

INSTRUCTION MANUALS

Draft copy of the of the front matter of the following instruction manual is enclosed with this submission:

68P81095E55-C Quantar Digital Capable Station
For Conventional, ASTRO
6809 Trunking, and IntelliRepeater Systems
Instruction Manual

Other system and radio / configuration service software manuals are available to support the product and system in operation. They can be provided to the Commission upon request.

TUNE-UP PROCEDURE

This exhibit contains the tune-up procedure as it will appear in the Configuration Service Software (CSS) manual.

The following adjustments comprise the total transmitter alignment:

1. Reference Oscillator
2. Transmitter Power Output
3. Transmit Deviation Control
4. Reference Modulation Compensation

Note: All adjustments are factory pre-set and do not require alignment under normal operating conditions. In the event alignment is needed, refer servicing to qualified radio maintenance personnel only.

TEST EQUIPMENT

<u>Description</u>	<u>Recommended model</u>
1. Service Monitor	Motorola R-2001 or equivalent
2. PC with CSS	

TRANSMITTER ALIGNMENT PROCEDURE

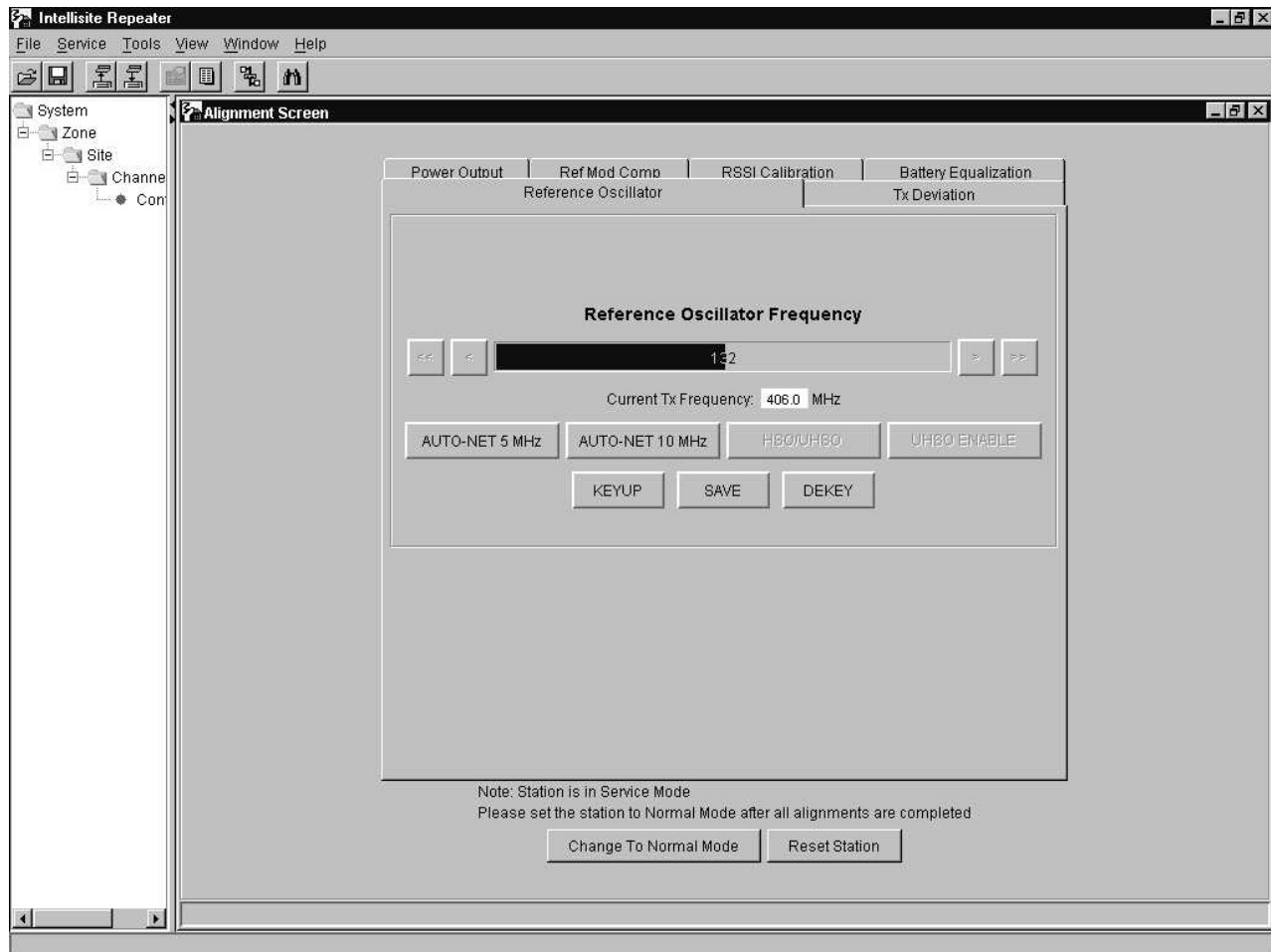
CSS/RSS Port: A 9-pin D connector is provided on the station control module front panel to allow service personnel to connect a PC loaded with the Configuration Service Software (CSS) and perform programming and maintenance tasks via this TIA RS-232 port. The following pages of this exhibit will show the important alignment screens.

EXHIBIT DESCRIPTION

- | | |
|----|--|
| 9A | Reference Oscillator Alignment Screen |
| 9B | Transmitter Power Output Alignment Screen |
| 9C | Transmitter Deviation Alignment Screen |
| 9D | Reference Modulation Compensation Alignment Screen |

All adjustments are software controlled and are pre-set at the factory. Certain station operating parameters can be changed via man-machine interface (MMI) commands, within predetermined limits. Examples include transmit / receiver operating frequencies and power level.

TUNE-UP PROCEDURE - Reference Oscillator Alignment Screen



TUNE-UP PROCEDURE - Transmitter Power Output Alignment Screen

Intellisite Repeater

File Service Tools View Window Help

System
Zone
Site
Channel
Con

Alignment Screen

Reference Oscillator	Tx Deviation
Power Output	Battery Equalization
Ref Mod Comp	RSSI Calibration

Rated Power Out: 100 Watts
 Power Read on Wattmeter: 0.01 Watts
 Transmit Frequency: 406.0 MHz

- 1) KEYUP the Station.
- 2) Enter Power Read on the Wattmeter.
- 3) Press the ADJUST Function Key and Wait for Station Response.
- 4) If the station is at desired Power, press the SAVE function key.
- 5) If the station is not at desired Power, Repeat steps 2 and 3.

Note: If a PA Failure occurs during adjustment, press the PA INIT Function Key to set the PA to an initial value. Then restart the alignment process.

Station Is Currently Dekeyed

PA INIT Keyup Adjust Save Dekey

Note: Station is in Service Mode
 Please set the station to Normal Mode after all alignments are completed

Change To Normal Mode Reset Station

TUNE-UP PROCEDURE - Transmitter Deviation Alignment Screen

The screenshot displays the 'Intellisite Repeater' software interface. The main window is titled 'Alignment Screen' and contains several tabs: 'Power Output', 'Ref Mod Comp', 'RSSI Calibration', and 'Battery Equalization'. The 'Ref Mod Comp' tab is selected, showing a 'Reference Oscillator' section with 'Tx Deviation' settings.

On the left, a tree view shows the hierarchy: System > Zone > Site > Channel > Configuration. The 'Configuration' item is selected.

The 'Tx Deviation' section contains four frequency alignment blocks:

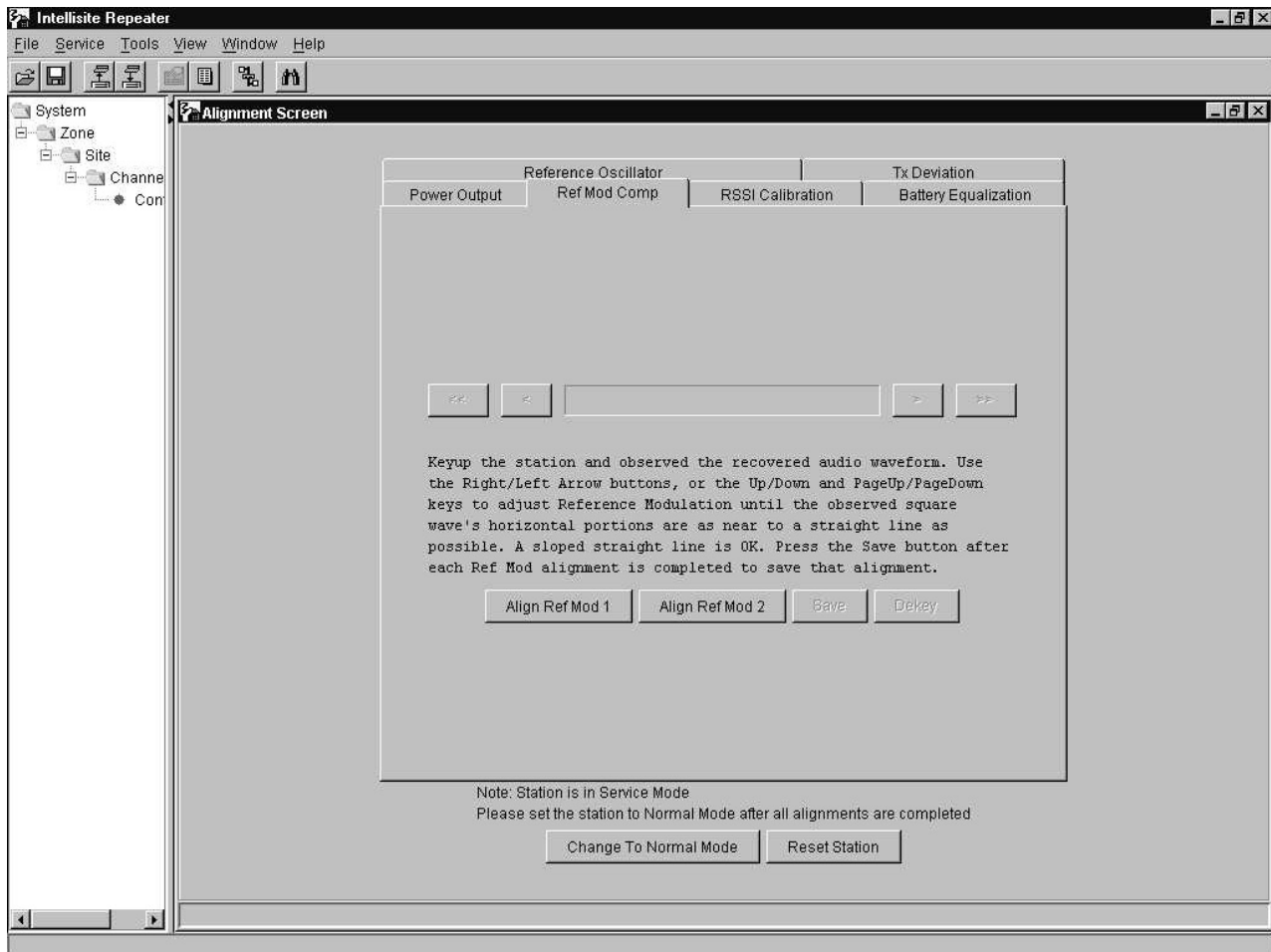
- Frequency 1:** Deviation (kHz) is 5.31, Current Deviation is 5.31. A 'Key On Freq1' button is present.
- Frequency 2:** Deviation (kHz) is 5.18, Current Deviation is 5.18. A 'Key On Freq2' button is present.
- Frequency 3:** Deviation (kHz) is 6.46, Current Deviation is 6.46. A 'Key On Freq3' button is present.
- Frequency 4:** Deviation (kHz) is 6.6, Current Deviation is 6.6. A 'Key On Freq4' button is present.

Below these blocks, the 'Current Frequency (MHz)' is 377.525 and the 'Key On Status' is 'Keyed Up On: Frequency 1'. There are 'Save' and 'Dekey' buttons.

