MOTOROLA

MTC 3600
SMARTNET II+

THEORY OF OPERATIONS

[redacted]

BOOKLET 1-2
OF VOLUME 1: MTC 3600 OPERATIONS

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ABOUT THIS BOOKLET

This booklet provides an overview of the operations and components of an MTC3600 (Motorola Trunking Controller - 3600 Baud control channel). The purpose of this booklet is to help you learn the basic operations and features of the MTC3600 controller.

WHO SHOULD USE THIS BOOKLET?

This booklet addresses the following audiences:

- MTC3600 customers who manage and maintain their MTC3600 two-way radio trunking system or who use third party technicians to maintain the system.
- Motorola system integrators who plan and execute the following:
  - installations
  - upgrades
  - configuration
  - maintenance
- Motorola System Support Center (SSC) technicians who support repair technicians.
- Motorola's Customer Center for System Integration (CCSI) technicians who initially assemble trunking systems received from the factory prior to shipment to the customer.
- Motorola's System Integration and Testing (SIT) personnel.
- Motorola Depot personnel who repair MTC3600 hardware.

SCOPE

This booklet provides basic information on MTC 3600 logical operations and physical components. You will find this booklet most helpful if you have already completed the training course, *Basic Trunking and Basic ASTRO Concepts*, which is available on CD-ROM (Course No. TRK100).

HOW THIS BOOKLET IS ORGANIZED

This booklet contains the following:

- Chapter 1, "MTC 3600 System View," describes the how the MTC 3600 interacts with other system devices in a standalone SmartNet II+ trunked radio system.
- Chapter 2, "MTC 3600 Hardware Description," describes how the MTC 3600 connects to other system devices and describes the MTC 3600 components. It also compares the MTC 3600 to its precursor, the 6809 controller.
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CHAPTER 1

MTC 3600 SYSTEM VIEW

The MTC 3600 is a trunking radio system controller that provides central site controller functions for standalone SmartNet II+ systems. These functions include call processing, channel resource allocation, and diagnostics.

Standalone SmartNet II+ systems meet the need for communication over a single centralized geographic area such as industrial sites, schools, hotels, or small municipalities. The MTC 3600 supports the following SmartNet II+ system features:

- Up to 28 channels with one of four possible control channels
- System Manager Terminal (SMT) accessible directly through a PC or Motorola's SMT Access network management tool. (You can purchase SMT Access separately or included with Site Lens™)
- Central Interconnect Terminal (CIT) telephone interconnect
- Redundant site controllers

NOTE: The MTC 3600 supports Type II trunking only. It does not support Type I trunking.

This chapter discusses the following topics:

- MTC 3600 in SmartNet II+
- MTC 3600 SmartNet II+ Options
- SmartNet II+ Calling Features

MTC 3600 IN SMARTNET II+

For a standalone SmartNet II+ system, the MTC 3600 supports up to 28 channels. Channels 1 - 4 can be used as either control or voice channels. Channels 5 - 28 can only be used as voice channels. Figure 1-1 shows the MTC 3600 configured in a standalone SmartNet II+ system.

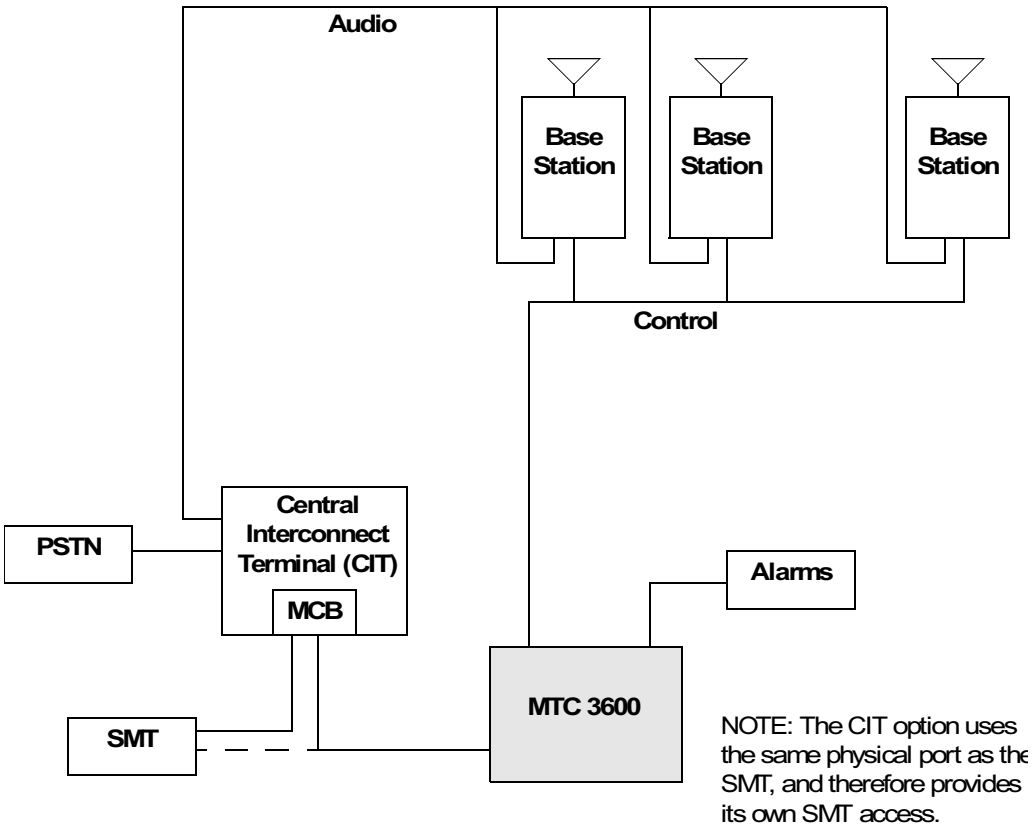

FIGURE 1-1 MTC 3600 IN A STANDALONE SMARTNET II+ SYSTEM

MTC 3600 SMARTNET II+ OPTIONS

The MTC 3600 supports the following SmartNet II+ system options:

- System Manager Terminal (SMT)
- Telephone Interconnect
- Redundant Controllers

SYSTEM MANAGER TERMINAL

The MTC 3600, as a SmartNet II+ central site controller, supports the System Manager Terminal (SMT) interface for managing controller operations. The SMT interface can be run from a personal computer connected to the MTC 3600 using terminal emulation software. Using dial-up access, the SMT interface can also be configured as a remote management workstation.

SMT provides the following capabilities:

- Monitor base stations and other system devices
- Diagnostic reporting on system devices
- Manage the Subscriber Access Control (SAC) and affiliation databases
- Modify system operating parameters

For more specific information about SMT, refer to the *MTC 3600 Operations* and the *MTC 3600 SMT Command Reference* booklets.

NOTE: Motorola's SMT Access is another method for accessing the SMT interface. This Windows® NT application eliminates the need for terminal emulation software and can be purchased separately or as part of Motorola's Site Lens™ network management tool.

TELEPHONE INTERCONNECT

The telephone interconnect ability supported by the MTC 3600 provides a link between a SmartNet II+ trunked radio system and the public switched telephone network (PSTN). It allows radio users to make and receive telephone calls on their radios. The MTC 3600 supports the Central Interconnect Terminal (CIT) telephone interconnect option.

