System Release 7.17
ASTRO® 25
INTEGRATED VOICE AND DATA

Conventional QUANTAR Replacement Guide

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Document History

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About the Conventional QUANTAR Replacement Guide

This manual provides information relating to the removal, installation, and configuration of a conventional QUANTAR® with a GTR 8000 Base Radio.

What is Covered In This Manual?

This manual contains the following chapters:

- Getting Started with the Conventional QUANTAR Replacement on page 23 provides general information related to the replacement of a digital, analog, and mixed mode conventional QUANTAR® with a GTR 8000 Base Radio.
- Conventional QUANTAR and GTR 8000 Base Radio Descriptions on page 25 provides a high-level description for the QUANTAR®, GTR 8000 Base Radio, and the supported conventional features.
- Installation Prerequisites and Electrical Connections on page 37 provides installation precautions, prerequisites, and the electrical connections of ports for both the QUANTAR® and, GTR 8000 Base Radio.
- Replacement of an Analog/Mixed Mode Conventional QUANTAR with a GTR 8000 Base Radio on page 49 provides the removal, installation, and configuration procedures for replacing a analog/mixed mode conventional QUANTAR® with a GTR 8000 Base Radio.
- Replacement of a Digital Conventional QUANTAR with a GTR 8000 Base Radio on page 59 provides the removal, installation, and configuration procedures for replacing a digital conventional QUANTAR® with a GTR 8000 Base Radio.
- Optimization and Troubleshooting for the GTR 8000 Base Radio on page 69 provides optimization procedures and troubleshooting information for the conventional GTR 8000 Base Radio.
- RSS to CSS Parameter Lookup on page 71 defines all the relevant parameters used for the conventional QUANTAR® as well as the equivalent parameters used for the conventional GTR 8000 Base Radio.
- Analog Simulcast Cable Assembly on page 87 provides all the part numbers, assembly procedures and installation procedures for the conventional analog simulcast connections to the GTR 8000 Base Radio.

Helpful Background Information

Motorola offers various courses designed to assist in learning about the system. For information, go to http://www.motorolasolutions.com/training to view the current course offerings and technology paths.

Related Information

See the following documents for information related to this manual:

Related Information	Purpose
Standards and Guidelines for Communication Sites	Provides standards and guidelines that should be followed when setting up a Motorola communications site. Also known as the R56 manual. This manual may be purchased on CD 9880384V83, by

Table continued…

Related Information	Purpose
	calling the North America Parts Organization at 800-422-4210 (or the international number: 302-444-9842).
GTR 8000 Base Radio	Provides information required to install, configure, and maintain the GTR 8000 Base Radio which provides the RF interface for voice, data, and control traffic transmissions between the infrastructure equipment and subscriber radios that use the system.
QUANTAR Instruction Manual (6881095E05–D)	Provides all relating information for the installation and operation of the QUANTAR® station for conventional, ASTRO®, 6809 Trunking, and IntelliRepeater systems.
Configuration/Service Software (CSS) Online Help	Provides descriptions and important information for all screens and parameters used with all G-series devices. For the conventional GTR 8000 Base Radio, see the “Conventional Site – ASTRO 7.13 and Later” contents for digital, analog, and mixed mode conventional help.
Conventional Operations	Provides information regarding conventional channel resource operating characteristics in standalone systems or ASTRO® 25 radio communication systems with K Series, L Series, or M Series.
Quick Guide for Implementing MLC 8000s	Provides site-level information and sequences for implementing the MLC 8000 device which is used as an analog conventional comparator/voter for analog IP-based simulcast and non-simulcast voting, and as a subsite link converter for conventional analog, digital, and mixed mode channels.

Chapter 1

Getting Started with the Conventional QUANTAR Replacement

This chapter provides general information related to the replacement of a conventional QUANTAR® station.

1.1 Purpose of Replacment Guide

This replacement guide provides all the necessary information to remove an existing conventional QUANTAR® station and replace it with a GTR 8000 Base Radio. Before proceeding with the replacement, take the time to familiarize yourself with the information covered in the first three chapters.

1.2 Compliance and Safety Considerations

IMPORTANT: Before performing a base radio replacement, verify and follow all safety, training, and certification requirements and considerations.

Make sure to follow the R56 standards and guidelines for communication sites, including all safety requirements and considerations. See the *Standards and Guidelines for Communication Sites* manual. The Motorola Online (MOL) website contains additional information. For more details, log on to https://businessonline.motorolasolutions.com/ and click **Resource Center**.

1.2.1 R56 Compliance Audit

Table 1: R56 Compliance Audit

Activity	Description	Reference
R56 Compliance	The site should meet R56 standards and an ETA certified R56 auditor must verify compliance.	See the following manuals: • *Standards and Guidelines for Communication Sites* • R56 Compliance Checklist and the R56 Audit Form in *Standards and Guidelines for Communication Sites*

1.2.2
Hardware Installation and Optimization

The following table covers the references to the information required for site preparation:

Table 2: Hardware Installation and Optimization

Activity	Description	Reference
Equipment Replacement and Configuration	Covers the equipment replacement and configuration procedures which must be performed at the site.	Chapter Replacement of an Analog/Mixed Mode Conventional QUANTAR with a GTR 8000 Base Radio on page 49 and Chapter Replacement of a Digital Conventional QUANTAR with a GTR 8000 Base Radio on page 59.
Optimization and Troubleshooting	Covers the equipment test and verification procedures which must be performed at the site.	Chapter Optimization and Troubleshooting for the GTR 8000 Base Radio on page 69.

Chapter 2

Conventional QUANTAR and GTR 8000 Base Radio Descriptions

This chapter provides a high-level description for the conventional QUANTAR® and GTR 8000 Base Radio as well as their supported features.

2.1 QUANTAR Overview

The QUANTAR® station supports conventional capabilities in a compact, software-controlled design. The station architecture and microprocessor-controlled Station Control Module allow for fast and reliable expansion and upgrading. FLASH memory in the Station Control Module allows software downloads to be performed locally (using the serial or Ethernet port) or remotely through the modem.

The station wireline circuitry provides a wide variety of telephone interfaces, including analog, ASTRO, ASTRO CAI, Tone Remote Control, DC Remote Control, and WildCard I/O connections. The configuration and servicing of a QUANTAR® station is performed using the Radio Service Software (RSS).

For a detailed description of the theory of operation for the QUANTAR® station, see the *QUANTAR Instruction Manual* (6881095E05–D).

2.2 GTR 8000 Base Radio Overview

A GTR 8000 Base Radio consists of a transceiver module, power amplifier module, fan module, and power supply. The transceiver module includes the functionality for the exciter, receiver, and station control. The base radio software, configuration, and network management, as well as inbound/outbound traffic handling, are performed through the transceiver module. On-board serial and Ethernet service ports are on this module for local servicing through the Configuration/Service Software (CSS). The power amplifier module amplifies the low-level modulated RF signal from the transceiver module and delivers the amplified signal on the path to the transmit antenna. The power supply module supports the transceiver and power amplifier modules. Radio Frequency Distribution System (RFDS) provides the interface between the transceivers and the site antennas and between the power amplifier and the site antennas.

For a detailed description of the theory of operation for the GTR 8000 Base Radio, See the *GTR 8000 Base Radio* manual.

2.3 Conventional System Configurations

The conventional GTR 8000 Base Radio is available in the following system configurations:

- Conventional circuit simulcast, voting, and multicast subsystems
- Conventional base or repeater sites
- Centralized Conventional Architecture
- Distributed Conventional (Subsystem) Architecture
- ASTRO® 3.1 Conventional System

NOTICE: Contact Motorola regarding the latest list of system architectures and site types supported by the conventional GTR 8000 Base Radio.

2.4 Conventional Software Options

The GTR 8000 Base Radio supports the following software options for conventional system operation:

- **CA01484AA** – Project 25 FDMA conventional software

  NOTICE: This option provides IP digital-only Project 25 FDMA conventional base radio software with capability for one frequency pair and in-cabinet repeat. Analog and mixed mode operation is not supported.

- **CA01948AA** – ASTRO® 3.1 conventional software

  NOTICE: This option provides the ASTRO® 3.1 conventional feature set; the GTR 8000 Base Radio can operate standalone or connected to an ASTRO® 25 7.12 system through a GGM 8000.

- **CA01949AA** – Analog conventional software

Option **CA01948AA** provides a similar feature set to the QUANTAR® conventional base radio. With this feature set, the base radio is configurable for digital Project 25 FDMA operation, analog conventional operation, and mixed mode (digital P25 and analog) operation. It supports digital V.24, analog 4-wire and mixed mode 4-wire/V.24 hybrid circuit wireline link interfaces. Up to 16 programmable channel configurations are supported. Each channel configuration can be configured for base station, repeater, simplex, or receive only operation.

Option **CA01949AA** provides a circuit analog conventional base radio. This base radio software supports 2-wire, 4-wire, and 8-wire circuit analog wireline links. Up to 16 programmable channel configurations are supported. Each channel configuration can be configured for base station, repeater, simplex, or receive only operation. Tone Remote Control wireline keying is supported, with a full complement of programmable function tones. An internal frequency reference is included as standard equipment with this option.

2.5 Conventional Architectures

The conventional GTR 8000 Base Radio supports the following architectures:

- Standalone repeater
- Console controlled repeater
- Console controlled base station
- Control station
- Simulcast configuration with GCM 8000 Comparator
- Simulcast configuration with ASTRO-TAC™ 3000 Comparator
- Simulcast configuration with MLC 8000 Comparator
- Voting configuration with ASTRO-TAC™ 3000 Comparator
- Voting configuration with DIGI-TAC
- Voting configuration with MLC 8000 Comparator

2.5.1
Analog Simulcast Channel Compatibility

Base radios used in an analog simulcast channel are only compatible when their respective audio delays are exactly the same. The audio delay in a QUANTAR® station is in the microsecond range. The GTR 8000 Base Radio processes simulcast audio through the DSP, which delays the audio by 11 milliseconds. Therefore, due to the mismatch in the inherent audio delays, the QUANTAR® station and GTR 8000 Base Radio are not compatible on the same analog simulcast channel.

2.6
Frequencies for ASTRO 3.1 Conventional Architectures

The GTR 8000 Base Radio supports the following frequency bands in a ASTRO 3.1 Conventional architecture:

- 700, 800 MHz
- UHF R1 (380-435 MHz)
- UHF R2 (435–524 MHz)
- VHF (136–174 MHz)

NOTICE:
Although the QUANTAR® station supports conventional operation at 900 MHz, the standalone GTR 8000 Base Radio does not support 900 MHz conventional operation.

2.7
QUANTAR Features Supported in the GTR 8000 Base Radio

The following table lists the QUANTAR® station features supported in the GTR 8000 Base Radio:

Table 3: QUANTAR Features Supported in the GTR 8000 Base Radio

QUANTAR Feature/Functionality	Conventional GTR 8000 Base Radio Support
Voice Receive and Transmit (ASTRO) – CAI C4FM	✓
Voice Receive and Transmit (Analog)	✓
Voice Receive and Transmit (Mixed Mode)	✓
Voice Receive and Transmit (Securenet-12kbps)	✗
ASTRO CAI Data receive and transmit	✓
ASTRO CAI Data repeat	✓
ASTRO Stat alert signaling (TSBK's)	✓
In-cabinet repeat or Base operation	✓
Console priority	✓
Community Repeater $F7F/Monitor $F7E	✓
Multiple Channels - up to 16	✓

Table continued…

QUANTAR Feature/Functionality	Conventional GTR 8000 Base Radio Support
Channel parameters, output power, time-out timers, etc	✓
Multiple Access Code Tables - up to 16	✓
Base Station Identification - FCC Morse code ID	✓
External Frequency Reference Capability	✓
Internal Frequency Reference and Wild-Card support	✓
Battery backup - 12, 24, 48, or 60 VDC	✓ (48 VDC)
Console Commands	
Repeater Setup/Knockdown	✓
Channel Change	✓
Disable Transmit PL / Receive PL	✓
Monitor	✓
Scan On/Off	✓
Console Interface	
Local or E&M	✓
DC Remote Control	✗
Tone Remote Control	✓
V.24 only and V.24 Hybrid	✓
Ethernet interface with zone core	✓
Service Features	
Station Status Panel	✓
Station Log (Alarms and Events)	✓
ASTRO BER and RSSI	✓
ASTRO Test Pattern Transmission	✓
Hardware Metering screens	✓
HW and SW version screens	✓
Software Download	✓
Standalone and Expandable Site Subsys-tem Hardware	✓
Alignments	✓
Options and Configurations	

Option	Description	Suppor-ted	Option	Description

Table continued…

QUANTAR Feature/Functionality		Conventional GTR 8000 Base Radio Support		
X777	Analog Simulcast	✓	CA01952AA	Analog Conventional Simulcast Software
X371	Antenna Relay	✓	CA01504AA	Antenna Relay
X437	ASTRO Modem	✗	—	—
X403	ASTRO SCAN	✓	CA01947AA	Receiver Scan Operation
X888	ASTRO Simulcast	✓	CA01502AA	ASTRO® 25 Conventional Simulcast Software
X233	Basic WildCard	✓	Standard	Basic WildCard
X157	Enhanced WildCard	✓	CA01954AA	WildCard with GPIO
U764	Fallback in cabinet repeat - Simulcast	✓	CA01503AA	Fallback in cabinet repeat - Simulcast
U453	Fast key up (analog feature)	✗	—	—
X873	Internal HSO	✓	CA1506AA	Optional Frequency Reference
—	Monitor before Data Transmit	✓	Standard	Receive Monitor
X286	Multi Coded Squelch => Multi PL and Multi-NAC	✓	CA01950AA	Conventional Multi-NAC and Multi-PL/DPL
X932	SAM (MDC, DTMF, etc)	✓	Standard	Included in CA01954AA
X889	V.24 Interface	✓	Standard	V.24 Interface
X269	Voting Option for Analog Simulcast	✓	CA01952AA	Analog Conventional Voting Software
X269	Voting Option for ASTRO Simulcast	✓	CA01505AA	ASTRO® 25 Conventional Voting Software
X312	Wideband Receiver VHF	✓	Standard	Wideband Receiver VHF
X322	Wideband Receiver VHF	✓	Standard	Wideband Receiver VHF
—	not supported	✓	Standard	IP Interface
—	—	✓	CA01506AA	Optional Frequency Reference

2.8 Performance Specifications

This section contains the performance specifications for the QUANTAR® station and GTR 8000 Base Radio.

NOTICE: The performance specifications listed in this section are not specific to this guide, but are valid for all applications.

2.8.1
General – QUANTAR

The following table lists the general performance specifications for the QUANTAR® station:

Table 4: General Performance Specifications – QUANTAR

Item	Description		
TX Sub-Band Range	**VHF** 132-154 MHz (R1) 150-174 MHz (R2)	**UHF** 380-433 MHz (R0) 403-433 MHz (R1) 438-470 MHz (R2) 470-494 MHz (R3) 494-520 MHz (R4)	**800** 851-870 MHz
RX Sub-Band Range	**VHF** 132-154 MHz (R1) 150-174 MHz (R2)	**UHF** 380-433 MHz (R0) 403-433 MHz (R1) 438-470 MHz (R2) 470-494 MHz (R3) 494-520 MHz (R4)	**800** 806-825 MHz
Number of Channel Configurations	1 to 16		
Channel Spacing	**VHF** 30, 25, 12.5 kHz	**800** 12.5, 25 kHz	**800** 12.5, 25 kHz
Frequency Generation	Synthesized		
Power Supply Type	Switching		
Power Supply Input Voltage	90-280 Vac		
Power Supply Input Frequency	47-63 Hz		
Battery Revert	12V (25W radios) 24V (100W, 110W, and 125W radios)		
T/R Separation (with duplexer option)	**VHF** >1.5 MHz	**UHF** 3 MHz	**800** 45 MHz
Temperature Range (ambient)	– 30 °C to + 60 °C (-22 °F to 140 °F)		

2.8.2
General – GTR 8000 Base Radio

The following table lists the general performance specifications for the GTR 8000 Base Radio for all applications:

Table 5: General Performance Specifications – GTR 8000 Base Radio

Item	Description		
TX Sub-Band Range	**VHF** 136–174 MHz	**UHF**	**700/800** 762-776 MHz

Table continued…

Item	Description		
		380–435 MHz (R1) 435–524 MHz (R2)	851-870 MHz
RX Sub-Band Range	**VHF** 136–174 MHz	**UHF** 380–435 MHz (R1) 435–524 MHz (R2)	**700/800** 792-825 MHz
Number of Channel Configurations	1 to 16		
Channel Spacing	**VHF**: 12.5 kHz, 15 kHz, 25 kHz, and 30 kHz	**UHF (R1/R2)**: 12.5 kHz and 25 kHz	**700**: 12.5 kHz **800**: 12.5 kHz, 25 kHz
Frequency Generation	Synthesized		
Power Supply Type	Switching		
Power Supply Input Voltage	90–264 VAC		
Power Supply Input Frequency	47–63 Hz		
Battery Revert	43.2–60 VDC		
T/R Separation (with duplexer option)	**VHF**: 1 MHz or more	**UHF (R1/R2)**: 2 MHz or more	**700**: 30 MHz **800**: 45 MHz
Temperature Range (ambient)	**Operating**: -30 °C to 60 °C (-22 °F to 140 °F) **Storage**: -40 °C to 85 °C (-40 °F to 185 °F)		