A note at the bottom states: 'Note: Station is in Service Mode. Please set the station to Normal Mode after all alignments are completed.' Below this note are 'Change To Normal Mode' and 'Reset Station' buttons.

A status bar at the very bottom reads: 'Click to Keyup the station using Frequency 1'.

TUNE-UP PROCEDURE - Reference Modulation Compensation Alignment Screen





QUANTAR™

Digital-Capable Station

For Conventional, *ASTRO*,
6809 Trunking, and *IntelliRepeater* Systems

VHF — 25W & 125W

UHF — 25W, 100W, & 110W

800 MHz — 20W & 100W

900 MHz — 100W

PRELIMINARY



Instruction Manual

68P81095E05-C

COMPUTER SOFTWARE COPYRIGHTS

The Motorola products described in this instruction manual may include copyrighted Motorola computer programs stored in semiconductor memories or other media. Laws in the United States and other countries preserve for Motorola certain exclusive rights for copyrighted computer programs, including the exclusive right to copy or reproduce in any form the copyrighted computer program. Accordingly, any copyrighted Motorola computer programs contained in the Motorola products described in this instruction manual may not be copied or reproduced in any manner without the express written permission of Motorola. Furthermore, the purchase of Motorola products shall not be deemed to grant either directly or by implication, estoppel, or otherwise, any license under the copyrights, patents or patent applications of Motorola, except for the normal non-exclusive, royalty free license to use that arises by operation of law in the sale of a product.

EPS-34440-B

COMMERCIAL WARRANTY (STANDARD)

Motorola radio communications products are warranted to be free from defects in material and workmanship for a period of ONE (1) YEAR, (except for crystals and channel elements which are warranted for a period of ten (10) years) from the date of shipment. Parts, including crystals and channel elements, will be replaced and labor will be provided free of charge for the full warranty period. Thereafter purchaser must pay for the labor involved in repairing the product or replacing the parts at the prevailing rates together with any transportation charges to or from the place where warranty service is provided. This express warranty is extended by Motorola Communications and Electronics, Inc., 1301 E. Algonquin Road, Schaumburg, Illinois 60196, to the original purchaser only, and only to those purchasing for purpose of leasing or solely for commercial, industrial, or governmental use.

THIS WARRANTY IS GIVEN IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED WHICH ARE SPECIFICALLY EXCLUDED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL MOTOROLA BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES TO THE FULL EXTENT SUCH MAY BE DISCLAIMED BY LAW.

In the event of a defect, malfunction or failure to conform to specifications established by seller, or if appropriate, to specifications accepted by Seller in writing, during the period shown, Motorola, at its option, will either repair or replace the product or refund the purchase price thereof, and such action on the part of Motorola shall be the full extent of Motorola's liability hereunder.

This warranty is void if:

- a. the product is used in other than its normal and customary manner;
- b. the product has been subject to misuse, accident, neglect or damage;
- c. unauthorized alterations or repairs have been made, or unapproved parts used in the equipment.

This warranty extends only to individual products, batteries are excluded. Because each radio system is unique, Motorola disclaims liability for range, coverage, or operation of the system as a whole under this warranty except by a separate written agreement signed by an officer of Motorola.

LICENSED PROGRAMS — Motorola software provided in connection with this order is warranted to be free from reproducible defects for a period of one (1) year. All material and labor to repair any such defects will be provided free of charge for the full warranty period, and **SUBJECT TO THE DISCLAIMER IN BOLD FACE TYPE.**

Non-Motorola manufactured products are excluded from this warranty, but subject to the warranty provided by their manufacturers, a copy of which will be supplied to you on specific written request.

In order to obtain performance of this warranty, purchaser must contact its Motorola salesperson or Motorola at the address first above shown, attention Quality Assurance Department.

This warranty applies only within the United States.

EPS-48759-O

FCC INTERFERENCE WARNING

The FCC Requires that manuals pertaining to Class A and Class B computing devices must contain warnings about possible interference with local residential radio and TV reception. This warning reads as follows:

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial or residential environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.



MOTOROLA

Commercial Government and
Industrial Solutions Sector

QUANTARTM
Digital—Capable Station
for Conventional, *ASTRO*,
6809 Trunking, and *IntelliRepeater* Systems

VHF — 25W & 125W
UHF — 25W, 100W, & 110W
800 MHz — 20W & 100W
900 MHz — 100W

Table of Contents

<i>Model/Option Information</i>	<i>xi</i>
<i>Foreword</i>	<i>xxiv</i>
<i>General Safety Information</i>	<i>xxvi</i>
<i>Performance Specifications</i>	<i>xxviii</i>

DESCRIPTION

DESCRIPTION	68P81096E56
Introduction	page 1
Compact Mechanical Design	page 1
State-of-the-Art Electrical Design	page 2
Summary of Operating Features	page 3
Multiple System Capability	page 4
Station Components	page 6
Functional Theory of Operation	page 8
Transmitter Circuitry Operation	page 8
Receiver Circuitry Operation	page 9
Station Control Circuitry Operation	page 9
Wireline Interface Board Operation	page 10
Power Supply Module Operation	page 10

INSTALLATION

INSTALLATION	68P81096E57
Pre—Installation Considerations	page 2
Installation Overview	page 2
Environmental Conditions at Intended Site	page 3
Equipment Ventilation	page 3
AC Input Power Requirements	page 4
Equipment Mounting Methods	page 4
Site Grounding and Lightning Protection	page 5
Recommended Tools and Equipment	page 6
Equipment Unpacking and Inspection	page 6
Physical Dimensions and Clearances	page 7

— continued on next page —

Mechanical Installation	page 14
Unpacking the Equipment	page 14
Mounting Procedures	page 20
Stacking Cabinets	page 25
Stacking Modular Racks	page 26
Anti–Vibration/EMI Screws	page 27
Electrical Connections	page 28
Power Supply Connections	page 28
RF Cabling Connections	page 32
Connecting System Cables	page 38
Connecting Telephone Lines	page 46
Connecting V.24 Modems	page 50
Connecting External Reference	page 51
Post–Installation Checkout	page 54
Applying Power	page 54
Verifying Proper Operation	page 54
Proceeding to Optimization	page 56

OPTIMIZATION

OPTIMIZATION	68P81086E72
Description	page 1

OPERATION

OPERATION	68P81096E58
Description	page 1
Summary of Switches, Pushbuttons, and Connectors	page 1
Summary of LED Indicators	page 1

MAINTENANCE & TROUBLESHOOTING

ROUTINE MAINTENANCE	68P81086E39
Introduction	page 1
Routine Maintenance Overview	page 1
Recommended Test Equipment	page 1
TROUBLESHOOTING	68P81096E59
Introduction	page 1
Troubleshooting Overview	page 1
Recommended Test Equipment	page 1
List of Test Equipment	page 1
Troubleshooting Procedures	page 2
Troubleshooting Overview	page 2
Interpreting LED Indicators	page 6
Interpreting Alarm Alert Tones	page 9
Verifying Transmitter Circuitry	page 10
Verifying Receiver Circuitry	page 14

— continued on next page —

Module Replacement Procedures	page 19
General Replacement Information	page 19
Replacing Power Amplifier Module	page 21
Replacing Exciter Module	page 22
Replacing Power Supply Module	page 23
Replacing Station Control Module	page 24
Replacing Wireline Interface Board	page 30
Replacing Receiver Module and/or Preselector Assembly (VHF and UHF)	page 32
Replacing Receiver Module (800 MHz and 900 MHz)	page 33
Replacing ASTRO Modem Card	page 34
Replacing Backplane Board	page 35
Preselector Field Tuning Procedure	page 36
Required Test Equipment	page 36
VHF Tuning Procedure	page 37
UHF Tuning Procedure	page 40

STATION MODULES

RECEIVER CIRCUITRY

RECEIVER MODULE (VHF Ranges 1 and 2; Includes Preselector) 68P81086E28

Description	page 1
General Description	page 1
Overview of Circuitry	page 1
Controls, Indicators, and Inputs/Outputs	page 2
Functional Theory of Operation	page 3
Synthesizer and VCO Circuitry	page 3
Preselector Filter Assembly	page 4
Receiver Front End Circuitry	page 4
Custom Receiver IC Circuitry	page 4
Address Decode and A/D Converter Circuitry	page 5
Voltage Regulator Circuitry	page 5

RECEIVER MODULE (UHF) 68P81086E48

Description	page 1
General Description	page 1
Overview of Circuitry	page 1
Controls, Indicators, and Inputs/Outputs	page 2
Functional Theory of Operation	page 3
Synthesizer and VCO Circuitry	page 3
Preselector Filter Assembly	page 4
Receiver Front End Circuitry	page 4
Custom Receiver IC Circuitry	page 4
Address Decode and A/D Converter Circuitry	page 5
Voltage Regulator Circuitry	page 5

RECEIVER MODULE (800 MHz) 68P81086E76

Description	page 1
General Description	page 1
Overview of Circuitry	page 1
Controls, Indicators, and Inputs/Outputs	page 2
Functional Theory of Operation	page 3
Synthesizer and VCO Circuitry	page 3
Receiver Front End Circuitry	page 4

— continued on next page —

Custom Receiver IC Circuitry	page 4
Address Decode and A/D Converter Circuitry	page 5
Voltage Regulator Circuitry	page 5
RECEIVER MODULE (900 MHz)	68P81091E92
Description	page 1
General Description	page 1
Overview of Circuitry	page 1
Controls, Indicators, and Inputs/Outputs	page 2
Functional Theory of Operation	page 3
Synthesizer and VCO Circuitry	page 3
Receiver Front End Circuitry	page 4
Custom Receiver IC Circuitry	page 4
Address Decode and A/D Converter Circuitry	page 5
Voltage Regulator Circuitry	page 5

TRANSMITTER CIRCUITRY

EXCITER BOARD (VHF, UHF, 800/900 MHz)	68P81086E24
Description	page 1
General Description	page 1
Overview of Circuitry	page 1
Controls, Indicators, and Inputs/Outputs	page 2
Functional Theory of Operation	page 3
Synthesizer and VCO Circuitry	page 3
RF Switch Circuitry	page 4
Microprocessor Circuitry	page 4
TX Power Control Circuitry	page 5
VHF POWER AMPLIFIER MODULE (25W/125W R1 & R2)	68P81086E23
Description	page 1
General Description	page 1
Overview of Circuitry	page 1
Controls, Indicators, and Inputs/Outputs	page 2
Functional Theory of Operation	page 3
RF Signal Path	page 3
Output Power Control	page 3
Sense and Detect Circuitry	page 4
Cooling Fans Control Circuitry	page 6
UHF POWER AMPLIFIER MODULE (R0/110W; R1 & R2/25W; R1–3/110W; R4/100W)	68P81088E44
Description	page 1
General Description	page 1
Overview of Circuitry	page 1
Controls, Indicators, and Inputs/Outputs	page 2
Functional Theory of Operation	page 3
RF Signal Path	page 3
Output Power Control	page 3
Sense and Detect Circuitry	page 4
Cooling Fans Control Circuitry	page 6

POWER AMPLIFIER MODULE (20W/100W 800 MHz; 100W 900 MHz;) 68P81091E91

Description	page 1
General Description	page 1
Overview of Circuitry	page 1
Controls, Indicators, and Inputs/Outputs	page 2
Functional Theory of Operation	page 3
RF Signal Path	page 3
Output Power Control	page 3
Sense and Detect Circuitry	page 4
Cooling Fans Control Circuitry	page 6

STATION CONTROL CIRCUITRY

STATION CONTROL MODULE (CLN6960/CLN6961) 68P81094E76

Description	page 1
General Description	page 1
Overview of Circuitry	page 2
Controls, Indicators, and Inputs/Outputs	page 3
Functional Theory of Operation	page 4
Host Microprocessor/Host ASIC Circuitry	page 4
Non–Volatile Memory	page 5
DRAM Memory	page 5
External Line Interface Circuitry	page 6
Digital Signal Processor (DSP) and DSP ASIC Circuitry	page 7
Station Reference Circuitry	page 8
HDLC Bus Control Circuitry	page 8
Audio Interface Circuitry	page 9
Input/Output Ports	page 10
6809/MRTI Interface Circuitry	page 10
Front Panel LEDs and Switches	page 11
Supply Voltages Circuitry	page 11

