circuit Protection

Tektronix recommends using the FP100 Fuse Panel (for DC units) or equivalent device for providing circuit protection for the G10 probe and SAS storage array. Ensure the device is installed in the same rack or an adjacent rack as the equipment.

Tektronix equipment, cables, and wiring diagrams comply with industry standard DC electrical color coding. Please ensure proper cabling if your equipment and cabling use nonstandard DC electrical color coding. Improper cabling can cause damage to equipment or personal injury.

FP100 Fuse Panel

The FP100 is a GMT dual circuit fuse panel that provides DC power connection, input fusing, and circuit protection for the GeoProbe G10 and SAS Storage Array (see **Figure 6.2**). The fuse panel is not applicable in AC power configurations.

Figure 6.2 - Fuse Panel Front View

The fuse panel contains two separate circuits: A and B. In each circuit, current flows from the input through the fuse bus. When you install a fuse in a fuse holder, it completes the circuit to the output connector. When a fuse fails, it sends a fail signal to the Fuse Fail Alarm circuit.

The back of the fuse panel provides input and output terminal connections, chassis ground connections, and wirewrap pins for external alarm hookups (see **Figure 6.3**).

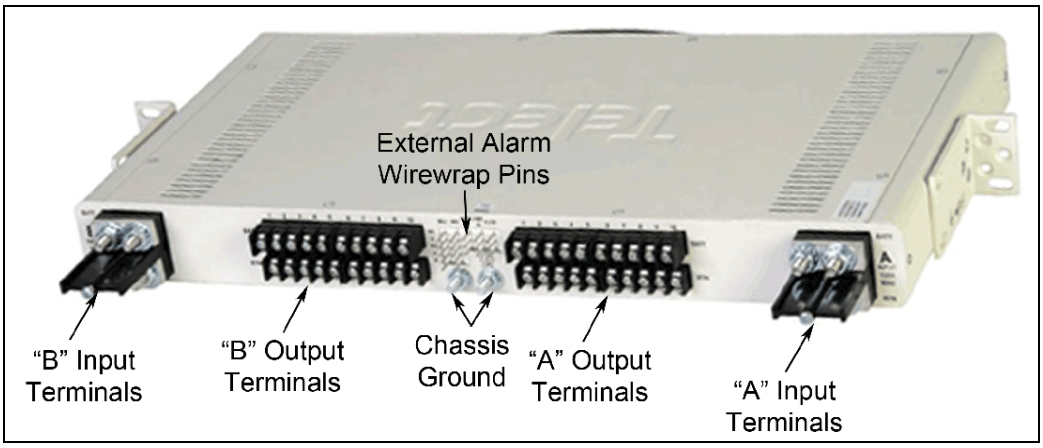


Figure 6.3 - Fuse Panel Rear View

Table 6.6 contains technical specifications for the fuse panel.

Table 6.6 - Fuse Panel Technical Specifications

Specification	Panel Capacity
Panel capacity	20 fuses (dual groups of 10)
Current capacity	0.18 to 20 A per fuse, 100 A max per group (200 A total)
Input voltage	40 to –72 VDC
Alarm contact relays	2 A
Temperature	-5 C to 55 C
Humidity	0 to 90%, non-condensing
Rack mounting	Standard 19 inch rack, 1U high

G10 Equipment Warning Labels

Table 6.7 shows the warning labels found on the G10 equipment.

Table 6.7 - G10 Equipment Warning Labels

Icon	Label
	Caution: Risk of danger. Consult accompanying documents.
	This product should be recycled and not disposed of as general waste. (WEEE annex IV resp. EN50419) Production of this equipment required the extraction and use of natural resources. The equipment may contain substances that could be harmful to the environment or human health if improperly handled at the product's end of life. In order to avoid release of such substances into the environment and to reduce the use of natural resources, we encourage you to recycle this product in an appropriate system that will ensure that most of the materials are reused or recycled appropriately. The symbol shown at left indicates that this product complies with the European Union's requirements according to Directive 2002/96/EC on waste electrical and electronic equipment (WEEE Annex IV resp. EN50419). For information about recycling options, check the Support/Service section of the Tektronix Web site (www.tektronix.com).
	If the product is not properly grounded, it may be damaged by electrostatic discharge. Make sure that each of the system's parts contact the EMI gasket. The system contains gaskets at the shelf and module level. The shelf is also fitted with ESD snaps for use with conductive wrist straps. Please take care for proper ESD protection of the operator.

A SFP Reference

Monitored Ports SFPs

This appendix provides reference information for the small form-factor pluggable (SFP) transceivers for the 1G ports and the 10G ports on the G10 probe.