2.8.3

Receiver – QUANTAR

The following table lists the receiver performance specifications for the QUANTAR® station:

Table 6: Receiver Performance Specifications – QUANTAR

Item	Description		
Intermediate Frequencies	**VHF** 21.45 MHz (1st) 450 kHz (2nd)	**UHF** 73.35 MHz (1st) 450 kHz (2nd)	**800** 73.35 MHz (1st) 450 kHz (2nd)
Preselector Bandwidth	**VHF** 4 MHz	**UHF** 4 MHz	**800** 19 MHz
Sensitivity (12 dB SINAD)	**VHF** –119 dBm	**UHF** –116 dBm	**800** –117 dBm
Adjacent Channel Rejection	**VHF** 90 dB (25/30 kHz) 80 dB (12.5 kHz)	**UHF** 75 dB (12.5 kHz) 85 dB (25 kHz)	**800** 70 dB (12.5 kHz) 80 dB (25 kHz)

Table continued…

Item	Description		
Intermodulation Rejection	**VHF** 85 dB (25/30 kHz) 80 dB (30 kHz)	**UHF** 85 dB	**800** 85 dB
Spurious and Image Rejection	100 dB		
Wireline Output	-20 dBm to 0 dBm @ 60% Rated System Deviation, 1 kHz		
Audio Response (Analog Mode)	+1, -3 dB from 6 dB per octave de-emphasis; 300-3000 Hz referenced to 1000 Hz at line input		
Audio Distortion	Less than 3% @ 1000 Hz		
FM Hum and Noise (300 to 3000 kHz bandwidth)	**VHF** 50 dB (25/30 kHz) 45 dB (12.5 kHz)	**UHF** 45 dB (12.5 kHz) 50 dB (25 kHz)	**800** 45 dB (12.5 kHz) 50 dB (25 kHz)
Frequency Stability	1 ppm		
RF Input Impedance	50 Ohms		
FCC Designation	**VHF** ABZ89FR3776	**UHF** ABZ89FR4796	**800** ABZ89FR5757

2.8.4
Receiver – GTR 8000 Base Radio

The following table lists the receiver performance specifications for the GTR 8000 Base Radio for all applications:

Table 7: Receiver Performance Specifications – GTR 8000 Base Radio

Item	Description		
Intermediate Frequencies	**VHF** 44.85 MHz (1st) 2.16 MHz (2nd)	**UHF R1/R2** 73.35 MHz (1st) 2.16 MHz (2nd)	**700/800** 73.35 MHz (1st) 2.16 MHz (2nd)
Electronic Bandwidth	Fullband		
Optional Preselector Bandwidth	**VHF**: 4 MHz	**UHF**: 4 MHz	**700/800**: Full Band
Analog Sensitivity (12 dB SINAD)	12.5 kHz: –119 dBm 25/30 kHz: –118 dBm	12.5 kHz: –118 dBm 25/30 kHz: –117 dBm	12.5 kHz: –118 dBm 25/30 kHz: –117 dBm
Digital Adjacent Channel Rejection	60 dB		
Analog Adjacent Channel Rejection (EIA603) 12.5 kHz	75 dB		
Analog Adjacent Channel Rejection (TIA603D)	12.5 kHz: 50 to 60 dB (adjustable) 25 kHz: 80 dB		

Table continued…

Item	Description		
Intermodulation Rejection	85 dB		
Spurious and Image Rejection	**VHF**: 90 dB	**UHF R1/R2**: 85 dB	**700/800**: 85 dB
Spurious and Image Rejection with optional Preselector	**VHF**:95 dB	**UHF R1/R2**: 100 dB	**700/800**: 100 dB
Wireline Output	-20 to 0 dBm		
Analog Audio Response	+1, –3 dB from 6 dB per octave de-emphasis; 300–3000 Hz referenced to 1000 Hz at line output		
Audio Distortion	3% or 5% (adjustable)		
Analog FM Hum and Noise	12.5 kHz: 45 dB 25 kHz: 50 dB		
Frequency Stability	100 ppb/2 yr or External Reference		
RF Input Impedance	50 Ohms		
Digital Sensitivity 5% Bit Error Rate (BER) Static	**VHF** C4FM: -119 dBm H-CPM: -117 dBm	**UHF R1/R2** C4FM: -118 dBm H-CPM: -116 dBm	**700/800** C4FM: -118 dBm H-CPM: -116 dBm
Digital Sensitivity 5% Bit Error Rate (BER) Faded	C4FM: -111 dBm	C4FM: -110 dBm	C4FM: -110 dBm
Signal Displacement Bandwidth	1 kHz		
Electronic Bandwidth	Full Bandwidth		
Blocking Immunity	100 dB		
Conducted Spurious	-57 dBm		
Bit Error Rate Floor	0.01%		
FCC Designation	**VHF**: ABZ89FR3791	**UHF R1**: ABZ89FR4822 **UHF R2**: ABZ89FR4820	**700/800**: ABZ89FR5811

2.8.5
Transmitter – QUANTAR

The following table lists the transmitter performance specifications for the QUANTAR® station:

Table 8: Transmitter Performance Specifications – QUANTAR

Item	Description		
Power Output	**VHF** 6-25W 25-125W	**UHF** 5-25W 25-110W	**800** 5-20W 20-100W
Electronic Bandwidth	Full sub-band		

Table continued…

Item	Description		
Intermodulation Attenuation	**VHF** 20 dB	**UHF** 50 dB	**800** 50 dB
Spurious and Harmonic Emissions Attenuation	90 dB		
Deviation	**VHF, UHF, and 800** ±5 kHz (25 kHz) ±2.5 kHz (12.5 kHz) ±4 kHz (SECURENET coded) ±2.4 kHz (SECURENET coded)		
Audio Sensitivity	-35 dBm to 0 dBm (variable)		
Audio Response (Analog Mode)	+1, -3 dB from 6 dB per octave pre-emphasis; 300-3000 Hz referenced to 1000 Hz at line input		
Audio Distortion	Less than 2% @ 1000 Hz @ 60% rated system deviation		
FM Hum and Noise (300 to 3000 Hz bandwidth)	45 dB nominal (12.5 kHz) 50 dB nominal (25/30 kHz)		
Frequency Stability	1 ppm		
RF Output Impedance	50 Ohms		
FCC Designation	**VHF** 25W: ABZ89FC3774 125W: ABZ89FC3773	**UHF** 25W: ABZ89FC4797 110W: ABZ89FC4798	**800** 20W: ABZ89FC5775 100W: ABZ89FC5776

2.8.6
Transmitter – GTR 8000 Base Radio

The following table lists the transmitter performance specifications for the GTR 8000 Base Radio for all applications:

Table 9: Transmitter Performance Specifications – GTR 8000 Base Radio

Item	Description		
Power Output	**VHF** 2-100 W for C4FM, FM 2-60 W for LSM, H-DQPSK	**UHF R1/R2** 2-110 W for C4FM, FM 2-110 W for LSM, H-DQPSK	**700/800** 2–100W
Electronic Bandwidth	Full bandwidth		
Modulation Fidelity	5%		
Intermodulation Attenuation	**VHF**: 55 dB	**UHF R1/R2**: 65 dB	**700/800**: 80 dB
Spurious and Harmonic Emissions Attenuation	90 dB		
Deviation	2.5, 4 or 5 kHz		

Table continued…

Item	Description		
Audio Response (Analog Mode)	+1, -3 dB from 6 dB per octave pre-emphasis		
Analog Audio Distortion	Less than 2% (1% typical) at 1000 Hz	Less than 2% (1% typical) at 1000 Hz	Less than 2% at 1000 Hz
Analog FM Hum and Noise	12.5 kHz: 45 dB 25 kHz: 50 dB		
Frequency Stability	100 ppb/2 yr or External Reference		
RF Output Impedance	50 Ohms		
FCC Designation	**VHF**: ABZ89FC3790	**UHF R1**: ABZ89FC4821 **UHF R2**: ABZ89FC4819	**700**: 2-100 W ABZ89FC5812 **800**: 2-100 W ABZ89FC5810

* Full transmitter output power is available during battery revert.

NOTICE: The output connector on the PA (Power Amplifier) provides the output power reference point. The signal loss of the transmitter output cable is as follows:

- 4% at 800 MHz
- 3% at 450 MHz
- 1% at 150 MHz

However, the software in the base radio allows the transmitter output power to be set to 10% above the rated value.

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Chapter 3

Installation Prerequisites and Electrical Connections

This chapter contains installation precautions and prerequisites, as well as electrical connections of ports for the QUANTAR® station and the GTR 8000 Base Radio.

3.1 Pre-Installation Considerations for the GTR 8000 Base Radio

Part of the pre-installation requirements is to become familiarize with the physical size of the device being replaced and the structure in which it is installed.

3.1.1 Base Radio Physical Dimensions

The physical size of the GTR 8000 Base Radio differs in comparison to the QUANTAR® station mostly in height and depth. The width of both base radios is the same. The most noticeable size issue between the base radios is the depth. The GTR 8000 Base Radio is 82 mm (3.23”) longer in depth than the QUANTAR® station.

NOTICE: The recommended clearance for service and installation is at least 2 ft in the front and rear of the base radio.

Table 10: Base Radio Dimensions

Description	QUANTAR	GTR 8000 Base Radio
Size (H x W x D)	220.5mm x 483mm x 375mm (8.68" x 19" x 14.75")	133mm x 483mm x 457mm (5.25" x 19" x 18")

3.1.2 Cabinet Replacement

Due to the physical size of the GTR 8000 Base Radio within an existing QUANTAR® station cabinet, an alternate cabinet may be required. It is the responsibility of the site designer and field engineer to ensure that the operating environment of the GTR 8000 Base Radio is within its rated specifications whether within a cabinet or in an open rack. The following recommendations are intended to serve as guidelines and not as a replacement for proper validation/measurement of the operating environment and radio functionality.

3.1.2.1 Inside Cabinet Clearance

It is recommended that any cabinet used to house a GTR 8000 Base Radio is at least 600 mm (23.62”) deep. The base radio may fit in cabinets as shallow as 490 mm (19.29”). However, care must be taken to center the base radio such that the front fan modules and the rear backplane cable clearances are maintained from the doors. In cabinets less than 600 mm deep, right angle adapters on some cables may be necessary, such as the BNC Rx input. The GTR 8000 Base Radio comes equipped with a right angle line cord.

The clearance from the front and rear of the GTR 8000 Base Radio within existing QUANTAR® station cabinets is different. This clearance may require the adjustment of cabinet rails or specialized spacers.

3.1.2.2
Cabinet Doors

All front and rear doors on cabinets used to house GTR 8000 Base Radios should be louvered or perforated for ventilation. At a minimum, it is highly recommended that the vents align with the fans on the GTR 8000 Base Radio. This alignment ensures that an ample airflow is supplied to the fans. In addition, a 1” clearance from a cabinet door to the fans allows for proper air diffusion and transition into the fans. The backplane of the GTR 8000 Base Radio provides for proper exit space with corner protection pins. The ventilation of rear doors should also align with each base radio within the cabinet.

3.1.2.3
Heat Considerations

When replacing QUANTAR® stations within a cabinet, it is recommended that the same or fewer numbers of GTR 8000 Base Radios be used. Even though GTR 8000 Base Radios are smaller in height than QUANTAR® stations, adding additional base radios can significantly increase the airflow requirements and total heat in the cabinet. The heat from additional base radios can result in thermal performance issues. It is also recommended to place blank panels in any extra spaces left in the cabinet. The extra panels prevent air recirculation from occurring which can cause a significant thermal rise within the cabinet.

3.2
Electrical Connections and Pinouts

This section describes the differences in electrical connections between the QUANTAR® station and the GTR 8000 Base Radio. It provides pinout cross-references for all relevant connection ports, as well as simple circuit schematics.

3.2.1
Power Requirements

The power requirements for the QUANTAR® station and the GTR 8000 Base Radio are identical. The power cord used for the QUANTAR® station can be reused to connect the GTR 8000 Base Radio to the power source. The following table lists the power requirements for each base radio:

Table 11: Power Requirements

Port	QUANTAR	GTR 8000 Base Radio
AC Input	120V/240 VAC	120V/240 VAC
DC/Batt	12, 24, 48, or 60 VDC	48 VDC

NOTICE: If a DC power source is used, the DC power source must be 48 VDC for the GTR 8000 Base Radio.

3.2.2
External Frequency Reference

The external frequency connection (5/10 MHz Input) on the QUANTAR® station can be made at the Station Control Module (Front) or at connector # 30 (Backplane). An EXT FREQ REF input for the GTR 8000 Base Radio is on the backplane. This feature is used in a simulcast subsystem.

NOTICE: An external termination is required to properly terminate the cable connected to the input. Motorola recommends connecting the BNC "T" and a 50 Ohm BNC termination to the input.

Table 12: External Frequency Reference

Base Radio	Port / Type	Description
QUANTAR® Station	Station Control Module / BNC Connector #30 (5/10 MHz Input) / BNC	Accepts an external 5 MHz or 10 MHz frequency for calibrating the station reference oscillator, located in the Station Control Module. **Station Control Module**: 1.0 ± 0.5 V RMS @ 50 ohms **Connector #30**: 2.5 V P-P minimum @ 150 kohms (High Impedance)
GTR 8000 Base Radio	EXT FREQ REF / BNC	The back port accepts a composite (5MHz + 1PPS), 5MHZ (square or sine wave) or 10MHZ (square or sine wave) external site reference signal to drive the internal oscillator for precise frequency stability. It also provides an accurate time source used for precisely launching simulcast data over the air. See GTR 8000 Base Radio Time and Frequency Inputs on page 40 for detailed specifications. The front port only accepts (5 MHz or 10 MHz signal) external site reference signal. **NOTICE:** The GTR 8000 Base Radio accepts either a composite or non-composite frequency reference source in either simulcast or non-simulcast configurations. If a non-composite frequency reference source is used for digital simulcast, then a 1 PPS signal must be provided separately. The Frequency Reference is configured on the Hardware Configuration window in CSS.

Base Radio	Port / Type	Description
		NOTICE: If a composite frequency reference source is used, the Time Reference parameter must be selected as Combined with Frequency Reference for simulcast or non-simulcast configurations.

3.2.3
Time Reference Connections

The 1 pulse per second (PPS) input from a GPS receiver is used for ASTRO® simulcast systems. The GTR 8000 Base Radio accepts a 1 PPS information as a standalone signal or as a composite signal.

Table 13: 1 PPS Connection

Base Radio	Port / Type	Description
QUANTAR® Station	Connector #21 (1 PPS) / BNC	1 PPS clock signal from external timing source for ASTRO® simulcast applications.
GTR 8000 Base Radio	1 PPS / BNC on the backplane	1 PPS clock signal from external timing source for ASTRO® simulcast applications.

3.2.4
GTR 8000 Base Radio Time and Frequency Inputs

Various external time and frequency inputs can be provided to the base station for normal operation or for Internal Frequency Reference Oscillator alignment. The following table provides a list of acceptable input signal types and levels for each base radio input port:

Table 14: Base Radio Time and Frequency Inputs

Input Port	Frequency	Waveform	Level	Impedance	Note
EXT FREQ REF	5 MHz	Sine	2.6-5.3Vpp	100 kohms	AC coupled
EXT FREQ REF	5 MHz	Square	—	100 kohms	AC coupled 45-55% duty cycle
EXT FREQ REF	10 MHz	Sine	2.6-5.3Vpp	100 kohms	AC coupled
EXT FREQ REF	10 MHz	Square	—	100 kohms	AC coupled 45-55% duty cycle
EXT FREQ REF	20 MHz	Sine	2.6-5.3Vpp	100 kohms	AC coupled
EXT FREQ REF	20 MHz	Square	—	100 kohms	AC coupled 45-55% duty cycle

Table continued…

Input Port	Frequency	Waveform	Level	Impedance	Note
EXT FREQ REF	5 MHz/ 1PPS	Square	2.6-5.3Vpp	100 kohms	AC coupled; 25% modulation 1pps arrives on 75% duty cycle
1 PPS	1 PPS	Pulse	2.6-5.3Vpp	100 kohms	DC coupled
Front Panel EXT FREQ REF	5 MHz	Sine	2-5Vpp; 10-18 dBm	50 ohms	AC coupled
Front Panel EXT FREQ REF	5 MHz	Square	—	50 ohms	AC coupled 45-55% duty cycle
Front Panel EXT FREQ REF	10 MHz	Sine	2-5Vpp; 10-18 dBm	50 ohms	AC coupled
Front Panel EXT FREQ REF	10 MHz	Square	—	50 ohms	AC coupled 45-55% duty cycle

NOTICE: The Front Panel EXT FREQ REF connection is the Frequency Calibrator (BNC connector) on the transceiver module.

3.2.5
Wireline Connections

Wireline connections provide a wide variety of telephone interfaces, including analog, ASTRO®, ASTRO CAI, Tone Remote Control. Wireline connections are on the QUANTAR® station backplane and on the Transceiver Option Card on the front of the GTR 8000 Base Radio. The following table provides a cross-reference of the wireline signals between the QUANTAR® station and GTR 8000 Base Radios:

Table 15: Wireline Connection Cross-Reference

	GTR 8000 Base Radio	QUANTAR Connectors	
Signal Name	Wireline RJ-45 Connector	Phone Line Inputs	50–Pin System Connector
Line 2+	1	3	2
Line 2–	2	4	27
Line 3+	3	5	3
Line 1–	4	2	26
Line 1+	5	1	1
Line 3–	6	6	28
Line 4+	7	7	4
Line 4–	8	8	29

3.2.6
System Connector

This section provides a pin out cross-reference for the system connector between the QUANTAR® station and the GTR 8000 Base Radio. It also contains the schematic differences in the I/O circuits between the base radios.