STATION CONTROL MODULE (CLN1614) 68P81096E87

Description	page 1
General Description	page 1
Overview of Circuitry	page 2
Controls, Indicators, and Inputs/Outputs	page 4
Functional Theory of Operation (CLN7060A Control Board)	page 6
Host Microprocessor/Host ASIC Circuitry	page 6
Non–Volatile Memory	page 7
DRAM Memory	page 7
External Line Interface Circuitry	page 8
Digital Signal Processor (DSP) and DSP ASIC Circuitry	page 9
Station Reference Circuitry	page 10
HDLC Bus Control Circuitry	page 10
Audio Interface Circuitry	page 11
Input/Output Ports	page 12
6809/MRTI Interface Circuitry	page 12
Supply Voltages Circuitry	page 13

— *continued on next page* —

Functional Theory of Operation (CLN7098A LED Board)	page 14
Front Panel LEDs and Switches	page 14
Front Panel Connectors	page 14

WIRELINE CIRCUITRY

WIRELINE INTERFACE BOARD (4–WIRE)	68P81094E77
Description	page 1
General Description	page 1
Overview of Circuitry	page 1
Controls, Indicators, and Inputs/Outputs	page 2
Functional Theory of Operation	page 3
Functional Overview	page 3
Description of Audio/Data Signal Paths	page 7
 WIRELINE INTERFACE MODULE (8–WIRE)	 68P81094E78
Description	page 1
General Description	page 1
Overview of Circuitry	page 1
Controls, Indicators, and Inputs/Outputs	page 2
Functional Theory of Operation	page 3
Functional Overview	page 3
Description of Audio/Data Signal Paths	page 7

STATION BACKPLANE

STATION BACKPLANE BOARD	68P81086E33
Description	page 1
General Description	page 1
Location of Backplane Connectors	page 2
Backplane Connectors Information	page 3

STATION POWER SUPPLY MODULES

265W POWER SUPPLY MODULE (ac input)	68P81096E09
Description	page 1
General Description	page 1
Power Supply Module Simplified Block Diagram	page 2
Overview of Circuitry	page 3
Performance Specifications	page 6
Controls, Indicators, and Inputs/Outputs	page 7
Functional Theory of Operation (AC-to-DC Converter Board)	page 8
Input Conditioning Circuitry	page 8
Startup Delay Circuitry	page 8
Boost/Power Factor Correction Circuitry	page 9
Battery Revert Trigger Circuitry	page 9
VCC Supply Circuitry	page 9
LED Status Indicators	page 10
Functional Theory of Operation (DC-to-DC Converter Board)	page 11
+14V Main Supply Circuitry	page 11

— continued on next page —

+5V Supply Circuitry	page 12
Battery Charger Control Circuitry	page 12
Reference Voltage Circuitry	page 12
Diagnostics Circuitry	page 13
Address Decode Circuitry	page 13
Startup/Shutdown Control Circuitry	page 14
Functional Theory of Operation (Battery Charger/Revert Board)	page 15
Charger Supply Circuitry	page 15
Pulse Width Modulator Circuitry	page 16
Battery Revert Circuitry	page 16
Current Mode Controller Circuitry	page 16
SPI Bus Interface Circuitry	page 17
Shutdown Circuitry	page 17
Local Supplies Circuitry	page 17
 625W POWER SUPPLY MODULE (ac input)	 68P81095E88
Description	page 1
Performance Specifications	page 6
Controls, Indicators, and Inputs/Outputs	page 7
Functional Theory of Operation (AC-to-DC Converter Board)	page 8
Input Conditioning Circuitry	page 8
Startup Delay Circuitry	page 8
Boost/Power Factor Correction Circuitry	page 9
Battery Revert Trigger Circuitry	page 9
VCC Supply Circuitry	page 9
LED Status Indicators	page 10
Functional Theory of Operation (DC-to-DC Converter Board)	page 11
+28V Main Supply Circuitry	page 11
+14V Supply Circuitry	page 12
+5V Supply Circuitry	page 12
Battery Charger Control Circuitry	page 13
Reference Voltage Circuitry	page 13
Diagnostics Circuitry	page 13
Address Decode Circuitry	page 14
Startup/Shutdown Control Circuitry	page 14
Functional Theory of Operation (Battery Charger/Revert Board)	page 15
Charger Supply Circuitry	page 15
Pulse Width Modulator Circuitry	page 16
Battery Revert Circuitry	page 16
Current Mode Controller Circuitry	page 16
SPI Bus Interface Circuitry	page 17
Shutdown Circuitry	page 17
Local Supplies Circuitry	page 17
 210W POWER SUPPLY MODULE (12/24 and 48/60 V dc input)	 68P81085E12
Description	page 1
General Description	page 1
Overview of Circuitry	page 2
Performance Specifications	page 3

— continued on next page —

Controls, Indicators, and Inputs/Outputs	page 4
Functional Theory of Operation	page 5
Input Conditioning Circuitry	page 5
Startup Inverter Circuitry	page 6
Main Inverter Circuitry	page 6
+5 V Inverter Circuitry	page 7
Diagnostics Circuitry	page 8
Address Decode Circuitry	page 8
 600W POWER SUPPLY MODULE (24 V dc input)	 68P81090E44
Description	page 1
Performance Specifications	page 3
Controls, Indicators, and Inputs/Outputs	page 4
Functional Theory of Operation	page 5
Input Conditioning Circuitry	page 5
Startup Inverter Circuitry	page 6
Main Inverter Circuitry	page 6
+14.2 V Inverter Circuitry	page 7
+5 V Inverter Circuitry	page 7
Diagnostics Circuitry	page 8
Address Decode Circuitry	page 8
 600W POWER SUPPLY MODULE (48/60 V dc input)	 68P81096E84
Description	page 1
General Description	page 1
Power Supply Module Simplified Block Diagram	page 2
Overview of Circuitry	page 3
Performance Specifications	page 4
Controls, Indicators, and Inputs/Outputs	page 5
Functional Theory of Operation (DC Input Board)	page 6
Input Conditioning Circuitry	page 6
Inverter Circuitry A and B	page 7
Output Filter Circuitry	page 7
Functional Theory of Operation (DC Output Board)	page 8
Inverters A/B Control Circuitry	page 8
+14.2 V Supply Circuitry	page 9
+5 V Supply Circuitry	page 9
Reference Voltage Circuitry	page 9
Diagnostics Circuitry	page 10
Address Decode Circuitry	page 10
Startup/Shutdown Control Circuitry	page 11

ANCILLARY EQUIPMENT

ANTENNA RELAY OPTION

ANTENNA RELAY (Option X371AA)	68P81086E22
Description	page 1
General Description	page 1
Input and Output Connections	page 2
Option Complement	page 3

— continued on next page —

Performance Specifications	page 3
Mounting Locations	page 4
Functional Theory of Operation	page 5

TRIPLE CIRCULATOR OPTIONS

VHF TRIPLE CIRCULATOR OPTION (Options X676AA–AC)	68P81086E34
Description	page 1
General Description	page 1
Options Complement	page 2
Performance Specifications	page 3
Inputs/Outputs	page 4
Functional Theory of Operation	page 5
UHF TRIPLE CIRCULATOR OPTION (Options X676AN and X676AP)	68P81088E54
Description	page 1
General Description	page 1
Option Complement	page 2
Performance Specifications	page 3
Inputs/Outputs	page 4
Functional Theory of Operation	page 5
800/900 MHz TRIPLE CIRCULATOR OPTION (Options X676AR and X676AQ)	68P81090E86
Description	page 1
General Description	page 1
Option Complement	page 2
Performance Specifications	page 2
Inputs/Outputs	page 3
Functional Theory of Operation	page 4

DUPLEXER OPTIONS

VHF DUPLEXERS (OPTIONS X182AA, AB, AJ)	68P81086E71
Description	page 1
General Description	page 1
Adjustments and Inputs/Outputs	page 2
Performance Specifications	page 3
Typical Mounting Configuration	page 3
Field Tuning Procedure	page 6
UHF DUPLEXER (Options X182AC thru X182AF)	68P81087E94
Description	page 1
General Description	page 1
Inputs/Outputs	page 2
Performance Specifications	page 3
Typical Mounting Configuration	page 4
Field Tuning Procedure	page 6
Field Tuning Overview	page 6
Required Test Equipment	page 6
Setting Up for Tuning Duplexer	page 7
Duplexer Tuning Procedure	page 8

800/900 MHz DUPLEXERS (Options X182AG and X182AH)	68P81091E93
Description	page 1
General Description	page 1
Inputs/Outputs	page 2
Performance Specifications	page 3
Typical Mounting Configuration	page 3

MODEM OPTION

ASTRO MODEM CARD (OPTION X437AA)	68P81086E38
Description	page 1
General Description	page 1

PERIPHERAL TRAY OPTION

PERIPHERAL TRAY (OPTION X696AA)	68P81086E37
Description	page 1
General Description	page 1
Options Complement	page 2
Peripheral Tray Contents and Inputs/Outputs	page 3

UHSO OPTION

ULTRA HIGH STABILITY OSCILLATOR (UHSO; Option X873AA)	68P81088E08
Description	page 1
General Description	page 1
Inputs/Outputs	page 2
Functional Theory of Operation	page 3

SYSTEM APPLICATIONS

RA/RT CONFIGURATION (TRC CONTROL)	68P81090E98
Overview	page 1
Electrical Connections (RF Link)	page 2
Console to Station 1 Wiring Connections	page 2
Station 2 to Station 3 Wiring Connections	page 3
Electrical Connections (Microwave Link)	page 4
Console to Microwave Station 1 Wiring Connections	page 4
Microwave Station 2 to Station 3 Wiring Connections	page 5
RSS Programming	page 6
TX Wireline Alignment	page 7
Station 1 TX Wireline Alignment	page 7
Station 2 TX Wireline Alignment	page 7
Station 3 TX Wireline Alignment	page 8

RA/RT CONFIGURATION (E & M Keying)	68P81090E99
Overview	page 1
Electrical Connections (RF Link)	page 2
Console to Station 1 Wiring Connections	page 2
Station 2 to Station 3 Wiring Connections	page 3

— *continued on next page* —

Electrical Connections (Microwave Link)	page 5
Console to Microwave Station 1 Wiring Connections	page 5
Microwave Station 2 to Station 3 Wiring Connections	page 6
RSS Programming	page 8
TX Wireline Alignment	page 9
Station 1 TX Wireline Alignment	page 9
Station 2 TX Wireline Alignment	page 9
Station 3 TX Wireline Alignment	page 10
FALL BACK IN-CABINET REPEAT FEATURE	68P81095E96
Overview	page 1
Configuring the FBICR Feature	page 4
MAIN / STANDBY CONFIGURATION	68P81095E89
Overview	page 1
Electrical Connections	page 2
Setting Wireline Impedance Jumpers	page 4
RSS Programming	page 5
Main/Standby Operation	page 6
Customizing Main/Standby Operation	page 8
FAST KEYUP FEATURE	68P80800A02
Overview	page 1
Electrical Connections	page 2
RSS Programming	page 4
Fast Keyup Performance Characteristics	page 5
DUAL CONTROL OF GATED ADDRESS VIA TRC AND SAM	68P81096E11
Overview	page 1
Station RSS Programming	page 4
SAM RSS Programming	page 8
INPUT/OUTPUT SPECIFICATIONS FOR EXTERNAL CONTROLLERS	68P81096E86
Overview	page 1
Electrical Connections	page 2
Electrical Characteristics	page 3
Editing Wildcard Tables	page 8
SERIAL INTERFACE SPECIFICATIONS	68P81131E57
Overview	page 1
Making Serial Connection to Station	page 1
Entering "RSS Mode"	page 3
Supported Commands	page 4
Important Things to Know	page 12

MODEL AND OPTION SELECTION PROCEDURE (INCLUDES MODEL/OPTION COMPLEMENTS)

The following equipment ordering scenario is used by the sales representative to equip a *Quantar* station with the proper hardware and firmware for specific system types and customer-defined options and features. The scenario is described here to explain the process and to show the structure and contents of the various options and models.

