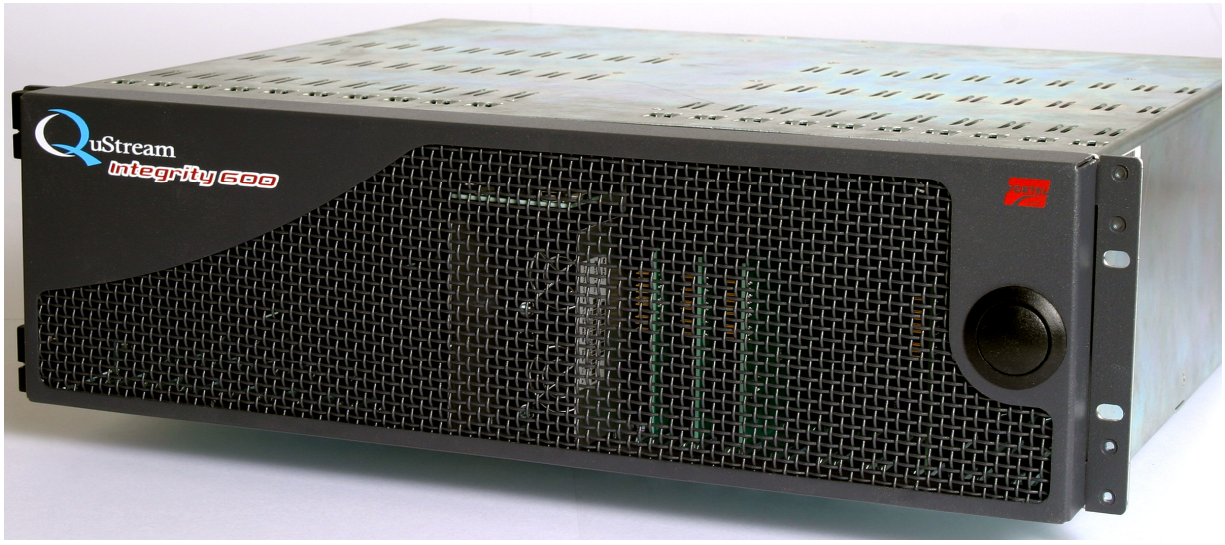
TECHNICAL MANUAL

INTEGRITY 600 SERIES
FRM603
CHASSIS FRAME



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Chapter 1 About This Manual

1.1 DOCUMENTATION AND SAFETY OVERVIEW

This manual provides instructions for the installation of the Integrity 600 Series "Smart Frame" built by PESA.

It is the responsibility of all personnel involved in the installation, operation, and maintenance of the equipment to know all the applicable safety regulations for the areas they will be working in. ***Under no circumstances should any person perform any procedure or sequence in this manual if the procedural sequence will directly conflict with local Safe Practices. Local Safe Practices shall remain as the sole determining factor for performing any procedure or sequence outlined in this document.***

1.2 WARNINGS, CAUTIONS, AND NOTES

Throughout this document, you should notice various Warnings, Cautions, and Notes. These addendum statements supply necessary information pertaining to the text or topic they address. It is imperative that audiences read and understand the statements to avoid possible loss of life, personal injury, and/or destruction/damage to the equipment. These additional statements may also provide added information that could enhance the operating characteristics of the equipment (i.e., Notes). Examples of the graphic symbol used to identify each type of statement and the nature of the statement content are shown in the following paragraphs:

1.2.1 WARNING

	**Warning statements identify conditions or practices that can result in loss of life or permanent personal injury if the instructions contained in the statement are not complied with.**

1.2.2 CAUTION

	**Caution statements identify conditions or practices that can result in personal injury and/or damage to equipment if the instructions contained in the statement are not complied with.**

1.2.3 NOTE

	**Notes are for information purposes only. However, they may contain invaluable information important to the correct installation, operation, and/or maintenance of the equipment.**

Chapter 2 Introduction

2.1 DESCRIPTION

PESA's FRM603 "Smart Frame" is a member of the Integrity 600 Series of audio and video processing products, featuring "Fortel Inside" Technology. This unique frame is designed with numerous internal signal routing and control capabilities, giving the engineer or system integrator amazing flexibility in implementing a video/audio processing system. Functionally, the FRM603 is a chassis frame providing 20 card slots for Integrity 600 Series A/V Processing Modules. It also supports a built-in Frame Controller CCA (redundant capable), one or two (for redundancy) power supplies and the signal-routing mid-plane. A front view of a typical FRM603 frame is shown in Figure 2-1.

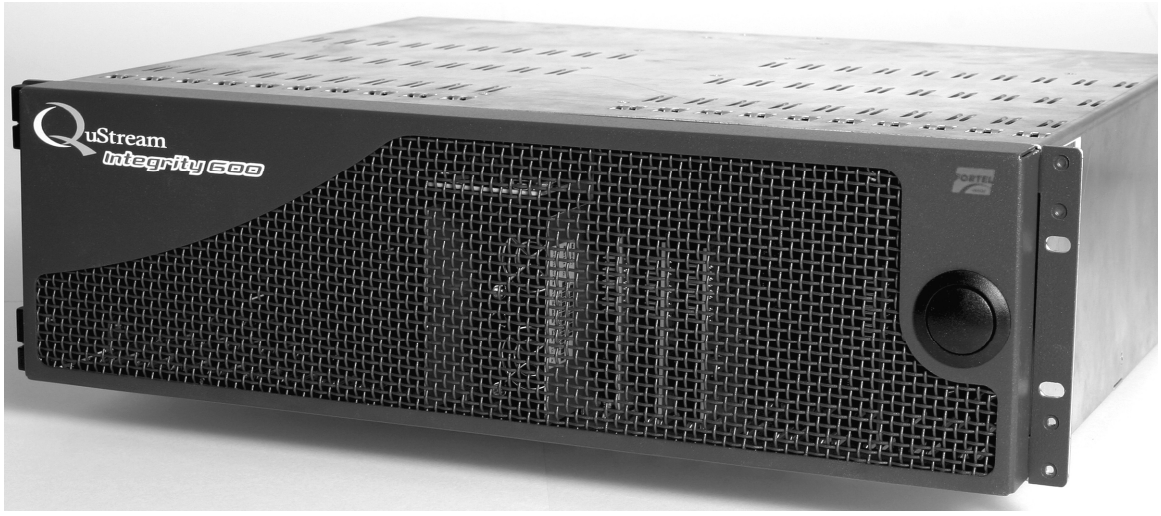


Figure 2-1 FRM603 Chassis Frame

All 600 Series Processing Modules are installed into the frame in two parts – the main circuit board and a removable rear panel. Module rear panels attach to the rear panel of the FRM603 frame and occupy either one or two card slots – depending on the type module used. Each module circuit board is installed from the front of the frame and mates to both its rear panel and the internal mid-plane.

Mid-plane signal routing allows you to scale input and output capability to virtually limitless combinations, using Star-Slot compatible modules; and allows tremendous signal format up/down conversion or D/A conversion flexibility for most installations.

The mid-plane of the FRM603 can route signals between installed modules in several ways:

- Modules can share signals between other modules located in adjacent card slots
- Modules with Star-Slot capability installed in either slot 5 or 16 can share signals with all other installed Star-Slot capable modules
- Sync reference signals are routed from genlock input BNC connectors on the frame rear panel to all card slots, if the frame is equipped with a frame controller or a REF603 sync distribution module

- Operational commands are routed from a Frame Controller Module to all installed modules

A block diagram of the FRM603 Frame is shown in Figure 2-2. Refer to the figure as we discuss the features and functions of the chassis frame.

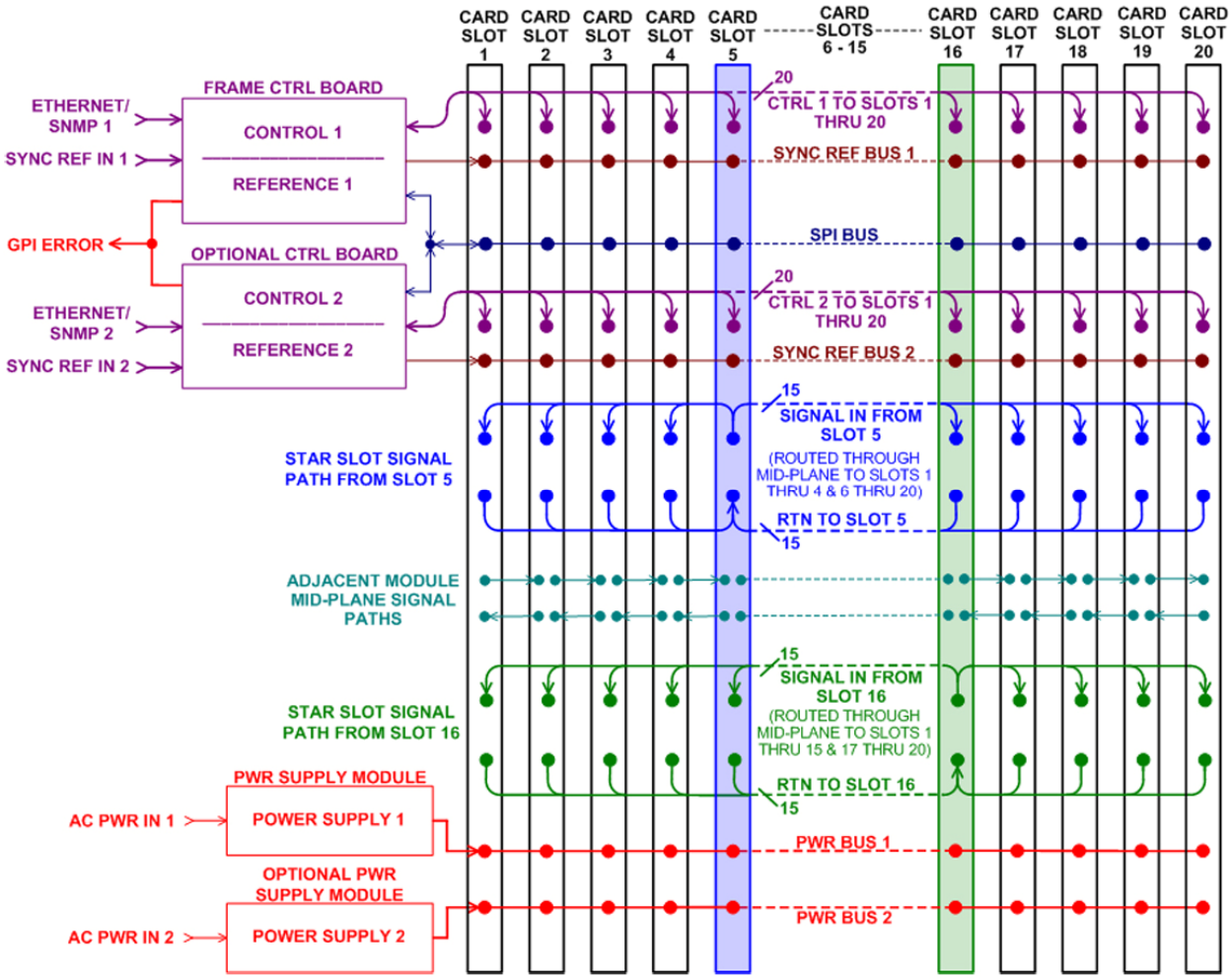


Figure 2-2 FRM603 System Interconnect Block Diagram

2.2 OVERVIEW OF SYSTEM ARCHITECTURE

Every Integrity 600 Series installation is composed of any number of various types of audio and video processing modules installed in a rack-mount chassis frame, such as the FRM603. In the Integrity 600 series there are modules that process analog audio and video, SD and HD SDI signals, up/down conversion modules and modules that embed/de-embed audio from digital signals. Each module receives input signals from an external source and provides signal outputs for connection to other facility equipment through rear panel connectors.