3.2.6.1
System Connector Pinout

The system connector on the GTR 8000 Base Radio is a 50-pin mini SCSI connector. It is used for all the WildCard general-purpose inputs and outputs. It also provides I/O for analog features. The following table cross-references the pinouts between a QUANTAR® station and a GTR 8000 Base Radio:

Table 16: 50–Pin System Connector Pinout Cross-Reference

GTR Pin #	QUANTAR Pin #	Signal	I/O Type	QUANTAR Function	Conventional Function	Note
1	12	Aux In 2	I	Tx Inhibit	Main Standby - External handshaking	Pull To GND To Activate
2	14	Aux In 4	I	Rx WL Inhibit	Main Standby-Status of other side	Pull To GND To Activate
3	16	Aux In 6	I	In cabinet Repeat	In-Cabinet Repeat	Pull To GND To Activate
4	42	Aux In 8	I		Main Standby - Connectivity other Station	Pull To GND To Activate
5	47	Aux In 9 –	I		Phone Patch - PL Strip	Opto-Isolated In - Current flow to Activate
6	48	Aux In 10 –	I		Phone Patch - Monitor	Opto-Isolated In - Current flow to Activate
7	49	Aux In 11 –	I			Opto-Isolated In - Current flow to Activate
8	50	Aux In 12 –	I			Opto-Isolated In - Current flow to Activate
9	n/a	Aux In 13	I	n/a	For future use	Pull To GND To Activate
10	n/a	Aux Out 12	O	n/a		Low Impedance to GND When Active
11	37	Aux Out 2	O	Rx Code Detect	Phone Patch - Rx Carrier	Low Impedance to GND When Active

Table continued…

GTR Pin #	QUANTAR Pin #	Signal	I/O Type	QUANTAR Function	Conventional Function	Note
12	39	Aux Out 4	O		Main Standby - Station Status	Low Impedance to GND When Active
13	41	Aux Out 6	O			Low Impedance to GND When Active
14	43	Aux Out Relay 7 Com	O	RD STAT	RD STAT - Receiver Active	Form Relay A Closed When Active
15	19	Aux Out Relay 8 Com	O		Main Standby - Antenna Relay	Form Relay A Closed When Active
16	20	Aux Out Relay 9 Com	O			Form Relay A Closed When Active
17	21	Aux Out Relay 10 Com	O			Form Relay A Closed When Active
18	n/a	Aux Out 11	O	n/a		Low Impedance to GND When Active
19	n/a	External_Reset	I	n/a	Reset	Buffered In Pull To GND To Activate
20	n/a	TSTAT	O	n/a	For future use	0 Volts When Inactive / +5 Volts when Active
21	30	Aux RX	O	Aux Rx	Aux Rx	Analog Signal - Unbalanced
22	n/a	TX DATA-	I	n/a	For future use	Analog Signal - 600 Ohm Balanced
23	5	Aux TX	I/O	Aux Tx	Aux Tx	Analog Signal - 600 Ohm Unbalanced
24	35	PL-	I	PL(-) In	PL(-) In	Analog Signal - 600 Ohm Balanced
25	9	Gen TX-	I	Gen TX Data-	Gen TX-	Analog Signal - 600 Ohm Balanced
26	11	Aux In 1	I	Ext Failsoft	Phone Patch - Call Request	Pull To GND To Activate
27	13	Aux In 3	I	Ext Code Detect	Tx Inhibit	Pull To GND To Activate

Table continued…

GTR Pin #	QUANTAR Pin #	Signal	I/O Type	QUANTAR Function	Conventional Function	Note
28	15	Aux In 5	I	Duplex Enable	External PTT	Pull To GND To Activate
29	17	Aux In 7	I	Channel 4	Rx Inhibit	Pull To GND To Activate
30	22	Aux In 9+	I	EXT PTT +	Phone Patch - PL Strip	Opto-Isolated In - Current flow to Activate
31	23	Aux In 10+	I	Channel 1 +	Phone Patch - Monitor	Opto-Isolated In - Current flow to Activate
32	24	Aux In 11+	I	Channel 2 +		Opto-Isolated In - Current flow to Activate
33	25	Aux In 12+	I	Channel 3+		Opto-Isolated In - Current flow to Activate
34	7	GND		GND	GND	
35	n/a	Aux In 14	I	n/a	For future use	Pull To GND To Activate
36	36	Aux Out 1	O	Failsoft	Phone Patch - Inhibit / Enable	Low Impedance to GND When Active
37	38	Aux Out 3	O			Low Impedance to GND When Active
38	40	Aux Out 5	O			Low Impedance to GND When Active
39	18	Aux Out Relay 7 N.O.	O	RD STAT	RD STAT - Receiver Active	Form Relay A Closed When Active
40	44	Aux Out Relay 8 N.O.	O		Main Standby - Antenna Relay	Form Relay A Closed When Active
41	45	Aux Out Relay 9 N.O.	O			Form Relay A Closed When Active
42	46	Aux Out Relay 10 N.O.	O			Form Relay A Closed When Active
43	32	GND		GND	GND	
44	n/a	GND		GND	GND	
45	n/a	RSTAT	O	n/a	For future use	0 Volts When Inactive / +5 Volts when Active

Table continued…

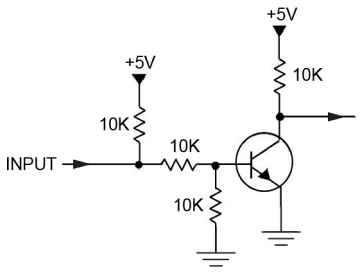
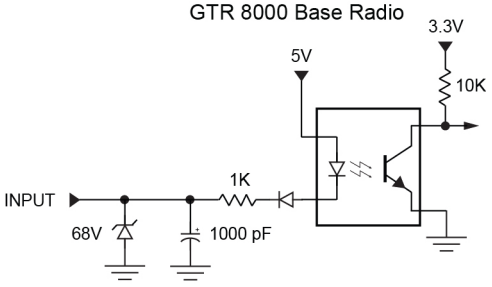
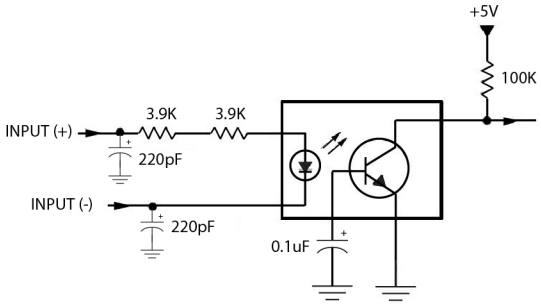
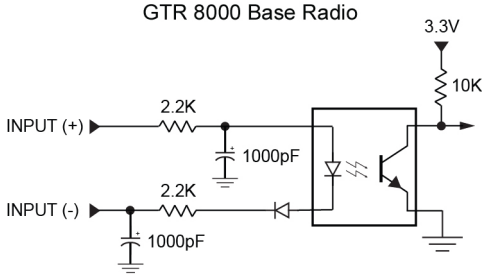
GTR Pin #	QUANTAR Pin #	Signal	I/O Type	QUANTAR Function	Conventional Function	Note
46	n/a	GND		GND	GND	
47	n/a	TX DATA+	I	n/a	For future use	Analog Signal - 600 Ohm Balanced
48	n/a	GND		GND	GND	
49	10	PL+	I	PL(+) In	PL(+) In	Analog Signal - 600 Ohm Balanced
50	34	Gen TX+	I	Gen TX Data+	Gen TX+	Analog Signal - 600 Ohm Balanced
n/a	1	Line 1 +		Line 1+	n/a	
n/a	2	Line 2 +		Line 2+	n/a	
n/a	3	Line 3 +		Line 3+	n/a	
n/a	4	Line 4 +		Line 4+	n/a	
n/a	8	5 VDC		5 VDC	n/a	
n/a	26	Line 1 –		Line 1–	n/a	
n/a	27	Line 2 –		Line 2–	n/a	
n/a	28	Line 3 –		Line 3–	n/a	
n/a	28	Line 4 –		Line 4–	n/a	
n/a	33	14.2 VDC		14.2 VDC	n/a	
n/a	6	Open				
n/a	31	Open				

3.2.6.2
System Connector I/O Circuits

The system I/O circuits illustrate the differences in the I/O circuitry between the QUANTAR® station and the GTR 8000 Base Radio. The Aux Inputs and Aux Outputs for the GTR 8000 Base Radio are hard coded to the 50-pin Telco. Access to these inputs and outputs is configured through the WildCard screens in CSS.
See the following *CSS Online Help* content for details:

Conventional Site - ASTRO 7.12 and Later → WildCard Tables Window

Table 17: System Connector Input Circuits

QUANTAR Station	GTR 8000 Base Radio (Transceiver Option Card)
QUANTAR  Transistor-Coupled Input Circuit	GTR 8000 Base Radio  Transistor Input Circuit The transistor input circuit represents Aux Inputs 1–8, 13, and 14 as well as the external reset input.
QUANTAR  Opto-Coupled Input Circuit	GTR 8000 Base Radio  Transistor Opto-Coupled Input Circuit The transistor opto-coupled input represents Aux Inputs 9–12.

GTR 8000 Base Radio System Connector Inputs:

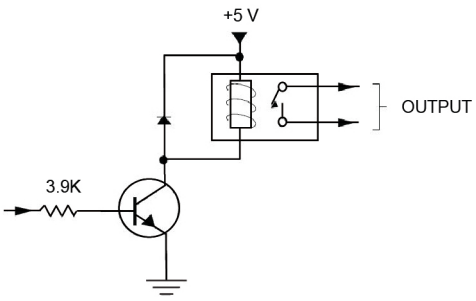
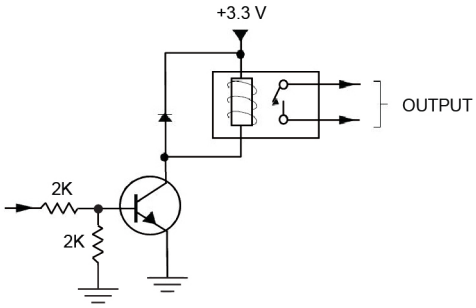
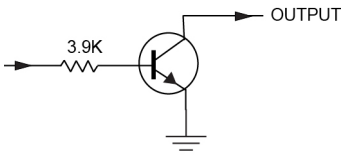
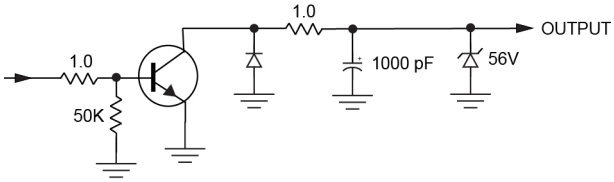
All WildCard inputs are debounced.

Non-isolated inputs (1-8) and the reset line are pull to ground inputs. These inputs are typically driven with an open collector device capable of sinking 5 mA.

Isolated inputs (9-12) require at least 4 VDC but less than 60 VDC to activate. Less than 0.8 VDC deactivates these inputs.

In all cases, the input voltage must always remain below 60 V.

Table 18: System Connector Output Circuits

QUANTAR Station	GTR 8000 Base Radio (Transceiver Option Card)
QUANTAR  Relay Closure Output Circuit	GTR 8000 Base Radio  Relay Closure Output Circuit The relay closure output circuits represents Aux Outputs 7–10.
QUANTAR  Transistor-Coupled Output Circuit	GTR 8000 Base Radio  Transistor-Coupled Output Circuit The transistor coupled output circuit represents Aux Outputs 1–6 and 11.

GTR 8000 Base Radio System Connector Outputs:
WildCard relay outputs (7-10) are rated up to 50 V and 100 mA.
WildCard transistor outputs (1-6, 11-12) are open collector outputs rated up to 50 V and 100 mA.

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Chapter 4

Replacement of an Analog/Mixed Mode Conventional QUANTAR with a GTR 8000 Base Radio

The procedures presented in this chapter are used to replace a analog/mixed mode conventional QUANTAR® with a GTR 8000 Base Radio.

4.1 Introduction – Conventional Base Radios

The GTR 8000 Base Radio provides the same site connections that are available on a QUANTAR® station. These include AC power, external frequency reference, and Rx/Tx antennas. However, there is a difference in the DC voltage backup requirements. The GTR 8000 Base Radio only uses a 48 VDC power source while the QUANTAR® station supports a 12 VDC, 24 VDC, 48 VDC, or 60 VDC power source, depending on the installed power supply. The GTR 8000 Base Radio provides a 10 Base T Ethernet connection, while the QUANTAR® provides a 10 Base 2 Ethernet connection.

The CSS supports service and configuration of the GTR 8000 Base Radio and provides the same configuration screens used with the RSS for the QUANTAR® station. The alignment process in CSS has been simplified for the GTR 8000 Base Radio. The CSS service screens provide the same settings as the service screens in the RSS for the QUANTAR® station.

4.2 Replacing the Analog/Mixed Mode Conventional QUANTAR

This section outlines the process of replacing an analog/mixed mode conventional QUANTAR® with a GTR 8000 Base Radio.

Process:

1. Archive the codeplug of the QUANTAR® using the WinRSS application. See the procedure in Archiving the QUANTAR Codeplug in WinRSS on page 49 for details.
2. Disable the QUANTAR® and then remove it from the QUANTAR® rack or cabinet. See the procedure in Powering Down and Removing the Conventional QUANTAR Station on page 51 for details.
3. Install the GTR 8000 Base Radio into the QUANTAR® rack or cabinet. See the procedure in Installing an Analog or Mixed Mode Conventional GTR 8000 Base Radio on page 53 for details.
4. Configure the GTR 8000 Base Radio using the CSS software. See the procedure in Configuring the GTR 8000 Base Radio in CSS on page 56 for details.

4.3 Archiving the QUANTAR Codeplug in WinRSS

Prerequisites: Wear an Electrostatic Discharge (ESD) strap and connect its cable to a verified good ground. This strap must be worn throughout this procedure to prevent ESD damage to any components.

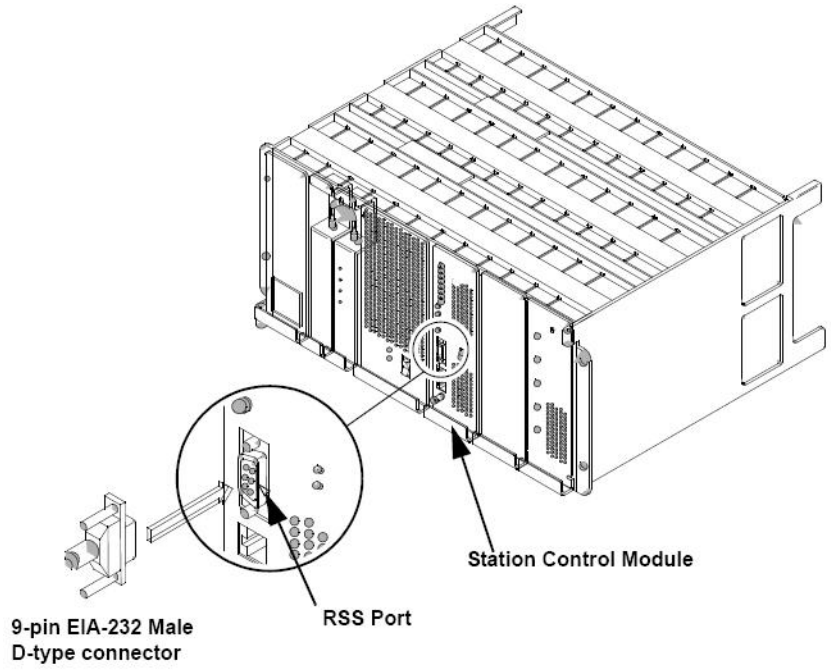
The following cable hardware and software application are required:

- 9-pin male to 9-pin female EIA-232 null-modem cable
- Radio Service Software (RSS)

When and where to use: This procedure describes how to read the current codeplug from the QUANTAR® station and save the codeplug as a codeplug report text file or as an archive file. The codeplug is used as reference when configuring the GTR 8000 Base Radio.

Procedure:

1 Connect the null-modem cable from the COM port on the computer to the RSS port on the station control module.



2 Launch the Radio Service Software (RSS) program.

3 From the **Connection Configuration** screen, select **Tools** → **Connection Configuration**.

4 Set the baud rate for the serial port on the computer to 9600 bps using Device Manager. The only available baud rate on the QUANTAR® station is 9600 bps.

   a From Windows, select **Start** → **Run** and enter `mmc devmgmt.msc`

   b Expand **Ports (COM and Port)** and right click **Communication Port (COM1)**.

   c Select the **Port Settings** tab and verify or modify the settings.

   WARNING: If the base radio is not connected to a transmitting antenna or to an appropriate piece of test equipment capable of handling the output, you must connect a dummy load to the transmitter output. Do not key the transmitter or use the base radio to transmit RF unless its transmitter output port is connected either to a transmitting antenna or to a 50 Ohm high-power dummy load.