1

The sales model is T5365A (as translated from C99ED/001C).

NOTE: *The Sales Model includes only a TRN7795A Base Station Nameplate. Equipping the station with the proper modules is accomplished by ordering additional options, as described in the following steps.*

2

A System Family Option must be selected as follows:

System Type	Family Option	VHF	UHF	800 MHZ	900 MHZ
Conventional Analog	X597	✓	✓	✓	✓
Conventional <i>ASTRO</i> VSELP	X599	✓	✓	✓	
Conventional <i>ASTRO</i> CAI	X806	✓	✓	✓	
6809 Trunking Analog	X997	✓	✓	✓	✓
6809 Trunking <i>ASTRO</i> VSELP	X992	✓	✓	✓	
6809 Trunking <i>ASTRO</i> CAI	X900	✓	✓	✓	
SMARTZONE 6809 Trunking <i>ASTRO</i> VSELP	X989	✓	✓	✓	
SMARTZONE 6809 Trunking <i>ASTRO</i> CAI	X897	✓	✓	✓	
SMARTZONE <i>IntelliRepeater</i> Trunking	X999	✓	✓	✓	✓
SMARTZONE <i>IntelliRepeater</i> <i>ASTRO</i> VSELP	X990	✓	✓	✓	
SMARTZONE <i>IntelliRepeater</i> <i>ASTRO</i> CAI	X898	✓	✓	✓	

(Continued)

The following tables show the available power and band options.

VHF

Frequency Range \ Output Power	25W	125W
VHF High Band Range 1 (132–154 MHz)	Option X330AA	Option X530AA
VHF High Band Range 2 (150–174 MHz)		Option X530AB

NOTE: Customer-specified frequencies which are in the 150–154 MHz range are automatically assigned to Range 2 by Order Processing **unless** one of the following options is ordered:

X325 (125W only) — Specifies Range 1 Exciter (overrides automatic assignment to Range 2) where the transmit frequency is between 150 and 154 MHz.

X326 — Specifies Range 1 Receiver (overrides automatic assignment to Range 2) where the receive frequency is between 150 and 154 MHz.

These options are typically used to ensure that the transmit and receive frequencies are in the required customer range; this is required for use with a duplexer module.

UHF

Frequency Range \ Output Power	25W	100W	110W
UHF Range 0 (380–433 MHz)	Not Available	Not Available	Option X640AK
UHF Range 1 (403–433 MHz)	Option X240AA	Not Available	Option X640AA
UHF Range 2 (438–470 MHz)	Option X240AB	Not Available	Option X640AB
UHF Range 3 (470–494 MHz)	Not Available	Not Available	Option X640AC
UHF Range 4 (494–520 MHz)	Not Available	Option X640AD	Not Available

800/900 MHz

Frequency Range \ Output Power	20W	100W
800 MHz	Option X250AA	Option X750AA
900 MHz	Not Available	Option X660AA

(Continued)

If no other options are selected, Motorola's Order Processing appends the appropriate standard options (based on power and frequency band) to complete the station equipment list. The tables below show the completed equipment lists for the available options. If additional options are desired, they must be added to the initial order form. Step 5 lists the available options and the impact each has on the standard equipment configuration.

VHF

OPTION X330AA SELECTED IN STEP 3 (VHF Range 1; 25W Transmitter)

Source	Option/ Kit	Description
Option from Initial Sales Order	X330AA TLD3110B TKN8699A TRN7480A TRN7708A CHN6100A	VHF High Band Ranges 1 & 2; 25W Transmitter 25 W Power Amplifier Module (VHF R1 & R2) PA-to-Exciter RF Cable Station Interconnect Board (Backplane) PA Module Front Panel Anti-Vibration/EFI Screws (2)
	X131AA CLD1270A CHN6100A	Exciter Module (VHF High-Band Range 1) Exciter Module (Board and Hardware) Anti-Vibration/EFI Screws (2)
Options/Kits Internally Added by Motorola Order Processing	X333AA CLD1250A CLN7334A TRN7799A CHN6100A	Receiver Module (VHF High-Band Range 1) Receiver Module (Board, Preselector, Hardware) Receiver Module Front Panel VHF/UHF Tuning Kit Anti-Vibration/EFI Screws (2)
	X43AB CPN1049B CLN7261A CPN6086A CHN6100A	Power Supply Assembly 265W Power Supply (AC input; w/o battery chrg) Ferrite RFI Suppressor Front Panel, Dummy Charger Connector Anti-Vibration/EFI Screws (2)
	X621AY CLN1614A TRN7476A TKN8751A	Station Control Module (SCM); Standard EPIC III Station Control Module SCM Internal Speaker Internal Speaker Cable
	X222AB CGN6157A CHN6100A	Front Panel (Station Control Module) Station Control Module Front Panel Anti-Vibration/EFI Screws (2)
	X216AA CLN6955A TKN8731A CLN6816A	Wireline Interface Module (WIM) (4-wire) Wireline Interface Board WIM Cable RFI Suppressor
	C831AA TRN7479A	Card Cage Card Cage Assembly (12")
	X142AA TRN7494A	Duplex Interface Assembly Duplex Interface (includes ant. connector bracket)
	X249AW TKN8753A TKN9126A	RF Cabling Receiver mini-UHF to N-type coax cable Transmitter N-type to N-type coax cable
	X187AA TRN7663A	Domestic Power Cable AC Line Cord
	X163AD TRN7696A CHN6100A	Blank Panels Dual Slot Wide Blank Panel Anti-Vibration/EFI Screws (2)
	X842AB CLN6885A	Ethernet Termination Kit Ethernet Termination Hardware
	X430AA THN6700A TTN5040A	12" Cabinet 12" x 20" Cabinet Grommet
	X362AA TBN6625A	Packing Packing for 12" Cabinet
	X436AA 68P81095E05	Instruction Manual <i>Quantar</i> Station Functional Manual

OPTION X330AA SELECTED IN STEP 3 (VHF Range 2; 25W Transmitter)

Source	Option/ Kit	Description
Option from Initial Sales Order	X330AA TLD3110B TKN8699A TRN7480A TRN7708A CHN6100A	VHF High Band Ranges 1 & 2; 25W Transmitter 25 W Power Amplifier Module (VHF R1 & R2) PA-to-Exciter RF Cable Station Interconnect Board (Backplane) PA Module Front Panel Anti-Vibration/EFI Screws (2)
	X131AB CLD1280A CHN6100A	Exciter Module (VHF High-Band Range 2) Exciter Module (Board and Hardware) Anti-Vibration/EFI Screws (2)
Options/Kits Internally Added by Motorola Order Processing	X333AB CLD1260A CLN7334A TRN7799A CHN6100A	Receiver Module (VHF High-Band Range 2) Receiver Module (Board, Preselector, Hardware) Receiver Module Front Panel VHF/UHF Tuning Kit Anti-Vibration/EFI Screws (2)
	X43AB CPN1049B CLN7261A CPN6086A CHN6100A	Power Supply Assembly 265W Power Supply (AC input; w/o battery chrg) Ferrite RFI Suppressor Front Panel, Dummy Charger Connector Anti-Vibration/EFI Screws (2)
	X621AY CLN1614A TRN7476A TKN8751A	Station Control Module (SCM); Standard EPIC III Station Control Module SCM Internal Speaker Internal Speaker Cable
	X222AB CGN6157A CHN6100A	Front Panel (Station Control Module) Station Control Module Front Panel Anti-Vibration/EFI Screws (2)
	X216AA CLN6955A TKN8731A CLN6816A	Wireline Interface Module (WIM) (4-wire) Wireline Interface Board WIM Cable RFI Suppressor
	C831AA TRN7479A	Card Cage Card Cage Assembly (12")
	X142AA TRN7494A	Duplex Interface Assembly Duplex Interface (includes ant. connector bracket)
	X249AW TKN8753A TKN9126A	RF Cabling Receiver mini-UHF to N-type coax cable Transmitter N-type to N-type coax cable
	X187AA TRN7663A	Domestic Power Cable AC Line Cord
	X163AD TRN7696A CHN6100A	Blank Panels Dual Slot Wide Blank Panel Anti-Vibration/EFI Screws (2)
	X842AB CLN6885A	Ethernet Termination Kit Ethernet Termination Hardware
	X430AA THN6700A TTN5040A	12" Cabinet 12" x 20" Cabinet Grommet
	X362AA TBN6625A	Packing Packing for 12" Cabinet
	X436AA 68P81095E05	Instruction Manual <i>Quantar</i> Station Functional Manual

(Continued)

VHF

OPTION X530AA SELECTED IN STEP 3 (VHF Range 1; 125W Transmitter)

OPTION X530AB SELECTED IN STEP 3 (VHF Range 2; 125W Transmitter)

Source	Option/ Kit	Description	Source	Option/ Kit	Description
Option from Initial Sales Order	X530AA TLD3101F TKN8699A TRN7480A TRN7708A CHN6100A	VHF High Band Range 1; 125W Transmitter 125 W Power Amplifier Module (VHF R1) PA—to—Exciter RF Cable Station Interconnect Board (Backplane) PA Module Front Panel Anti-Vibration/EFI Screws (2)	Option from Initial Sales Order	X530AB TLD3102F TKN8699A TRN7480A TRN7708A CHN6100A	VHF High Band Range 2; 125W Transmitter 125 W Power Amplifier Module (VHF R2) PA—to—Exciter RF Cable Station Interconnect Board (Backplane) PA Module Front Panel Anti-Vibration/EFI Screws (2)
Options/Kits Internally Added by Motorola Order Processing	X131AA CLD1270A CHN6100A	Exciter Module (VHF High-Band Range 1) Exciter Module (Board and Hardware) Anti-Vibration/EFI Screws (2)	Options/Kits Internally Added by Motorola Order Processing	X131AB CLD1280A CHN6100A	Exciter Module (VHF High-Band Range 2) Exciter Module (Board and Hardware) Anti-Vibration/EFI Screws (2)
	X333AA CLD1250A CLN7334A TRN7799A CHN6100A	Receiver Module (VHF High-Band Range 1) Receiver Module (Board, Preselector, Hardware) Receiver Module Front Panel VHF/UHF Tuning Kit Anti-Vibration/EFI Screws (2)		X333AB CLD1260A CLN7334A TRN7799A CHN6100A	Receiver Module (VHF High-Band Range 2) Receiver Module (Board, Preselector, Hardware) Receiver Module Front Panel VHF/UHF Tuning Kit Anti-Vibration/EFI Screws (2)
	X43AA CPN1047A CLN7261A CPN6086A CHN6100A	Power Supply Assembly 625W Power Supply (AC input; w/o battery chrg) Ferrite RFI Suppressor Front Panel, Dummy Charger Connector Anti-Vibration/EFI Screws (2)		X43AA CPN1047A CLN7261A CPN6086A CHN6100A	Power Supply Assembly 625W Power Supply (AC input; w/o battery chrg) Ferrite RFI Suppressor Front Panel, Dummy Charger Connector Anti-Vibration/EFI Screws (2)
	X621AY CLN1614A TRN7476A TKN8751A	Station Control Module (SCM); Standard EPIC III Station Control Module SCM Internal Speaker Internal Speaker Cable		X621AY CLN1614A TRN7476A TKN8751A	Station Control Module (SCM); Standard EPIC III Station Control Module SCM Internal Speaker Internal Speaker Cable
	X222AB CGN6157A CHN6100A	Front Panel (Station Control Module) Station Control Module Front Panel Anti-Vibration/EFI Screws (2)		X222AB CGN6157A CHN6100A	Front Panel (Station Control Module) Station Control Module Front Panel Anti-Vibration/EFI Screws (2)
	X216AA CLN6955A TKN8731A CLN6816A	Wireline Interface Module (WIM) (4—wire) Wireline Interface Board WIM Cable RFI Suppressor		X216AA CLN6955A TKN8731A CLN6816A	Wireline Interface Module (WIM) (4—wire) Wireline Interface Board WIM Cable RFI Suppressor
	C831AA TRN7479A	Card Cage Card Cage Assembly (12")		C831AA TRN7479A	Card Cage Card Cage Assembly (12")
	X142AA TRN7494A	Duplex Interface Assembly Duplex Interface (includes ant. connector bracket)		X142AA TRN7494A	Duplex Interface Assembly Duplex Interface (includes ant. connector bracket)
	X249AW TKN8753A TKN9126A	RF Cabling Receiver mini—UHF to N—type coax cable Transmitter N—type to N—type coax cable		X249AW TKN8753A TKN9126A	RF Cabling Receiver mini—UHF to N—type coax cable Transmitter N—type to N—type coax cable
	X187AA TRN7663A	Domestic Power Cable AC Line Cord		X187AA TRN7663A	Domestic Power Cable AC Line Cord
	X163AD TRN7696A CHN6100A	Blank Panels Dual Slot Wide Blank Panel Anti-Vibration/EFI Screws (2)		X163AD TRN7696A CHN6100A	Blank Panels Dual Slot Wide Blank Panel Anti-Vibration/EFI Screws (2)
	X842AB CLN6885A	Ethernet Termination Kit Ethernet Termination Hardware		X842AB CLN6885A	Ethernet Termination Kit Ethernet Termination Hardware
	X430AA THN6700A TTN5040A	12" Cabinet 12" x 20" Cabinet Grommet		X430AA THN6700A TTN5040A	12" Cabinet 12" x 20" Cabinet Grommet
	X362AA TBN6625A	Packing Packing for 12" Cabinet		X362AA TBN6625A	Packing Packing for 12" Cabinet
	X436AA 68P81095E05	Instruction Manual Quantar Station Functional Manual		X436AA 68P81095E05	Instruction Manual Quantar Station Functional Manual