The FRM603 Chassis Frame, Figure 2-3, provides 20 module slots in a 3 RU frame, internal Frame Controllers with SNMP Monitoring and Reporting, Sync Reference distribution to each module and Power for all modules. Full Control and Power redundancy is optionally available by adding a second Frame Controller module and Power Supply Module. Frame Controller, Power Supply and all Processing Modules are accessible from the front and are "hot-swappable" for easy access and maintenance.

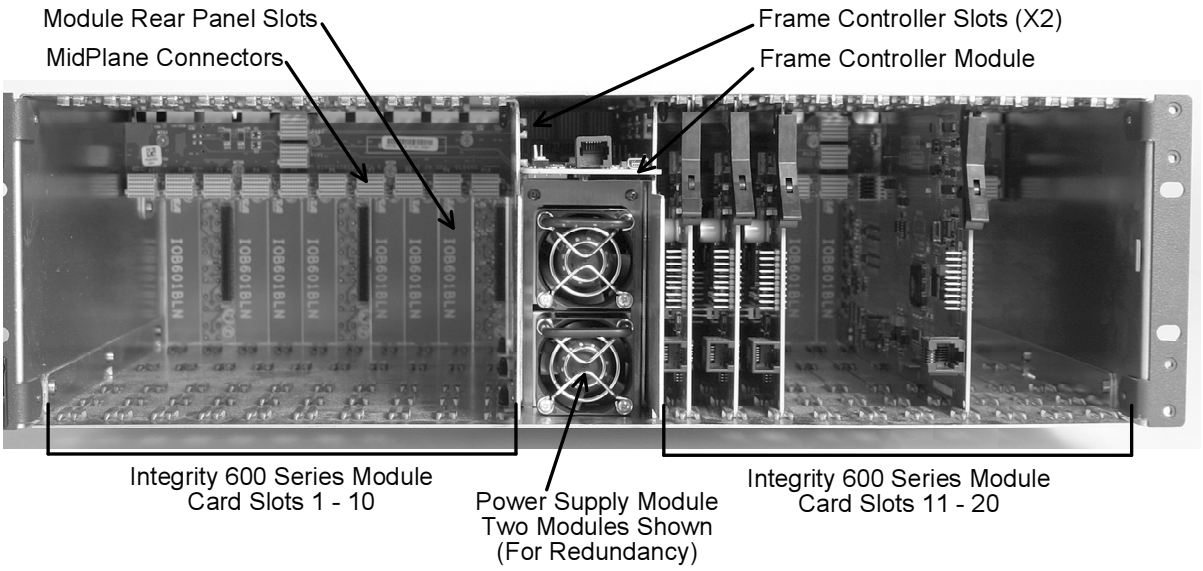


Figure 2-3 FRM603 Front View – Access Door Open

2.2.1 INTERNAL SIGNAL ROUTING

Figure 2-2 schematically illustrates the signal routing capability of the frame. Card Slots 1 through 20, the Frame Controller and internal Power Supply are shown in the diagram.

Many Integrity 600 Series modules are equipped with an input selector device, whereby the input signal source may be selected as the rear panel connector of the module or the output signal from a module located in an adjacent card slot within the frame. 600 Series modules designated as Star Slot compatible, may also receive a signal delivered through the mid-plane of the frame over either of two special purpose buses called the Star Slot Buses. Figure 2-2 illustrates each "Star Slot" bus and the adjacent module signal paths.

Internal routing through the frame mid-plane allows multiple modules to be installed in a cascade fashion. In practical application, this feature may be used to expand outputs, produce various output signal formats from a single HD input source, or any of numerous other system configuration possibilities. The "Star Slot" buses allow compatible modules installed in slots 5 or 16 to share input or output signals with all other module slots in the frame. This capability greatly expands the system design possibilities of an Integrity 600 Series installation.

2.2.2 FRAME CONTROLLER

Although not all installations require a Frame Controller Module be installed; in most applications, at least one Frame Controller will be present. When present, the Frame Controller serves as the master overseer of all modules in the frame. A typical Frame Controller Module is shown in Figure 2-4. The NET603 frame controller communicates via an Ethernet connection to RCP-503 Integrity Series remote control panels or to a Windows™ based PC running the SOFT603 software control application. Using menus on the remote control panel or PC, you may configure numerous operational parameters of the processing modules, monitor the health and status of the processing modules using SNMP monitoring and reporting and perform other operational tasks. Specific control functions for each module are discussed in the documentation package for the module.

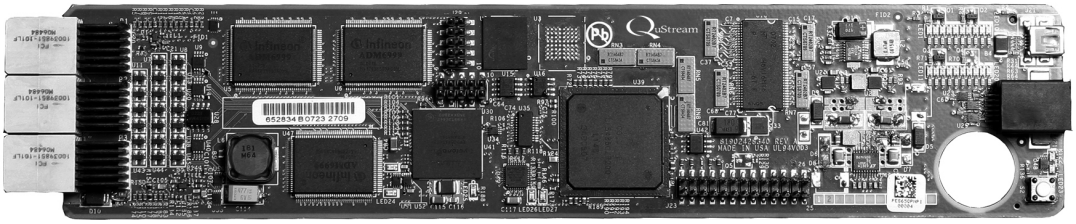


Figure 2-4 Frame Controller Module

The FRM603 frame provides two Frame Controller slots - only one module is necessary for system operation. A second module may be installed for control redundancy.

Each frame controller slot in the FRM603 frame is connected to a dedicated rear panel BNC connector for input of sync reference (genlock) from an external source. Connector GEN1 connects to the controller module in controller slot 1; and GEN2 connects to the controller module in controller slot 2. The active controller distributes sync reference to all modules in the frame via the mid-plane.

Each frame controller slot in the FRM603 frame is also connected to a dedicated rear panel RJ-45 Ethernet connector for connection to external remote control panels or a PC running a 600 Series software control application. Connector ETHERNET 1 connects to the controller module in controller slot 1; and ETHERNET 2 connects to the controller module in controller slot 2.

Notice in Figure 2-2, that there is a bi-directional data and control bus between the Frame Controller Module and each of the 20 card slots. This is the main communication bus between the modules and the controller. Operational commands are communicated to the modules and status information from the modules is returned to the controller via this bus.

2.2.3 POWER SUPPLY MODULE

A single Power Supply Module can provide power for all 20 card slots. A second power supply module may be installed for redundancy. Power is distributed to each module over individual power busses from each power supply. There are some restrictions on the number of modules that may be installed in the frame, and these are discussed in Paragraph 3.3.

2.2.4 FRAME REAR PANEL

Figure 2-5 illustrates the rear panel of the FRM603 chassis frame. The center portion is the rear panel of the power supply/frame controller chassis. This panel contains power connectors for the two power supply slots, Ethernet connectors for the two frame controller modules, plus connectors for input of sync reference signals and external frame alarm circuits. There are 10 module slots on each side of the power supply/frame controller chassis

Figure 2-5 FRM603 Rear Panel

2.2.5 INTEGRITY 600 SERIES MODULES

Every Integrity 600 Series processing module consists of a rear connector panel and the main circuit card. These two items are shipped as a set, but must be installed individually into the FRM603 Chassis Frame. A typical 600 Series module, with main board and modular rear panel, is shown in Figure 2-6.

There are two variations of rear panels used with 600 Series modules – single-width and double-width. Single-width rear panels are fitted with 8 connectors and occupy a single slot in the FRM603 chassis. Double-width rear panels are fitted with 16 connectors and occupy two rear-panel slots in the chassis. The main circuit board is the same physical size for both applications and occupies a single card slot in the front of the chassis.

Certain 600 Series modules are “Star-Slot” compatible, meaning that these modules have on-board circuitry to send and receive signals over the FRM603 Star-Slot bus with other Star-Slot compatible modules.

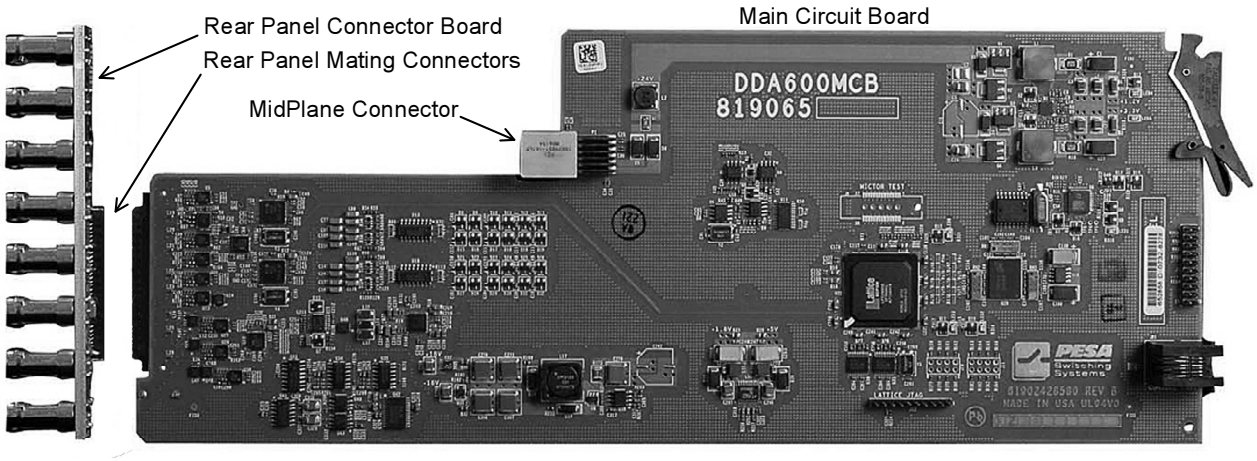


Figure 2-6 Integrity 600 Series Module - Typical

Chapter 3 Installation

3.1 UNPACK EQUIPMENT

Carefully remove all equipment from the packing containers and verify that no small or wrapped items have been inadvertently left in the packing material. Inspect all equipment items prior to beginning installation.

3.2 GENERAL SYSTEM LAYOUT

In order to realize the greatest versatility and take full advantage of the internal routing features of your Integrity 600 system, careful planning and layout of module locations within the FRM603 is important.

There are no restrictions on placing modules in the FRM603 frame – any module will function stand-alone in any slot. However, if you are intending to incorporate internal frame routing, adjacent module signal sharing or Star Slot routing, you should have the system pre-planned prior to module installation. PESA recommends that you make a detailed drawing of your system and follow it when loading modules into the frame. The following guidelines will help you in your system planning, but they are not intended to be an all-inclusive, step-by-step guide.

- Make a listing of the modules you will use in your system, and determine the internal routing capability of each module. Not all 600 Series modules share the same capabilities: for example single input distribution amplifiers can only receive input signals from the module *LEFT* adjacent to it, or the Star Slot *A* routing bus.

- Not all modules are equipped for internal signal routing. If you are going to use internal routing in your layout, it would not be advisable to install modules without such capability in a Start Slot or in a frame slot you may need for signal sharing.

- Consider placement of modules you intend to share signals first. Include in your sketch which module will receive a signal from an external source, how you want signals distributed to other modules and with which module the internal routing will terminate.