5 Click **Connect/Dial** to establish a connection to the QUANTAR® station.

6 Select **File** → **Read from Device** to read the current codeplug.

7 Optional: If required, enter the password for the device and click **OK**.

8 Archive the codeplug data using one of the following methods:

   - Save the codeplug as a text file (filename.txt) by selecting **File** → **Save Codeplug Report**.
   - Save the codeplug as an archive file (filename.cp) by selecting **File** → **Save As**.

9 Close the RSS program.

10 Disconnect the null-modem cable from the station control module and the COM port on the computer.

4.4

Powering Down and Removing the Conventional QUANTAR Station

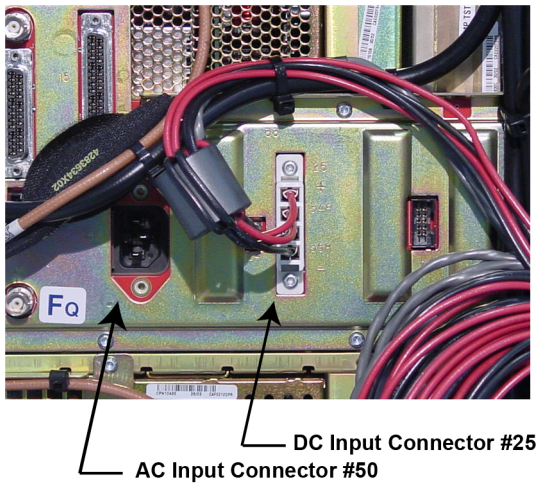
When and where to use: This procedure describes the proper sequence for powering down the QUANTAR® station before disconnecting it and removing it from the site. The channel and any traffic on the base radio are lost when the QUANTAR® station is powered down.

WARNING: Shock hazard. The QUANTAR® station contains dangerous voltages which can cause electrical shock or damage equipment. Turn off the base radio and disconnect the power cabling when servicing this equipment. Allow the base radio to cool before disconnecting any cables. Exposed surfaces of the unit may be hot.

Procedure:

1 Power down the QUANTAR® station.

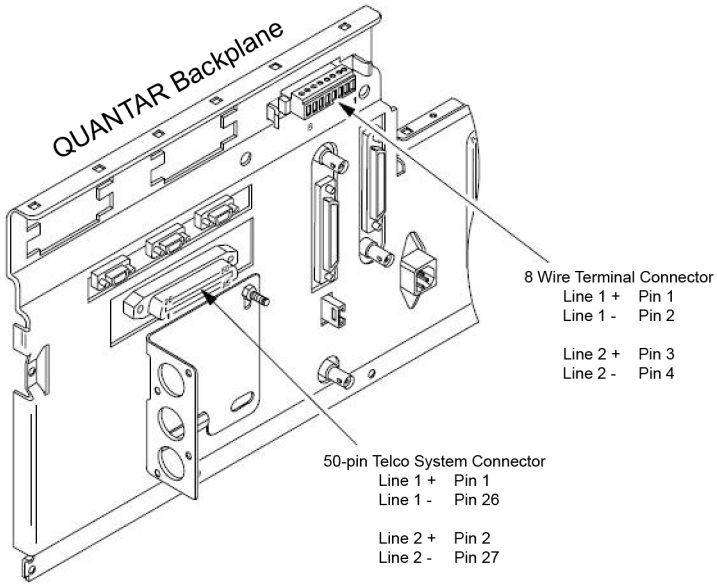
- **a** Set the rocker or toggle switch, on the front panel of the power supply module, to the **OFF** position.
- **b** Disconnect the power cable from the power source and AC input connection.
- **c** Disconnect the cable from the DC input connection if the base radio includes a battery backup or is powered from a DC source.



2 Disconnect the ground wire.

3 Disconnect the V.24 cable (digital or mixed mode configurations), if present .

4 Disconnect the 50-pin Telco system connection (connector #17), if present.



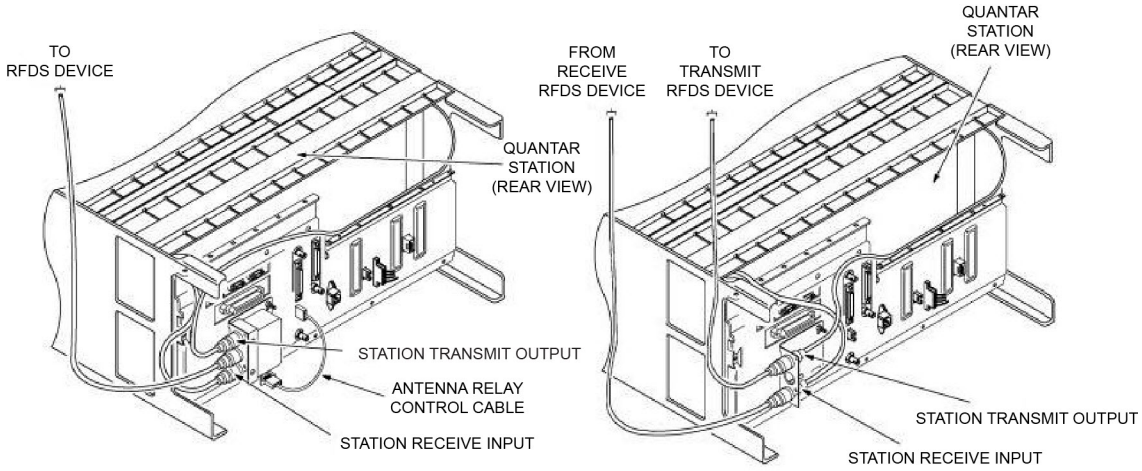
5 Disconnect the 8 wireline screw terminal connection (Phone Line Inputs), if present (analog or mixed mode configurations).

NOTICE: Phone line connections may be made at either the 50-pin Telco system connector or at the 8 wire screw terminal connector. See the “Installation” section of the appropriate QUANTAR® station functional manual for more details on phone line connections.

6 Disconnect the transmit antenna and receive input cables.

- If using the antenna relay option, disconnect the single transmit/receive cable.

Figure 1: QUANTAR Station Transmit and Receive Connections



QUANTAR WITH ANTENNA RELAY QUANTAR WITHOUT ANTENNA RELAY

7 For a simulcast subsystem, disconnect the Frequency reference.

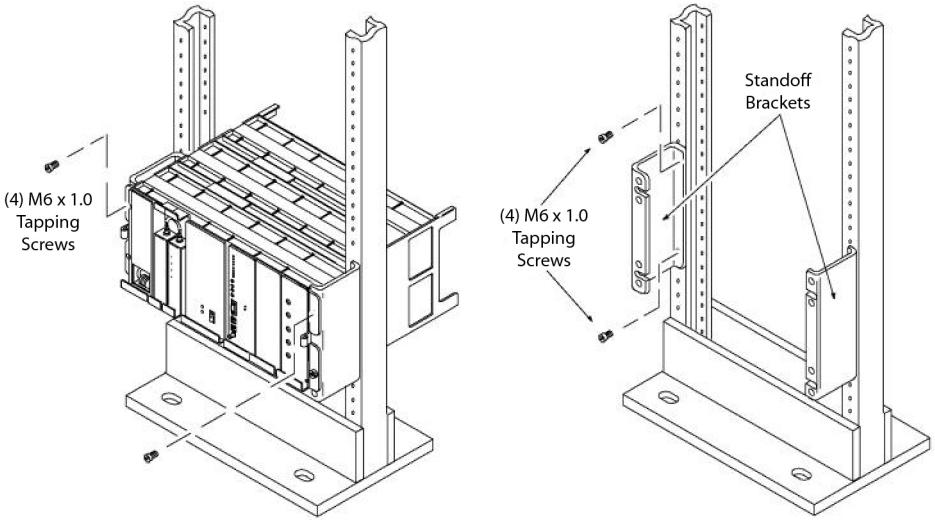
- Disconnect the BNC 5/10 MHz cable (connector #30), if present. This cable may be present if the QUANTAR® station is used in a digital simulcast. This cable is only required if the GTR 8000 Base Radio is used in a digital simulcast configuration.
- Disconnect the BNC 1PPS cable, if present, from the 1PPS port (connector #21).

8 Remove the QUANTAR® station from the rack or cabinet.

CAUTION: When removing the QUANTAR® station from a cabinet enclosure or rack, use the National Institute of Occupational Safety and Health (NIOSH) lifting equation to determine whether a one or two person lift is required when a system component must be removed and replaced in a cabinet enclosure or rack.

a Remove the four M6 screws, from the front of the QUANTAR® station, using a T27 bit driver.

b Remove the QUANTAR® station from the front of the rack or cabinet by sliding it towards you until it clears the rack.



9 Optional: If installed in a rack, remove the standoff brackets used to hold the QUANTAR® station.

4.5 Installing an Analog or Mixed Mode Conventional GTR 8000 Base Radio

When and where to use: Used for an analog-only or mixed mode conventional GTR 8000 Base Radio in place of a conventional QUANTAR® station. See the following images of the GTR 8000 Base Radio for connections:

Figure 2: GTR 8000 Base Radio – Backplane

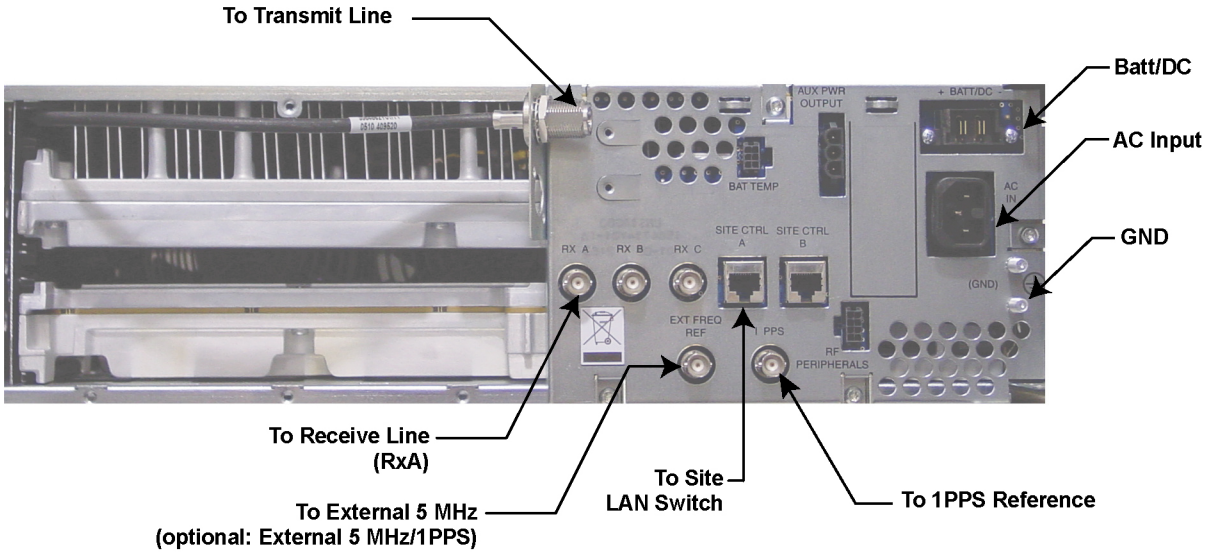
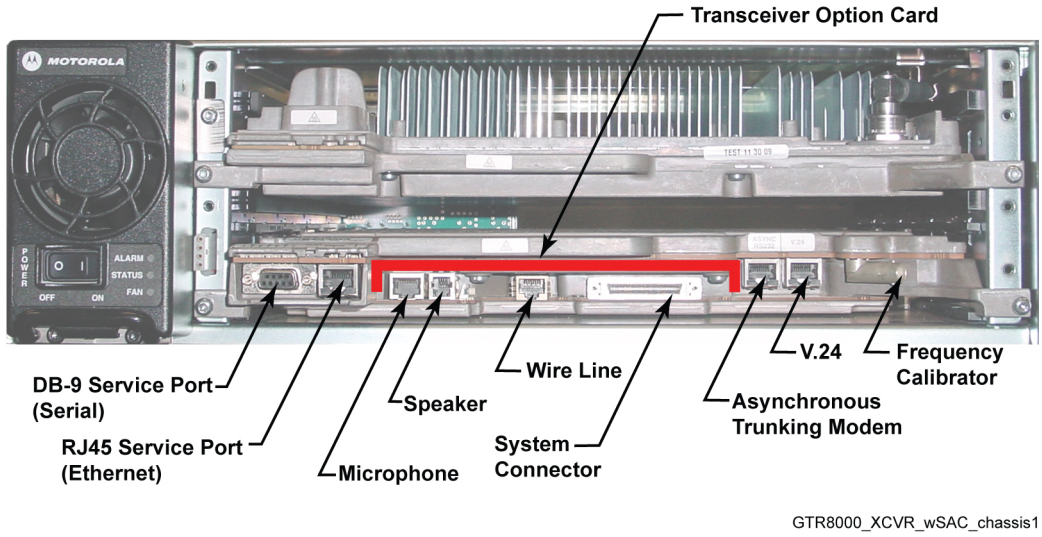


Figure 3: GTR 8000 Base Radio – Front with Transceiver Option Card



Procedure:

1 Insert the GTR 8000 Base Radio into the rack and secure it with the four M6 screws using a T27 bit. Torque to 42 in-lbs.

NOTICE: If standoff brackets were used with the QUANTAR®, install new standoff brackets for the GTR 8000 Base Radio.

2 Attach the ground cable for the GTR 8000 Base Radio to the grounding bus bar using grounding screw.

IMPORTANT: See the *Motorola Standards and Guidelines for Communication Sites* manual for detailed information about grounding and lightning protection.

3 Make the following power connections:

a **For DC**: Connect the power cable from the BATT/DC port to the circuit breaker or to the power source at the site.

b **For AC**: Connect the power cable from the AC IN port to the appropriate wall outlet.

c **For Battery Backup**: QUANTAR® station battery revert voltage (28 V) is not compatible with GTR 8000 Base Radio battery revert. The voltages are different and must not be connected. A 48 V battery for the GTR 8000 Base Radio must be used instead. For AC/DC battery revert, use both the AC (supplied) and DC power cables.

d **For Battery Temperature**: Connect the battery temperature sensor cable.

4 **Analog-only system:**

a Connect the 50-pin SCSI system connector to the System Connector port on the Transceiver Option Card on the GTR 8000 Base Radio. See System Connector on page 42 for a detailed pinout.

b Connect the wireline connections to the RJ-45 wireline port on the Transceiver Option Card on the GTR 8000 Base Radio. See Wireline Connections on page 41 for a detailed pinout.

5 **Mixed Mode system:**

a Connect the 50-pin SCSI system connector to the System Connector port on the Transceiver Option Card on the GTR 8000 Base Radio. See System Connector on page 42 for a detailed pinout.

b Connect the wireline connections to the RJ-45 wireline port on the Transceiver Option Card on the GTR 8000 Base Radio. See Wireline Connections on page 41 for a detailed pinout.

c Connect the V.24 interface for voice and data traffic to the V.24 port on the GTR 8000 Base Radio. See Figure 3: GTR 8000 Base Radio – Front with Transceiver Option Card on page 54 for details.

6 Make the following RF receive and transmit connections:

If…	Then…
If an antenna relay is not used,	perform the following actions: **a** Connect the receive RF input cable from the station to the Receive Line (RxA port) on the backplane of the GTR 8000 Base Radio, as follows: • If a preselector is used, connect the N-type cable, removed from the QUANTAR® station, to the input port on the preselector. • If no preselector is used, connect a BNC Male to N-Female adapter to the receive cable and connect the cable to the RxA port on the GTR 8000 Base Radio. The GTR 8000 Base Radio RxA port uses a BNC connector. **b** Connect the transmit RF output cable from the station to the Transmit Line port on the backplane of the GTR 8000 Base Radio.
If an antenna relay is used,	connect the single transmit/receive antenna cable from the station to the center connection on the GTR 8000 Base Radio antenna relay module. **NOTICE:** The antenna relay module is mounted on the backplane of the GTR 8000 Base Radio just above the Rx A port. The receive and transmit cables for the base radio are connected by Motorola. See the “Antenna Relay Module” section of the *GTR 8000 Base Radio* manual for details.

7 If the GTR 8000 is installed in a Simulcast Subsystem, perform the following actions:

- Connect the BNC 5 MHz cable, if present, to the **EXT FREQ REF** port.
- Connect the BNC 1PPS cable, if present, to the **1PPS** port.

NOTICE: For analog simulcast connections from existing QUANTAR® station wiring, see Analog Simulcast Cable Assembly on page 87 for details.

NOTICE: Optional Configuration: Connect a BNC composite 5 MHz/1PPS cable to the **EXT FREQ REF** port instead of the separate signals.

8 Connect the site LAN connection, if present, to the **SITE CTRL A** Ethernet port.

NOTICE: Place the RFI suppressor onto the Ethernet cable.

9 Power up the GTR 8000 Base Radio by toggling the power switch on the power supply module.

4.6 Configuring the GTR 8000 Base Radio in CSS

Prerequisites: This procedure requires the following hardware and software:

- Standard or crossover RJ-45 Ethernet cable
- A PC with the Configuration/Service Software (CSS)

When and where to use: This procedure describes the proper steps for configuring the analog-only, digital-only, or mixed mode GTR 8000 Base Radio. If possible, the configuration of the GTR 8000 Base Radio is performed ahead of time and saved to an archive file.