For authorized users, the MTC 3600 grants the voice channel and the Master Control Board (MCB) of the CIT routes the voice channel to one of its telephone lines. The MTC 3600 supports the following:

- calls initiated by a landline telephone to either a single subscriber radio or a talkgroup
- calls initiated by a singled subscriber or talkgroup to a landline telephone

REDUNDANT CONTROLLER

A second MTC3600 controller can be installed as a redundant controller for standalone SmartNet II+ systems to prevent the loss of service resulting from a controller failure. This redundant controller automatically takes over site control operations when the primary MTC3600 has failed. A T-Bar switch combined with a Vega switch controller box provide the switching capability. The Vega box receives alarm indications from both controllers and determines when to switch to the backup controller.

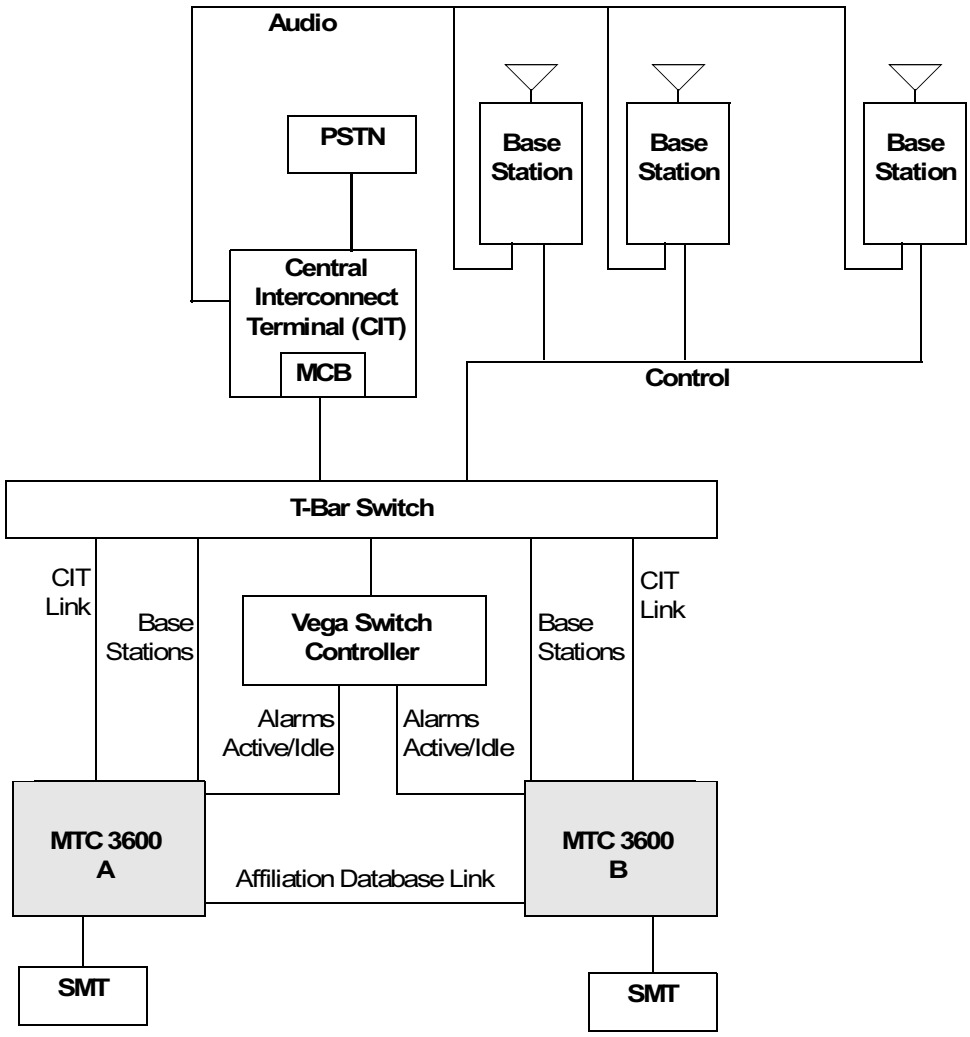

FIGURE 1-2 REDUNDANT MTC 3600S IN A STANDALONE SMARTNET II+ SYSTEM

ALARMS

The MTC 3600 supports customer-supplied alarm indicator equipment by providing major and minor relay contact closures to indicate alarms. A separate alarm card is also provided for systems that use the optional dual power supply configuration. This alarm card provides relay closures and alerts the system operator to the failure of one of the power supplies.

During normal operation, both power supplies provide power to the MTC 3600. If one power supply fails, the alarm card activates and the remaining power supply provides all the power required by the controller.

SMARTNET II+ CALLING FEATURES

TABLE 1-1 SMARTNET II+ CALLING FEATURES SUPPORTED BY THE MTC 3600

Calling Feature	Description
Group Calls	The MTC 3600 supports the following types of group calls: • Talkgroup calls • Multigroup calls • System wide calls
Selective Calls	The MTC 3600 supports the following types of selective calls: • Call alert • Private conversations • Enhanced private calls
Emergency Call/Alarm	Users can immediately alert dispatchers of life threatening situations by pressing the emergency button on their radio. Emergency callers can be granted a voice channel on either an immediate or priority basis.
Telephone Interconnect	The MTC 3600 uses the CIT telephone interconnect option to allow subscribers to make or receive telephone calls on their radios. Subscribers can also call all the radios in a talkgroup from a landline phone.
Radio User Monitoring	Subscribers can use two methods of radio monitoring: • Trunked Talkgroup Scan • Priority Monitor

NOTE: The MTC 3600 does not support 12 Kbit Securenet calls.

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CHAPTER 2

MTC 3600 HARDWARE DESCRIPTION

The MTC 3600 trunking controller provides site control for standalone SmartNet II+ radio systems and replaces Motorola's 6809 processor-based site controller. The MTC 3600 has been designed to extend the reliable 6809 controller functionality into the future and to be a drop-in replacement for existing 6809 systems.

Primary site control operations occur on the MTC 3600 system board (MCP750). Many supporting operations that were performed by peripheral 6809 controller cards (e.g., Receiver Site Controller, Transmitter Site Controller, etc.) have been consolidated into the MTC 3600's ACE (Analog/digital Communications Engine) board.

NOTE: SmartNet II+ system and diagnostic messages still refer to these peripheral 6809 components. Therefore, MTC 3600 terminology refers to the operations of these peripheral 6809 boards as functions rather than as actual physical components of the site controller.

This chapter describes the following topics:

- The MTC 3600 Trunking Controller
- Connections to Other Site Devices
- MTC 3600 Components
- MTC 3600 to 6809 Comparison

THE MTC 3600 TRUNKING CONTROLLER

The MTC 3600 in a stand-alone SmartNet II+ system contains the components shown in Figure 2-1. These components are housed in a Motorola CPX2408 CompactPCI chassis that includes a 400 watt power supply. (Dual 400 watt power supplies are an option.) The MTC 3600 has eight card slots, one system slot and seven peripheral slots. Processing boards are located in the front bay, attached to the backplane. Each processing board has a corresponding transition card installed on the other side of the backplane which provides I/O ports. Refer to Table 2-1 for a brief description of these component boards and to the section, MTC 3600 Components, for complete details.