Every Integrity 600 Series processing module consists of a rear connector panel and the main circuit card. These two items are shipped as a set, but must be installed individually into the FRM603 Chassis Frame. The DDA-617 processing module occupies a single card slot and may be installed in any available slot in the chassis frame. Proper installation requires that the rear connector panel be installed before the circuit board. Observe the following precautions before proceeding with installation:

3.3 INSTALL MODULES

Installing 600 Series modules requires access to both the front and rear of the chassis frame. While it really makes no difference operationally whether the modules are installed prior to mounting the chassis frame in a rack, you may find it more convenient to install the modules first.

Proper installation requires that the rear connector panel be installed before the circuit board. Observe the following precautions before proceeding with installation:

CAUTION

Damage may occur to the rear connector panel or the circuit board if installation instructions are not properly followed.

- Rear connector panel MUST be installed before the front-mounted circuit board.
- If a circuit board should occupy a chassis frame slot where a rear connector panel is to be added or changed, the circuit card MUST be removed or slid out a minimum of two inches from the front side of the chassis frame before installing the rear connector panel.

3.4 INSTALL REAR CONNECTOR PANEL

Install rear connector panel as follows:

1. If your processing module was shipped with the rear connector panel attached to the main circuit board, separate the two units.
2. Figure 3-1 illustrates the connector panel installation process using a single-width panel; however the procedure is identical for installing a double-width rear panel.
3. Orient the rear connector panel with the main board connector toward the lower edge of the chassis.
4. Install the panel by pressing it upward under the top lip of the chassis frame, and move the panel toward the chassis until it is flat against the chassis frame, refer to Figure 3-1.
5. Allow the bottom edge of the connector panel to drop down into its mating slot at the bottom of the lower edge of the chassis.
6. Install retention screw through connector panel to chassis frame, but **DO NOT** fully tighten the retention screw, leaving the rear panel freedom to move, until after the Main Circuit Board is installed per Paragraph 3.3.2.

CAUTION

DO NOT fully tighten the retention screw until **after** the Main Circuit Board is installed. Severe damage could occur to the main board connector if the rear panel is tightly secured prior to installing the main board.

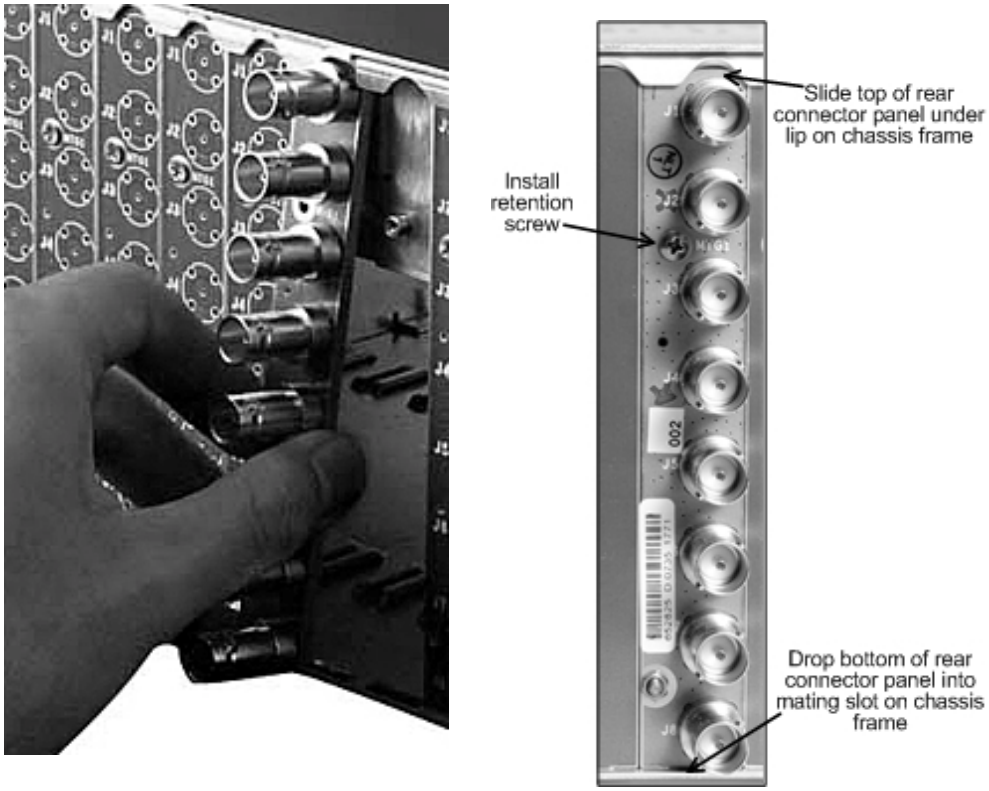


Figure 3-1 Installing Rear Connector Panel

3.5 INSTALL MAIN CIRCUIT BOARD

Install main circuit board as follows:

1. Open front access door on the FRM603 chassis frame.
2. Locate the empty card slot that mates to the rear connector panel installed in the previous step.
3. Align the top and bottom edges of the circuit board with the chassis card guides as shown in Figure 3-2.
4. Hold the card ejector lever out (unlocked position) as shown when inserting the board.
5. Press the board into place to ensure solid connection with the mating connectors on the mid-plane and rear connector panel.

NOTE

Do not force the card into position. If the card does not seat with gentle pressure, back it out, realign with the card guides and reinsert the card.

6. When the card is properly seated, press the card ejector lever toward the board to lock the card in position.
7. Once the main board is seated and locked, and all connectors have properly mated, secure the rear connector panel to the chassis frame by tightening the retention screw.
8. Close the chassis frame front access door.

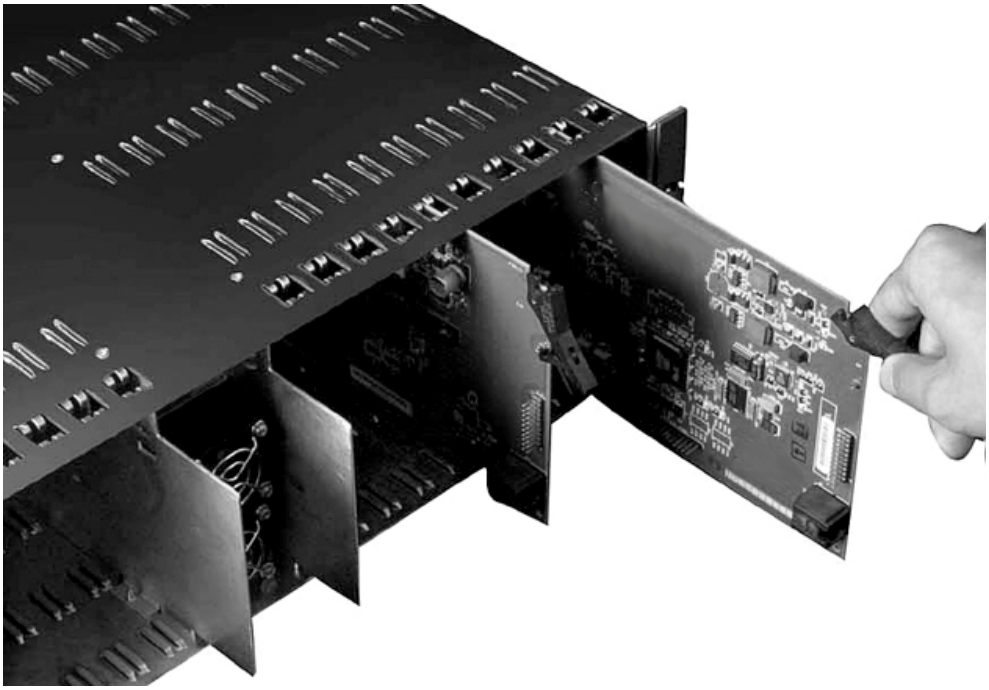


Figure 3-2 Installing Main Circuit Board

3.6 MOUNT THE FRM603 CHASSIS FRAME IN AN EQUIPMENT RACK

Make sure the frame power cords are disconnected from the power source before installing the frame into an equipment rack.

	**Fans that are mounted inside of this equipment provide forced-air cooling. Do not block airflow around the chassis.**

All frames comprising an Integrity 600 Series system are designed for installation in a standard 19" equipment rack. Provide sufficient space behind the equipment racks to allow for control, signal, interconnect and power cables. Use all chassis mounting holes, and tighten mounting hardware securely by using the rack equipment manufacturer's suggested torque settings.

Install equipment into racks as follows:

7. Carefully, remove equipment from packing container and place frame near the rack where it will be installed.
8. Insert chassis frame into equipment rack and support the bottom of the chassis while mounting hardware is installed.
9. Install the bottom two chassis mounting screws.
10. Install the top two chassis mounting screws.
11. Tighten all chassis mounting screws until they are secure.

3.7 REAR PANEL SIGNAL CONNECTIONS

Input and output connections to processing modules may be made through the rear connector panel, or, in some installations, the internal routing midplane of the chassis frame. When rear panel connectors are used for I/O connections, follow the panel layout diagram provided with documentation supplied with each particular module. When making connections to the rear panel connectors, use a good quality coaxial cable and ensure that the mating BNC connector is properly installed. Relieve strain on all cables to prevent connector separation. To the greatest extent possible, separate control, signal, and power cables to minimize crosstalk and interference.

Use cable ties, or other fastener, to secure hook-up cables to the rack, as shown in Figure 3-3. This will provide cable strain relief and help route cables away from hazardous areas. Do not use cable ties on fiber optic cable.

Route cables away from physical traffic areas to avoid creating a safety hazard (trip or shock).

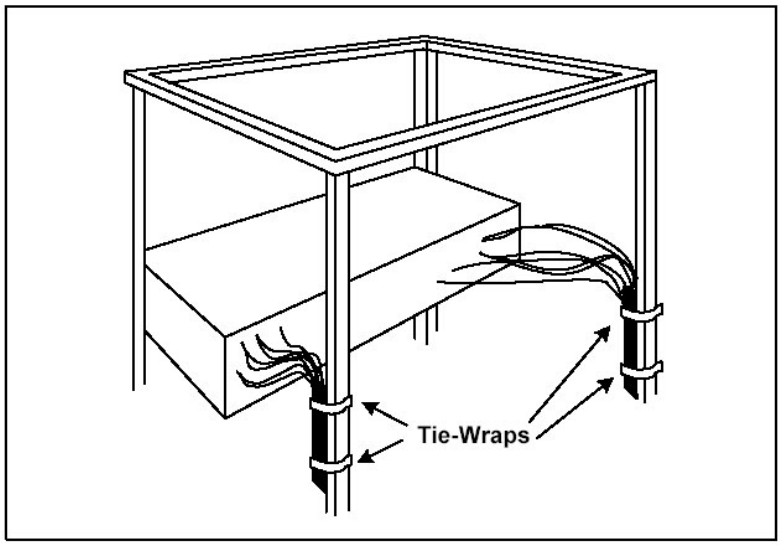


Figure 3-3 Cables Attached To Supports

3.8 ETHERNET CONNECTIONS

All communication between the frame controllers, if so equipped, and external control devices is made over an Ethernet communication link. Frame controllers may be interfaced to RCP-503 remote control panels, a Windows™ based PC running the Soft603 software application or may be connected over a facility intranet to interface with multiple devices over the network.

3.8.1 FRM603 CHASSIS FRAME TO A SINGLE RCP-503 CONTROL PANEL

In the most basic installation application, a single FRM603 is connected to a single RCP-503 remote control panel. In this application, all adjustments and selections to 600 series modules are made through the single control panel. Ethernet connections are made using common CAT5E cable with RJ45 connectors fitted to each end.