Procedure:

1 Connect the Ethernet cable between the Ethernet port on the PC and the Ethernet service port on the front of the GTR 8000 Base Radio.

2 Set the IP address of the PC to subnet 192.168.1.***<x>***

where ***<x>*** is any number between 2 and 253.

NOTICE: This action can be automatically accomplished by enabling DHCP on the PC. Set the Internet Protocol (TCP/IP) Properties for the PC to **Obtain an IP address automatically** and **Obtain DNS server address automatically** from the **Local Area Connection Properties** window.

3 Launch the Configuration/Service Software (CSS) application.

4 Select **Tools** → **Connection Configuration**..

5 In the **Connection Type** area, select **Ethernet**.

6 Click **Front Panel Ethernet**.

7 Click **Connect** to establish the connection.

A Passphrase Prompt screen opens.

8 Enter User Information and Passphrase Information and click **OK**.

NOTICE: If SNMPv3 configuration and user credentials are not set, click **OK** to proceed.

9 Select **File** → **Read Configuration From Device** to read the configuration from the base radio.

The **Progress monitor** window opens. Upon completion of a successful read, click the **OK** button to continue.

10 Configure the GTR 8000 Base Radio using one of the following methods:

- Print out the Codeplug report archived in the “Archiving the QUANTAR Codeplug Report using WinRSS” procedure and use it as a reference to configure the GTR 8000 Base Radio.
- Launch the RSS application and open the archived QUANTAR® station codeplug file. At the same time, open the CSS application and compare RSS parameters to their equivalent CSS parameters.

NOTICE: See RSS to CSS Parameter Lookup on page 71 for a listing comparing RSS parameters to CSS parameters.

11 Set the relevant parameters in the CSS screens to match the values from the QUANTAR® station codeplug.

NOTICE: See the “Conventional Site – ASTRO 7.12 and Later” section in *CSS Online Help*.

12 Select **File** → **Save As** to save the new configuration file.

13 Select **File** → **Write Configuration To Device** to write the configuration to the base radio.

14 Close the CSS application and disconnect the PC.

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Chapter 5

Replacement of a Digital Conventional QUANTAR with a GTR 8000 Base Radio

The procedures presented in this chapter are used to replace a digital Conventional QUANTAR® with a GTR 8000 Base Radio.

5.1 Introduction – Conventional Base Radios

The GTR 8000 Base Radio provides the same site connections that are available on a QUANTAR® station. These include AC power, external frequency reference, and Rx/Tx antennas. However, there is a difference in the DC voltage backup requirements. The GTR 8000 Base Radio only uses a 48 VDC power source while the QUANTAR® station supports a 12 VDC, 24 VDC, 48 VDC, or 60 VDC power source, depending on the installed power supply. The GTR 8000 Base Radio provides a 10 Base T Ethernet connection, while the QUANTAR® provides a 10 Base 2 Ethernet connection.

The CSS supports service and configuration of the GTR 8000 Base Radio and provides the same configuration screens used with the RSS for the QUANTAR® station. The alignment process in CSS has been simplified for the GTR 8000 Base Radio. The CSS service screens provide the same settings as the service screens in the RSS for the QUANTAR® station.

5.2 Replacing the Digital Conventional QUANTAR

This section outlines the process of replacing a digital Conventional QUANTAR® with a GTR 8000 Base Radio.

Process:

1. Archive the codeplug of the QUANTAR® using the WinRSS application. See the procedure in Archiving the QUANTAR Codeplug in WinRSS on page 59 for details.
2. Disable the QUANTAR® and then remove it from the QUANTAR® rack or cabinet. See the procedure in Powering Down and Removing the Conventional QUANTAR Station on page 61 for details.
3. Install the GTR 8000 Base Radio into the QUANTAR® rack or cabinet. See the procedure in Installing a Digital Conventional GTR 8000 Base Radio on page 63 for details.
4. Configure the GTR 8000 Base Radio using the CSS software. See the procedure in Configuring the GTR 8000 Base Radio in CSS on page 66 for details.

5.3 Archiving the QUANTAR Codeplug in WinRSS

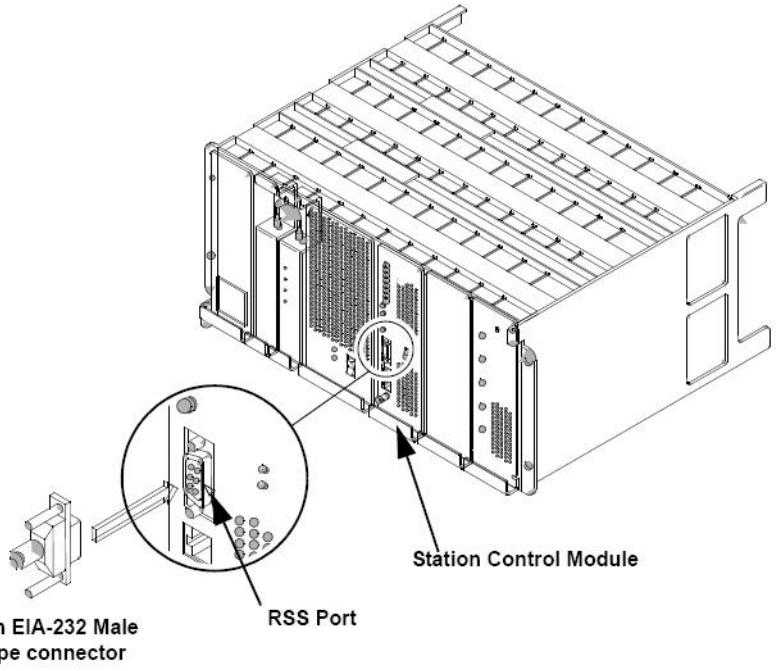
Prerequisites: Wear an Electrostatic Discharge (ESD) strap and connect its cable to a verified good ground. This strap must be worn throughout this procedure to prevent ESD damage to any components.
The following cable hardware and software application are required:

- 9-pin male to 9-pin female EIA-232 null-modem cable
- Radio Service Software (RSS)

When and where to use: This procedure describes how to read the current codeplug from the QUANTAR® station and save the codeplug as a codeplug report text file or as an archive file. The codeplug is used as reference when configuring the GTR 8000 Base Radio.

Procedure:

1 Connect the null-modem cable from the COM port on the computer to the RSS port on the station control module.



2 Launch the Radio Service Software (RSS) program.

3 From the **Connection Configuration** screen, select **Tools** → **Connection Configuration**.

4 Set the baud rate for the serial port on the computer to 9600 bps using Device Manager. The only available baud rate on the QUANTAR® station is 9600 bps.

   a From Windows, select **Start** → **Run** and enter `mmc devmgmt.msc`

   b Expand **Ports (COM and Port)** and right click **Communication Port (COM1)**.

   c Select the **Port Settings** tab and verify or modify the settings.

   WARNING: If the base radio is not connected to a transmitting antenna or to an appropriate piece of test equipment capable of handling the output, you must connect a dummy load to the transmitter output. Do not key the transmitter or use the base radio to transmit RF unless its transmitter output port is connected either to a transmitting antenna or to a 50 Ohm high-power dummy load.

5 Click **Connect/Dial** to establish a connection to the QUANTAR® station.

6 Select **File** → **Read from Device** to read the current codeplug.

7 Optional: If required, enter the password for the device and click **OK**.

8 Archive the codeplug data using one of the following methods:

   - Save the codeplug as a text file (filename.txt) by selecting **File** → **Save Codeplug Report**.
   - Save the codeplug as an archive file (filename.cp) by selecting **File** → **Save As**.

9 Close the RSS program.

10 Disconnect the null-modem cable from the station control module and the COM port on the computer.

5.4

Powering Down and Removing the Conventional QUANTAR Station

When and where to use: This procedure describes the proper sequence for powering down the QUANTAR® station before disconnecting it and removing it from the site. The channel and any traffic on the base radio are lost when the QUANTAR® station is powered down.

WARNING: Shock hazard. The QUANTAR® station contains dangerous voltages which can cause electrical shock or damage equipment. Turn off the base radio and disconnect the power cabling when servicing this equipment. Allow the base radio to cool before disconnecting any cables. Exposed surfaces of the unit may be hot.

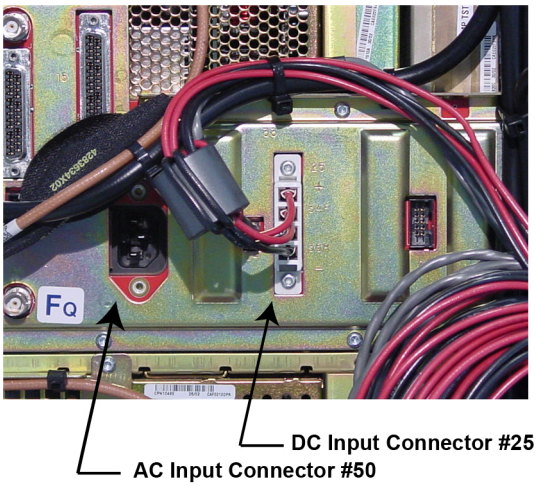
Procedure:

1 Power down the QUANTAR® station.

a Set the rocker or toggle switch, on the front panel of the power supply module, to the **OFF** position.

b Disconnect the power cable from the power source and AC input connection.

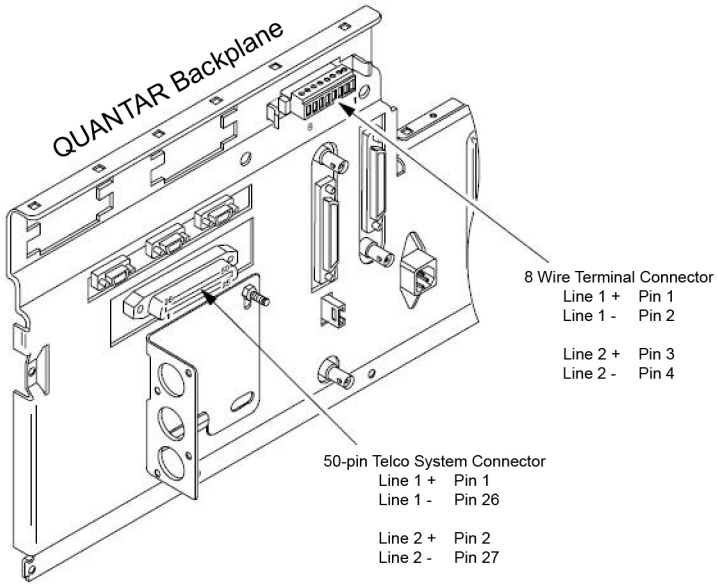
c Disconnect the cable from the DC input connection if the base radio includes a battery backup or is powered from a DC source.



2 Disconnect the ground wire.

3 Disconnect the V.24 cable (digital or mixed mode configurations), if present .

4 Disconnect the 50-pin Telco system connection (connector #17), if present.



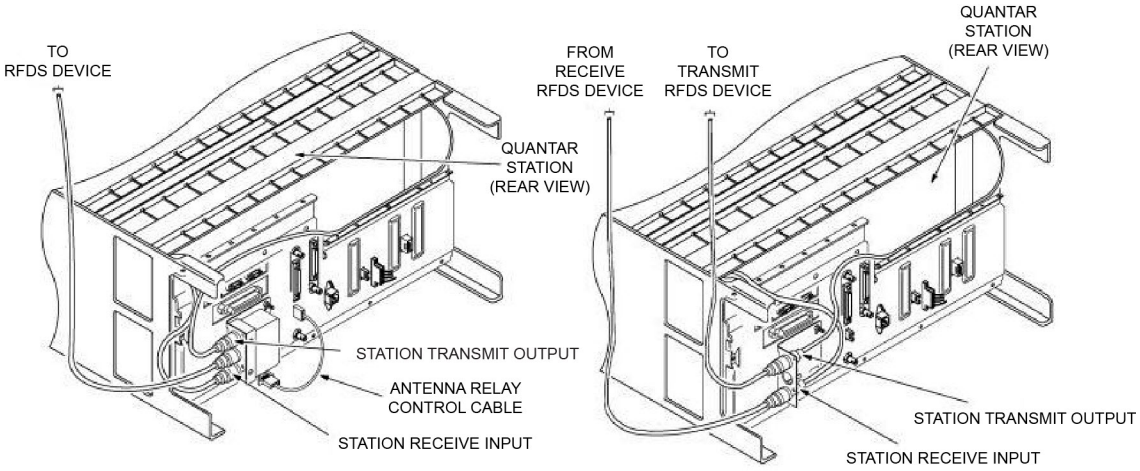
5 Disconnect the 8 wireline screw terminal connection (Phone Line Inputs), if present (analog or mixed mode configurations).

NOTICE: Phone line connections may be made at either the 50-pin Telco system connector or at the 8 wire screw terminal connector. See the “Installation” section of the appropriate QUANTAR® station functional manual for more details on phone line connections.

6 Disconnect the transmit antenna and receive input cables.

- If using the antenna relay option, disconnect the single transmit/receive cable.

Figure 4: QUANTAR Station Transmit and Receive Connections



QUANTAR WITH ANTENNA RELAY QUANTAR WITHOUT ANTENNA RELAY

7 For a simulcast subsystem, disconnect the Frequency reference.

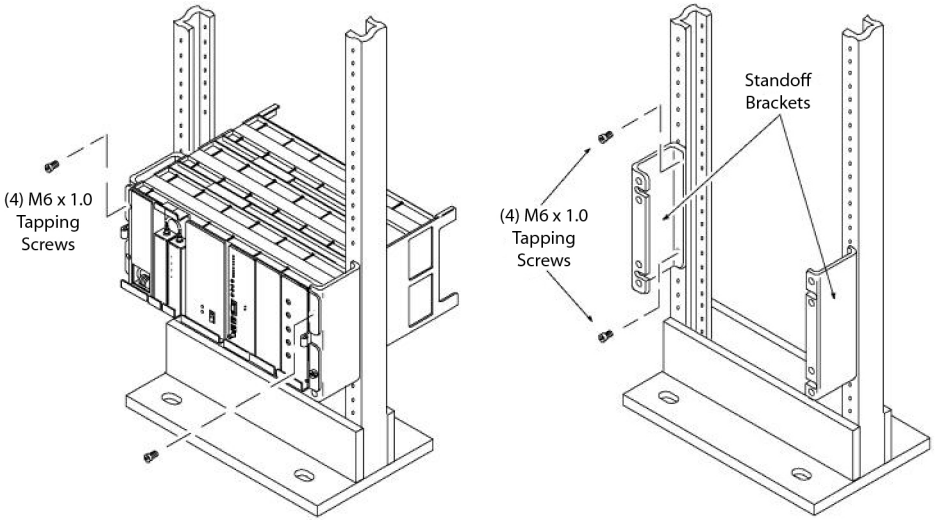
- Disconnect the BNC 5/10 MHz cable (connector #30), if present. This cable may be present if the QUANTAR® station is used in a digital simulcast. This cable is only required if the GTR 8000 Base Radio is used in a digital simulcast configuration.
- Disconnect the BNC 1PPS cable, if present, from the 1PPS port (connector #21).

8 Remove the QUANTAR® station from the rack or cabinet.

CAUTION: When removing the QUANTAR® station from a cabinet enclosure or rack, use the National Institute of Occupational Safety and Health (NIOSH) lifting equation to determine whether a one or two person lift is required when a system component must be removed and replaced in a cabinet enclosure or rack.

a Remove the four M6 screws, from the front of the QUANTAR® station, using a T27 bit driver.

b Remove the QUANTAR® station from the front of the rack or cabinet by sliding it towards you until it clears the rack.