(Continued)

UHF

OPTION X640AK SELECTED IN STEP 3 (Quantar UHF; Range 0, 110W Transmitter)

Source	Option/ Kit	Description
Option from Initial Sales Order	X640AK CTX1146A TKN8699A TRN7480A TRN7708A CHN6100A	Quantar UHF R0; 110W Transmitter 110 W Power Amplifier Module (UHF R0) PA-to-Exciter RF Cable Station Interconnect Board (Backplane) PA Module Front Panel Anti-Vibration/EFI Screws (2)
Options/Kits Internally Added by Motorola Order Processing	X132AV CLX1000A CHN6100A	Exciter Module (UHF, R0) Exciter Module (Board and Hardware) Anti-Vibration/EFI Screws (2)
	X334BB CRX1027A CLN7884A TRN7799A CHN6100A	Receiver Module (UHF, R0) Receiver Module (Board, Preselector, Hardware) Receiver Module Front Panel w/Tuning Screw Cover VHF/UHF Tuning Kit Anti-Vibration/EFI Screws (2)
	X43AA CPN1047E CLN7261A CPN6086A CHN6100A	Power Supply Assembly 625W Power Supply (AC input; w/o battery chrg) Ferrite RFI Suppressor Front Panel, Dummy Charger Connector Anti-Vibration/EFI Screws (2)
	X621AB CLN6961D TRN7476A TKN8751A	Station Control Module (SCM); Standard EPIC II Station Control Module SCM Internal Speaker Internal Speaker Cable
	X222AB TGN6157A CHN6100A	Front Panel (Station Control Module) Station Control Module Front Panel Anti-Vibration/EFI Screws (2)
	X216AA CLN6955B TKN8731A CLN6816A	Wireline Interface Module (WIM) (4-wire) Wireline Interface Board WIM Cable RFI Suppressor
	C831AA TRN7479A	Card Cage Card Cage Assembly (12")
	X142AA TRN7494A	Duplex Interface Assembly Duplex Interface (includes ant. connector bracket)
	X249AW TKN8753A TKN9126A	RF Cabling Receiver mini-UHF to N-type coax cable Transmitter N-type to N-type coax cable
	X187AA TRN7663A	Domestic Power Cable AC Line Cord
	X163AD TRN7696A CHN6100A	Blank Panels Dual Slot Wide Blank Panel Anti-Vibration/EFI Screws (2)
	X842AB CLN6885A	Ethernet Termination Kit Ethernet Termination Hardware
	X430AA THN6700A TTN5040B	12" Cabinet 12" x 20" Cabinet Grommet
	X362AA TBN6625A	Packing Packing for 12" Cabinet
	X436AJ 68P81095E05	Instruction Manual Quantar Station Functional Manual

(Continued)

UHF

OPTION X240AA SELECTED IN STEP 3 (Quantar UHF; Range 1, 25W Transmitter)

Source	Option/ Kit	Description
Option from Initial Sales Order	X240AA TLE2731A TKN8699A TRN7480A TRN7708A CHN6100A	Quantar UHF R1; 25W Transmitter 25 W Power Amplifier Module (UHF R1) PA—to—Exciter RF Cable Station Interconnect Board (Backplane) PA Module Front Panel Anti-Vibration/EFI Screws (2)
Options/Kits Internally Added by Motorola Order Processing	X132AA CLE1230A CHN6100A	Exciter Module (UHF, R1) Exciter Module (Board and Hardware) Anti-Vibration/EFI Screws (2)
	X334AA CLE1190A CLN7334A TRN7799A CHN6100A	Receiver Module (UHF, R1) Receiver Module (Board, Preselector, Hardware) Receiver Module Front Panel VHF/UHF Tuning Kit Anti-Vibration/EFI Screws (2)
	X43AB CPN1049B CLN7261A CPN6086A CHN6100A	Power Supply Assembly 265W Power Supply (AC input; w/o battery chrg) Ferrite RFI Suppressor Front Panel, Dummy Charger Connector Anti-Vibration/EFI Screws (2)
	X621AY CLN1614A TRN7476A TKN8751A	Station Control Module (SCM); Standard EPIC III Station Control Module SCM Internal Speaker Internal Speaker Cable
	X222AB CGN6157A CHN6100A	Front Panel (Station Control Module) Station Control Module Front Panel Anti-Vibration/EFI Screws (2)
	X216AA CLN6955A TKN8731A CLN6816A	Wireline Interface Module (WIM) (4—wire) Wireline Interface Board WIM Cable RFI Suppressor
	C831AA TRN7479A	Card Cage Card Cage Assembly (12")
	X142AA TRN7494A	Duplex Interface Assembly Duplex Interface (includes ant. connector bracket)
	X249AW TKN8753A TKN9126A	RF Cabling Receiver mini—UHF to N—type coax cable Transmitter N—type to N—type coax cable
	X187AA TRN7663A	Domestic Power Cable AC Line Cord
	X163AD TRN7696A CHN6100A	Blank Panels Dual Slot Wide Blank Panel Anti-Vibration/EFI Screws (2)
	X842AB CLN6885A	Ethernet Termination Kit Ethernet Termination Hardware
	X430AA THN6700A TTN5040A	12" Cabinet 12" x 20" Cabinet Grommet
	X362AA TBN6625A	Packing Packing for 12" Cabinet
	X436AJ 68P81095E05	Instruction Manual Quantar Station Functional Manual

OPTION X640AA SELECTED IN STEP 3 (Quantar UHF; Range 1, 110W Transmitter)

Source	Option/ Kit	Description
Option from Initial Sales Order	X640AA TTE2061A TKN8699A TRN7480A TRN7708A CHN6100A	Quantar UHF R1; 110W Transmitter 110 W Power Amplifier Module (UHF R1) PA—to—Exciter RF Cable Station Interconnect Board (Backplane) PA Module Front Panel Anti-Vibration/EFI Screws (2)
Options/Kits Internally Added by Motorola Order Processing	X132AA CLE1230A CHN6100A	Exciter Module (UHF, R1) Exciter Module (Board and Hardware) Anti-Vibration/EFI Screws (2)
	X334AA CLE1190A CLN7334A TRN7799A CHN6100A	Receiver Module (UHF, R1) Receiver Module (Board, Preselector, Hardware) Receiver Module Front Panel VHF/UHF Tuning Kit Anti-Vibration/EFI Screws (2)
	X43AA CPN1047A CLN7261A CPN6086A CHN6100A	Power Supply Assembly 625W Power Supply (AC input; w/o battery chrg) Ferrite RFI Suppressor Front Panel, Dummy Charger Connector Anti-Vibration/EFI Screws (2)
	X621AY CLN1614A TRN7476A TKN8751A	Station Control Module (SCM); Standard EPIC III Station Control Module SCM Internal Speaker Internal Speaker Cable
	X222AB CGN6157A CHN6100A	Front Panel (Station Control Module) Station Control Module Front Panel Anti-Vibration/EFI Screws (2)
	X216AA CLN6955A TKN8731A CLN6816A	Wireline Interface Module (WIM) (4—wire) Wireline Interface Board WIM Cable RFI Suppressor
	C831AA TRN7479A	Card Cage Card Cage Assembly (12")
	X142AA TRN7494A	Duplex Interface Assembly Duplex Interface (includes ant. connector bracket)
	X249AW TKN8753A TKN9126A	RF Cabling Receiver mini—UHF to N—type coax cable Transmitter N—type to N—type coax cable
	X187AA TRN7663A	Domestic Power Cable AC Line Cord
	X163AD TRN7696A CHN6100A	Blank Panels Dual Slot Wide Blank Panel Anti-Vibration/EFI Screws (2)
	X842AB CLN6885A	Ethernet Termination Kit Ethernet Termination Hardware
	X430AA THN6700A TTN5040A	12" Cabinet 12" x 20" Cabinet Grommet
	X362AA TBN6625A	Packing Packing for 12" Cabinet
	X436AJ 68P81095E05	Instruction Manual Quantar Station Functional Manual

(Continued)

UHF

OPTION X240AB SELECTED IN STEP 3 (Quantar UHF; Range 2, 25W Transmitter)

OPTION X640AB SELECTED IN STEP 3 (Quantar UHF; Range 2, 110W Transmitter)

Source	Option/ Kit	Description
Option from Initial Sales Order	X240AB TLE2732A TKN8699A TRN7480A TRN7708A CHN6100A	Quantar UHF R2; 25W Transmitter 25 W Power Amplifier Module (UHF R2) PA-to-Exciter RF Cable Station Interconnect Board (Backplane) PA Module Front Panel Anti-Vibration/EFI Screws (2)
	X132AB CLE1240A CHN6100A	Exciter Module (UHF, R2) Exciter Module (Board and Hardware) Anti-Vibration/EFI Screws (2)
Options/Kits Internally Added by Motorola Order Processing	X334AB CLE1200A CLN7334A TRN7799A CHN6100A	Receiver Module (UHF, R2) Receiver Module (Board, Preselector, Hardware) Receiver Module Front Panel VHF/UHF Tuning Kit Anti-Vibration/EFI Screws (2)
	X43AB CPN1049B CLN7261A CPN6086A CHN6100A	Power Supply Assembly 265W Power Supply (AC input; w/o battery chrg) Ferrite RFI Suppressor Front Panel, Dummy Charger Connector Anti-Vibration/EFI Screws (2)
	X621AY CLN1614A TRN7476A TKN8751A	Station Control Module (SCM); Standard EPIC III Station Control Module SCM Internal Speaker Internal Speaker Cable
	X222AB CGN6157A CHN6100A	Front Panel (Station Control Module) Station Control Module Front Panel Anti-Vibration/EFI Screws (2)
	X216AA CLN6955A TKN8731A CLN6816A	Wireline Interface Module (WIM) (4-wire) Wireline Interface Board WIM Cable RFI Suppressor
	C831AA TRN7479A	Card Cage Card Cage Assembly (12")
	X142AA TRN7494A	Duplex Interface Assembly Duplex Interface (includes ant. connector bracket)
	X249AW TKN8753A TKN9126A	RF Cabling Receiver mini-UHF to N-type coax cable Transmitter N-type to N-type coax cable
	X187AA TRN7663A	Domestic Power Cable AC Line Cord
	X163AD TRN7696A CHN6100A	Blank Panels Dual Slot Wide Blank Panel Anti-Vibration/EFI Screws (2)
	X842AB CLN6885A	Ethernet Termination Kit Ethernet Termination Hardware
	X430AA THN6700A TTN5040A	12" Cabinet 12" x 20" Cabinet Grommet
	X362AA TBN6625A	Packing Packing for 12" Cabinet
	X436AJ 68P81095E05	Instruction Manual Quantar Station Functional Manual