Figure 3-4 illustrates the hook-up for a single FRM603 and a single RCP-503. A CAT5E crossover cable is used in this application. Connect one end of the CAT5E cable to the remote control rear panel connector labeled REMOTE 1 and the other end to the chassis frame rear panel ETHERNET connector associated with the controller slot containing the frame controller module. In our example illustration ETHERNET 1, assuming the NET603 frame controller is installed in controller slot 1. Remember that rear panel ETHERNET connectors 1 and 2 are controller slot specific. ETHERNET connector 1 connects directly to frame controller slot 1 and ETHERNET connector 2 connects directly to frame controller slot 2.

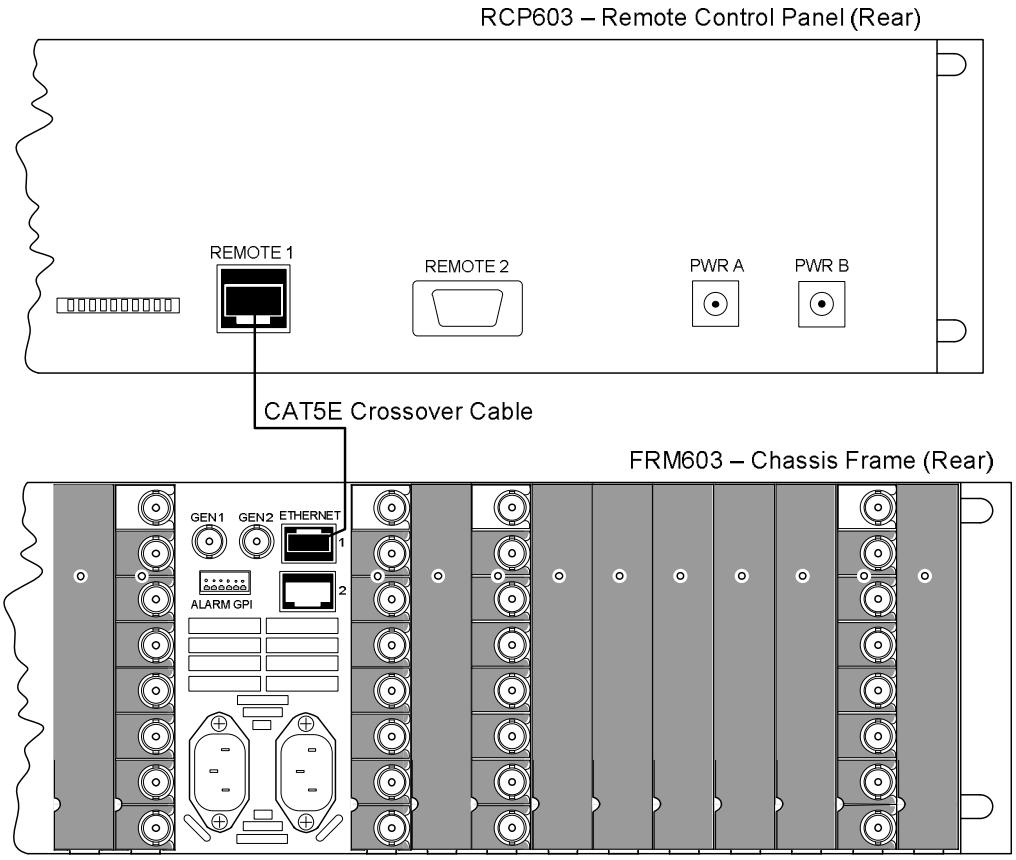
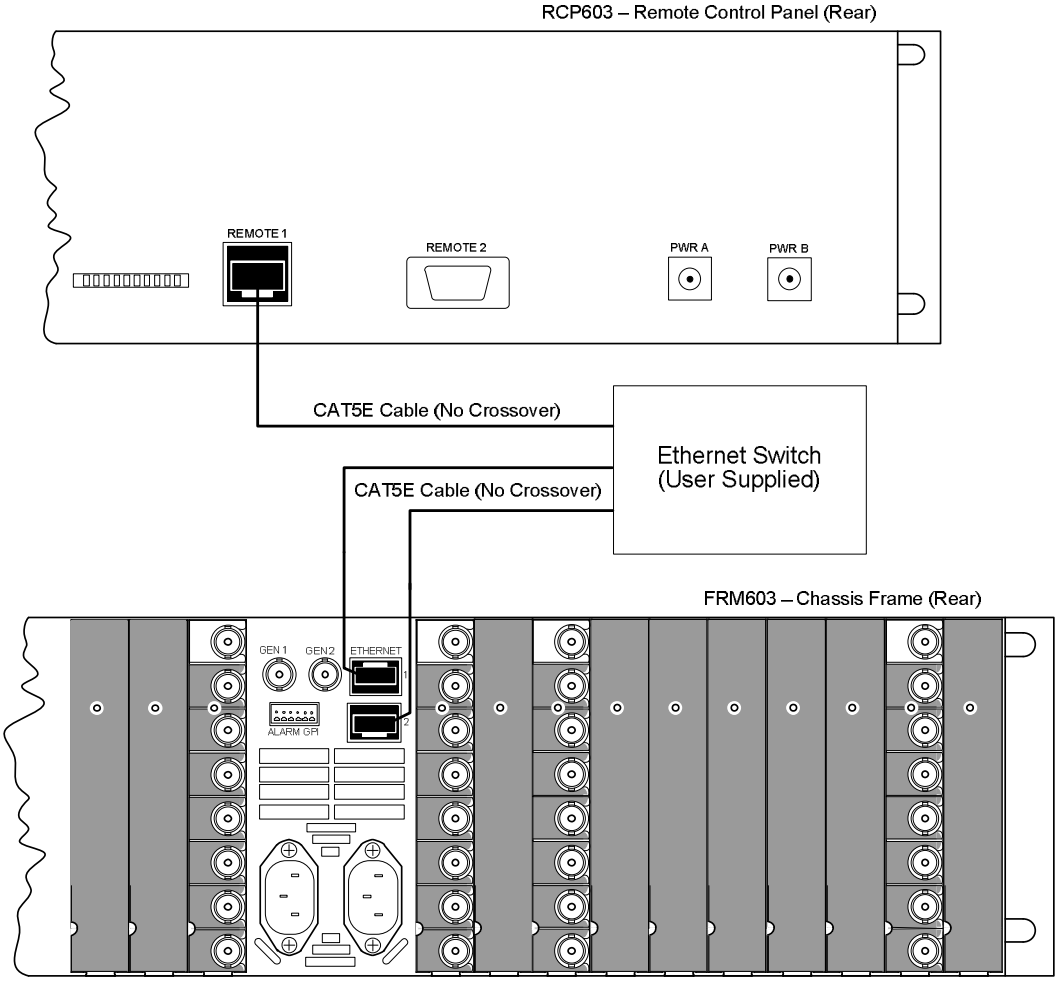


Figure 3-4 Frame Direct to Single Control Panel

3.8.2 FRM603 CHASSIS FRAME WITH REDUNDANT FRAME CONTROLLERS TO A SINGLE RCP-503 CONTROL PANEL

When dual (redundant) frame controllers are used in the chassis frame, each controller must be independently connected to the control panel. This is accomplished by using an external Ethernet switch device, as shown in Figure 3-5.



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3.8.3 MULTIPLE FRM603 FRAMES OR CONTROL DEVICES

Any installation other than a single frame to a single panel requires the use of an external Ethernet switch. Frames and control panels may be interconnected through the switch as a unique intranet, or may be connected to the facility local area network (LAN). Every frame and control panel must be assigned a unique IP Address on the network. By networking any number of frames, control panels or PCs running the Soft603 application, you can easily configure a processing system with multiple control points located close to operator stations or remote areas of the facility.

3.9 CONNECTION CHECKLIST

Once the frame is installed in an equipment rack, associated system connections can be completed. Order of completion of installation steps is not critical, however, DO NOT apply power to a frame until all signal, sync and control cables have been installed and their connections verified for proper placement and accuracy. Use the following guide to insure that all connections are made properly and that power, system interconnect and signal cables are correctly installed.

1. Connect an external sync source to the Sync Reference Input (REF) of each DXE Frame using 75 Ohm coaxial cable such as Belden 8281, or equivalent. Be sure to properly terminate external sync sources into a 75Ω load terminator.
2. Complete audio and video connections to module rear panel connectors.
3. Use a good quality CAT5E cable to complete a connection through the FRM603 rear panel between the NET603 frame controller and Integrity Series remote control panels, a host PC or a facility LAN.
4. If you wish to incorporate external alarm devices in your installation, complete connections between the external alarm circuitry and the NET603 controller through the rear panel Alarm/GPI connector.

3.10 POWER CONNECTIONS

Power for the FRM603 is derived from wall receptacles. No special direct wiring or heavy gauge wire is required for this equipment. There are two power connector receptacles, one for each power supply module, located side-by-side on the frame rear panel. In a non-redundant power system, only one of the power supply slots will have a power supply module installed. Attach the power cord to the receptacle supplying power to the populated power supply slot. Input power is not bussed between modules. When two power supplies are used (for redundancy) a separate power cord must be attached to each rear panel receptacle through its access port.

Connecting the power cord to a source of power immediately applies power to the FRM603. Do not apply power for the first time until all signal, sync and control connections have been made and verified.

3.11 INITIAL POWER-UP

Before applying power for the first time, please take time to go back over your installation:

- Check for electrically sound connections, proper connector placement and possible wiring errors.
- Ensure that each FRM603 has a connection with a source of in-house sync.
- Check that all 600 Series modules, rear panels, power supply and controller modules are securely installed.

There is no power switch on the frame, and it is powered-up simply by connecting the main power cord to a source of primary power. Systems with redundant power supply modules have two main power cords, each of which must be connected to source of primary power.

Chapter 4 Operation

4.1 INTRODUCTION

There are no operating controls located on the FRM603 chassis frame. All control and panel set-up operations are done through an external control panel or a PC running the SOFT603 software application connected to the chassis frame through an Ethernet connection to the NET603 frame controller contained in the chassis.

Any number of FRM603 frames and external control panels may be connected to each other through an external Ethernet switch device or connected through the facility local area network (LAN).

When any Ethernet devices are connected to a network using an IP protocol, each device must have a unique IP address assigned. It is beyond the scope of this document to provide a tutorial on networking or IP address structure. If you are connecting Integrity 600 devices together directly or through an Ethernet switch in a unique intranet configuration, the factory set IP addresses will likely not need to be changed, and will allow the devices to communicate with one another.

If your installation requires including the Integrity 600 devices into an existing facility LAN, you will need to consult your network administrator for the proper IP addressing scheme to use for each device in the system. If it is necessary to change the IP address of the NET603 frame controller, use the procedure contained in Paragraph 4.2. Changing the IP address of modules within the frame is accomplished through the control panel or control software. Consult the manual for the RCP-503 remote control panel or SOFT603 control software for information on changing the IP addressing of the panel or 600 series modules.

In order to communicate with one another, all Integrity 600 series devices must be programmed with the proper IP address data, and the external control panels must be able to communicate with all frames and all modules in the system. Refer to control system documentation for further information and procedures for operating the 600 series system.

4.2 CHANGING THE DEFAULT FRAME CONTROLLER IP ADDRESS

The NET603 frame controller determines the IP address of the chassis frame. Refer to the NET603 Technical Manual, 81-9059-0644-0, for the procedure to change the IP address or net mask of the controller.

4.3 SYSTEM OPERATION

Once the IP addressing scheme is set and the panels, frames and modules are communicating, all operating procedures for the frame and modules within the frame are performed through the control system panels.