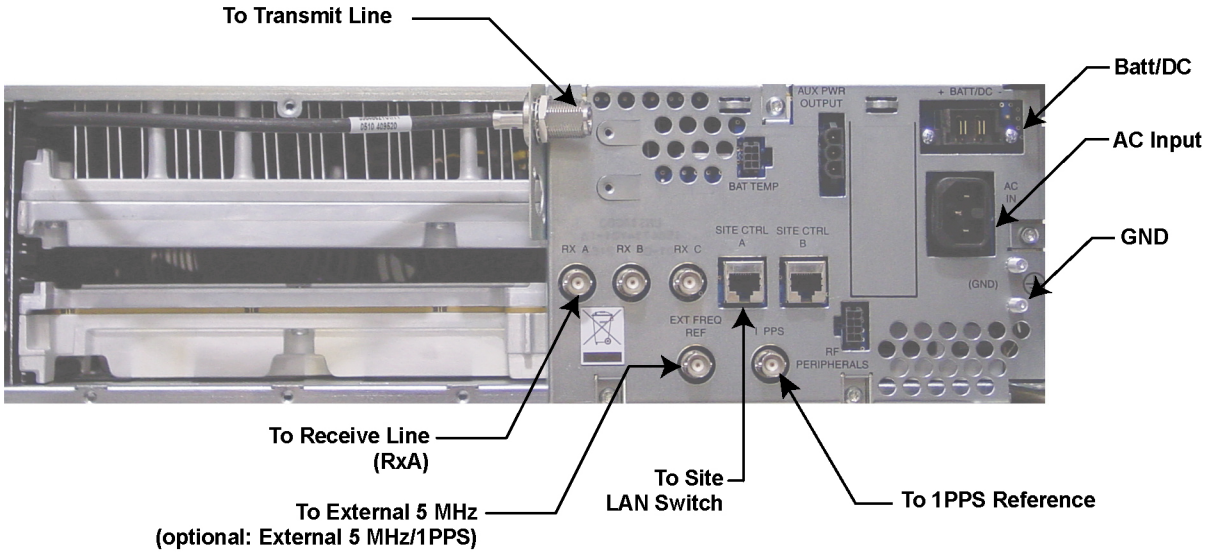


9 Optional: If installed in a rack, remove the standoff brackets used to hold the QUANTAR® station.

5.5 Installing a Digital Conventional GTR 8000 Base Radio

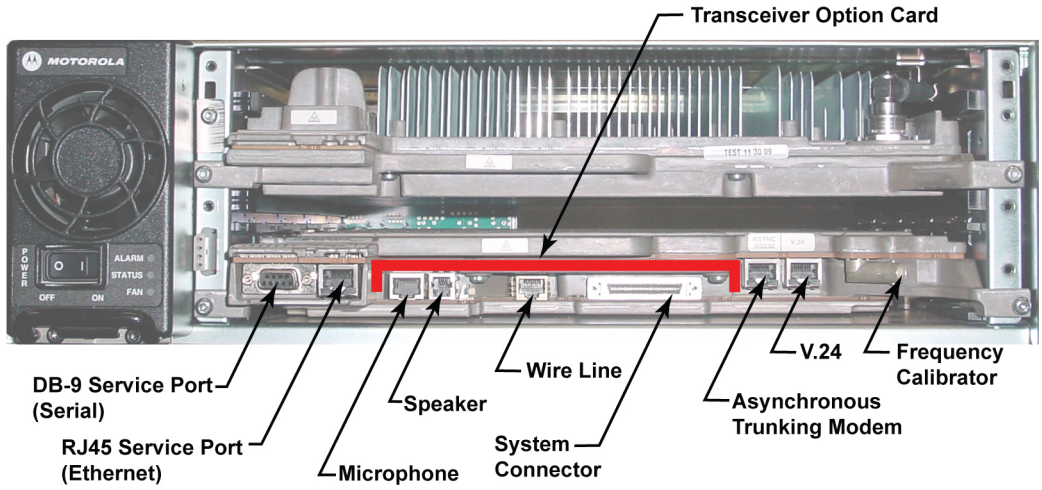
When and where to use: This procedure describes the proper sequence for installing the digital conventional GTR 8000 Base Radio in place of a conventional QUANTAR® station. See the following images of the GTR 8000 Base Radio for connections:

Figure 5: GTR 8000 Base Radio – Backplane



GTR8000_base_radio_quantar_simulcast_retrofit

Figure 6: GTR 8000 Base Radio – Front with Transceiver Option Card



GTR8000_XCVR_wSAC_chassis1

Procedure:

1 Insert the GTR 8000 Base Radio into the rack and secure it with the four M6 screws using a T27 bit. Torque to 42 in-lbs.

NOTICE: If standoff brackets are used with the QUANTAR® station, remove them and install new standoff brackets used with the GTR 8000 Base Radio.

2 Attach the ground cable for the GTR 8000 Base Radio to the grounding bus bar using grounding screw.

3 Make the following power connections:

a **For DC**: Connect the power cable from the BATT/DC port to the circuit breaker or to the power source at the site.

b **For AC**: Connect the power cable from the AC IN port to the appropriate wall outlet.

c **For Battery Backup**: QUANTAR® station battery revert voltage (28 V) is not compatible with GTR 8000 Base Radio battery revert. The voltages are different and must not be connected. A 48 V battery for the GTR 8000 Base Radio must be used instead. For AC/DC battery revert, use both the AC (supplied) and DC power cables.

d **For Battery Temperature**: Connect the battery temperature sensor cable.

4 Connect the 50–pin SCSI system connector to the System Connector port on the Transceiver Option Card on the GTR 8000 Base Radio. See System Connector on page 42 for a detailed pinout.

5 Connect the V.24 interface for voice and data traffic to the V.24 port on the GTR 8000 Base Radio. See Figure 6: GTR 8000 Base Radio – Front with Transceiver Option Card on page 64 for details.

6 Make the following RF receive and transmit connections:

If…	Then…
If an antenna relay is not used,	perform the following actions: **a** Connect the station's receive RF input cable to the Receive Line (RxA port) on the backplane of the GTR 8000 Base Radio, as follows: • If a preselector is used, connect the N-type cable, removed from the QUANTAR® station, to the input port on the preselector. • If no preselector is used, connect a BNC Male to N-Female adapter to the receive cable and connect the cable to the RxA port on the GTR 8000 Base Radio. The GTR 8000 Base Radio RxA port uses a BNC connector. **b** Connect the station's transmit RF output cable to the Transmit Line port on the backplane of the GTR 8000 Base Radio.
If an antenna relay is used,	Connect the station's single transmit/receive antenna cable to the center connection on the GTR 8000 Base Radio antenna relay module. **NOTICE:** The antenna relay module is mounted on the backplane of the GTR 8000 Base Radio just above the Rx A port. The base radio's receive and transmit cables are connected by Motorola. See the “Antenna Relay Module” section of the *GTR 8000 Base Radio* manual for details.

7 If the GTR 8000 is installed in a Simulcast Subsystem,

- Connect the BNC 5 MHz cable, if present, to the EXT FREQ REF port.
- Connect the BNC 1PPS cable, if present, to the 1PPS port.

NOTICE: *Optional Configuration*: Connect a BNC composite 5 MHz/1PPS cable to the EXT FREQ REF port instead of the separate signals.

8 Connect the site LAN connection, if present, to the SITE CTRL A Ethernet port.

NOTICE: Place the RFI suppressor onto the Ethernet cable.

9 Power up the GTR 8000 Base Radio by toggling the power switch on the power supply module.

5.6

Configuring the GTR 8000 Base Radio in CSS

Prerequisites: This procedure requires the following hardware and software:

- Standard or crossover RJ-45 Ethernet cable
- A PC with the Configuration/Service Software (CSS)

When and where to use: This procedure describes the proper steps for configuring the analog-only, digital-only, or mixed mode GTR 8000 Base Radio. If possible, the configuration of the GTR 8000 Base Radio is performed ahead of time and saved to an archive file.

Procedure:

1. Connect the Ethernet cable between the Ethernet port on the PC and the Ethernet service port on the front of the GTR 8000 Base Radio.
2. Set the IP address of the PC to subnet 192.168.1.***<x>***

   where ***<x>*** is any number between 2 and 253.

   NOTICE: This action can be automatically accomplished by enabling DHCP on the PC. Set the Internet Protocol (TCP/IP) Properties for the PC to **Obtain an IP address automatically** and **Obtain DNS server address automatically** from the **Local Area Connection Properties** window.
3. Launch the Configuration/Service Software (CSS) application.
4. Select **Tools** → **Connection Configuration**..
5. In the **Connection Type** area, select **Ethernet**.
6. Click **Front Panel Ethernet**.
7. Click **Connect** to establish the connection.

   A Passphrase Prompt screen opens.
8. Enter User Information and Passphrase Information and click **OK**.

   NOTICE: If SNMPv3 configuration and user credentials are not set, click **OK** to proceed.
9. Select **File** → **Read Configuration From Device** to read the configuration from the base radio.

   The **Progress monitor** window opens. Upon completion of a successful read, click the **OK** button to continue.
10. Configure the GTR 8000 Base Radio using one of the following methods:
    - Print out the Codeplug report archived in the “Archiving the QUANTAR Codeplug Report using WinRSS” procedure and use it as a reference to configure the GTR 8000 Base Radio.
    - Launch the RSS application and open the archived QUANTAR® station codeplug file. At the same time, open the CSS application and compare RSS parameters to their equivalent CSS parameters.

      NOTICE: See RSS to CSS Parameter Lookup on page 71 for a listing comparing RSS parameters to CSS parameters.
11. Set the relevant parameters in the CSS screens to match the values from the QUANTAR® station codeplug.

    NOTICE: See the “Conventional Site – ASTRO 7.12 and Later” section in *CSS Online Help*.

12 Select **File** → **Save As** to save the new configuration file.

13 Select **File** → **Write Configuration To Device** to write the configuration to the base radio.

14 Close the CSS application and disconnect the PC.

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Chapter 6

Optimization and Troubleshooting for the GTR 8000 Base Radio

This chapter provides optimization and troubleshooting information for the conventional GTR 8000 Base Radio.

6.1 Alignment and Equalization Procedures

The following alignment and equalization procedures should be performed on the GTR 8000 Base Radio in order in which they listed:

- Reference Oscillator Alignment
- Tx Wireline Alignment
- Rx Wireline Alignment
- Carrier Squelch Alignment
- Battery Equalization
- ASTRO/Analog Simulcast Alignment

WARNING: To guard against personal injury and/or damage to equipment, switch the base radio to Service Mode when performing service. Transmit inhibiting the base radio within the Station Status screen in the CSS will also prevent the transmitter from keying. Remember to switch the base radio back to Normal Mode when service is complete.

All alignment and equalization procedures are performed using the CSS service Alignment screens. See the following *CSS Online Help* contents selection for detailed procedures:

Base Radio Service Help → Service Screens → Alignment Screens

Expand the relevant Alignment Screen tab from the conventional GTR 8000 section, for example, Reference Oscillator Alignment Tab, and click the procedure link.

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Appendix A

RSS to CSS Parameter Lookup

This appendix defines all the relevant parameters used for the conventional QUANTAR® station as well as the equivalent parameters used for the conventional GTR 8000 Base Radio. QUANTAR® station parameters are configured using the Radio Service Software (RSS). GTR 8000 Base Radio parameters are configured using the Configuration/Service Software (CSS). The sections in this appendix contain comparison tables listing QUANTAR® station to GTR 8000 parameters and their corresponding locations within each of the configuration software applications.

NOTICE:
All parameters listed for the conventional GTR 8000 Base Radio are described in the *Base Radio Configuration & Service Help* in CSS. Online help is launched from the CSS software by selecting

Help → **CSS Help**. See the “Conventional Site - ASTRO 7.12 and Later” content link for details.

A.1
Hardware Configuration Parameter Comparison from RSS to CSS

The following table compares the QUANTAR® station parameters found on the Hardware Configuration screen in RSS to the corresponding equivalent GTR 8000 Base Radio parameters found in CSS:

Table 19: Hardware Configuration Parameters in RSS

QUANTAR Station			GTR 8000 Base Radio		
Radio Service Software (RSS)			Configuration/Service Software (CSS)		
Parameter	**Screen**	**Tab**	**Parameter**	**Screen**	**Tab**
Station Name	Hardware Configuration	—	Station Name	Hardware Configuration	Hardware Configuration
Hardware Platform	Hardware Configuration	—	Hardware Platform	Hardware Configuration	Hardware Configuration
Station Type	Hardware Configuration	—	Station Type	Hardware Configuration	Hardware Configuration
Power Supply	Hardware Configuration	—	Power Supply Type	Hardware Configuration	Hardware Configuration
Battery Type	Hardware Configuration	—	Battery Type	Hardware Configuration	Hardware Configuration
Wireline	Hardware Configuration	—	Infrastructure Interface	Infrastructure Interface	Common

Table continued…

QUANTAR Station			GTR 8000 Base Radio		
Radio Service Software (RSS)			Configuration/Service Software (CSS)		
Parameter	**Screen**	**Tab**	**Parameter**	**Screen**	**Tab**
Wildcard	Hardware Configuration	—	Wildcard	Options	—
Freq Ref	Hardware Configuration	—	Frequency Reference	Hardware Configuration	Hardware Configuration
Simulcast Operation	Hardware Configuration	—	Simulcast Operation	Options	—
Multi-Coded Squelch	Hardware Configuration	—	Multi-Coded Squelch	Options	
Phone Patch Interface	Hardware Configuration	—	Phone Patch Interface	Options	
Scanning Receiver	Hardware Configuration	—	Scanning Receiver	Options	
Main/ Standby	Hardware Configuration	—	Main/Standby	Options	
Serial Number	Hardware Configuration	—	—	—	—
System Type	Hardware Configuration	—	—	—	—
Rx Freq Band 1	Hardware Configuration	—	—	—	—
Rx Freq Band 2	Hardware Configuration	—	—	—	—
Tx Freq Band	Hardware Configuration	—	—	—	—
PA Power Rating	Hardware Configuration	—	—	—	—
Site Number	Hardware Configuration	—	—	—	—

Table continued…

QUANTAR Station			GTR 8000 Base Radio		
Radio Service Software (RSS)			Configuration/Service Software (CSS)		
Parameter	**Screen**	**Tab**	**Parameter**	**Screen**	**Tab**
External Wattmeter	Hardware Configuration	—	—	—	—

A.2

Wireline Configuration Parameter Comparison from RSS to CSS

The following table compares the QUANTAR® station parameters found on the Wireline Configuration screen in RSS to the corresponding equivalent GTR 8000 Base Radio parameters found in CSS:

Table 20: Wireline Configuration Parameters in RSS

QUANTAR Station			GTR 8000 Base Radio		
Radio Service Software (RSS)			Configuration/Service Software (CSS)		
Parameter	**Screen**	**Tab**	**Parameter**	**Screen**	**Tab**
Wireline Operation	Wireline Configuration	Wireline	Infrastructure Operation	Infrastructure Interface	Common
Remote Control Type	Wireline Configuration	Wireline	—	—	—
Outbound Analog Link Timer	Wireline Configuration	Wireline	—	—	—
ASTRO To Wireline	Wireline Configuration	Wireline	ASTRO To Wireline	Channel Configuration	Key Up Controls
Equalization	Wireline Configuration	Wireline	Equalization	Infrastructure Interface	Common
Comparator	Wireline Configuration	Wireline	Comparator Type	Infrastructure Interface	Common
Fall Back In-Cabinet Repeat	Wireline Configuration	Wireline	Fallback In-Cabinet Repeat	Infrastructure Interface	Common
Fall Back Time	Wireline Configuration	Wireline	Fallback Determination Time	Infrastructure Interface	Common
Status Tone	Wireline Configuration	Wireline	Status Tone	Infrastructure Interface	Common

Table continued…

QUANTAR Station			GTR 8000 Base Radio		
Radio Service Software (RSS)			Configuration/Service Software (CSS)		
Parameter	Screen	Tab	Parameter	Screen	Tab
Status Tone Frequency	Wireline Configuration	Wireline	Status Tone Frequency	Infrastructure Interface	Common
Wireline Squelch	Wireline Configuration	Wireline	Wireline Squelch	Infrastructure Interface	Common
Squelch Threshold	Wireline Configuration	Wireline	Current Tx Wireline Squelch Threshold	Alignment Screen	Tx Wireline Alignment
Squelch Hysteresis	Wireline Configuration	Wireline	Tx Wireline Hysteresis Level	Alignment Screen	Tx Wireline Alignment
HLGT Frequency	Wireline Configuration	TRC	HLGT Frequency	Infrastructure Interface	TRC Configuration
Automatic Level Control	Wireline Configuration	TRC	Automatic Level Control	Infrastructure Interface	TRC Configuration
Tx Notch Filter	Wireline Configuration	TRC	Tx Notch Filter	Infrastructure Interface	TRC Configuration
Rx Notch Filter	Wireline Configuration	TRC	Rx Notch Filter	Infrastructure Interface	TRC Configuration
LLGT Undetect Time	Wireline Configuration	TRC	LLGT Undetect Time	Infrastructure Interface	TRC Configuration
TRC detection algorithm	Wireline Configuration	TRC	TRC Detection	Infrastructure Interface	TRC Configuration
Function Tones detected	Wireline Configuration	TRC	Function Tones Detected	Infrastructure Interface	TRC Configuration
Wireline Interface	Wireline Configuration	ASTRO	Infrastructure Interface	Infrastructure Interface	Common
Analog Idle Link Check	Wireline Configuration	ASTRO	Analog Idle Link Check	Infrastructure Interface	ASTRO Configuration
Digital Idle Link Check	Wireline Configuration	ASTRO	Digital Idle Link Check	Infrastructure Interface	ASTRO Configuration

Table continued...