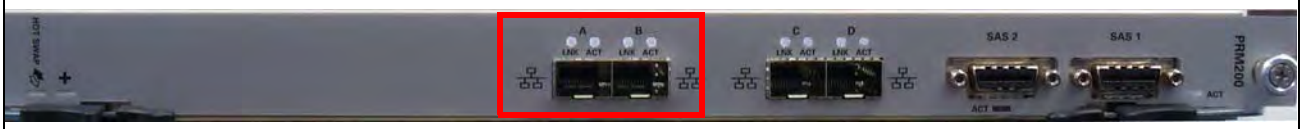
1 GB PORT SFPS

The G10 probe has the following 1G Ethernet connections (**Figure A.1**):

- IIC200—up to eight 1G Ethernet ports (4 1G ports + 4 1/10G ports)
- PRM200 RTM or PRM300 RTM—two 1G Ethernet ports (Port A and Port B)
- IIC100—up to eight 1G Ethernet ports

IIC200 eight 1G Ethernet ports (4 1G ports + 4 1/10G ports)

PRM200 RTM or PRM300 RTM (1G Ethernet Ports A and B)



IIC100 (Eight 1G Ethernet ports)

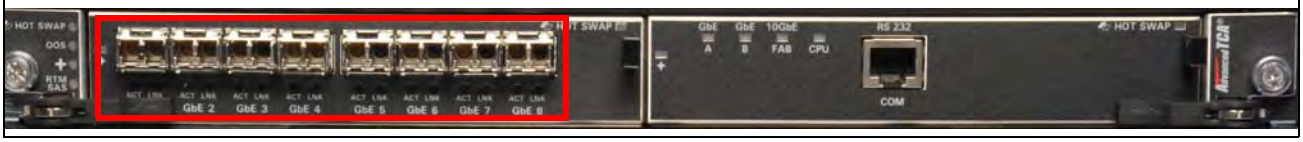


Figure A.1 - G10 1G Ethernet Connections

The available connections support optical or electrical Ethernet links. The G10 1G Ethernet ports support the following connectivity:

- 1000base-LX Fiber
- 1000base-SX Fiber
- 1000base-T Copper

1000base-LX Fiber

Distance	Tek P/N	Finisar P/N	Handle Color / Shape
1310 nm multi- or single-mode	119736700	FTLF1318P3BTL-TK	Blue / Round

1000base-SX Fiber

Distance	Tek P/N	Finisar P/N	Handle Color / Shape
850 nm multi-mode	119738600	FTLF8519P3BNL-TK	Black / Round

1000base-T Copper

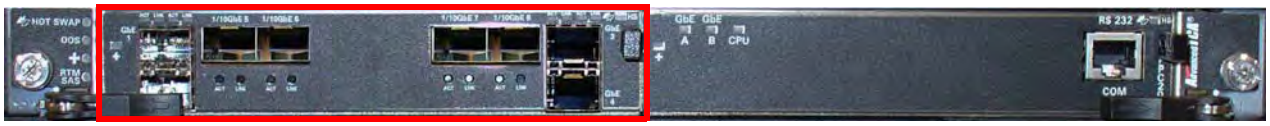
Distance	Tek P/N	Finisar P/N	Handle color / Shape
RJ-45/cat5e	119738700	FCLF-8521-3	Yellow / Round

10 GB PORT SFPS

The G10 probe has the following 10G Ethernet connections (**Figure A.2**):

- IIC200—four 10G Ethernet ports (4 1/10G ports)
- SRM200 RTM—four 10G Ethernet ports (Xlink 1-4 ports are used in multiprobe configurations)
- PRM200 RTM or PRM300 RTM—two 10G Ethernet ports (Port C and Port D are used in multiprobe configurations)
- TRM100 RTM—four 10G Ethernet ports when used with IIC100. When used with IIC200, the 10G ports are not used for monitored traffic (all monitored traffic connects to G10 using IIC200).

IIC200 four 10G Ethernet ports (4 1/10G ports)



SRM200 RTM (Four Xlink Ports)

PRM200 RTM or PRM300 RTM (10G Ethernet Ports C and D)

TRM100 (Four 10G Ethernet ports when used with IIC100)

Figure A.2 - 10 GB Ethernet Ports

The four LC type optical connections use SFP+ transceiver modules for input of 10G Ethernet links. The G10 10G Ethernet ports support the following fiber connectivity:

- 10Gbase-SR Fiber
- 10Gbase-LR Fiber

10Gbase-SR Fiber

Distance	Tek P/N	Finisar P/N	Handle color / Shape
850 nm multi-mode	119741700	FTLX8571D3BCL	Light-grey/Flat

10Gbase-LR Fiber

Distance	Tek P/N	Finisar P/N	Handle color / Shape
1310 nm single-mode	119747500	FTLX1471D3BCL	Blue/Flat

MINIMUM SIGNAL LEVELS

To accurately monitor links, a minimum signal strength is required at each G10 input port. The signal strength requirement is broad enough to allow some amount of optical taps and splitters. The Inputs must comply with **Table A.1**.