Source	Option/ Kit	Description
Option from Initial Sales Order	X640AB TTE2062A TKN8699A TRN7480A TRN7708A CHN6100A	Quantar UHF R2; 110W Transmitter 110 W Power Amplifier Module (UHF R2) PA-to-Exciter RF Cable Station Interconnect Board (Backplane) PA Module Front Panel Anti-Vibration/EFI Screws (2)
	X132AB CLE1240A CHN6100A	Exciter Module (UHF, R2) Exciter Module (Board and Hardware) Anti-Vibration/EFI Screws (2)
Options/Kits Internally Added by Motorola Order Processing	X334AB CLE1200A CLN7334A TRN7799A CHN6100A	Receiver Module (UHF, R2) Receiver Module (Board, Preselector, Hardware) Receiver Module Front Panel VHF/UHF Tuning Kit Anti-Vibration/EFI Screws (2)
	X43AA CPN1047A CLN7261A CPN6086A CHN6100A	Power Supply Assembly 625W Power Supply (AC input; w/o battery chrg) Ferrite RFI Suppressor Front Panel, Dummy Charger Connector Anti-Vibration/EFI Screws (2)
	X621AY CLN1614A TRN7476A TKN8751A	Station Control Module (SCM); Standard EPIC III Station Control Module SCM Internal Speaker Internal Speaker Cable
	X222AB CGN6157A CHN6100A	Front Panel (Station Control Module) Station Control Module Front Panel Anti-Vibration/EFI Screws (2)
	X216AA CLN6955A TKN8731A CLN6816A	Wireline Interface Module (WIM) (4-wire) Wireline Interface Board WIM Cable RFI Suppressor
	C831AA TRN7479A	Card Cage Card Cage Assembly (12")
	X142AA TRN7494A	Duplex Interface Assembly Duplex Interface (includes ant. connector bracket)
	X249AW TKN8753A TKN9126A	RF Cabling Receiver mini-UHF to N-type coax cable Transmitter N-type to N-type coax cable
	X187AA TRN7663A	Domestic Power Cable AC Line Cord
	X163AD TRN7696A CHN6100A	Blank Panels Dual Slot Wide Blank Panel Anti-Vibration/EFI Screws (2)
	X842AB CLN6885A	Ethernet Termination Kit Ethernet Termination Hardware
	X430AA THN6700A TTN5040A	12" Cabinet 12" x 20" Cabinet Grommet
	X362AA TBN6625A	Packing Packing for 12" Cabinet
	X436AJ 68P81095E05	Instruction Manual Quantar Station Functional Manual

(Continued)

UHF

OPTION X640AC SELECTED IN STEP 3 (Quantar UHF; Range 3, 110W Transmitter)

Source	Option/ Kit	Description
Option from Initial Sales Order	X640AC TTE2063A TKN8699A TRN7480A TRN7708A CHN6100A	Quantar UHF R3; 110W Transmitter 110 W Power Amplifier Module (UHF R3) PA—to—Exciter RF Cable Station Interconnect Board (Backplane) PA Module Front Panel Anti-Vibration/EFI Screws (2)
Options/Kits Internally Added by Motorola Order Processing	X132AC CLE1250A CHN6100A	Exciter Module (UHF, R3) Exciter Module (Board and Hardware) Anti-Vibration/EFI Screws (2)
	X334AC CLE1210A CLN7334A TRN7799A CHN6100A	Receiver Module (UHF, R3) Receiver Module (Board, Preselector, Hardware) Receiver Module Front Panel VHF/UHF Tuning Kit Anti-Vibration/EFI Screws (2)
	X43AA CPN1047A CLN7261A CPN6086A CHN6100A	Power Supply Assembly 625W Power Supply (AC input; w/o battery chrg) Ferrite RFI Suppressor Front Panel, Dummy Charger Connector Anti-Vibration/EFI Screws (2)
	X621AY CLN1614A TRN7476A TKN8751A	Station Control Module (SCM); Standard EPIC III Station Control Module SCM Internal Speaker Internal Speaker Cable
	X222AB CGN6157A CHN6100A	Front Panel (Station Control Module) Station Control Module Front Panel Anti-Vibration/EFI Screws (2)
	X216AA CLN6955A TKN8731A CLN6816A	Wireline Interface Module (WIM) (4—wire) Wireline Interface Board WIM Cable RFI Suppressor
	C831AA TRN7479A	Card Cage Card Cage Assembly (12")
	X142AA TRN7494A	Duplex Interface Assembly Duplex Interface (includes ant. connector bracket)
	X249AW TKN8753A TKN9126A	RF Cabling Receiver mini—UHF to N—type coax cable Transmitter N—type to N—type coax cable
	X187AA TRN7663A	Domestic Power Cable AC Line Cord
	X163AD TRN7696A CHN6100A	Blank Panels Dual Slot Wide Blank Panel Anti-Vibration/EFI Screws (2)
	X842AB CLN6885A	Ethernet Termination Kit Ethernet Termination Hardware
	X430AA THN6700A TTN5040A	12" Cabinet 12" x 20" Cabinet Grommet
	X362AA TBN6625A	Packing Packing for 12" Cabinet
	X436AJ 68P81095E05	Instruction Manual Quantar Station Functional Manual

OPTION X640AD SELECTED IN STEP 3 (Quantar UHF; Range 4, 100W Transmitter)

Source	Option/ Kit	Description
Option from Initial Sales Order	X640AD TTE2064A TKN8699A TRN7480A TRN7708A CHN6100A	Quantar UHF R4; 100W Transmitter 100 W Power Amplifier Module (UHF R4) PA—to—Exciter RF Cable Station Interconnect Board (Backplane) PA Module Front Panel Anti-Vibration/EFI Screws (2)
Options/Kits Internally Added by Motorola Order Processing	X132AD CLE1260A CHN6100A	Exciter Module (UHF, R4) Exciter Module (Board and Hardware) Anti-Vibration/EFI Screws (2)
	X334AD CLE1220A CLN7334A TRN7799A CHN6100A	Receiver Module (UHF, R4) Receiver Module (Board, Preselector, Hardware) Receiver Module Front Panel VHF/UHF Tuning Kit Anti-Vibration/EFI Screws (2)
	X43AA CPN1047A CLN7261A CPN6086A CHN6100A	Power Supply Assembly 625W Power Supply (AC input; w/o battery chrg) Ferrite RFI Suppressor Front Panel, Dummy Charger Connector Anti-Vibration/EFI Screws (2)
	X621AY CLN1614A TRN7476A TKN8751A	Station Control Module (SCM); Standard EPIC III Station Control Module SCM Internal Speaker Internal Speaker Cable
	X222AB CGN6157A CHN6100A	Front Panel (Station Control Module) Station Control Module Front Panel Anti-Vibration/EFI Screws (2)
	X216AA CLN6955A TKN8731A CLN6816A	Wireline Interface Module (WIM) (4—wire) Wireline Interface Board WIM Cable RFI Suppressor
	C831AA TRN7479A	Card Cage Card Cage Assembly (12")
	X142AA TRN7494A	Duplex Interface Assembly Duplex Interface (includes ant. connector bracket)
	X249AW TKN8753A TKN9126A	RF Cabling Receiver mini—UHF to N—type coax cable Transmitter N—type to N—type coax cable
	X187AA TRN7663A	Domestic Power Cable AC Line Cord
	X163AD TRN7696A CHN6100A	Blank Panels Dual Slot Wide Blank Panel Anti-Vibration/EFI Screws (2)
	X842AB CLN6885A	Ethernet Termination Kit Ethernet Termination Hardware
	X430AA THN6700A TTN5040A	12" Cabinet 12" x 20" Cabinet Grommet
	X362AA TBN6625A	Packing Packing for 12" Cabinet
	X436AJ 68P81095E05	Instruction Manual Quantar Station Functional Manual

(Continued)

800 MHz

OPTION X250AA SELECTED IN STEP 3 (800 MHz *Quantar*; 20W Transmitter)

OPTION X750AA SELECTED IN STEP 3 (800 MHz *Quantar*; 100W Transmitter)

Source	Option/ Kit	Description	Source	Option/ Kit	Description
Option from Initial Sales Order	X250AA TLF1940A TKN8699A TRN7480A TRN7708A CHN6100A	Quantar 800 MHz; 20W Transmitter 20 W Power Amplifier Module (800 MHz) PA—to—Exciter RF Cable Station Interconnect Board (Backplane) PA Module Front Panel Anti-Vibration/EFI Screws (2)	Option from Initial Sales Order	X750AA TLF1930C TKN8699A TRN7480A TRN7708A CHN6100A	Quantar 800 MHz; 100W Transmitter 100 W Power Amplifier Module (800 MHz) PA—to—Exciter RF Cable Station Interconnect Board (Backplane) PA Module Front Panel Anti-Vibration/EFI Screws (2)
Options/Kits Internally Added by Motorola Order Processing	X133AA CLF1510A CHN6100A	Exciter Module (800 MHz) Exciter Module (Board and Hardware) Anti-Vibration/EFI Screws (2)	Options/Kits Internally Added by Motorola Order Processing	X133AA CLF1510A CHN6100A	Exciter Module (800 MHz) Exciter Module (Board and Hardware) Anti-Vibration/EFI Screws (2)
	X335AA CLF1530A CHN6100A	Receiver Module (800 MHz) Receiver Module (Board, Front Panel, Hardware) Anti-Vibration/EFI Screws (2)		X335AA CLF1530A CHN6100A	Receiver Module (800 MHz) Receiver Module (Board, Front Panel, Hardware) Anti-Vibration/EFI Screws (2)
	X43AB CPN1049B CLN7261A CPN6086A CHN6100A	Power Supply Assembly 265W Power Supply (AC input; w/o battery chrg) Ferrite RFI Suppressor Front Panel, Dummy Charger Connector Anti-Vibration/EFI Screws (2)		X43AA CPN1047A CLN7261A CPN6086A CHN6100A	Power Supply Assembly 625W Power Supply (AC input; w/o battery chrg) Ferrite RFI Suppressor Front Panel, Dummy Charger Connector Anti-Vibration/EFI Screws (2)
	X621AY CLN1614A TRN7476A TKN8751A	Station Control Module (SCM); Standard EPIC III Station Control Module SCM Internal Speaker Internal Speaker Cable		X621AY CLN1614A TRN7476A TKN8751A	Station Control Module (SCM); Standard EPIC III Station Control Module SCM Internal Speaker Internal Speaker Cable
	X222AB CGN6157A CHN6100A	Front Panel (Station Control Module) Station Control Module Front Panel Anti-Vibration/EFI Screws (2)		X222AB CGN6157A CHN6100A	Front Panel (Station Control Module) Station Control Module Front Panel Anti-Vibration/EFI Screws (2)
	X216AA CLN6955A TKN8731A CLN6816A	Wireline Interface Module (WIM) (4—wire) Wireline Interface Board WIM Cable RFI Suppressor		X216AA CLN6955A TKN8731A CLN6816A	Wireline Interface Module (WIM) (4—wire) Wireline Interface Board WIM Cable RFI Suppressor
	C831AA TRN7479A	Card Cage Card Cage Assembly (12")		C831AA TRN7479A	Card Cage Card Cage Assembly (12")
	X142AA TRN7494A	Duplex Interface Assembly Duplex Interface (includes ant. connector bracket)		X142AA TRN7494A	Duplex Interface Assembly Duplex Interface (includes ant. connector bracket)
	X249AW TKN8753A TKN9126A	RF Cabling Receiver mini—UHF to N—type coax cable Transmitter N—type to N—type coax cable		X249AW TKN8753A TKN9126A	RF Cabling Receiver mini—UHF to N—type coax cable Transmitter N—type to N—type coax cable
	X187AA TRN7663A	Domestic Power Cable AC Line Cord		X187AA TRN7663A	Domestic Power Cable AC Line Cord
	X163AL TRN7695A TRN7696A CHN6100A	Blank Panels Single Slot Wide Blank Panel Dual Slot Wide Blank Panel Anti-Vibration/EFI Screws (2)		X163AL TRN7695A TRN7696A CHN6100A	Blank Panels Single Slot Wide Blank Panel Dual Slot Wide Blank Panel Anti-Vibration/EFI Screws (2)
	X842AB CLN6885A	Ethernet Termination Kit Ethernet Termination Hardware		X842AB CLN6885A	Ethernet Termination Kit Ethernet Termination Hardware
	X430AA THN6700A TTN5040A	12" Cabinet 12" x 20" Cabinet Grommet		X430AA THN6700A TTN5040A	12" Cabinet 12" x 20" Cabinet Grommet
	X362AA TBN6625A	Packing Packing for 12" Cabinet		X362AA TBN6625A	Packing Packing for 12" Cabinet
	X436AH 68P81095E05	Instruction Manual <i>Quantar</i> Station Functional Manual		X436AH 68P81095E05	Instruction Manual <i>Quantar</i> Station Functional Manual