QUANTAR Station			GTR 8000 Base Radio		
Radio Service Software (RSS)			Configuration/Service Software (CSS)		
Parameter	**Screen**	**Tab**	**Parameter**	**Screen**	**Tab**
External Transmit Clock	Wireline Configuration	ASTRO	V.24 Transmit Clock	Infrastructure Interface	ASTRO Configuration
Modem Input Level - Tx WL	Wireline Configuration	ASTRO	—	—	—
Modem Output Level - Rx WL	Wireline Configuration	ASTRO	—	—	—
RT/RT Configuration	Wireline Configuration	ASTRO	RT/RT Configuration	Infrastructure Interface	ASTRO Configuration

A.3

Access Code Table Parameter Comparison from RSS to CSS

The following table compares the QUANTAR® station parameters found on the Access Code Table screen in RSS to the corresponding equivalent GTR 8000 Base Radio parameters found in CSS:

Table 21: Access Code Table Parameters in RSS

QUANTAR Station			GTR 8000 Base Radio		
Radio Service Software (RSS)			Configuration/Service Software (CSS)		
Parameter	**Screen**	**Tab**	**Parameter**	**Screen**	**Tab**
Access Code Table Number	Access Code Table	N/A	—	—	—
Rx Squelch Type	Access Code Table	N/A	Rx Squelch Type	Channel Configuration	PL/DPL
Rx PL/DPL Code	Access Code Table	N/A	Rx Squelch Code	Channel Configuration	PL/DPL
Tx Squelch Type	Access Code Table	N/A	Tx Squelch Type	Channel Configuration	PL/DPL
Tx PL/DPL Code	Access Code Table	N/A	Tx Squelch Code	Channel Configuration	PL/DPL
Rx NAC Operation	Access Code Table	N/A	Rx NAC Operation	Channel Configuration	ASTRO NAC

Table continued…

QUANTAR Station			GTR 8000 Base Radio		
Radio Service Software (RSS)			Configuration/Service Software (CSS)		
Parameter	**Screen**	**Tab**	**Parameter**	**Screen**	**Tab**
Rx Astro Access Code	Access Code Table	N/A	Rx NAC	Channel Configuration	ASTRO NAC
Tx Astro Access Code	Access Code Table	N/A	Tx NAC	Channel Configuration	ASTRO NAC
Transmit Using Last Received NAC	Access Code Table	N/A	Tx NAC selected by Last Rx NAC	Channel Configuration	ASTRO NAC
Expiration Time	Access Code Table	N/A	Tx NAC selected by Last Rx NAC Duration	Channel Configuration	ASTRO NAC
Multi-NAC Table: RX Network Access Code	Access Code Table	N/A	Rx NAC	Channel Configuration	ASTRO NAC
Multi-NAC Table: TX Network Access Code	Access Code Table	N/A	Tx NAC	Channel Configuration	ASTRO NAC

A.4

Multi-Coded Squelch Table Parameter Comparison from RSS to CSS

The following table compares the QUANTAR® station parameters found on the Multi-Coded Squelch Table screen in RSS to the corresponding equivalent GTR 8000 Base Radio parameters found in CSS:

Table 22: Multi-Coded Squelch Table Parameters in RSS

QUANTAR Station			GTR 8000 Base Radio		
Radio Service Software (RSS)			Configuration/Service Software (CSS)		
Parameter	**Screen**	**Tab**	**Parameter**	**Screen**	**Tab**
Rx Type	Multi-Coded Squelch Table	—	Rx Squelch Type	Channel Configuration	PL/DPL
Rx Freq/ Code	Multi-Coded Squelch Table	—	Rx Squelch Code	Channel Configuration	PL/DPL

Table continued…

QUANTAR Station			GTR 8000 Base Radio		
Radio Service Software (RSS)			Configuration/Service Software (CSS)		
Parameter	**Screen**	**Tab**	**Parameter**	**Screen**	**Tab**
Tx Type	Multi-Coded Squelch Table	—	Tx Squelch Type	Channel Configuration	PL/DPL
Tx Freq/ Code	Multi-Coded Squelch Table	—	Tx Squelch Code	Channel Configuration	PL/DPL
User Access	Multi-Coded Squelch Table	—	User Access	Channel Configuration	PL/DPL
Total Time Used	Multi-Coded Squelch Table	—	—	—	—
Number of Calls	Multi-Coded Squelch Table	—	—	—	—

A.5

Channel Information Parameter Comparison from RSS to CSS

The following table compares the QUANTAR® station parameters found on the Channel Information screen in RSS to the corresponding equivalent GTR 8000 Base Radio parameters found in CSS:

Table 23: Channel Information Parameters in RSS

QUANTAR Station			GTR 8000 Base Radio		
Radio Service Software (RSS)			Configuration/Service Software (CSS)		
Parameter	**Screen**	**Tab**	**Parameter**	**Screen**	**Tab**
Rx1 Frequency	Channel Information	Basic	Rx Frequency	Channel Configuration	RF Parameters
Rx2 Frequency	Channel Information	Basic	—	—	—
Tx Frequency	Channel Information	Basic	Tx Frequency	Channel Configuration	RF Parameters
Tx Idle Frequency	Channel Information	Basic	Tx Idle Frequency	Channel Configuration	RF Parameters
Modulation Type	Channel Information	Basic	Channel Operation	Channel Configuration	RF Parameters

Table continued…

QUANTAR Station			GTR 8000 Base Radio		
Radio Service Software (RSS)			Configuration/Service Software (CSS)		
Parameter	**Screen**	**Tab**	**Parameter**	**Screen**	**Tab**
Tx Rated Deviation	Channel Information	Basic	Tx Rated Deviation	Channel Configuration	RF Parameters
Receive Channel BW	Channel Information	Basic	Receive Channel Bandwidth	Channel Configuration	RF Parameters
Call Sign	Channel Information	Basic	Base Station Identification	Channel Configuration	Key Up Controls
Call Sign Over Wireline	Channel Information	Basic	BSI Over Wireline	Channel Configuration	Key Up Controls
Carrier Squelch Transition	Channel Information	Basic	Carrier Squelch Transition	Channel Configuration	Key Up Controls
Analog Rx Activation	Channel Information	Basic	Analog Rx Activation	Channel Configuration	Key Up Controls
Analog Rptr Activation	Channel Information	Basic	Analog Repeater Activation	Channel Configuration	Key Up Controls
Analog Rptr Hold-In	Channel Information	Basic	Analog Repeater Hold-In	Channel Configuration	Key Up Controls
Analog Rptr Access	Channel Information	Basic	Analog Rptr Access	Options	—
Tx Power Out: Normal	Channel Information	Advanced	Tx Power Out	Channel Configuration	RF Parameters
Tx Power Out: Battery Backup	Channel Information	Advanced	Tx Power Level Battery Backup	Channel Configuration	RF Parameters
Repeater: Drop Out Delay	Channel Information	Advanced	Audio Hold-Off Timer	Channel Configuration	Timeouts
			Audio Hold-Off Timer Duration	Channel Configuration	Timeouts
Repeater: Audio Hold-Off	Channel Information	Advanced	Repeater Drop Out Delay	Channel Configuration	Timeouts
			Repeater Drop Out Delay Duration	Channel Configuration	Timeouts
Time Out Timers: Wireline	Channel Information	Advanced	Infrastructure Timeout Timer	Channel Configuration	Timeouts

Table continued…

QUANTAR Station			GTR 8000 Base Radio		
Radio Service Software (RSS)			Configuration/Service Software (CSS)		
Parameter	**Screen**	**Tab**	**Parameter**	**Screen**	**Tab**
			Infrastructure Timeout Timer Duration	Channel Configuration	Timeouts
Time Out Timers: Local	Channel Information	Advanced	Local Timeout Timer	Channel Configuration	Timeouts
			Local Timeout Timer Duration	Channel Configuration	Timeouts
Time Out Timers: Repeater	Channel Information	Advanced	Repeater Timeout Timer	Channel Configuration	Timeouts
			Repeater Timeout Timer Duration	Channel Configuration	Timeouts
Time Out Timers: Phone Patch	Channel Information	Advanced	Phone Patch Timeout Timer	Channel Configuration	Timeouts
			Phone Patch Timeout Timer Duration	Channel Configuration	Timeouts
Hear Clear: Compander	Channel Information	Advanced	Compander	Channel Configuration	Filters and Alarms
Hear clear: Noise Canceller	Channel Information	Advanced	Noise Canceller	Channel Configuration	Filters and Alarms
Alarm Tone: Over Air	Channel Information	Advanced	Alarm Tone Over Air	Channel Configuration	Filters and Alarms
Alarm Tone: Over Wireline	Channel Information	Advanced	Alarm Tone Over Wireline	Channel Configuration	Filters and Alarms
Audio Filters: Pre-emphasis	Channel Information	Advanced	Pre-emphasis	Channel Configuration	Filters and Alarms
Audio Filters: De-emphasis	Channel Information	Advanced	De-emphasis	Channel Configuration	Filters and Alarms
Audio Filters: Hi-Pass Filter	Channel Information	Advanced	Hi-Pass Filter	Channel Configuration	Filters and Alarms
Phone Patch Operation	Channel Information	Advanced	Phone Patch	Channel Configuration	Key Up Controls
Rcv Signal Inversion	Channel Information	Advanced	—	—	—

Table continued…

QUANTAR Station			GTR 8000 Base Radio		
Radio Service Software (RSS)			Configuration/Service Software (CSS)		
Parameter	Screen	Tab	Parameter	Screen	Tab
PTT Priority	Channel Information	Advanced	PTT Priority	Channel Configuration	Key Up Controls
Analog Repeater Boost	Channel Information	Advanced	Analog Repeater Boost	Channel Configuration	Key Up Controls
Monitor Before Transmit	Channel Information	Advanced	Monitor Receiver Activity	Channel Configuration	Filters and Alarms

A.6

RF Configuration Parameter Comparison from RSS to CSS

The following table compares the QUANTAR® station parameters found on the RF Configuration screen in RSS to the corresponding equivalent GTR 8000 Base Radio parameters found in CSS:

Table 24: RF Configuration Parameters in RSS

QUANTAR Station			GTR 8000 Base Radio		
Radio Service Software (RSS)			Configuration/Service Software (CSS)		
Parameter	Screen	Tab	Parameter	Screen	Tab
Repeater Operation	RF Configuration	—	Repeater/Base Operation	Repeater Configuration	—
Fast Key-Up	RF Configuration	—	—	—	—
Low Speed/PL Deviation	RF Configuration	—	PL/DPL Deviation	Channel Configuration	RF Parameters
Max Deviation	RF Configuration	—	Max Deviation	Repeater Configuration	—
Antenna Relay	RF Configuration	—	Antenna Relay	Hardware Configuration	Hardware Configuration
Antenna Relay Delay	RF Configuration	—	Antenna Relay Delay	Hardware Configuration	Hardware Configuration
Call Sign Interval	RF Configuration	—	BSI Interval	Channel Configuration	Key Up Controls
Startup On Last Active Channel	RF Configuration	—	Startup On Last Active Channel	Channel Configuration	All
Startup Channel	RF Configuration	—	Startup Channel	Channel Configuration	All

Table continued…

QUANTAR Station			GTR 8000 Base Radio		
Radio Service Software (RSS)			Configuration/Service Software (CSS)		
Parameter	**Screen**	**Tab**	**Parameter**	**Screen**	**Tab**
ASTRO Fade Tolerance	RF Configuration	—	ASTRO Fade Tolerance	Infrastructure Interface	ASTRO Configuration
Repeat	RF Configuration	—	Repeat Data	Repeater Configuration	N/A
Wireline Drop Out Delay	RF Configuration	—	Infrastructure Data Drop Out Delay	Infrastructure Interface	ASTRO Configuration
			Infrastructure Data Drop Out Delay Duration	Infrastructure Interface	ASTRO Configuration
ASTRO Tx Filter	RF Configuration	—	—	—	—
Analog Simulcast Reverse Burst	RF Configuration	—	Analog Simulcast Reverse Burst	Infrastructure Interface	Common
Rx Code Detect Fade Timer	RF Configuration	—	—	—	—
Fade EOM timer	RF Configuration	—	—	—	—

A.7

Scan List Configuration Parameter Comparison from RSS to CSS

The following table compares the QUANTAR® station parameters found on the Scan List Configuration screen in RSS to the corresponding equivalent GTR 8000 Base Radio parameters found in CSS:

Table 25: Scan List Configuration Parameters in RSS

QUANTAR Station			GTR 8000 Base Radio		
Radio Service Software (RSS)			Configuration/Service Software (CSS)		
Parameter	**Screen**	**Tab**	**Parameter**	**Screen**	**Tab**
Scan On At Reset	Scan List Configuration	—	Scan On At Reset	Receiver Scan	—
Priority Channel	Scan List Configuration	—	Priority Channel Type	Receiver Scan	—
			Priority Channel Number	Priority Channel Number	

Table continued…

QUANTAR Station			GTR 8000 Base Radio		
Radio Service Software (RSS)			Configuration/Service Software (CSS)		
Parameter	Screen	Tab	Parameter	Screen	Tab
Floating Priority	Scan List Configuration	—	Floating Priority	Receiver Scan	—
Channel Marking	Scan List Configuration	—	Channel Marking	Receiver Scan	—
Scan Delay	Scan List Configuration	—	Scan Delay	Receiver Scan	—
Priority Scan Delay	Scan List Configuration	—	Priority Scan Delay	Receiver Scan	—
Scan Sample Time	Scan List Configuration	—	Scan Sample Time	Receiver Scan	—
Rx Qualify Time	Scan List Configuration	—	Rx Qualify Time	Receiver Scan	—
Resume Scan Timer	Scan List Configuration	—	Resume Scan Timer	Receiver Scan	—
Scan	Scan List Configuration	—	Scan	Receiver Scan	—
TX Slave	Scan List Configuration	—	Tx Slave	Receiver Scan	—

A.8
WildCard Parameter Comparison from RSS to CSS

The following table compares the QUANTAR® station parameters found on the WildCard screens in RSS to the corresponding equivalent GTR 8000 Base Radio parameters found in CSS:

Table 26: WildCard Parameters in RSS

QUANTAR Station			GTR 8000 Base Radio		
Radio Service Software (RSS)			Configuration/Service Software (CSS)		
Parameter	Screen	Tab	Parameter	Screen	Tab
Channel: Binary Group	WildCard Input	—	Channel Binary Group	WildCard Tables	WildCard Inputs

Table continued…

QUANTAR Station			GTR 8000 Base Radio		
Radio Service Software (RSS)			Configuration/Service Software (CSS)		
Parameter	**Screen**	**Tab**	**Parameter**	**Screen**	**Tab**
Access Code Table: Binary Group	WildCard Input	—	—	—	—
Active Level	WildCard Input	—	—	—	—
Channel: Binary Group	WildCard Output	—	Channel Binary Group	WildCard Tables	WildCard Tables
Multi-Coded Squelch: Binary Group	WildCard Output	—	Multi PL Binary Group	WildCard Tables	WildCard Tables
Access Code Table: Binary Group	WildCard Output	—	—	—	—
Active Level	WildCard Output	—	—	—	—
Jump to Table	WildCard Tables	—	TABLE	WildCard Tables	WildCard Tables
Description	WildCard Tables	—	Description	WildCard Tables	WildCard Tables
State	WildCard Tables	—	State	WildCard Tables	WildCard Tables
Cond	WildCard Tables	—	Condition	WildCard Tables	WildCard Tables
Action	WildCard Tables	—	Actions	WildCard Tables	WildCard Tables
Inaction	WildCard Tables	—	Inactions	WildCard Tables	WildCard Tables

A.9

GTR 8000 Base Radio Parameters in CSS not Supported in RSS

The following table provides of listing of GTR 8000 Base Radio parameters found in CSS that provide new functionality not supported in the QUANTAR® station:

Table 27: CSS Parameters not Supported in RSS

GTR 8000 Base Radio – Configuration/Service Software (CSS)		
Parameter	**Screen**	**Tab**
Transceiver	Hardware Configuration	Hardware Configuration
Transceiver Option Card Actual	Hardware Configuration	Hardware Configuration
Transceiver Option Card	Hardware Configuration	Hardware Configuration
Time Reference	Hardware Configuration	Hardware Configuration
Fall Back to Internal Frequency Reference	Hardware Configuration	Hardware Configuration
Power Supply Type Actual	Hardware Configuration	Hardware Configuration
Antenna Relay	Hardware Configuration	Hardware Configuration
Antenna Relay Delay	Hardware Configuration	Hardware Configuration
ASTRO CAI — RTTE Capable	Hardware Configuration	Hardware Configuration
ASTRO CAI Capable — RTTE Operation	Hardware Configuration	Hardware Configuration
GTR 8000 Configuration	Hardware Configuration	Receiver Multicoupler Configuration
Site RMC Configuration	Hardware Configuration	Receiver Multicoupler Configuration
Site RMC Attenuation	Hardware Configuration	Receiver Multicoupler Configuration
Cabinet RMC Configuration	Hardware Configuration	Receiver Multicoupler Configuration
Cabinet RMC Attenuation	Hardware Configuration	Receiver Multicoupler Configuration
System Gain	Hardware Configuration	Receiver Multicoupler Configuration
Analog Rptr Access	Options	—
Analog Simulcast Reverse Burst	Infrastructure Interface	Common
Subsite ID	Infrastructure Interface	ASTRO Configuration
Subsite Name	Infrastructure Interface	ASTRO Configuration
Ethernet Type	Infrastructure Interface	ASTRO Configuration
ASTRO Fade Tolerance	Infrastructure Interface	ASTRO Configuration
FDMA Minimum Jitter Buffer	Infrastructure Interface	ASTRO Configuration

Table continued…

GTR 8000 Base Radio – Configuration/Service Software (CSS)		
Parameter	**Screen**	**Tab**
Infrastructure Data Drop Out Delay	Infrastructure Interface	ASTRO Configuration
Infrastructure Data Drop Out Delay Duration	Infrastructure Interface	ASTRO Configuration
Channel Description	Channel Configuration	RF Parameters
Tx Frequency Max	Channel Configuration	RF Parameters
Tx Frequency Max	Channel Configuration	RF Parameters
Rx Frequency Max	Channel Configuration	RF Parameters
Rx Frequency Min	Channel Configuration	RF Parameters
Autocalculate Frequencies	Channel Configuration	RF Parameters
Digital Tx Modulation Type	Channel Configuration	RF Parameters
FM Tx Power Out Max	Channel Configuration	RF Parameters
FM Tx Power Out Min	Channel Configuration	RF Parameters
LSM Tx Power Out Max	Channel Configuration	RF Parameters
Tx Power Out for LSM	Channel Configuration	RF Parameters
Tx Power Level Battery Back-up For LSM	Channel Configuration	RF Parameters
LSM Tx Power Out Min	Channel Configuration	RF Parameters
ASTRO Repeat	Channel Configuration	Key Up Controls
BSI Transmission	Channel Configuration	Key Up Controls
RF Channel Interference Duration	Channel Configuration	Filters and Alarms
Multi-PL	Channel Configuration	PL/DPL
Tx PL/DPL Selected by Last Rx PL/DPL	Channel Configuration	PL/DPL
Tx PL/DPL Selected by Last Rx PL/DPL Duration	Channel Configuration	PL/DPL
Repeater Gate Update	Repeater Configuration	—
Repeater Gate Startup State	Repeater Configuration	—
Busy Bit Slot Time	Repeater Configuration	—
Singletone Frequency	Repeater Access	—
DTMF ID	Repeater Access	—
DTMF Sequence	Repeater Access	—
Multi NAC Binary Group	WildCard Tables	WildCard Outputs

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Appendix B

Analog Simulcast Cable Assembly

The analog simulcast cable assembly combines and translates the pinouts of the GTR 8000 Base Radio wireline and system connector to a T57 Telco connector. This cable assembly is combined with a panel bracket. It can be mounted on a rack or cabinet. The assembled cable and panel is aligned with the backplane of the GTR 8000 Base Radio. All required components, assembly, and installations are provided in this section.