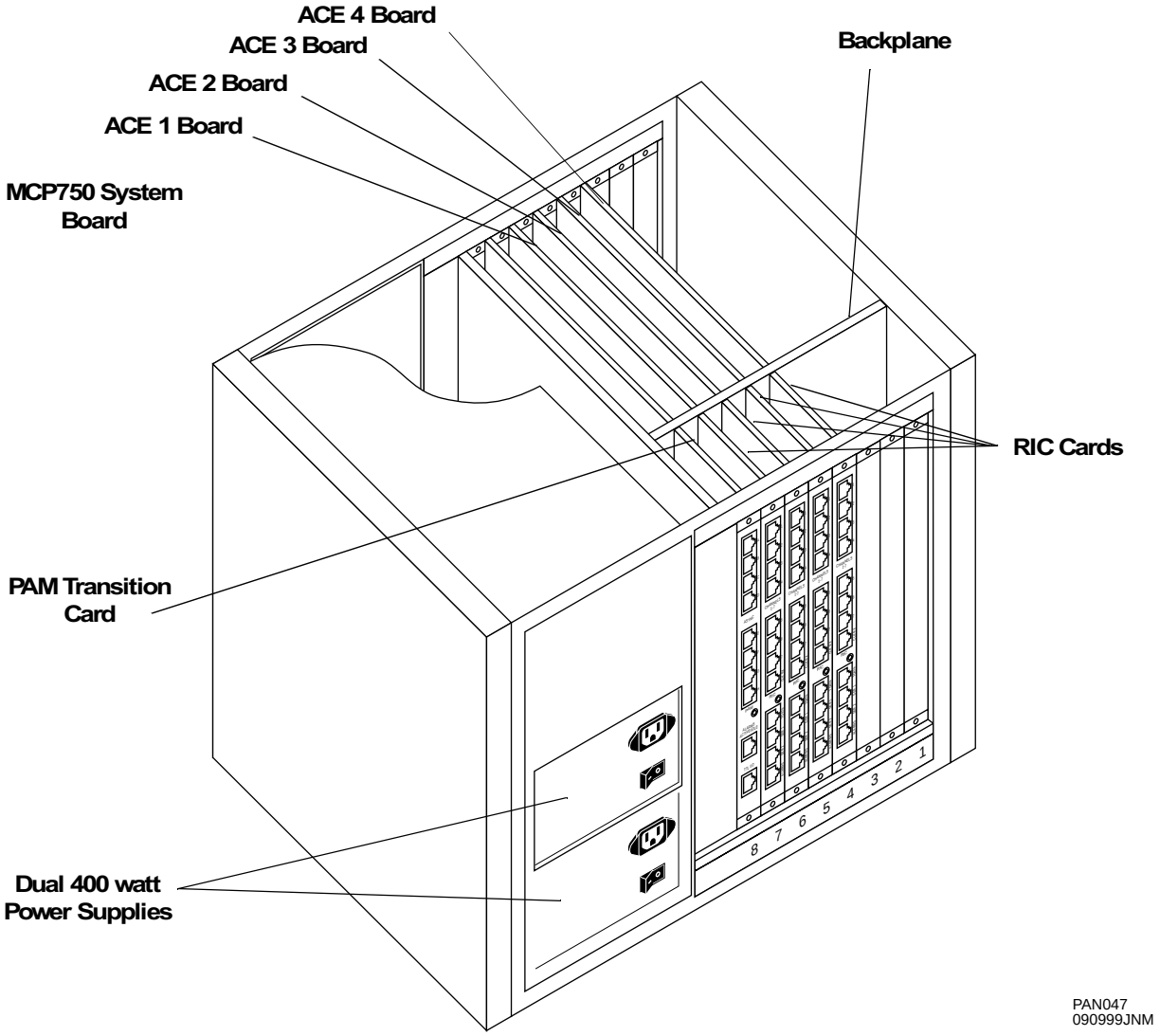

FIGURE 2-1 MTC 3600 COMPONENTS IN A STANDALONE SMARTNET II+ SYSTEM (REAR VIEW)

TABLE 2-1 STANDALONE SMARTNET II+ MTC 3600 COMPONENTS

Component Name	Transition Card	Slot	Description
MCP750 System Board	PAM	8	A PowerPC-based system board. Contains a Compact Flash memory card that stores the code plug and controller software. Provides physical ports for the following: • SMT • Alarms • CIT interconnect • Redundant controller affiliation link
ACE 1 Board	RIC	7	Digital signal processor (Analog/digital Communications Engine) which supports up to 7 base station channels. First four channels can be control channels. All 7 channels can be voice channels. Performs the following 6809 controller logical functions for the base stations connected to it: • RSC - Receiver Site Controller • RIB - Receiver Interface Board • IRB - Inbound Recovery Board • TSC - Transmitter Site Controller • TIB - Transmitter Interface Board
ACE 2, ACE 3, ACE 4 Boards	RIC	4 - 6	Up to 3 additional ACE boards, each support up to 7 voice only base station channels. Performs the following 6809 controller logical functions for the base stations connected to it: • RIB - Receiver Interface Board • TIB - Transmitter Interface Board

CONNECTIONS TO OTHER SITE DEVICES

This section describes the connections between the MTC 3600 and other system devices in a standalone SmartNet II+ system. Figure 2-2 identifies the MTC 3600 connector ports used in a standalone SmartNet II+ system. See the following section for a description of these connections. Note that only the ACE/RIC card in slot 7 shows connections to base stations. The RIC cards in slots 4 - 6 may also have up to 7 connections depending upon the number of channels in the system.

NOTE: Two physical links between the MCP750 system board and the RSC and TSC functions on the ACE 1 board made through the PAM and RIC 1 cards are not shown in Figure 2-2 because they are internal MTC 3600 connections. Refer to the section, Connections Within the MTC 3600, for more information.