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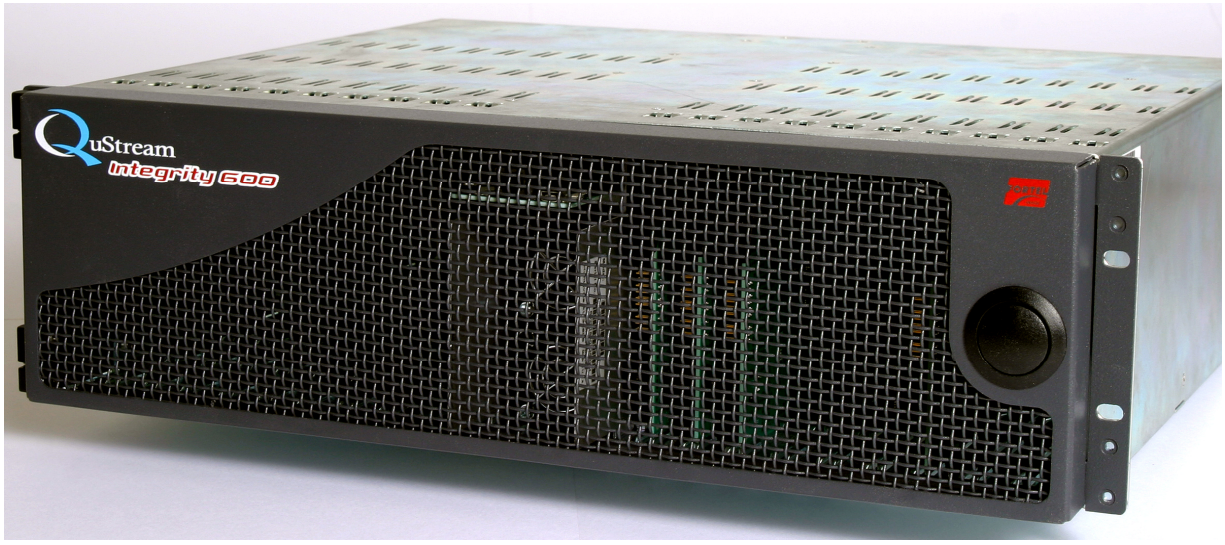

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Our commitment is to continue earning the trust and confidence of our customers throughout the industry by incorporating cutting-edge technology into the highest quality, most cost effective products on the market. And we would like to invite you to tell us how we're doing. If you have any comments or suggestions concerning your PESA equipment, please contact our Customer Service Department.

Again thank you for choosing a PESA product and we look forward to a long-term partnership with you and your facility.

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May, 2008

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Chapter 1 About This Manual

1.1 DOCUMENTATION AND SAFETY OVERVIEW

This manual provides instructions for the installation of the Integrity 600 Series "Smart Frame" built by PESA.

It is the responsibility of all personnel involved in the installation, operation, and maintenance of the equipment to know all the applicable safety regulations for the areas they will be working in. ***Under no circumstances should any person perform any procedure or sequence in this manual if the procedural sequence will directly conflict with local Safe Practices. Local Safe Practices shall remain as the sole determining factor for performing any procedure or sequence outlined in this document.***

1.2 WARNINGS, CAUTIONS, AND NOTES

Throughout this document, you should notice various Warnings, Cautions, and Notes. These addendum statements supply necessary information pertaining to the text or topic they address. It is imperative that audiences read and understand the statements to avoid possible loss of life, personal injury, and/or destruction/damage to the equipment. These additional statements may also provide added information that could enhance the operating characteristics of the equipment (i.e., Notes). Examples of the graphic symbol used to identify each type of statement and the nature of the statement content are shown in the following paragraphs:

1.2.1 WARNING

	**Warning statements identify conditions or practices that can result in loss of life or permanent personal injury if the instructions contained in the statement are not complied with.**

1.2.2 CAUTION

	**Caution statements identify conditions or practices that can result in personal injury and/or damage to equipment if the instructions contained in the statement are not complied with.**

1.2.3 NOTE

	**Notes are for information purposes only. However, they may contain invaluable information important to the correct installation, operation, and/or maintenance of the equipment.**

Chapter 2 Introduction

2.1 DESCRIPTION

PESA's FRM603 "Smart Frame" is a member of the Integrity 600 Series of audio and video processing products, featuring "Fortel Inside" Technology. This unique frame is designed with numerous internal signal routing and control capabilities, giving the engineer or system integrator amazing flexibility in implementing a video/audio processing system. Functionally, the FRM603 is a chassis frame providing 20 card slots for Integrity 600 Series A/V Processing Modules. It also supports a built-in Frame Controller CCA (redundant capable), one or two (for redundancy) power supplies and the signal-routing mid-plane. A front view of a typical FRM603 frame is shown in Figure 2-1.

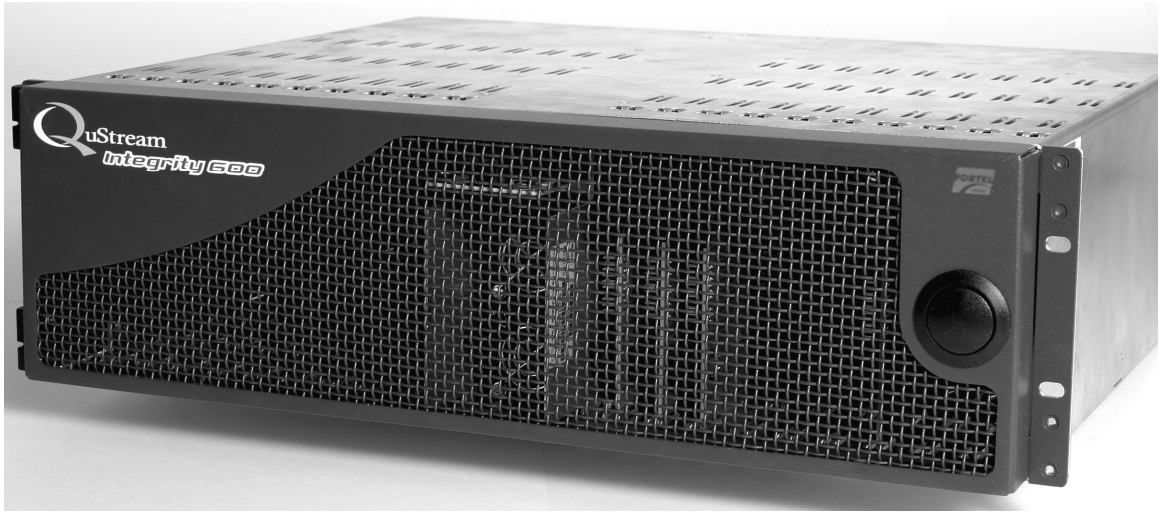


Figure 2-1 FRM603 Chassis Frame

All 600 Series Processing Modules are installed into the frame in two parts – the main circuit board and a removable rear panel. Module rear panels attach to the rear panel of the FRM603 frame and occupy either one or two card slots – depending on the type module used. Each module circuit board is installed from the front of the frame and mates to both its rear panel and the internal mid-plane.

Mid-plane signal routing allows you to scale input and output capability to virtually limitless combinations, using Star-Slot compatible modules; and allows tremendous signal format up/down conversion or D/A conversion flexibility for most installations.

The mid-plane of the FRM603 can route signals between installed modules in several ways:

- Modules can share signals between other modules located in adjacent card slots
- Modules with Star-Slot capability installed in either slot 5 or 16 can share signals with all other installed Star-Slot capable modules
- Sync reference signals are routed from genlock input BNC connectors on the frame rear panel to all card slots, if the frame is equipped with a frame controller or a REF603 sync distribution module

- Operational commands are routed from a Frame Controller Module to all installed modules

A block diagram of the FRM603 Frame is shown in Figure 2-2. Refer to the figure as we discuss the features and functions of the chassis frame.

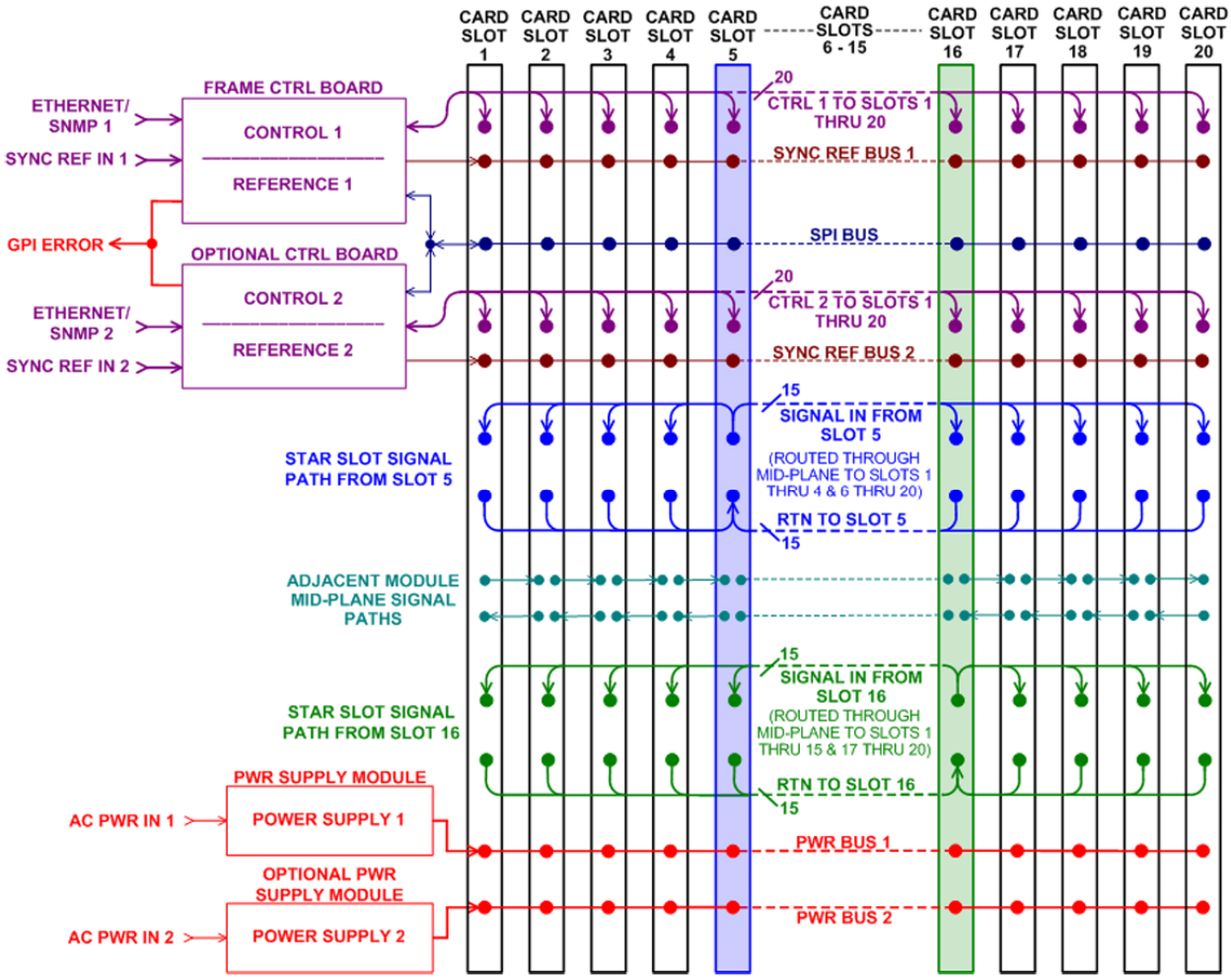


Figure 2-2 FRM603 System Interconnect Block Diagram

2.2 OVERVIEW OF SYSTEM ARCHITECTURE

Every Integrity 600 Series installation is composed of any number of various types of audio and video processing modules installed in a rack-mount chassis frame, such as the FRM603. In the Integrity 600 series there are modules that process analog audio and video, SD and HD SDI signals, up/down conversion modules and modules that embed/de-embed audio from digital signals. Each module receives input signals from an external source and provides signal outputs for connection to other facility equipment through rear panel connectors.