B.1
Analog Simulcast Cable Kit Parts List

This section contains all the parts required to assemble and install the analog simulcast cable assembly in a rack or cabinet configuration.

Table 28: Analog Simulcast Cable Kit Parts List

FRU	Kit	Item	Part Number	Description	Quantity
DLN6821A				GTR ANALOG 4W E&M W/ SIMULCAST KIT	1
	CBN6270A			PKG KIT ANLG SIMULCAST CBL ASSY	1
			5675232H04	CARTON, OUTER BOX	1
			5682347B19	BAG PLASTIC	1
			5682347B20	BAG PLASTIC	2
			5682347B21	BAG, PLASTIC 584 X 431 MM	2
	CKN6950A			CABLE, ANALOG SIMULCAST	1
		A	30009398002	ANALOG SIMULCAST CABLE	1
		B	07009381001	BRACKET-SIMULCAST CABLE MOUNT	1
		C	4285940Y01	STRAIN RELIEF W VELCRO STRAP	1
		D	0310943J10	SCREW,MET-RIC,M3X0.5,8MM,STAR,PAN,STEEL,ZINC-PLATED,THREAD FORMING	2
		E	0785716Y02	EXTENDER, OPEN RACK	2
		F	0312016A54	SCREW,MET-RIC,M6X1,10MM,STAR,PAN,STEEL,ZINC-PLATED,THREAD FORMING	4

Table continued…

FRU	Kit	Item	Part Number	Description	Quantity
		G	0310909E60	SCREW,THREAD ROLL-ING,M4X. 7,8MM,STAR,PAN,STEEL	4
		H	0285504U05	NUT - MET-RIC,CAGE,M6,STEEL	4
		I	0310909C91	SCREW,MA-CHINE,M6,13MM,STAR,PAN,STEEL	5

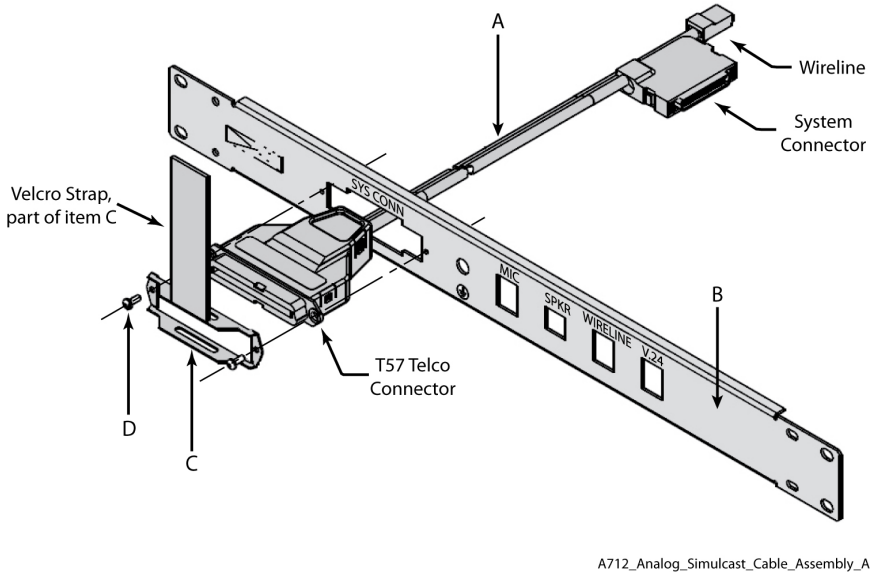
B.2

Assembling the Analog Simulcast Cable and Panel

Procedure:

1. Use this figure to identify the items used throughout this procedure. See Analog Simulcast Cable Kit Parts List on page 87 for the part numbers of the items called out in this procedure.

   Figure 7: Analog Simulcast Cable and Panel Assembly



2. Insert the cable assembly (item A) through the system connector opening in the panel (item B).

   NOTICE: The T57 Telco connector may be positioned with the d-shape keying feature either up or down. When using a right-angle mating connector, verify the orientation needed for proper cable routing before securing to the panel bracket.

3. Position the strain relief (item C) over the T57 Telco connector.
4. Using the two metric M3 screws (item D), fasten the strain relief through the T57 Telco connector and secure it to the panel using a Tx10 bit driver. Torque to 17 in-lbs.

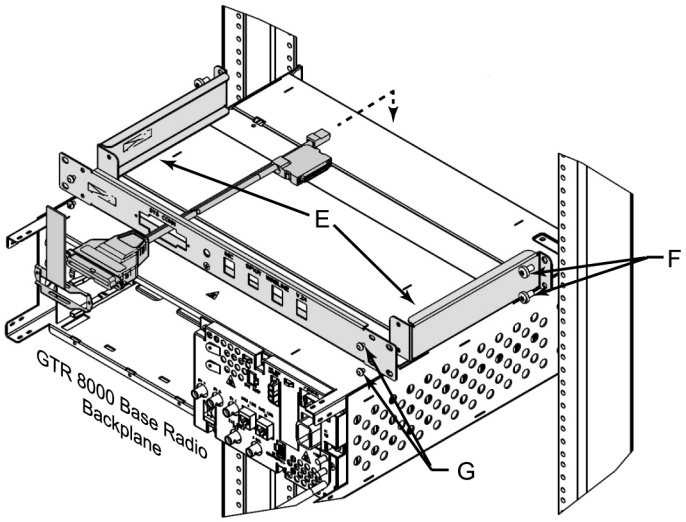
B.3

Installing the Analog Simulcast Cable in an Open Rack Configuration

Procedure:

1 Use this figure to identify the items used throughout this procedure. See Analog Simulcast Cable Kit Parts List on page 87 for the part numbers of the items called out in this procedure.

Figure 8: Analog Simulcast Cable in an Open Rack Configuration



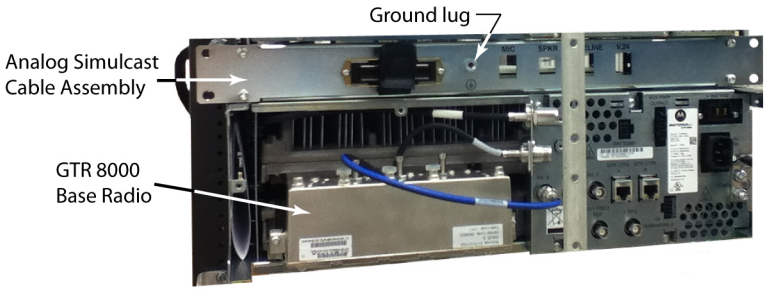
A712_Analog_Simulcast_Cable_Assembly_Rack_A

2 Secure each extender bracket (item E) to the tapped holes on the rack using two M6 (item F) screws using a Tx30 bit driver. Torque to 55 in-lbs.

NOTICE: The extender brackets should be mounted one rack unit above or below the GTR 8000 Base Radio. Installation is dependent on existing devices on the rack.

3 Secure the assembled Analog Simulcast panel (using the inner hole patterns) to the extender brackets using four M4 (item G) screws using a Tx20 bit driver. Torque to 17 in-lbs.

Figure 9: Analog Simulcast Assembly in Rack – GTR 8000 Base Radio Backplane



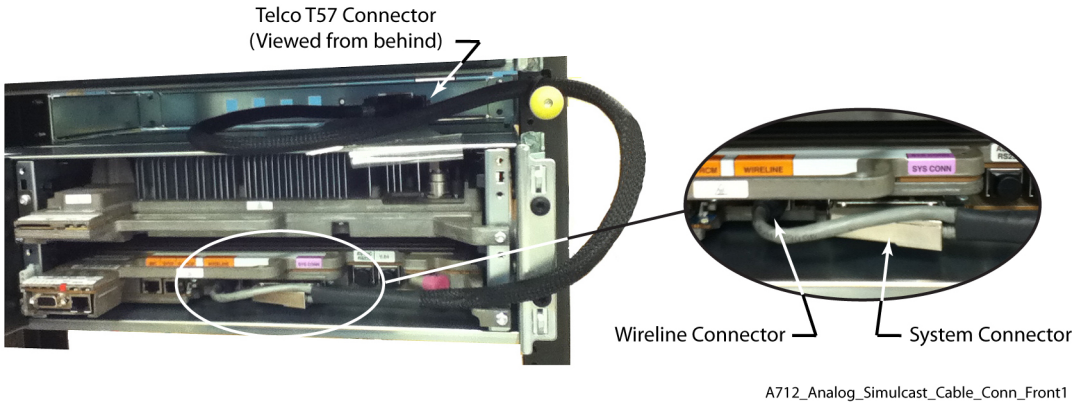
A712_Analog_SimCable_Rack_Mount1

4 Connect an approved ground cable to the ground lug on the Analog Simulcast panel using an M6 (item I) star screw using a Tx30 bit driver. Torque to 55 in-lbs.

5 Remove the fan module to gain access to the Transceiver Option Card (TOC) on the transceiver module. See “Replacing the Fan Assembly” in the *GTR 8000 Base Radio* manual for details.

6 Route the Analog Simulcast Cable over the GTR 8000 Base Radio if the panel was mounted over the base radio.

Figure 10: Connected Analog Simulcast Cable – GTR 8000 Base Radio Front View



7 Connect the 50-pin connector to the system connector on the TOC.

8 Connect the RJ-45 wireline connector to the wireline port on the TOC.

9 Replace the fan module on the base radio so that the Analog Simulcast Cable hangs out through the right-side of the fan module.

10 Secure the remaining Analog Simulcast Cable to the rack using cable ties.

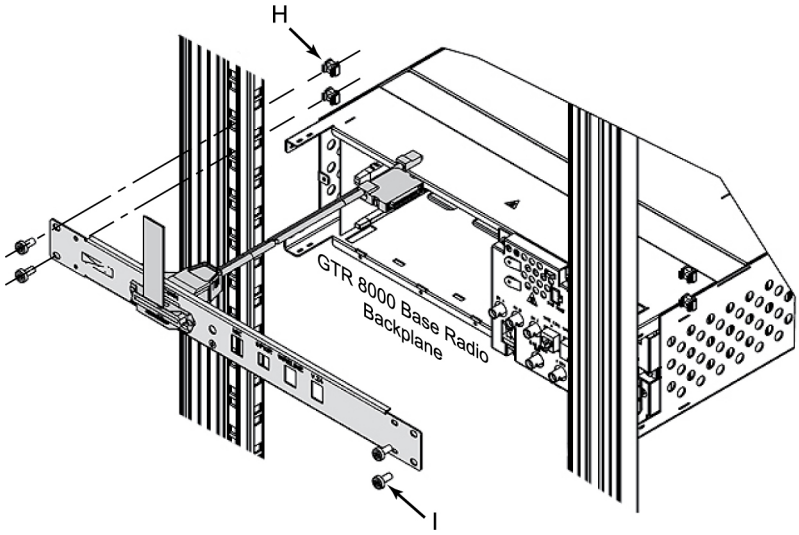
Figure 11: Analog Simulcast Cable – GTR 8000 Base Radio with Fan Modules

B.4 Installing the Analog Simulcast Cable in a Cabinet Configuration

Procedure:

1 Use this figure to identify the items used throughout this procedure. See Analog Simulcast Cable Kit Parts List on page 87 for the part numbers of the items called out in this procedure.

Figure 12: Analog Simulcast Cable in a Cabinet Configuration



2 Insert four cage nuts (item H) into cabinet rail opening.

NOTICE: The cage nuts should be mounted one rack unit above or below the GTR 8000 Base Radio. Installation is dependent on existing devices on the rack.

3 Secure the assembled Analog Simulcast panel (using the outer hole patterns) to the cage nuts using four M6 (item I) star screws using a Tx30 bit driver. Torque to 55 in-lbs.

NOTICE: See Figure 9: Analog Simulcast Assembly in Rack – GTR 8000 Base Radio Backplane on page 89 for an example.

4 Connect an approved ground cable to the ground on the Analog Simulcast panel using an M6 (item I) star screw using a Tx30 bit driver. Torque to 55 in-lbs.

5 Remove the fan module to gain access to the Transceiver Option Card (TOC) on the transceiver module. See “Replacing the Fan Assembly” in the *GTR 8000 Base Radio* manual for details.

6 Route the Analog Simulcast Cable over the GTR 8000 Base Radio if the panel was mounted over the base radio.

NOTICE: See Figure 10: Connected Analog Simulcast Cable – GTR 8000 Base Radio Front View on page 90 for an example.

7 Connect the 50-pin connector to the system connector on the TOC.

8 Connect the RJ-45 wireline connector to the wireline port on the TOC.

9 Replace the fan module on the base radio so that the Analog Simulcast Cable hangs out through the right-side of the fan module.

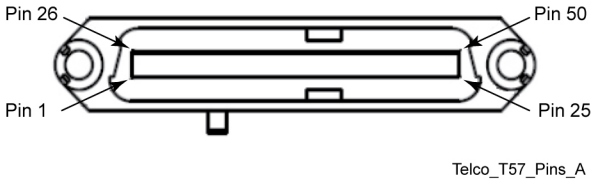
NOTICE: See Figure 11: Analog Simulcast Cable – GTR 8000 Base Radio with Fan Modules on page 90 for an example.

10 Secure the remaining Analog Simulcast Cable to the rack using cable ties.

B.5 Analog Simulcast Cable Pin Assignment

This section contains the pin assignment for the analog simulcast cable. It defines the connections from the T57 Telco connector to the system connector and wireline connector on the Transceiver Option Card of the GTR 8000 Base Radio.

Figure 13: Telco T57 Female Connector on the Analog Simulcast Cable



NOTICE: For the system connector pin-outs, see System Connector on page 42. For the wireline connector, see Wireline Connections on page 41.

Table 29: Analog Simulcast Cable Pin Assignment

T57	Sys Conn	Wire-line	Signal	Type	Function	Note
1	n/a	5	Line 1 +	I	Customer 4-Wire Line Input (Line 1+)	Analog Signal
2	n/a	1	Line 2 +	I/O	Customer 2-Wire Line Input/Output (Line 2+)	Analog Signal
7	34	n/a	GND	I	GND	
9	25	n/a	Gen TX -	I	Gen TX Data-	Analog Signal - 600 Ohm Balanced
10	49	n/a	PL +	I	PL (+) In	Analog Signal - 600 Ohm Balanced
13	27	n/a	Aux In 3	I	Tx Inhibit	Pull To Ground To Activate
15	28	n/a	Aux In 5	I	External PTT	Pull To Ground To Activate
16	3	n/a	Aux In 6	I	In-Cabinet Repeat	Pull To Ground To Activate
17	29	n/a	Aux In 7	I	Rx Inhibit	Pull To Ground To Activate
18	39	n/a	AUX Out Relay 7 N.O.	O	RD STAT - Receiver Active	Form Relay A Closed When Active
24	32	n/a	Aux In 11 +	I		Opto-Isolated In - Current flow to Activate
26	n/a	4	Line 1 -	I	Customer 4-Wire Line Input (Line 1-)	Analog Signal
27	n/a	2	Line 2 -	I/O	Customer 2-Wire Line Input/Output (Line 2-)	Analog Signal
32	43	n/a	GND		GND	

Table continued...

T57	Sys Conn	Wire-line	Signal	Type	Function	Note
34	50	n/a	Gen TX +	I	Gen TX Data+	Analog Signal - 600 Ohm Balanced
35	24	n/a	PL -	I	PL (-) In	Analog Signal - 600 Ohm Balanced
38	37	n/a	Aux Out 3	O		Low Impedance to Ground When Active
40	38	n/a	Aux Out 5	O		Low Impedance to Ground When Active
43	14	n/a	Aux Out Relay 7 Com	O	RD STAT - Receiver Active	Form Relay A Closed When Active
49	7	n/a	Aux In 11 -	I		Opto-Isolated In - Current flow to Activate

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