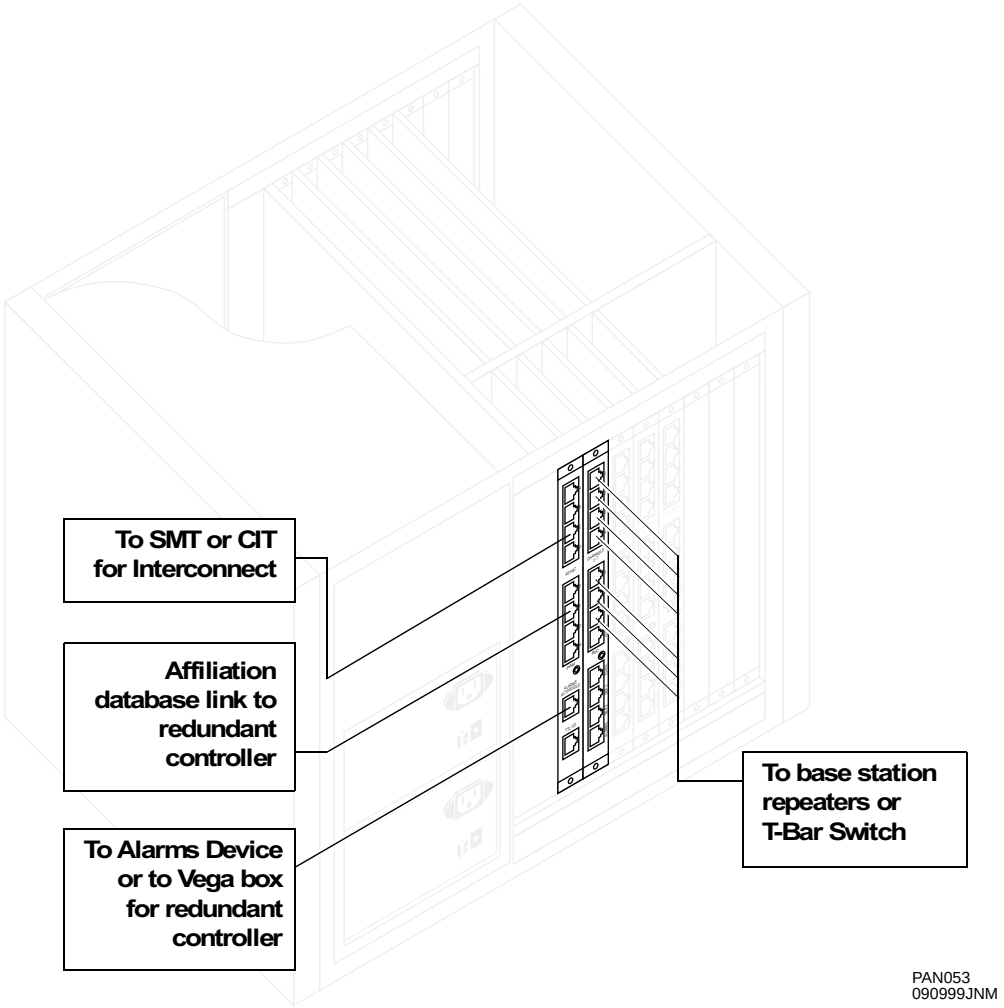

FIGURE 2-2 MTC 3600 CONNECTIONS IN A STANDALONE SMARTNET II+ SYSTEM

BASE STATION CONNECTIONS

The MTC 3600 connects to each base station repeater with one cable from one of the first seven RIC card connector ports. Any of the first seven connector ports can connect to a voice channel repeater. To serve as a control channel, at least one base station repeater must be connected to connector ports 1 - 4 on the RIC card opposite the ACE 1 board (slot 7).

If connector ports 1 - 4 all have connections to base station repeaters, the MTC 3600 uses one channel as a control channel and the other three channels as voice channels. The MTC 3600 can use any of the base station repeaters connected to connector ports 1 - 4 as the control channel. Control and voice channels use the same cables.

These links carry voice channel control signals, control channel data and repeater control/status signals.

SMT CONNECTION

For systems using a separate terminal or personal computer (PC) for the System Manager's Terminal (SMT), the MTC 3600 connects to this terminal with an RS-232 cable from connector port C on the PAM card to a serial port on the terminal or personal computer. (The PAM card is opposite the MCP750 system board in slot 8.) If using terminal emulation software, configure the connection through a COM port on the PC at 4800 baud, no parity, 8 data bits and 1 stop bit.

NOTE: Motorola's SMT Access is another method for accessing the SMT interface. This Windows® NT application eliminates the need for terminal emulation software and can be purchased separately or as part of Motorola's Site Lens™ network management tool.

TELEPHONE INTERCONNECT

For systems offering the Centralized Interconnect Terminal (CIT), the MTC 3600 connects to the CIT's MCB card with an RS-232 cable from connector port C on the PAM card. (The PAM card is opposite the MCP750 system board in slot 8.) The MTC 3600 sends CIT command messages over this connection, along with SMT data.

NOTE: Connector port C can be used for the CIT connection or the SMT connection — if no interconnect option exists in the system. When using the CIT option, connect the SMT to the CIT. Refer to the CIT's documentation for more information about this connection.

ALARM CONNECTION

The MTC 3600 connects to an Alarm Indicator device with an cable from the Alarms Active/Idle connector port on the PAM card located in slot 8. This dry contact link conveys major and minor alarms to the Alarm Indicator device.

REDUNDANT MTC 3600 CONNECTION

For systems using a redundant MTC3600 for fault tolerance, the MTC3600 uses a T-Bar Switch and Vega box as an interface with the redundant controller.

- The main MTC3600 connects to the backup controller with an RS-232 affiliation database link from the PAM card's connector port F to the same connector on the backup controller. This link allows the main controller to maintain an identical affiliation database on the backup controller.
- Both the main and backup MTC3600 controllers connect to the T-Bar with a cable from the bottom connector port on the PAM card found in slot 8. This connection supports the In-cabinet Repeat Relay.
- All cables from both controllers to external devices (e.g., base station repeaters, CIT - except the SMT and Alarms links) connect to the T-Bar switch. The external devices then connect to the T-bar switch.
- For systems without a telephone interconnect, the SMT link remains connected from the main MTC3600 to a management terminal or PC. Motorola recommends a second SMT for the backup controller. In the event of a failure, the operator can then query either controller. For systems using a single SMT, in the event of the failure of the main MTC3600, the operator can simply connect the SMT to the backup or active MTC3600.
- The Alarms TTL control signal link connects from the Alarms Active/Idle connector port to the Vega box which monitors the status of the two controllers. The Vega box performs a switchover when the active controller fails. It also provides an active/idle indicator for each controller.

CONNECTIONS WITHIN THE MTC 3600

Connections between MTC 3600 boards occur over the following paths:

- CompactPCI (Peripheral Component Interconnect) bus (chassis' backplane)
- IEEE 1394 serial bus (chassis' backplane)
- RS-232 interface (cable)

A local PCI bus within the MCP750 boards allows for conversion of CompactPCI input to IEEE 1394 output and vice versa.

MCP750 - ACE COMMUNICATION

Communication between the MCP750 system board and the ACE 1 board occur over two physical RS-232 interfaces that use 8 conductor cables and RJ45 connectors. One interface, cabled between the PAM card's connector port A and the RIC 1 card's connector port SER 1, support the TSC link between the MCP750 and the ACE 1 boards. The second interface, cabled between the PAM card's connector port B and the RIC 1 card's connector port SER 2, support the RSC link between the MCP750 and the ACE 1 boards. The TSC and RSC are functions which run on the ACE 1 board.

ACE TO ACE COMMUNICATION

The ACE 1 board communicates with the other three possible ACE boards over the IEEE 1394 serial bus. This connection supports communications between the RIB and TIB functions for the channels controlled by the other three possible ACE boards and the TSC, RSC and IRB functions that run on the ACE 1 board. ACE 2, ACE 3, and ACE 4 boards do not communicate with other MTC 3600 components.

MTC 3600 COMPONENTS

The MTC 3600 uses CompactPCI single board computers for site control, digital signal processing and peripheral controller options. Transition cards provide I/O access from the rear of the chassis. This chapter describes the following MTC 3600 components.

- MCP750 System Board
- ACE Board
- Transition Cards
- Dual Power Supply Alarm Card

MCP750 SYSTEM BOARD

The MCP750 system board hosts the controller software and performs the CSC (Central Site Controller) function. The MCP750 connects to the backplane of the MTC 3600 chassis in the system slot (8), which is also labeled, **CPU**. The system slot is responsible for system initialization, configuration, PCI bus arbitration and system interrupt and error handling.

The system board has a bootable, IDE Compact Flash memory card, which emulates an IDE disk drive and stores the system's code plug information and controller software. This memory card can be replaced in the field, if necessary. It is shipped from the factory fully configured with system information.