The FRM603 Chassis Frame, Figure 2-3, provides 20 module slots in a 3 RU frame, internal Frame Controllers with SNMP Monitoring and Reporting, Sync Reference distribution to each module and Power for all modules. Full Control and Power redundancy is optionally available by adding a second Frame Controller module and Power Supply Module. Frame Controller, Power Supply and all Processing Modules are accessible from the front and are "hot-swappable" for easy access and maintenance.

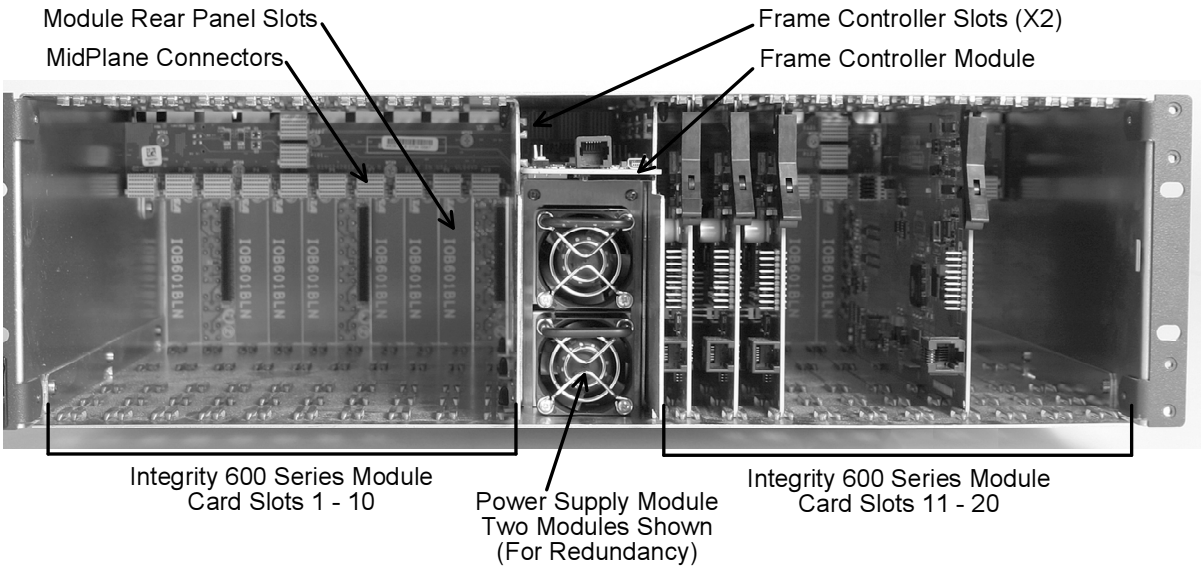


Figure 2-3 FRM603 Front View – Access Door Open

2.2.1 INTERNAL SIGNAL ROUTING

Figure 2-2 schematically illustrates the signal routing capability of the frame. Card Slots 1 through 20, the Frame Controller and internal Power Supply are shown in the diagram.

Many Integrity 600 Series modules are equipped with an input selector device, whereby the input signal source may be selected as the rear panel connector of the module or the output signal from a module located in an adjacent card slot within the frame. 600 Series modules designated as Star Slot compatible, may also receive a signal delivered through the mid-plane of the frame over either of two special purpose buses called the Star Slot Buses. Figure 2-2 illustrates each "Star Slot" bus and the adjacent module signal paths.

Internal routing through the frame mid-plane allows multiple modules to be installed in a cascade fashion. In practical application, this feature may be used to expand outputs, produce various output signal formats from a single HD input source, or any of numerous other system configuration possibilities. The "Star Slot" buses allow compatible modules installed in slots 5 or 16 to share input or output signals with all other module slots in the frame. This capability greatly expands the system design possibilities of an Integrity 600 Series installation.

2.2.2 FRAME CONTROLLER

Although not all installations require a Frame Controller Module be installed; in most applications, at least one Frame Controller will be present. When present, the Frame Controller serves as the master overseer of all modules in the frame. A typical Frame Controller Module is shown in Figure 2-4. The NET603 frame controller communicates via an Ethernet connection to RCP-503 Integrity Series remote control panels or to a Windows™ based PC running the SOFT603 software control application. Using menus on the remote control panel or PC, you may configure numerous operational parameters of the processing modules, monitor the health and status of the processing modules using SNMP monitoring and reporting and perform other operational tasks. Specific control functions for each module are discussed in the documentation package for the module.

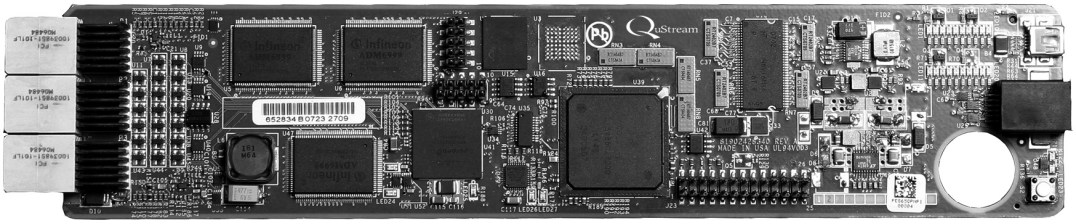


Figure 2-4 Frame Controller Module

The FRM603 frame provides two Frame Controller slots - only one module is necessary for system operation. A second module may be installed for control redundancy.

Each frame controller slot in the FRM603 frame is connected to a dedicated rear panel BNC connector for input of sync reference (genlock) from an external source. Connector GEN1 connects to the controller module in controller slot 1; and GEN2 connects to the controller module in controller slot 2. The active controller distributes sync reference to all modules in the frame via the mid-plane.

Each frame controller slot in the FRM603 frame is also connected to a dedicated rear panel RJ-45 Ethernet connector for connection to external remote control panels or a PC running a 600 Series software control application. Connector ETHERNET 1 connects to the controller module in controller slot 1; and ETHERNET 2 connects to the controller module in controller slot 2.

Notice in Figure 2-2, that there is a bi-directional data and control bus between the Frame Controller Module and each of the 20 card slots. This is the main communication bus between the modules and the controller. Operational commands are communicated to the modules and status information from the modules is returned to the controller via this bus.

2.2.3 POWER SUPPLY MODULE

A single Power Supply Module can provide power for all 20 card slots. A second power supply module may be installed for redundancy. Power is distributed to each module over individual power busses from each power supply. There are some restrictions on the number of modules that may be installed in the frame, and these are discussed in Paragraph 3.3.

2.2.4 FRAME REAR PANEL

Figure 2-5 illustrates the rear panel of the FRM603 chassis frame. The center portion is the rear panel of the power supply/frame controller chassis. This panel contains power connectors for the two power supply slots, Ethernet connectors for the two frame controller modules, plus connectors for input of sync reference signals and external frame alarm circuits. There are 10 module slots on each side of the power supply/frame controller chassis

Figure 2-5 FRM603 Rear Panel

2.2.5 INTEGRITY 600 SERIES MODULES

Every Integrity 600 Series processing module consists of a rear connector panel and the main circuit card. These two items are shipped as a set, but must be installed individually into the FRM603 Chassis Frame. A typical 600 Series module, with main board and modular rear panel, is shown in Figure 2-6.

There are two variations of rear panels used with 600 Series modules – single-width and double-width. Single-width rear panels are fitted with 8 connectors and occupy a single slot in the FRM603 chassis. Double-width rear panels are fitted with 16 connectors and occupy two rear-panel slots in the chassis. The main circuit board is the same physical size for both applications and occupies a single card slot in the front of the chassis.

Certain 600 Series modules are “Star-Slot” compatible, meaning that these modules have on-board circuitry to send and receive signals over the FRM603 Star-Slot bus with other Star-Slot compatible modules.

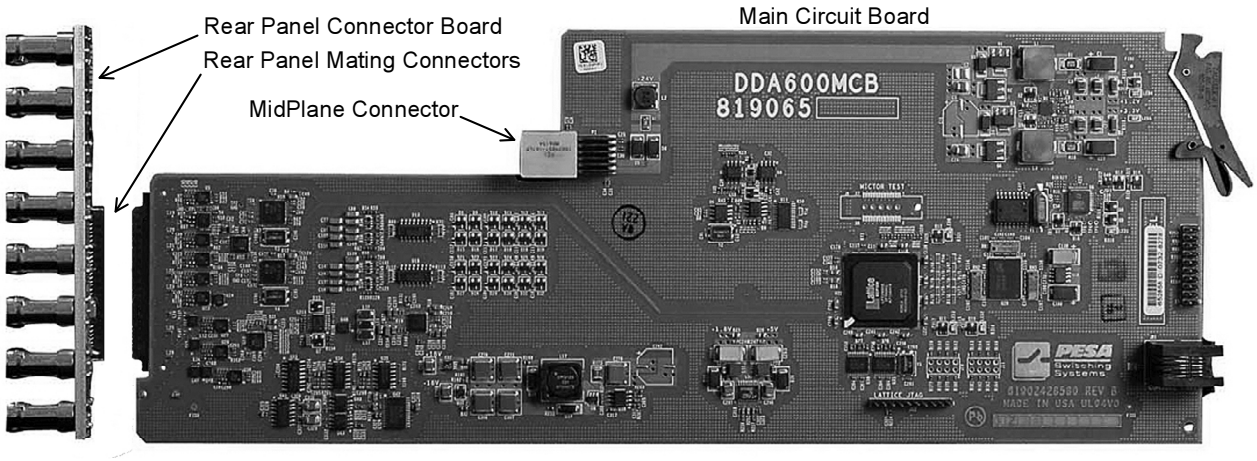


Figure 2-6 Integrity 600 Series Module - Typical

Chapter 3 Installation

3.1 UNPACK EQUIPMENT

Carefully remove all equipment from the packing containers and verify that no small or wrapped items have been inadvertently left in the packing material. Inspect all equipment items prior to beginning installation.

3.2 GENERAL SYSTEM LAYOUT

In order to realize the greatest versatility and take full advantage of the internal routing features of your Integrity 600 system, careful planning and layout of module locations within the FRM603 is important.

There are no restrictions on placing modules in the FRM603 frame – any module will function stand-alone in any slot. However, if you are intending to incorporate internal frame routing, adjacent module signal sharing or Star Slot routing, you should have the system pre-planned prior to module installation. PESA recommends that you make a detailed drawing of your system and follow it when loading modules into the frame. The following guidelines will help you in your system planning, but they are not intended to be an all-inclusive, step-by-step guide.

- Make a listing of the modules you will use in your system, and determine the internal routing capability of each module. Not all 600 Series modules share the same capabilities: for example single input distribution amplifiers can only receive input signals from the module *LEFT* adjacent to it, or the Star Slot *A* routing bus.

- Not all modules are equipped for internal signal routing. If you are going to use internal routing in your layout, it would not be advisable to install modules without such capability in a Start Slot or in a frame slot you may need for signal sharing.

- Consider placement of modules you intend to share signals first. Include in your sketch which module will receive a signal from an external source, how you want signals distributed to other modules and with which module the internal routing will terminate.