(Continued)

900 MHz

OPTION X660AA SELECTED IN STEP 3 (900 MHz; 100W Transmitter)

Source	Option/ Kit	Description
Option from Initial Sales Order	X660AA TLF1800B TKN8699A TRN7480A TRN7708A CHN6100A	Quantar 900 MHz; 100W Transmitter 100 W Power Amplifier Module (900 MHz) PA-to-Exciter RF Cable Station Interconnect Board (Backplane) PA Module Front Panel Anti-Vibration/EFI Screws (2)
Options/Kits Internally Added by Motorola Order Processing	X134AA CLF1520A CHN6100A	Exciter Module (900 MHz) Exciter Module (Board and Hardware) Anti-Vibration/EFI Screws (2)
	X336AA CLF1540A CHN6100A	Receiver Module (900 MHz) Receiver Module (Board, Front Panel, Hardware) Anti-Vibration/EFI Screws (2)
	X43AA CPN1047A CLN7261A CPN6086A CHN6100A	Power Supply Assembly 625W Power Supply (AC input; w/o battery chrg) Ferrite RFI Suppressor Front Panel, Dummy Charger Connector Anti-Vibration/EFI Screws (2)
	X621AY CLN1614A TRN7476A TKN8751A	Station Control Module (SCM); Standard EPIC III Station Control Module SCM Internal Speaker Internal Speaker Cable
	X222AB CGN6157A CHN6100A	Front Panel (Station Control Module) Station Control Module Front Panel Anti-Vibration/EFI Screws (2)
	X216AA CLN6955A TKN8731A CLN6816A	Wireline Interface Module (WIM) (4-wire) Wireline Interface Board WIM Cable RFI Suppressor
	C831AA TRN7479A	Card Cage Card Cage Assembly (12")
	X142AA TRN7494A	Duplex Interface Assembly Duplex Interface (includes ant. connector bracket)
	X249AW TKN8753A TKN9126A	RF Cabling Receiver mini-UHF to N-type coax cable Transmitter N-type to N-type coax cable
	X187AA TRN7663A	Domestic Power Cable AC Line Cord
	X163AL TRN7695A TRN7696A CHN6100A	Blank Panels Single Slot Wide Blank Panel Dual Slot Wide Blank Panel Anti-Vibration/EFI Screws (2)
	X842AB CLN6885A	Ethernet Termination Kit Ethernet Termination Hardware
	X430AA THN6700A TTN5040A	12" Cabinet 12" x 20" Cabinet Grommet
	X362AA TBN6625A	Packing Packing for 12" Cabinet
	X436AD 68P81095E05	Instruction Manual Quantar Station Functional Manual

(Continued)

The following lists available options that may be selected in addition to the standard model and options (described in Steps 1 thru 4).

AVAILABLE HARDWARE OPTIONS FOR QUANTAR STATION

Option Category	Option and Complement	
Power Supply	AC Input Supplies X30AA 625W Power Supply with Battery Charger CPN1048C 625W Power Supply Assembly w/ Battery Charger TKN8732A Battery Charger Cable Kit TKN8786A Battery Temperature Sensor TRN5155A 10' Extension Cable w/connectors and fuse block CHN6100A Anti-Vibration/EFI Screws (2) CLN7261A AC Line Cord Ferrite RFI Suppressor CLN7419A Power Supply Front Panel w/Screws X30AB 265W Power Supply with Battery Charger CPN1050E 265W Power Supply Assembly w/ Battery Charger TKN8732A Battery Charger Cable Kit TKN8786A Battery Temperature Sensor TRN5155A 10' Extension Cable w/connectors and fuse block CHN6100A Anti-Vibration/EFI Screws (2) CLN7261A AC Line Cord Ferrite RFI Suppressor CPN6086A Power Supply Front Panel w/Screws	DC Input Supplies X121AA 210W Power Supply (12/24V DC Input) TRN7802A 210W Power Supply Assembly (12/24 V DC Input) TKN8732A Battery Charger Cable Kit TRN5155A 10' Extension Cable w/connectors and fuse block CHN6100A Anti-Vibration/EFI Screws (2) X112AA 600W Power Supply (24V DC Input) TRN7801A 600W Power Supply Assembly (24 V DC Input) TKN8732A Battery Charger Cable Kit TRN5155A 10' Extension Cable w/connectors and fuse block CHN6100A Anti-Vibration/EFI Screws (2) X113AA 210W Power Supply (48/60 V DC Input) TRN7803A 210W Power Supply Assembly (48/60 V DC Input) TKN8732A Battery Charger Cable Kit TRN5155A 10' Extension Cable w/connectors and fuse block CHN6100A Anti-Vibration/EFI Screws (2) X113AB 600W Power Supply (48/60 V DC Input) CPN1031B 600W Power Supply Assembly (48/60 V DC Input) TKN8732A Battery Charger Cable Kit TRN5155A 10' Extension Cable w/connectors and fuse block TTN4068A Power Supply Front Panel and Screws CHN6100A Anti-Vibration/EFI Screws (2)
Wireline Interface Module	X84AA Omit Standard Wireline Interface Module (WIM) X144AA Add 8-Wire Wireline Interface Module (WIM) CLN6956A 8-Wire Wireline Interface Board (WIB) TKN8731A WIM Cable Kit CLN6816A RFI Suppressor	
Antenna Relay	X371AA Add Antenna Relay TRN7664A Antenna Relay, Cables, and Mounting Hardware	
Duplexer	X182BV Add Duplexer Module (UHF R0) 0185417U10 Duplexer (UHF R0; 380–412 MHz) TTN5008A Duplexer Mtg Hdwr X182AC Add Duplexer Module (UHF R1) 0185417U04 Duplexer (UHF R1) TTN5008A Duplexer Mtg Hdwr X182AD Add Duplexer Module (UHF R2) 0185417U05 Duplexer (UHF R2) TTN5008A Duplexer Mtg Hdwr X182AE Add Duplexer Module (UHF R3) 0185417U06 Duplexer (UHF R3) TTN5008A Duplexer Mtg Hdwr X182AF Add Duplexer Module (UHF R4) 0185417U07 Duplexer (UHF R4) TTN5008A Duplexer Mtg Hdwr	X182AA Add Duplexer Module (132–146 MHz) 0185417U01 Duplexer (132–146 MHz) TTN5008A Duplexer Mtg Hdwr X182AB Add Duplexer Module (144–160MHz) 0185417U02 Duplexer (144–160 MHz) TTN5008A Duplexer Mtg Hdwr X182AJ Add Duplexer Module (158–174 MHz) 0185417U03 Duplexer (158–174 MHz) TTN5008A Duplexer Mtg Hdwr X182AG Add Duplexer Module (800 MHz) TDF6980A Duplexer (800 MHz) TTN5008A Duplexer Hardware (4 screws) X182AH Add Duplexer Module (900 MHz) TDF6542A Duplexer (900 MHz) TTN5008A Duplexer Hardware (4 screws)
Modem	X437AA Add ASTRO Modem TRN7668A ASTRO Modem Card	

Option Category	Option and Complement
Circulator	CA00187AA Add Triple Circulator (UHF, R0) TLE9120B Dual Circulator TLN3391A 50 Ohm Load with Heat Sink TLE9140A Low Pass Filter TRN7796A Fan, Peripheral Tray X676AB Add Triple Circulator (144–160 MHz) Same as X676AA except substitute TYD4002A Dual Circulator X676AN Add Triple Circulator (UHF, R1 and R2) TLE9120A Dual Circulator TLN3391A 50 Ohm Load with Heat Sink TLE9140A Low Pass Filter TRN7796A Fan, Peripheral Tray X676AC Add Triple Circulator (158–174 MHz) Same as X676AA except substitute TYD4003A Dual Circulator X676AP Add Triple Circulator (UHF, R3 and R4) TLE9130A Dual Circulator TLN3391A 50 Ohm Load with Heat Sink TLE9140A Low Pass Filter TRN7796A Fan, Peripheral Tray X676AQ Add Triple Circulator (800 MHz) TLF7320A Dual Circulator TLN3391A 50 Ohm Load with Heat Sink TLF7340A Low Pass Filter TRN7796A Fan, Peripheral Tray X676AA Add Triple Circulator (132–146 MHz) TYD4001A Dual Circulator TLN3391A 50 Ohm Load with Heat Sink TYD4010A Low Pass Filter TRN7796A Cooling Fan X676AR Add Triple Circulator (900 MHz) TLF7330A Dual Circulator TLN3391A 50 Ohm Load with Heat Sink TLF7340A Low Pass Filter TRN7796A Fan, Peripheral Tray
UHSO	X873AA Add Internal Ultra High Stability Oscillator CLN7012A BNC Terminator CHN6100A Anti-Vibration/EFI Screws (2) CLN1477A UHSO Module TTN5070C UHSO Board TTN5071A UHSO Housing and Front Panel TTN5072A UHSO 5 PPB Ovenized Element
Peripheral Tray	X696AA Add Peripheral Tray TRN7751A <i>Quantar</i> Peripheral Shelf
Miscellaneous	HSN1000 External Speaker TRN7738A External Speaker Hardware (bracket and cable) HMN1001A Microphone <i>Note that the external speaker and microphone are not options and must be ordered as line items on the STIC–1 order form.</i>

FOREWORD

Product Maintenance Philosophy

Due to the high percentage of surface-mount components and multi-layer circuit boards, the maintenance philosophy for this product is one of Field Replaceable Unit (FRU) substitution. The station is comprised of self-contained modules (FRUs) which, when determined to be faulty, may be quickly and easily replaced with a known good module to bring the equipment back to normal operation. The faulty module must then be shipped to the Motorola System Support Center for further troubleshooting and repair to the component level.

Scope of Manual

This manual is intended for use by experienced technicians familiar with similar types of equipment. In keeping with the maintenance philosophy of Field Replaceable Units (FRU), this manual contains functional information sufficient to give service personnel an operational understanding of all FRU modules, allowing faulty FRU modules to be identified and replaced with known good FRU replacements.

The information in this manual is current as of the printing date. Changes which occur after the printing date are incorporated by Instruction Manual Revisions (SMR). These SMRs are added to the manuals as the engineering changes are incorporated into the equipment.

Service and Replacement Modules

*Motorola System Support Center
2214 Galvin Drive
Elgin, IL 60123*

*1-800-221-7144
Int'l 1-847-576-7300
FAX 1-847-576-2172*

For complete information on ordering FRU replacement modules, or instructions on how to return faulty modules for repair, contact the System Support Center (see sidebar).