Four serial ports route to backplane connectors, accessible through the PAM card. The MCP750 system board also possesses an Ethernet controller with a 10/100BaseT port located on the front panel. The Ethernet port is used for loading software updates and reconfiguration information. For more information on these processes, refer to the booklet, *MTC 3600 Expansion Information*.

Each MCP750 system board uses a PAM transition card. For more information about this card, refer to the section, PAM Card, later in this chapter.

MCP750 FRONT PANEL

A view of the MCP750 front panel appears in Figure 2-3. Refer to Table 2-2 for a description of these elements.

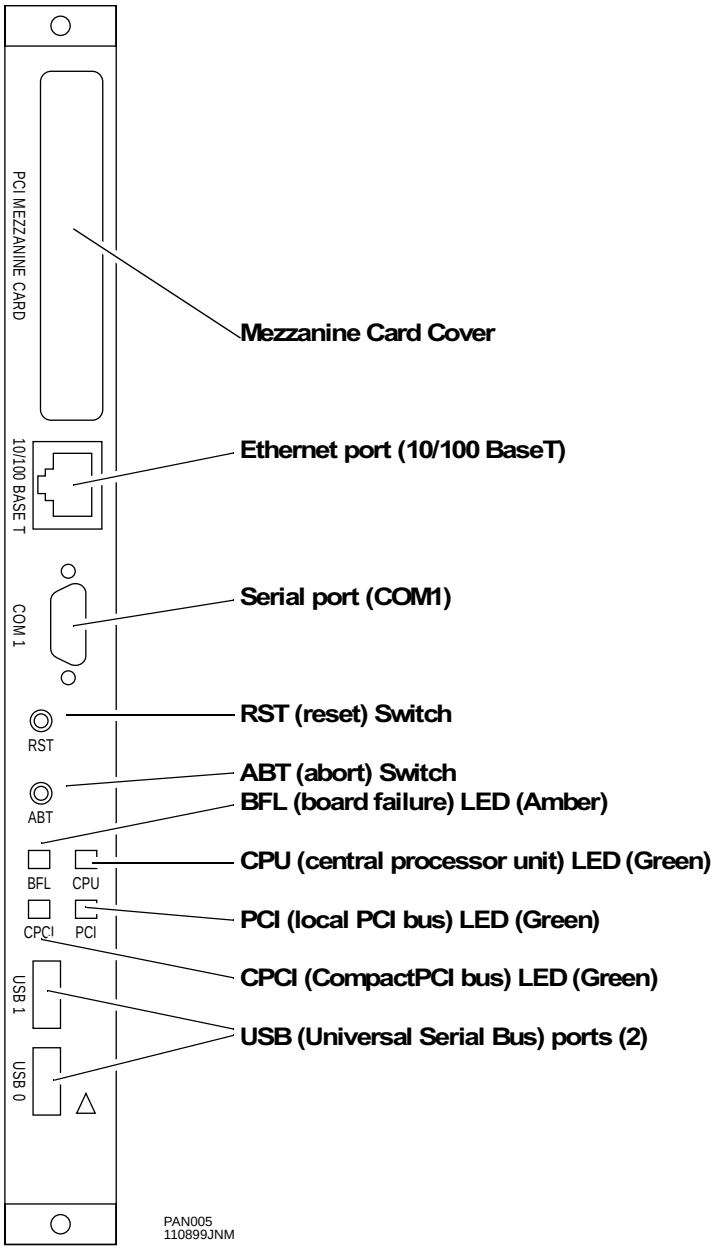

FIGURE 2-3 FRONT VIEW OF MCP750 SYSTEM BOARD

TABLE 2-2 DESCRIPTION OF MCP750 BOARD FRONT PANEL ELEMENTS

Element	Color	Description
Ethernet Port	—	Provides an RJ-45 connector to the Ethernet LAN controller.
Serial Port	—	Provides access to the 9-pin, asynchronous COM1 serial port.
RST Switch	—	Reset switch that generates a CompactPCI backplane reset and resets the MCP750 system board. This breaks the TSC and RSC links to the ACE 1 board which causes the ACE 1 board to reset, along with any additional ACE boards installed. **CAUTION:** ***Resetting the system also clears system memory, which erases the Subscriber Access Control (SAC) database. You must either re-enter all subscriber information or restore your SAC database with SMT's CLOAD command. Refer to the MTC 3600 Operations booklet for more information.***
ABT Switch	—	Abort switch that has no effect during normal trunking operations.
BFL LED	Amber	Indicates a board failure and that the board needs to be replaced.
CPU LED	Green	Indicates CPU (MPC750 PowerPC) activity.
CPCI LED	Green	Indicates that the CPCI bus is active.
PCI LED	Green	Indicates that the local PCI bus is active.
USB Ports (1 - 2)	—	Two Universal Serial Bus (USB) Series A ports

ACE BOARD

The MTC 3600's ACE (Analog/digital Communications Engine) board contains a digital signal processor that performs base station control functions previously found on the following 6809 controller boards:

- RSC - Receiver Site Controller
- RIB - Receiver Interface Board
- IRB - Inbound Recovery Board
- TSC - Transmitter Site Controller
- TIB - Transmitter Interface Board

The ACE board uses Compact Flash memory for code storage. A reset switch and status/diagnostic LEDs appear on the front panel. (For more information refer to the section, ACE Board Front Panel, later in this chapter.

Each ACE board also provides a diagnostic port on the front panel which gives access to the ACE Board Diagnostic Interface. For more information refer to the section, ACE Board Diagnostic Interface, later in this chapter.

All ACE boards use a RIC transition card. For more information refer to the section, RIC Card, later in this chapter.

ACE 1 AND SUPPORTING ACE BOARDS

An ACE board supports up to seven base stations. The MTC 3600 supports up to four ACE boards, for a total of 28 base station repeaters. At least one ACE board is required. The ACE board installed in slot 7, next to the MCP750 system board, is the ACE 1 board. Up to three additional ACE boards can be installed next to the ACE 1 for additional voice channels. Table 2-3 shows the channel options for the four possible ACE boards.

TABLE 2-3 CHANNEL TYPE OPTIONS FOR MTC 3600

ACE Board	Slot	Channels	Channel Type
ACE 1	7	1 - 4	Control or voice channels
		5 - 7	Voice channel only
ACE 2	6	8 - 14	Voice channel only
ACE 3	5	15 - 21	Voice channel only
ACE 4	4	22 - 28	Voice channel only

MTC 3600 SUPPORTED BASE STATIONS

The ACE board supports the following base station repeaters.

- MTR 2000
- Quantar
- Quantro

DIP switch settings on the ACE board specify the type of repeater used. Refer to the *Field Replaceable Units* booklet in the *MTC 3600 Service Manual* for specific base station dip switch settings.

ACE BOARD DIAGNOSTIC INTERFACE

Each ACE board provides access to its diagnostic interface through the RS-232 Diag port located on the board's front panel. This interface reports diagnostic messages about the board's operation. For more information about these messages refer to the *MTC 3600 Service Manual*. For the ACE 1 card, you can also enter configuration commands. This interface is not part of the System Manager Terminal (SMT).

The interface connection can be established from a PC using terminal emulation software. You can configure the connection through a COM port on the PC at 9600 bps, no parity, 8 data bits and 1 stop bit.