Every Integrity 600 Series processing module consists of a rear connector panel and the main circuit card. These two items are shipped as a set, but must be installed individually into the FRM603 Chassis Frame. The DDA-617 processing module occupies a single card slot and may be installed in any available slot in the chassis frame. Proper installation requires that the rear connector panel be installed before the circuit board. Observe the following precautions before proceeding with installation:

3.3 INSTALL MODULES

Installing 600 Series modules requires access to both the front and rear of the chassis frame. While it really makes no difference operationally whether the modules are installed prior to mounting the chassis frame in a rack, you may find it more convenient to install the modules first.

Proper installation requires that the rear connector panel be installed before the circuit board. Observe the following precautions before proceeding with installation:

CAUTION

Damage may occur to the rear connector panel or the circuit board if installation instructions are not properly followed.

- Rear connector panel MUST be installed before the front-mounted circuit board.
- If a circuit board should occupy a chassis frame slot where a rear connector panel is to be added or changed, the circuit card MUST be removed or slid out a minimum of two inches from the front side of the chassis frame before installing the rear connector panel.

3.4 INSTALL REAR CONNECTOR PANEL

Install rear connector panel as follows:

1. If your processing module was shipped with the rear connector panel attached to the main circuit board, separate the two units.
2. Figure 3-1 illustrates the connector panel installation process using a single-width panel; however the procedure is identical for installing a double-width rear panel.
3. Orient the rear connector panel with the main board connector toward the lower edge of the chassis.
4. Install the panel by pressing it upward under the top lip of the chassis frame, and move the panel toward the chassis until it is flat against the chassis frame, refer to Figure 3-1.
5. Allow the bottom edge of the connector panel to drop down into its mating slot at the bottom of the lower edge of the chassis.
6. Install retention screw through connector panel to chassis frame, but **DO NOT** fully tighten the retention screw, leaving the rear panel freedom to move, until after the Main Circuit Board is installed per Paragraph 3.3.2.

CAUTION

DO NOT fully tighten the retention screw until **after** the Main Circuit Board is installed. Severe damage could occur to the main board connector if the rear panel is tightly secured prior to installing the main board.

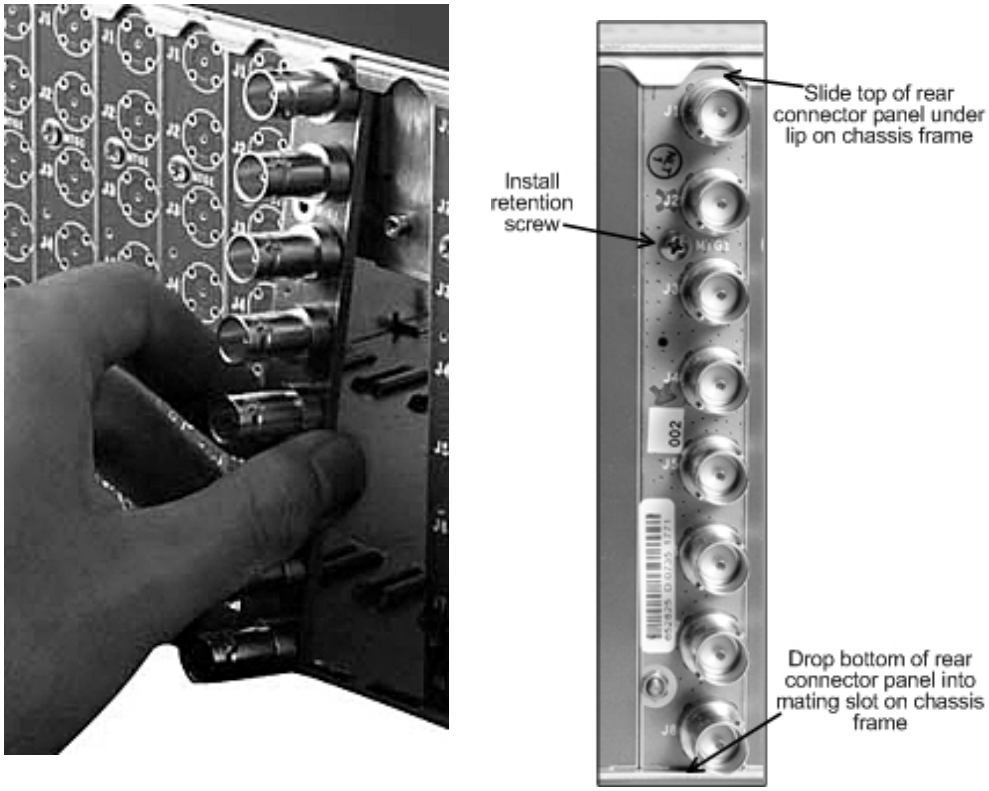


Figure 3-1 Installing Rear Connector Panel

3.5 INSTALL MAIN CIRCUIT BOARD

Install main circuit board as follows:

1. Open front access door on the FRM603 chassis frame.
2. Locate the empty card slot that mates to the rear connector panel installed in the previous step.
3. Align the top and bottom edges of the circuit board with the chassis card guides as shown in Figure 3-2.
4. Hold the card ejector lever out (unlocked position) as shown when inserting the board.
5. Press the board into place to ensure solid connection with the mating connectors on the mid-plane and rear connector panel.

NOTE

Do not force the card into position. If the card does not seat with gentle pressure, back it out, realign with the card guides and reinsert the card.

6. When the card is properly seated, press the card ejector lever toward the board to lock the card in position.
7. Once the main board is seated and locked, and all connectors have properly mated, secure the rear connector panel to the chassis frame by tightening the retention screw.
8. Close the chassis frame front access door.

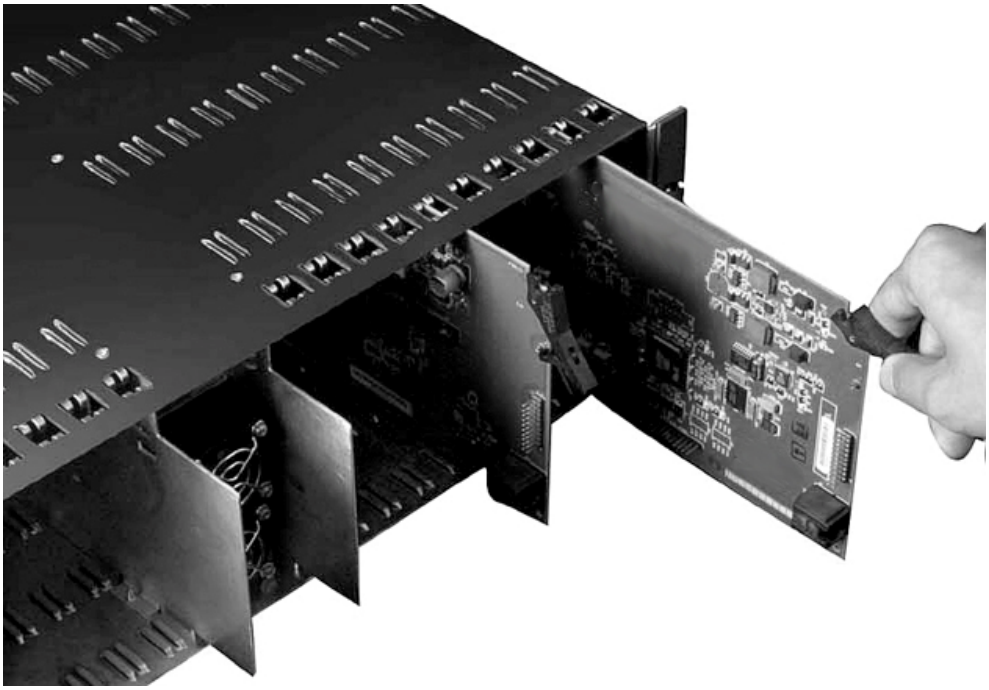


Figure 3-2 Installing Main Circuit Board

3.6 MOUNT THE FRM603 CHASSIS FRAME IN AN EQUIPMENT RACK

Make sure the frame power cords are disconnected from the power source before installing the frame into an equipment rack.

	**Fans that are mounted inside of this equipment provide forced-air cooling. Do not block airflow around the chassis.**

All frames comprising an Integrity 600 Series system are designed for installation in a standard 19" equipment rack. Provide sufficient space behind the equipment racks to allow for control, signal, interconnect and power cables. Use all chassis mounting holes, and tighten mounting hardware securely by using the rack equipment manufacturer's suggested torque settings.

Install equipment into racks as follows:

7. Carefully, remove equipment from packing container and place frame near the rack where it will be installed.
8. Insert chassis frame into equipment rack and support the bottom of the chassis while mounting hardware is installed.
9. Install the bottom two chassis mounting screws.
10. Install the top two chassis mounting screws.
11. Tighten all chassis mounting screws until they are secure.

3.7 REAR PANEL SIGNAL CONNECTIONS

Input and output connections to processing modules may be made through the rear connector panel, or, in some installations, the internal routing midplane of the chassis frame. When rear panel connectors are used for I/O connections, follow the panel layout diagram provided with documentation supplied with each particular module. When making connections to the rear panel connectors, use a good quality coaxial cable and ensure that the mating BNC connector is properly installed. Relieve strain on all cables to prevent connector separation. To the greatest extent possible, separate control, signal, and power cables to minimize crosstalk and interference.

Use cable ties, or other fastener, to secure hook-up cables to the rack, as shown in Figure 3-3. This will provide cable strain relief and help route cables away from hazardous areas. Do not use cable ties on fiber optic cable.

Route cables away from physical traffic areas to avoid creating a safety hazard (trip or shock).

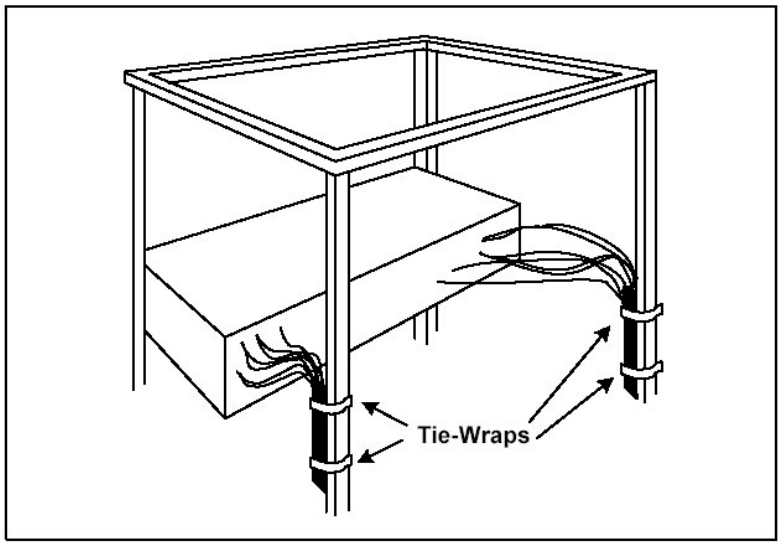


Figure 3-3 Cables Attached To Supports

3.8 ETHERNET CONNECTIONS

All communication between the frame controllers, if so equipped, and external control devices is made over an Ethernet communication link. Frame controllers may be interfaced to RCP-503 remote control panels, a Windows™ based PC running the Soft603 software application or may be connected over a facility intranet to interface with multiple devices over the network.

3.8.1 FRM603 CHASSIS FRAME TO A SINGLE RCP-503 CONTROL PANEL

In the most basic installation application, a single FRM603 is connected to a single RCP-503 remote control panel. In this application, all adjustments and selections to 600 series modules are made through the single control panel. Ethernet connections are made using common CAT5E cable with RJ45 connectors fitted to each end.