Table A.1 - Minimum Signal Levels

Interface Type	Mode	Minimum Signal Level
10 GB Ethernet	850 nm multi-mode	-9 dBm (0 dBm maximum)
	1310 nm single-mode	-12 dBm (0 dBm maximum)
1 GB Ethernet	850 nm multi-mode (SC)	-16 dBm (0 dBm maximum)
	1300/1310 nm multi-mode (LX)	-18 dBm (0 dBm maximum)
	1310 nm single-mode (LX)	-20 dBm (0 dBm maximum)

INSTALLING SFPS

You can install and remove/replace SFPs without powering down the probe or blade. Perform the following steps to install or remove/replace SFPs.

Step Action

1. Perform one of the following:
   - **New SFPs**: Remove the filler plugs from the sockets on the blades where the SFPs will be installed. Keep the filler plugs in place for any unused or empty sockets to protect the sockets and to control airflow.
   - **Replacing SFPs**: Remove cabling from the SFPs that will be replaced. Open the handle on the SFP and remove it by pulling it gently out of the socket.
2. Make sure the new/replacement SFP's handle is in the closed position. This ensures that the SFP snaps into position when inserted into the socket. Also, keep the SFP filler plug in place until the SFP is installed.
3. Determine the correct orientation for the SFP you are inserting. SFP orientation varies depending on the blade and port in which you are installing it. Refer to the following sections for orientation details:
   - IIC200
   - IIC100
   - TRM100 RTM
   - PRM200 RTM or PRM300 RTM
   - SRM200 RTM
4. Carefully slide the SFP into the socket until its connector is fully seated and snaps into position. Keep the filler plugs in place until you are ready to connect cables to the SFPs. The plugs protect the SFP internal components.
5. Connect cabling.
6. If this is a new installation, you must configure the Physical Device Port settings in Probe Details tab in Iris Admin. Refer to the Iris Admin online help for details.

   If replacing SFPs, procedures vary depending on the type of SFP replacement you are performing and the blade in which you are replacing it. **Table A.2** summarizes the required steps for each scenario.

Table A.2 - SFP Replacement Procedures

G10 Blade	Type of SFP Replacement		
	Same SFP Speed and Mode as Original	**Change SFP Speed (1G to 10G or 10G to 1G)**	**Change SFP Mode (multi- to single- or single- to multi-)**
IIC200	Reboot the IIC200.	Update the Physical Device Port settings in Probe Details tab in Iris Admin. Reboot IIC200	Reboot the IIC200.
IIC100	No reboot necessary.	Update the Physical Device Port settings in Probe Details tab in Iris Admin. Reboot the IIC100.	No reboot necessary.
PRM200 RTM	Reboot the IAP200.	Reboot the IAP200.	Reboot the IAP200.
PRM300 RTM	Reboot the IAP320.	Reboot the IAP320.	Reboot the IAP320.
PRM100 RTM	N/A	N/A	N/A
IAP320	N/A	N/A	N/A
IAP200	N/A	N/A	N/A
IAP100	N/A	N/A	N/A

IIC200

The IIC200 SFP module socket configurations vary depending on the port. When the handle is in the closed and locked position, you insert the SFP with either the handle in the UP or DOWN position, depending on the port. Ensure that you are installing the SFP module in the correct orientation for the port. Refer to the following table and **Figure A.3**.

G10 Port	Insert SFP with Closed Handle:	Port TX/RX	
		Left	**Right**
1 GbE 1 and 3	**UP**	**TX**	**RX**
1/10GbE 5-8	**DOWN**	**RX**	**TX**
1 GbE 2 and 4	**DOWN**	**RX**	**TX**

Figure A.3 - IIC200 SFPs

IIC100

Insert 1 Gb SFPs into the IIC100 with the closed handle in DOWN position (**Figure A.4**). For the 1G SFPs, the left port is Receive (RX) and the right port is Transmit (TX).