ACE 1 BOARD DIAGNOSTIC INTERFACE START-UP BANNER

The ACE Interface presents a start-up banner during initialization. Figure 2-4 provides an example of the ACE 1 start-up banner. Table 2-4 describes the line items in the ACE 1 start-up banner.

```
1.    Copyright Motorola Inc. 1998. All rights reserved.
2.
3.    Function    : ACE 1
4.    Site Config : SmartNet Site or SmartZone Remote
5.    SW Revision : D_00_.00.00
6.    Station Type: QUANTAR
7.    RSC Link    : 4800 bps
8.    TSC Link    : 4800 bps
9.    SmartNet ACTIVE mode
10.   ACE sub 1 missing, disabled chan 8-14
11.   ACE sub 2 missing, disabled chan 15-21
12.   ACE sub 3 missing, disabled chan 22-28
```

FIGURE 2-4 ACE 1 BOARD DIAGNOSTIC INTERFACE START-UP BANNER

TABLE 2-4 ACE 1 BOARD START-UP BANNER LINE INFORMATION

Line Number	Name	Description
1	—	Copyright
2	—	Blank
3	Function	Indicates the function of the ACE board (ACE 1)
4	Site Config	Indicates the site configuration. Possible values are: • SmartNet Site or SmartZone Remote • Prime Site TSC • Simulcast Remote • RX Only Site
5	SW Revision	Indicates the software version stored on the Compact Flash memory card.
	Station Type	Indicates the type of base station configured on the ACE 1 board's Repeater Type dip switches.
7	RSC Link	Indicates the baud rate for the RSC link between the ACE 1 board and the MCP750 system board. The baud rate for SmartNet is 4800 and is set at the factory on the ACE 1 board's Serial A dip switches. See the *Field Replaceable Units* booklet in the *MTC 3600 Service Manual* for these dip switch settings. If no value appears, the dip switches have been set incorrectly.
8	TSC Link	Indicates the baud rate for the TSC link between the ACE 1 board and the MCP750 system board. The baud rate for SmartNet is 4800 and is set at the factory on the ACE 1 board's Serial B dip switches. See the *Field Replaceable Units* booklet in the *MTC 3600 Service Manual* for these dip switch settings. If no value appears, the dip switches have been set incorrectly.
9	—	Indicates: • the system configuration as reported by the MCP750 system board (SmartNet or SmartZone) • that the channels controlled by the ACE 1 have been tested (ISTAT) • the active-idle state of the controller.
10 - 12	—	Indicates which of the possible additional ACE cards are present and if the channels for each card are enabled or disabled.

SUPPORTING ACE BOARD DIAGNOSTIC INTERFACE START-UP BANNER

The start-up banner for the ACE 2, ACE 3, and ACE 4 boards differs from the banner for the ACE 1 board. Figure 2-5 provides an example of the supporting ACE start-up banner. Table 2-5 describes the line items in the start-up banner.

```
1.    Copyright Motorola Inc. 1998. All rights reserved.
2.
3.    Function    : ACE 2
4.    Site Config : SmartNet Site or SmartZone Remote
5.    SW Revision : D_00_.00.00
6.    ACE No.2 in sync with ACE No. 1
7.    Begin chan enable
8.    Connect Tone: 116.13 Hz
9.    SmartNet ACTIVE mode
```

FIGURE 2-5 SUPPORTING ACE BOARD DIAGNOSTIC INTERFACE START-UP BANNER

TABLE 2-5 SUPPORTING ACE BOARDS START-UP BANNER LINE INFORMATION

Line Number	Name	Description
1	—	Copyright
2	—	Blank
3	Function	Indicates the function of the ACE board. Possible values are: • ACE 2 • ACE 3 • ACE 4
4	Site Config	Indicates the site configuration. Possible values are: • SmartNet Site or SmartZone Remote • Prime Site TSC • Simulcast Remote • RX Only Site
5	SW Revision	Indicates the software version stored on the Compact Flash memory card.
6	—	Indicates that communication has been established between ACE 2 and ACE 1.
7	—	.Indicates the ACE board has tested (TSTAT) and enabled the channels it manages

TABLE 2-5 SUPPORTING ACE BOARDS START-UP BANNER LINE INFORMATION (CONTINUED)

Line Number	Name	Description
8	—	.Indicates the Connect Tone frequency for the channels managed by the ACe board.
9	—	Indicates: • the system configuration as reported by the MCP750 system board (SmartNet or SmartZone) • the active-idle state of the controller.

ACE INTERFACE LOGON

A logon name and password protects the ACE interface from unauthorized usage. After logon, the following prompt appears.

ACE>

While the ACE Interface is active, diagnostic messages appear as conditions warrant. For more information about logging on to the ACE Interface refer to the *MTC 3600 Operations* booklet.

ACE INTERFACE COMMANDS

If you have logged on to the ACE 1 board, you can enter configuration commands. The ACE Interface commands appear with brief descriptions in Table 2-6. For more information about the ACE configuration commands refer to the *MTC 3600 Installation & Configuration* booklet.

TABLE 2-6 ACE INTERFACE COMMANDS

Command	Description
LOCK	Disables the E/D - SEL switch on all ACE boards.
SQLH	Allows you to adjust the squelch.
STAT	Produces the start-up banner. An example appears in Figure 2-4
VER	Displays the software version number (line 5 in the start-up banner) along with a 6-digit hexadecimal checksum.
BYE	Log off and exit the ACE Interface.
EXIT	Log off and exit the ACE Interface.
?	Produces a list of the seven ACE Interface commands.

ACE BOARD FRONT PANEL

A front panel view of an ACE board appears in Figure 2-6. Refer to Table 2-7 for descriptions of these front panel elements.

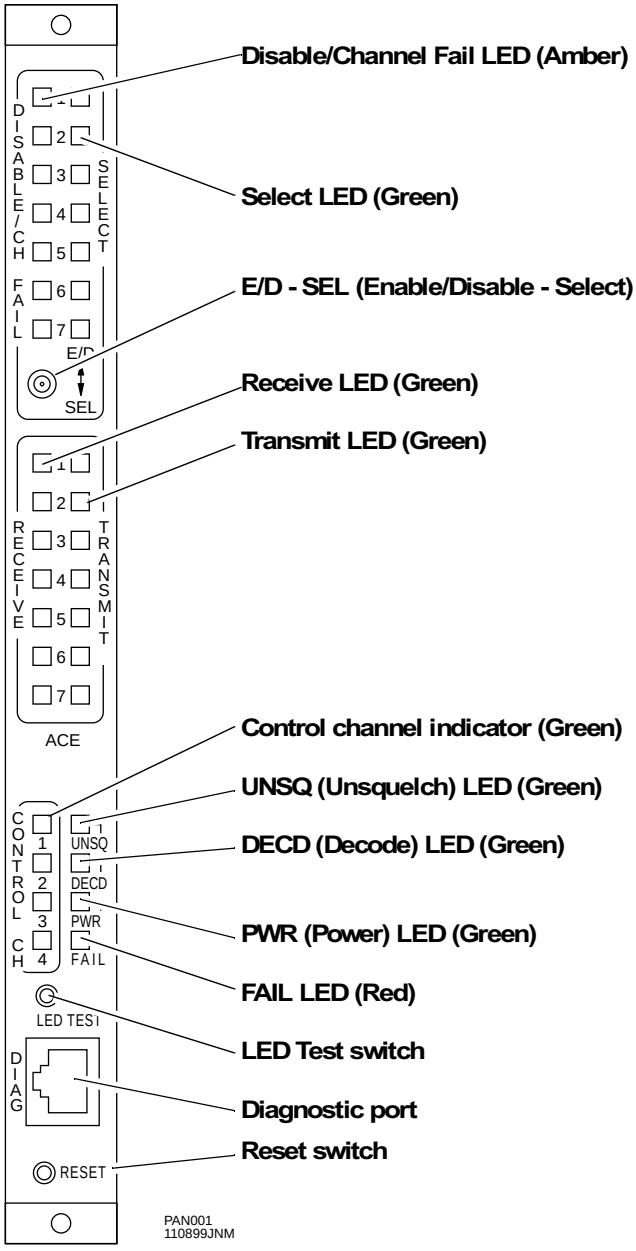

FIGURE 2-6 FRONT VIEW OF ACE BOARD

The following table describes the significance and operation of the ACE board's front panel LEDs and switches.