Figure 3-4 illustrates the hook-up for a single FRM603 and a single RCP-503. A CAT5E crossover cable is used in this application. Connect one end of the CAT5E cable to the remote control rear panel connector labeled REMOTE 1 and the other end to the chassis frame rear panel ETHERNET connector associated with the controller slot containing the frame controller module. In our example illustration ETHERNET 1, assuming the NET603 frame controller is installed in controller slot 1. Remember that rear panel ETHERNET connectors 1 and 2 are controller slot specific. ETHERNET connector 1 connects directly to frame controller slot 1 and ETHERNET connector 2 connects directly to frame controller slot 2.

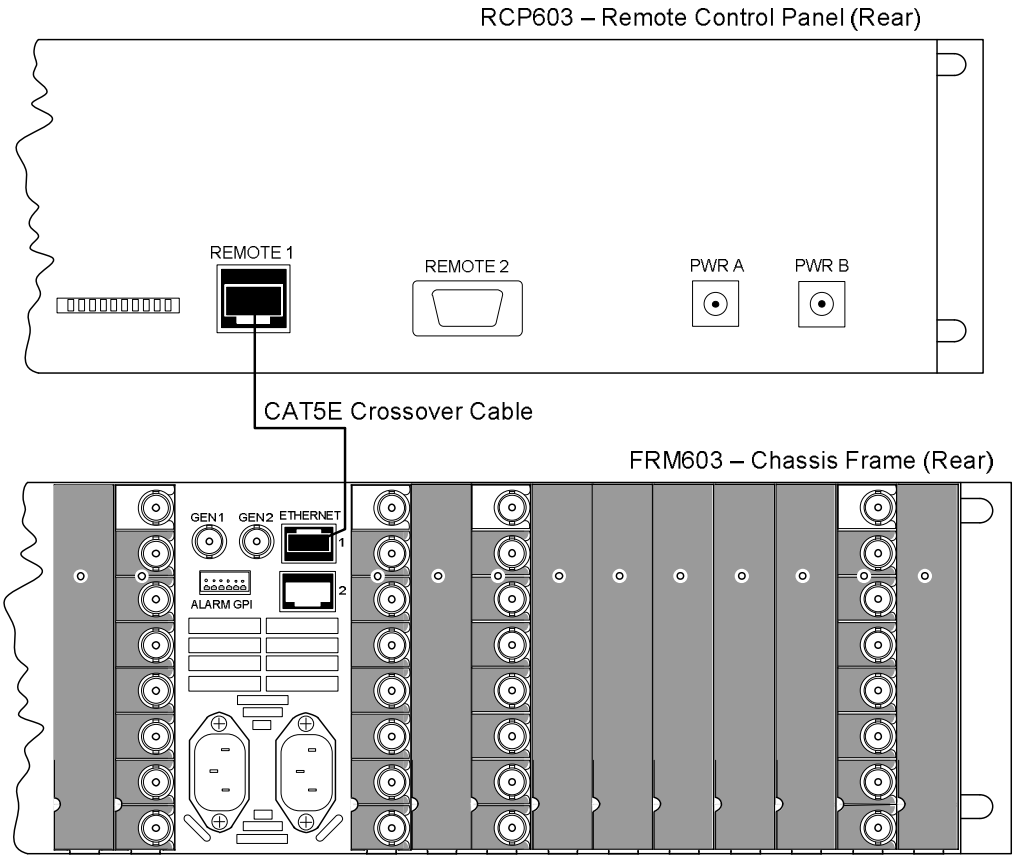
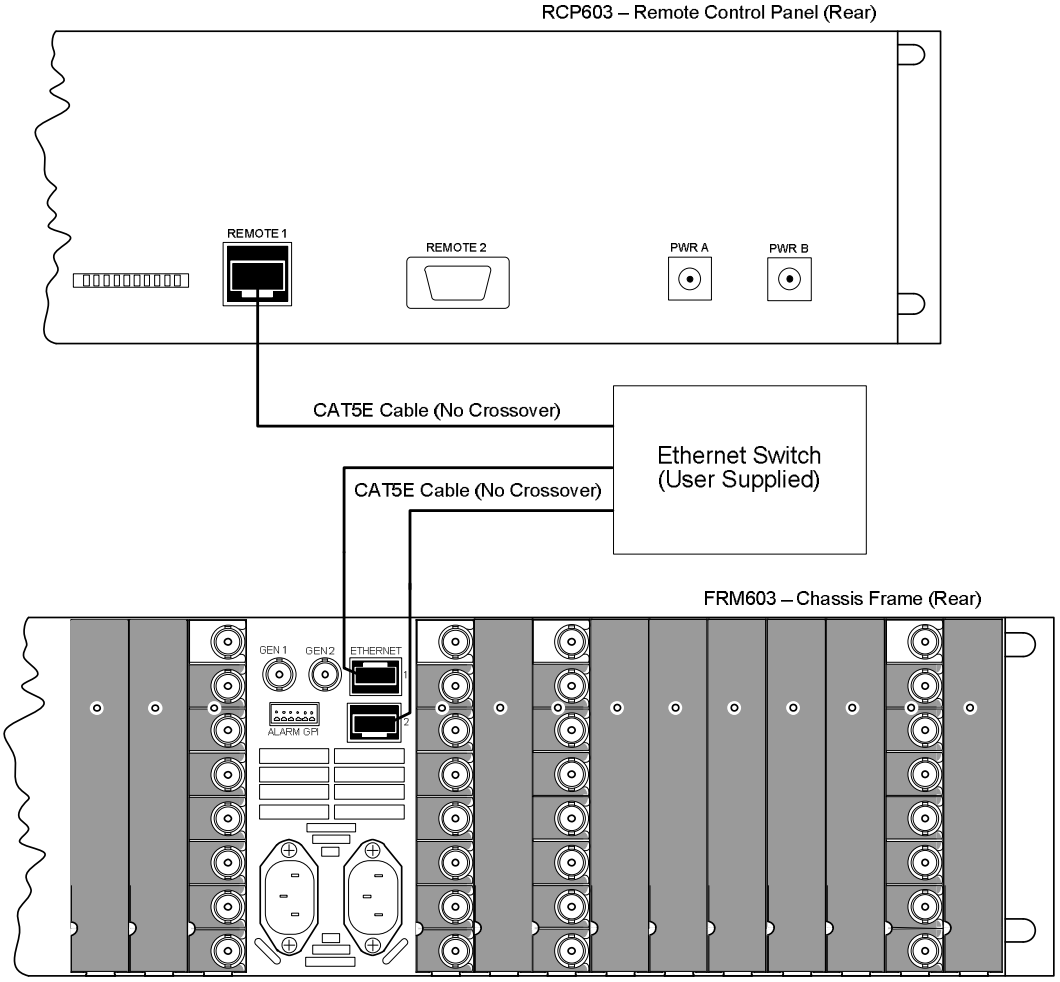


Figure 3-4 Frame Direct to Single Control Panel

3.8.2 FRM603 CHASSIS FRAME WITH REDUNDANT FRAME CONTROLLERS TO A SINGLE RCP-503 CONTROL PANEL

When dual (redundant) frame controllers are used in the chassis frame, each controller must be independently connected to the control panel. This is accomplished by using an external Ethernet switch device, as shown in Figure 3-5.



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3.8.3 MULTIPLE FRM603 FRAMES OR CONTROL DEVICES

Any installation other than a single frame to a single panel requires the use of an external Ethernet switch. Frames and control panels may be interconnected through the switch as a unique intranet, or may be connected to the facility local area network (LAN). Every frame and control panel must be assigned a unique IP Address on the network. By networking any number of frames, control panels or PCs running the Soft603 application, you can easily configure a processing system with multiple control points located close to operator stations or remote areas of the facility.

3.9 CONNECTION CHECKLIST

Once the frame is installed in an equipment rack, associated system connections can be completed. Order of completion of installation steps is not critical, however, DO NOT apply power to a frame until all signal, sync and control cables have been installed and their connections verified for proper placement and accuracy. Use the following guide to insure that all connections are made properly and that power, system interconnect and signal cables are correctly installed.

1. Connect an external sync source to the Sync Reference Input (REF) of each DXE Frame using 75 Ohm coaxial cable such as Belden 8281, or equivalent. Be sure to properly terminate external sync sources into a 75Ω load terminator.
2. Complete audio and video connections to module rear panel connectors.
3. Use a good quality CAT5E cable to complete a connection through the FRM603 rear panel between the NET603 frame controller and Integrity Series remote control panels, a host PC or a facility LAN.
4. If you wish to incorporate external alarm devices in your installation, complete connections between the external alarm circuitry and the NET603 controller through the rear panel Alarm/GPI connector.

3.10 POWER CONNECTIONS

Power for the FRM603 is derived from wall receptacles. No special direct wiring or heavy gauge wire is required for this equipment. There are two power connector receptacles, one for each power supply module, located side-by-side on the frame rear panel. In a non-redundant power system, only one of the power supply slots will have a power supply module installed. Attach the power cord to the receptacle supplying power to the populated power supply slot. Input power is not bussed between modules. When two power supplies are used (for redundancy) a separate power cord must be attached to each rear panel receptacle through its access port.

Connecting the power cord to a source of power immediately applies power to the FRM603. Do not apply power for the first time until all signal, sync and control connections have been made and verified.

3.11 INITIAL POWER-UP

Before applying power for the first time, please take time to go back over your installation:

- Check for electrically sound connections, proper connector placement and possible wiring errors.
- Ensure that each FRM603 has a connection with a source of in-house sync.
- Check that all 600 Series modules, rear panels, power supply and controller modules are securely installed.

There is no power switch on the frame, and it is powered-up simply by connecting the main power cord to a source of primary power. Systems with redundant power supply modules have two main power cords, each of which must be connected to source of primary power.

Chapter 4 Operation

4.1 INTRODUCTION

There are no operating controls located on the FRM603 chassis frame. All control and panel set-up operations are done through an external control panel or a PC running the SOFT603 software application connected to the chassis frame through an Ethernet connection to the NET603 frame controller contained in the chassis.

Any number of FRM603 frames and external control panels may be connected to each other through an external Ethernet switch device or connected through the facility local area network (LAN).

When any Ethernet devices are connected to a network using an IP protocol, each device must have a unique IP address assigned. It is beyond the scope of this document to provide a tutorial on networking or IP address structure. If you are connecting Integrity 600 devices together directly or through an Ethernet switch in a unique intranet configuration, the factory set IP addresses will likely not need to be changed, and will allow the devices to communicate with one another.

If your installation requires including the Integrity 600 devices into an existing facility LAN, you will need to consult your network administrator for the proper IP addressing scheme to use for each device in the system. If it is necessary to change the IP address of the NET603 frame controller, use the procedure contained in Paragraph 4.2. Changing the IP address of modules within the frame is accomplished through the control panel or control software. Consult the manual for the RCP-503 remote control panel or SOFT603 control software for information on changing the IP addressing of the panel or 600 series modules.

In order to communicate with one another, all Integrity 600 series devices must be programmed with the proper IP address data, and the external control panels must be able to communicate with all frames and all modules in the system. Refer to control system documentation for further information and procedures for operating the 600 series system.

4.2 CHANGING THE DEFAULT FRAME CONTROLLER IP ADDRESS

The NET603 frame controller determines the IP address of the chassis frame. Refer to the NET603 Technical Manual, 81-9059-0644-0, for the procedure to change the IP address or net mask of the controller.

4.3 SYSTEM OPERATION

Once the IP addressing scheme is set and the panels, frames and modules are communicating, all operating procedures for the frame and modules within the frame are performed through the control system panels.