The following FRU replacement modules are available:

Receiver Module (VHF Range 1)	TLN3250A
Receiver Module (VHF Range 2)	TLN3251A
Receiver Module (UHF, Range 0)	DLN1215A
Receiver Module (UHF, Range 1)	TLN3313A
Receiver Module (UHF, Range 2)	TLN3314A
Receiver Module (UHF, Range 3)	TLN3373A
Receiver Module (UHF, Range 4)	TLN3374A
Receiver Module (800 MHz)	TLN3315A
Receiver Module (900 MHz)	TLN3316A
Exciter Module (VHF Range 1)	TLN3252A
Exciter Module (VHF Range 2)	TLN3253A
Exciter Module (UHF, Range 0)	DLN1214A
Exciter Module (UHF, Range 1)	TLN3305A
Exciter Module (UHF, Range 2)	TLN3306A
Exciter Module (UHF, Range 3)	TLN3375A
Exciter Module (UHF, Range 4)	TLN3376A
Exciter Module (800 MHz)	TLN3307A
Exciter Module (900 MHz)	TLN3308A
Power Amplifier Module (VHF 25W, R1 & R2)	TLN3255A
Power Amplifier Module (VHF 125W, R1)	TLN3379A
Power Amplifier Module (VHF 125W, R2)	TLN3254A
Power Amplifier Module (UHF R0; 110W)	DLN1216A
Power Amplifier Module (UHF R1; 25W)	TLN3443A
Power Amplifier Module (UHF R2; 110W)	TLN3446A
Power Amplifier Module (UHF R4; 100W)	TLN3450A
Power Amplifier Module (800 MHz 20W)	TLN3441A
Power Amplifier Module (800 MHz 100W)	TLN3442A
Power Amplifier Module (900 MHz 100W)	TLN3299A
Station Control Module (Conventional/6809)	CLN1293A
Station Control Module (Conventional/6809 <i>EPIC III</i>)	CLN1621A
Station Control Module (<i>IntelliRepeater</i>)	CLN1294A
4-Wire Wireline Interface Module	CLN1295A
8-Wire Wireline Interface Module	CLN1296A
Power Supply Module (625W AC)	TLN3259A
Power Supply Module (625W AC w/charger)	TLN3260A
Power Supply Module (265W AC)	TLN3261A
Power Supply Module (265W AC w/charger)	TLN3262A
Power Supply Module (210W 12/24 V DC)	TLN3264A
Power Supply Module (210W 48/60 V DC)	TLN3378A
Power Supply Module (600W 24 V DC)	TLN3263A
Power Supply Module (600W 48/60 V DC)	TLN3377A
ASTRO Modem Card	TLN3265A

GENERAL SAFETY INFORMATION

The following general safety precautions must be observed during all phases of operation, service, and repair of the equipment described in this manual. The safety precautions listed below represent warnings of certain dangers of which we are aware. You should follow these warnings and all other safety precautions necessary for the safe operation of the equipment in your operating environment.

General Safety Precautions

- ▶ Read and follow all warning notices and instructions marked on the product or included in this manual before installing, servicing or operating the equipment. Retain these safety instructions for future reference. Also, all applicable safety procedures, such as Occupational, Safety, and Health Administration (OSHA) requirements, National Electrical Code (NEC) requirements, local code requirements, safe working practices, and good judgement must be used by personnel.
- ▶ Refer to appropriate section of the product service manual for additional pertinent safety information.
- ▶ Because of danger of introducing additional hazards, do not install substitute parts or perform any unauthorized modifications of equipment.
- ▶ Identify maintenance actions that require two people to perform the repair. Two people are required when:
 - A repair has the risk of injury that would require one person to perform first aid or call for emergency support. An example would be work around high voltage sources. A second person may be required to remove power and call for emergency aid if an accident occurs to the first person.
Note 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 its rack.
- ▶ If troubleshooting the equipment while power is applied, be aware of the live circuits.
- ▶ DO NOT operate the transmitter of any radio unless all RF connectors are secure and all connectors are properly terminated.
- ▶ All equipment must be properly grounded in accordance with Motorola Standards and Guideline for Communications Sites “R56” 68P81089E50 and specified installation instructions for safe operation.
- ▶ Slots and openings in the cabinet are provided for ventilation. To ensure reliable operation of the product and to protect it from overheating, these slots and openings must not be blocked or covered.
- ▶ Only a qualified technician familiar with similar electronic equipment should service equipment.
- ▶ Some equipment components can become extremely hot during operation. Turn off all power to the equipment and wait until sufficiently cool before touching.

Human Exposure Compliance

This equipment is designed to generate and radiate radio frequency (RF) energy by means of an external antenna. When terminated into a non-radiating RF load, the base station equipment is certified to comply with Federal Communications Commission (FCC) regulations pertaining to human exposure to RF radiation in accordance with the FCC Rules Part 1 section 1.1310 as published in title 47 code of federal regulations and procedures established in TIA/EIA TSB92, Report On EME Evaluation for RF Cabinet Emissions Under FCC MPE Guidelines. Compliance to FCC regulations of the final installation should be assessed and take into account site specific characteristics

such as type and location of antennas, as well as site accessibility of occupational personnel (controlled environment) and the general public (uncontrolled environment). This equipment should only be installed and maintained by trained technicians. Licensees of the FCC using this equipment are responsible for insuring that its installation and operation comply with FCC regulations Part 1 section 1.1310 as published in title 47 code of federal regulations.

Whether a given installation meets FCC limits for human exposure to radio frequency radiation may depend not only on this equipment but also on whether the “environments” being assessed are being affected by radio frequency fields from other equipment, the effects of which may add to the level of exposure. Accordingly, the overall exposure may be affected by radio frequency generating facilities that exist at the time the licensee’s equipment is being installed or even by equipment installed later. Therefore, the effects of any such facilities must be considered in site selection and in determining whether a particular installation meets the FCC requirements.

FCC OET Bulletin 65 provides materials to assist in making determinations if a given facility is compliant with the human exposure to RF radiation limits. Determining the compliance of transmitter sites of various complexities may be accomplished by means of computational methods. For more complex sites direct measurement of the power density may be more expedient. Additional information on the topic of electromagnetic exposure is contained in the Motorola Standards and Guideline for Communications Sites publication. Persons responsible for installation of this equipment are urged to consult the listed reference material to assist in determining whether a given installation complies with the applicable limits.

In general the following guidelines should be observed when working in or around radio transmitter sites:

- ▶ All personnel should have electromagnetic energy awareness training
- ▶ All personnel entering the site must be authorized
- ▶ Obey all posted signs
- ▶ Assume all antennas are active
- ▶ Before working on antennas, notify owners and disable appropriate transmitters
- ▶ Maintain minimum 3 feet clearance from all antennas
- ▶ Do not stop in front of antennas
- ▶ Use personal RF monitors while working near antennas
- ▶ Never operate transmitters without shields during normal operation
- ▶ Do not operate base station antennas in equipment rooms

For installations outside of the U.S., consult with the applicable governing body and standards for RF energy human exposure requirements and take the necessary steps for compliance with local regulations.

References

TIA/EIA TSB92 “Report On EME Evaluation for RF Cabinet Emissions Under FCC MPE Guidelines,” Global Engineering Documents: <http://global.ihs.com/>

FCC OET Bulletin 65 “Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields”: <http://www.fcc.gov/oet/rfsafety/>.

Motorola Standards and Guideline for Communications Sites, Motorola manual 68P81089E50.

IEEE Recommended Practice for the Measure of Potentially Hazardous Electromagnetic Fields – RF and Microwave, IEEE Std C95.3–1991, Publication Sales, 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855–1331

IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz, IEEE C95.1 – 1991, Publication Sales, 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855–1331.

PERFORMANCE SPECIFICATIONS

General

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	900 935–941 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	900 896–902 MHz
Number of Channels	16			
Channel Spacing	VHF: 30, 25, 12.5 kHz UHF/800: 12.5, 25 kHz 900: 12.5 kHz			
Frequency Generation	Synthesized			
Power Supply Type	Switching			
Power Supply Input Voltage	90–280 V ac			
Power Supply Input Frequency	47–63 Hz			
Battery Revert	12V (25W radios) 24V (100W, 110W, and 125W radios)			
T/R Separation (without duplexer option)	VHF/UHF: Any spacing within same sub-band 800: 45 MHz 900: 39 MHz			
T/R Separation (with duplexer option)	VHF/UHF: ≥ 1.5 MHz 800: 45 MHz 900: 39 MHz			
Temperature Range (ambient)	–30° C to +60° C			

PERFORMANCE SPECIFICATIONS (Cont'd)

Receiver

I–F 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)	900 73.35 MHz (1st) 450 kHz (2nd)
Preselector Bandwidth	VHF/UHF: 4 MHz		800: 19 MHz	900: 6 MHz
Sensitivity (12 dB SINAD)	VHF: 0.25 μV	UHF: 0.35 μV	800/900: 0.30 μV	
Sensitivity (20 dB Quieting)	VHF: 0.35 μV	UHF: 0.5 μV	800/900: 0.42 μV	
Adjacent Channel Rejection	VHF 90 dB (25/30 kHz) 80 dB (23.5 kHz)	UHF 75 dB (12.5 kHz) 85 dB (25 kHz)	800 70 dB (12.5 kHz) 80 db (25 kHz)	900 70dB 70 dB (25 kHz)
Intermodulation Rejection	VHF 85 dB (25/30 kHz) 80 dB (30 kHz)	UHF 85 dB	800 85 dB	900 70 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 band-width)	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)	900 45 db 50 dB (25 kHz)
Frequency Stability	VHF/UHF/800: 1 ppm		900: 0.1 ppm	
RF Input Impedance	50 Ω			
FCC Designation (FCC Rule Part 15)	VHF: ABZ89FR3776 900: ABZ89FR5768		UHF: ABZ89FR4796	800: ABZ89FR5757

PERFORMANCE SPECIFICATIONS (Cont'd)

Transmitter

Power Output	VHF 6–25W 25–125W	UHF 5–25W 25–110W	800 5–20W 20–100W	900 25–100W
Electronic Bandwidth	Full sub–band			
Intermodulation Attenuation	VHF: 20 dB (single circulator; standard on all PAs) 65 dB (triple circulator – requires triple circulator option) UHF: 50 dB (single circulator; standard on all PAs) 800: 50 dB (single circulator; standard on all PAs) 900: 20 dB (single circulator; standard on all PAs) 70 dB (triple circulator – requires triple circulator option)			
SpuriousandHarmonicEmissionsAttenuation	90 dB			
Deviation	VHF, UHF, and 800 ±5 kHz (25 kHz) ±2.5 kHz (12.5 kHz)		900 ±2.5 kHz	
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			
FMHumandNoise (300to3000Hzbandwidth)	45 dB nominal (12.5 kHz) 50 dB nominal (25/30 kHz)			
Frequency Stability	VHF, UHF, 800: 1 ppm		900: 0.1ppm	
RF Output Impedance	50 Ω			
FCC Designation	VHF 25W: ABZ89FC3774 (FCC Rule Parts 22, 74, 80, 90) 125W: ABZ89FC3773 (FCC Rule Parts 22, 74, 80, 90)			
	UHF 25W/R1–2: ABZ89FC4797 (FCC Rule Parts 22, 74, 90) 110W/R0: ABZ89FC4798-D (FCC Rule Part 90) 110W/R1–3: ABZ89FC4798 (FCC Rule Parts 22, 90) 100W/R4: ABZ89FC4798 (FCC Rule Part 74)			
	800 20W: ABZ89FC5775 (FCC Rule Parts 22, 90) 100W: ABZ89FC5776 (FCC Rule Parts 22, 90)			
FCC Designation	900 100W: ABZ89FC5767 (FCC Rule Part 90)			

*Measurement Methods per TIA/EIA–603
Specifications subject to change without notice*