TABLE 2-7 DESCRIPTION OF ACE BOARD FRONT PANEL ELEMENTS

LED or Switch	Color	Description
Disable/Ch Fail LEDs (1 - 7)	Amber	A solid amber Disable/Fail light indicates that a base station repeater is not configured for the channel in the system's code plug. A solid amber Disable/Fail light corresponds to the SMT status, DIS. Channels must be configured in the system's code plug stored on the MCP750's Compact Flash memory card. A flashing amber Disable/Fail light indicates a failure in a configured base station. Corresponds to the SMT status, MALF.
Select LEDs (1 - 7)	Green	Indicates the channel is selected to be either enabled or disabled.
E/D - SEL switch	—	Allows you to select a channel by pressing down on the switch repeatedly until the desired channel's green Select LED lights up. You cannot select disabled channels (solid amber Disable/ Fail light). For the selected channel, you can then toggle between Enable and Disable by pressing up on the switch. Disabling a channel with this switch produces the SW DIS status in the SMT.
Transmit LEDs (1 - 7)	Green	Indicates the channel is transmitting. (The assigned control channel will always be green.) This LED also lights when the controller sends a TSTAT signal to the channel's base station.
Receive LEDs (1 - 7)	Green	Indicates the channel is receiving a signal.
Control Ch LEDs (1 - 4)	Green	Indicates which channel is designated as the control channel (ACE 1 board only). In a redundant controller configuration, the idle controller does not display the assigned control channel.
UNSQ LED	Green	Indicates the assigned control channel is receiving a signal equal to or stronger than the unsquelch threshold configured for the ACE 1 board. (ACE 1 board only)
DECD LED	Green	Indicates the IRB function on the ACE board has decoded an ISW. (ACE 1 board only)
PWR LED	Green	Indicates the ACE board is on. In a redundant controller configuration, the PWR LED is the only LED lit on the idle controller until

TABLE 2-7 DESCRIPTION OF ACE BOARD FRONT PANEL ELEMENTS (CONTINUED)

LED or Switch	Color	Description
FAIL LED	Red	A solid red FAIL LED indicates the ACE board has failed and must be replaced. A blinking FAIL LED indicates an error during the Self Test procedure that runs at power-up and during the software load program. Refer to the *Troubleshooting* booklet in the *MTC 3600 Service Manual* for more information.
LED Test switch	—	Initiates a self test of all LEDs to determine if any LEDs have failed. This is a hardware test only and does not affect the board's trunking activity.
Diag	—	Provides an RS-232 port for reporting ACE board diagnostics, loading software., and setting parameters (ACE 1 board only).
Reset switch	—	Resets the ACE board which initiates the power up self test sequence.

TRANSITION CARDS

Transition cards plug into the rear of the backplane and provide rear I/O for the CompactPCI board directly opposite across the backplane. They do not interface with the PCI bus.

This section describes the following transition cards:

- PAM Card
- RIC Card

PAM CARD

The PAM card connects to the rear of the backplane opposite the MCP750 system board. Figure 2-7 shows the PAM card I/O ports (RJ45). Table 2-8 describes the connections made from these I/O ports.