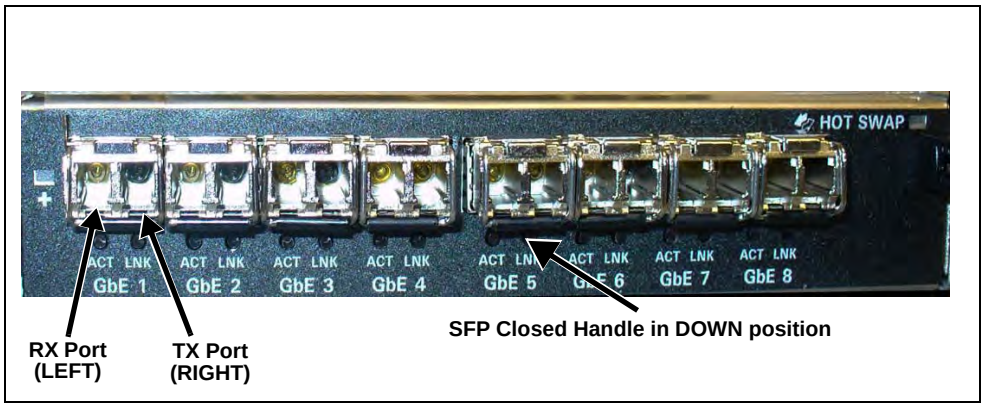


Figure A.4 - IIC100 SFPs

TRM100 RTM

The four 10G Ethernet ports are only used when paired with the IIC100. When paired with IIC200, the 10G ports are not used for monitored traffic (all monitored traffic connects to G10 using IIC200).

Insert 10 Gb SFPs with the closed handle in UP position (**Figure A.5**). For the 10G SFPs, the left port is **Transmit (TX)** and the right port is **Receive (RX)**.

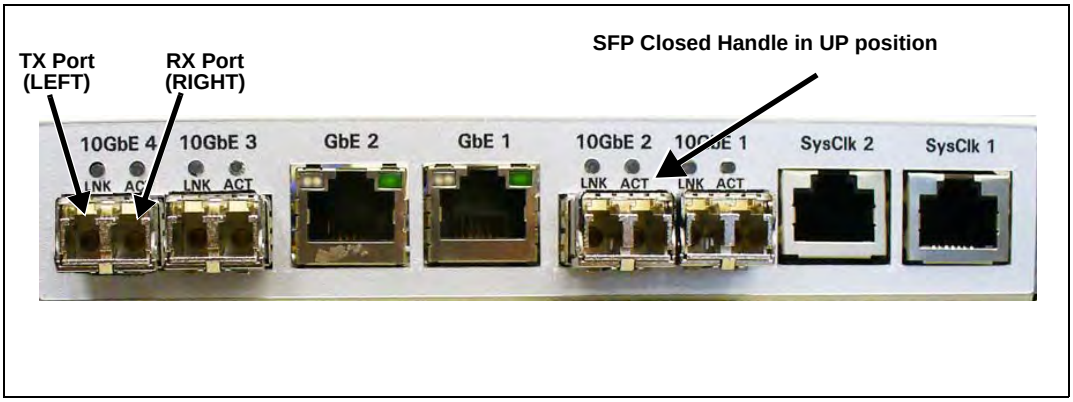


Figure A.5 - TRM100 RTM Paired with IIC100

PRM200 RTM or PRM300 RTM

Insert 1G and 10G SFPs with closed handle in UP position (**Figure A.6**):

- Port A and Port B—1G Ethernet ports
- Port C and Port D—10G Ethernet ports (only used in multiprobe configurations)

Figure A.6 - PRM200 RTM or PRM300 RTM SFPs

SRM200 RTM

Insert 10G SFPs with closed handle in UP position (**Figure A.7**):

- Xlink 1-4 ports—used in multiprobe configurations

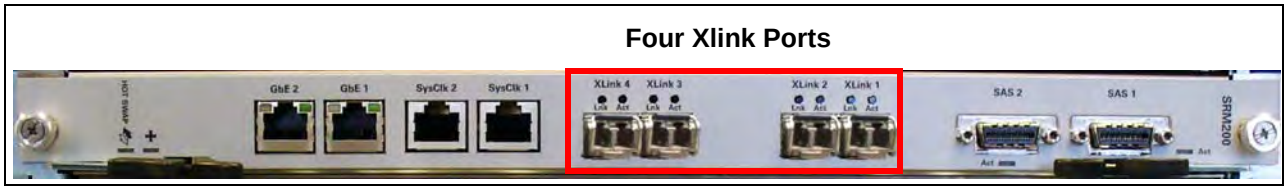


Figure A.7 - SRM200 RTM SFPs