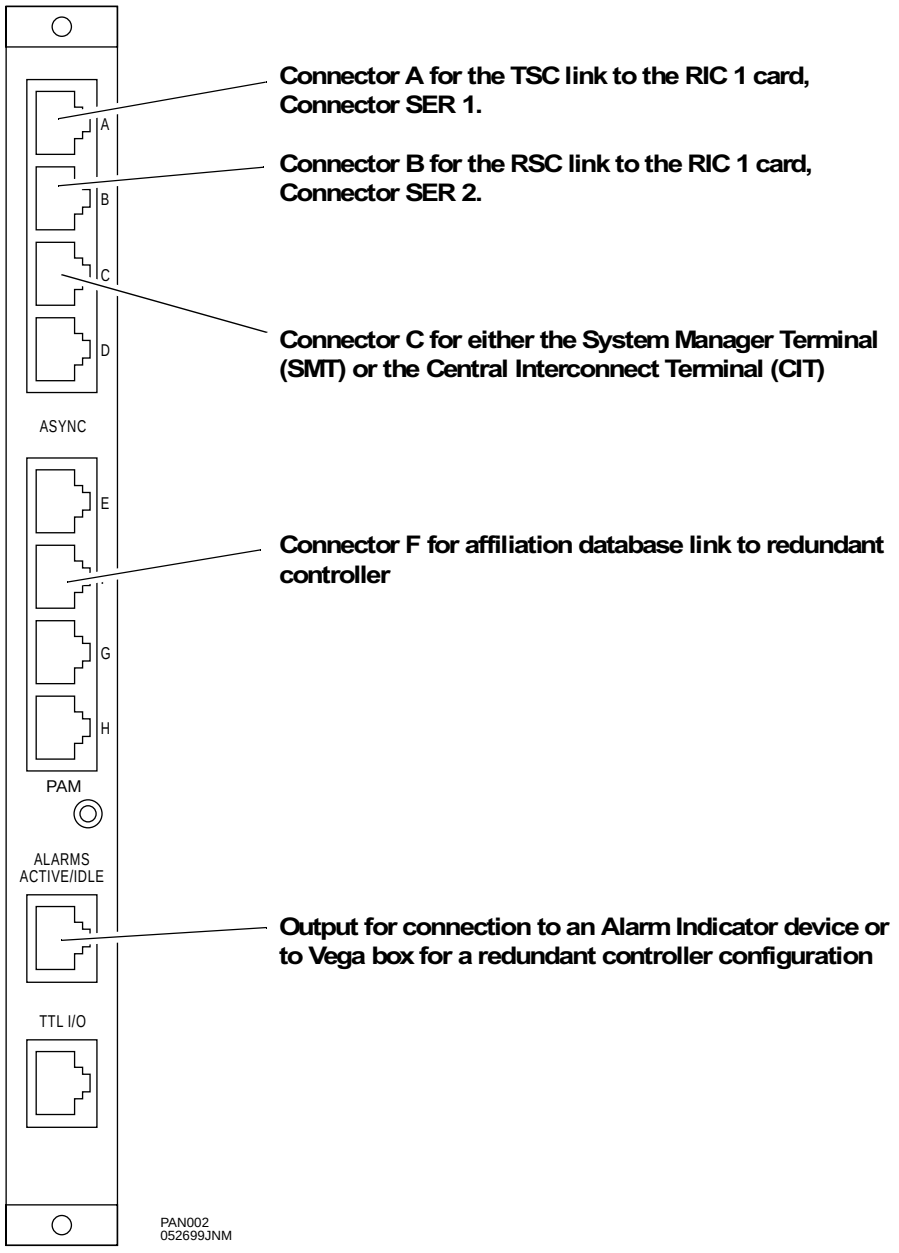

FIGURE 2-7 PAM CARD I/O PORTS

TABLE 2-8 DESCRIPTION OF PAM CARD I/O PORTS

Port	Description
Connector port A	TSC link that supports the flow of control information between the CSC function of the MCP750 System Board and the Transmitter Site Controller (TSC) function on the ACE 1 board.
Connector port B	RSC link that supports the flow of control information between the CSC function of the MCP750 System Board and the Receiver Site Controller (RSC) function on the ACE 1 board.
Connector port C	Serial output for either the System Manager Terminal (SMT) or the Central Interconnect Terminal (CIT). If using the CIT interconnect option, the CIT provides a serial port for SMT.
Connector port D	No connection
Connector port E	No connection
Connector port F	Serial output for the affiliation database link to a redundant MTC3600.
Connector port G	No connection
Connector port H	No connection
Alarms Active/Idle	TTL link output for connection to an Alarm Indicator device. This connector is also used to link the MTC3600 system board to a Vega box in a redundant controller configuration.
TTL I/O	No connection

RIC CARD

The RIC card connects to the rear of the backplane opposite an ACE board. It provides one port for connections to each of the possible seven base station repeaters. In a redundant controller configuration, these ports connect to the T-Bar Switch, which in turn connects to the base station repeaters.

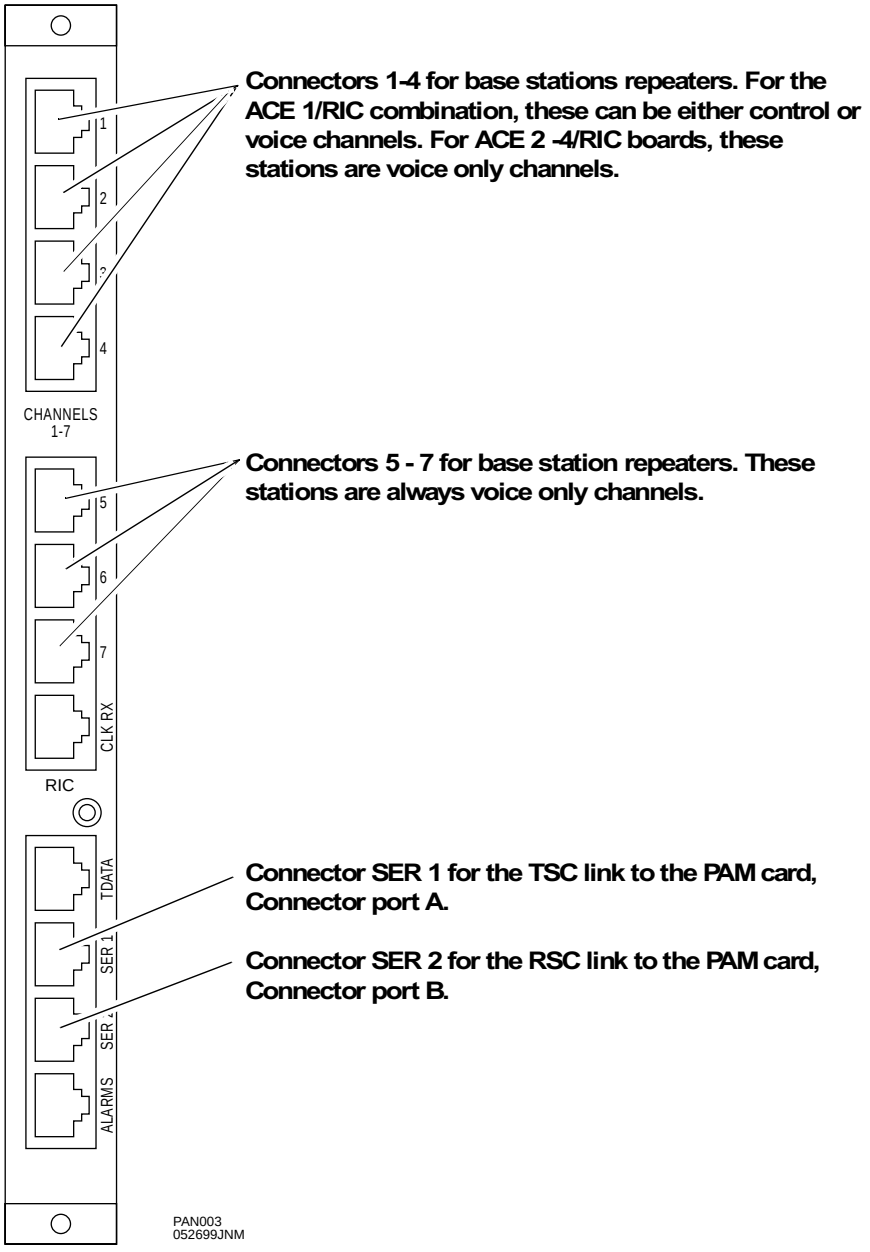

FIGURE 2-8 RIC CARD I/O PORTS

MTC 3600 TO 6809 COMPARISON

TABLE 2-9 DESCRIPTION OF RIC CARD I/O PORTS

Port	Description
Channel 1	Output to base station repeater. In redundant controller configuration, output connects to the T-Bar Switch.
Channel 2	Output to base station repeater. In redundant controller configuration, output connects to the T-Bar Switch.
Channel 3	Output to base station repeater. In redundant controller configuration, output connects to the T-Bar Switch.
Channel 4	Output to base station repeater. In redundant controller configuration, output connects to the T-Bar Switch.
Channel 5	Output to base station repeater. In redundant controller configuration, output connects to the T-Bar Switch.
Channel 6	Output to base station repeater. In redundant controller configuration, output connects to the T-Bar Switch.
Channel 7	Output to base station repeater. In redundant controller configuration, output connects to the T-Bar Switch.
CLK RX	No connection
TDATA	No connection
SER 1	TSC link that supports the flow of control information between the CSC function of the MCP750 System Board and the Transmitter Site Controller (TSC) function on the ACE 1 board.
SER 2	RSC link that supports the flow of control information between the CSC function of the MCP750 System Board and the Receiver Site Controller (RSC) function on the ACE 1 board.
ALARMS	No connection

TABLE 2-10 COMPARISON OF 6809 COMPONENTS TO MTC 3600 COMPONENTS

6809 Component	MTC 3600 Component
CSC - Central Site Controller	MCP750 System Board
ACB - Asynchronous Communications Board	MCP750 System Board and PAM card
RSC - Receiver Site Controller	ACE 1 Board
RIB - Receiver Interface Board	ACE 1 - 4 Boards
IRB - Inbound Recovery Board	ACE 1 Board
TSC - Transmitter Site Controller	ACE 1 Board
TIB - Transmitter Interface Board	ACE 1 - 4 Boards