Civil Air Patrol



Motorola Quantar Troubleshooting

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Motorola Quantar Repeater Field Troubleshooting Guide



Quantar Repeater Field Troubleshooting

Step 1 Quantar Repeater



Special Note:
Prior to making the troubleshooting trip to your repeater site, it's a good idea to arrange for a resource knowledgeable about Quantar repeaters to be available by cell phone.

This person can offer valuable advice to help interpret your findings on site and recommend next courses of action, such as module or complete repeater removal for repair.

For information on suitable resources, please contact your wing Director of Communications or the CAP National Technology Center:

Communication System Engineering:
ntc@capnhq.gov
(O) 888.211.1812 ext. 341

Quantar Repeater Field Troubleshooting

Major Components



Front View

- A-C Power Distribution Panel
- Sinclair Isolator Panel
- Sinclair Pass/Notch Duplexer
- Quantar Repeater



Rear View

Quantar Repeater Field Troubleshooting

Part-1

Basic Troubleshooting



Quantar Repeater Field Troubleshooting

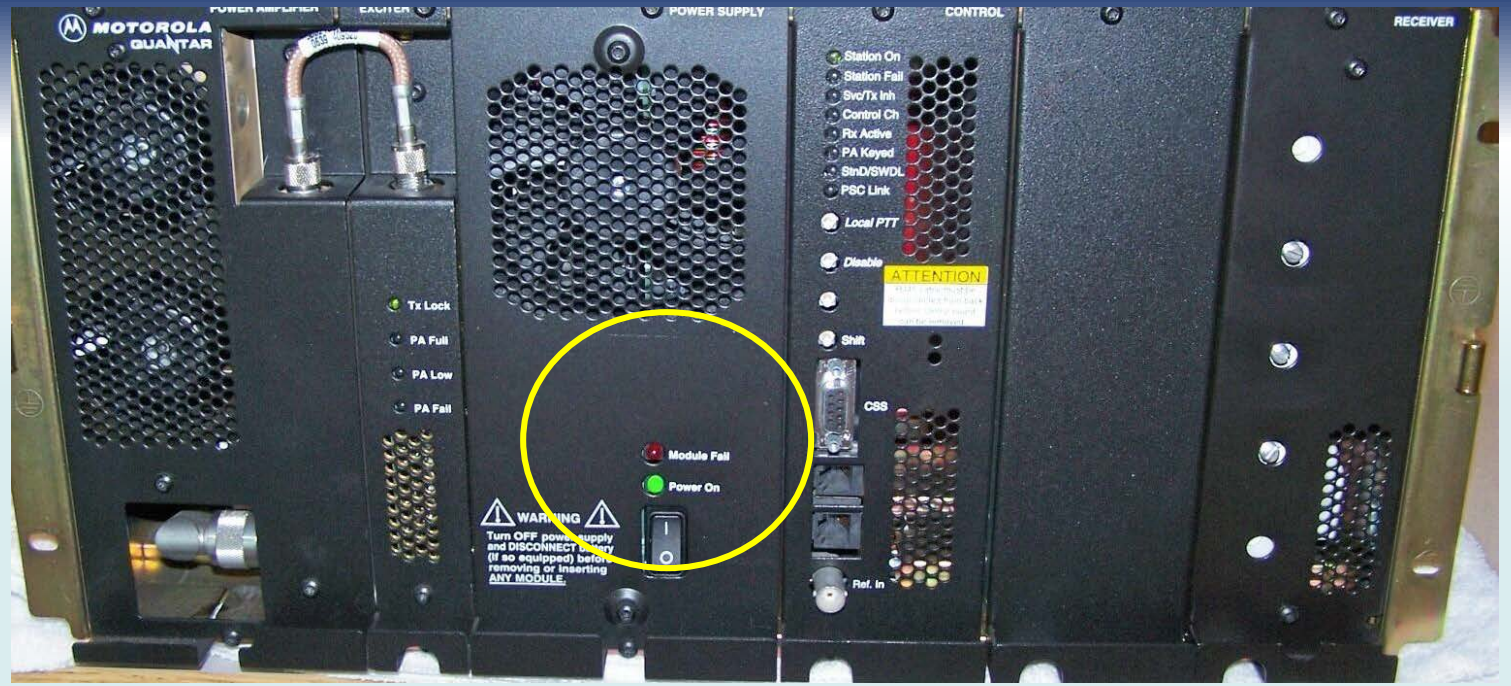
Quantar Repeater Module—Front View



Quantar Repeater Field Troubleshooting

Step 1 Quantar Repeater

a. Status Lights Check, Power Supply

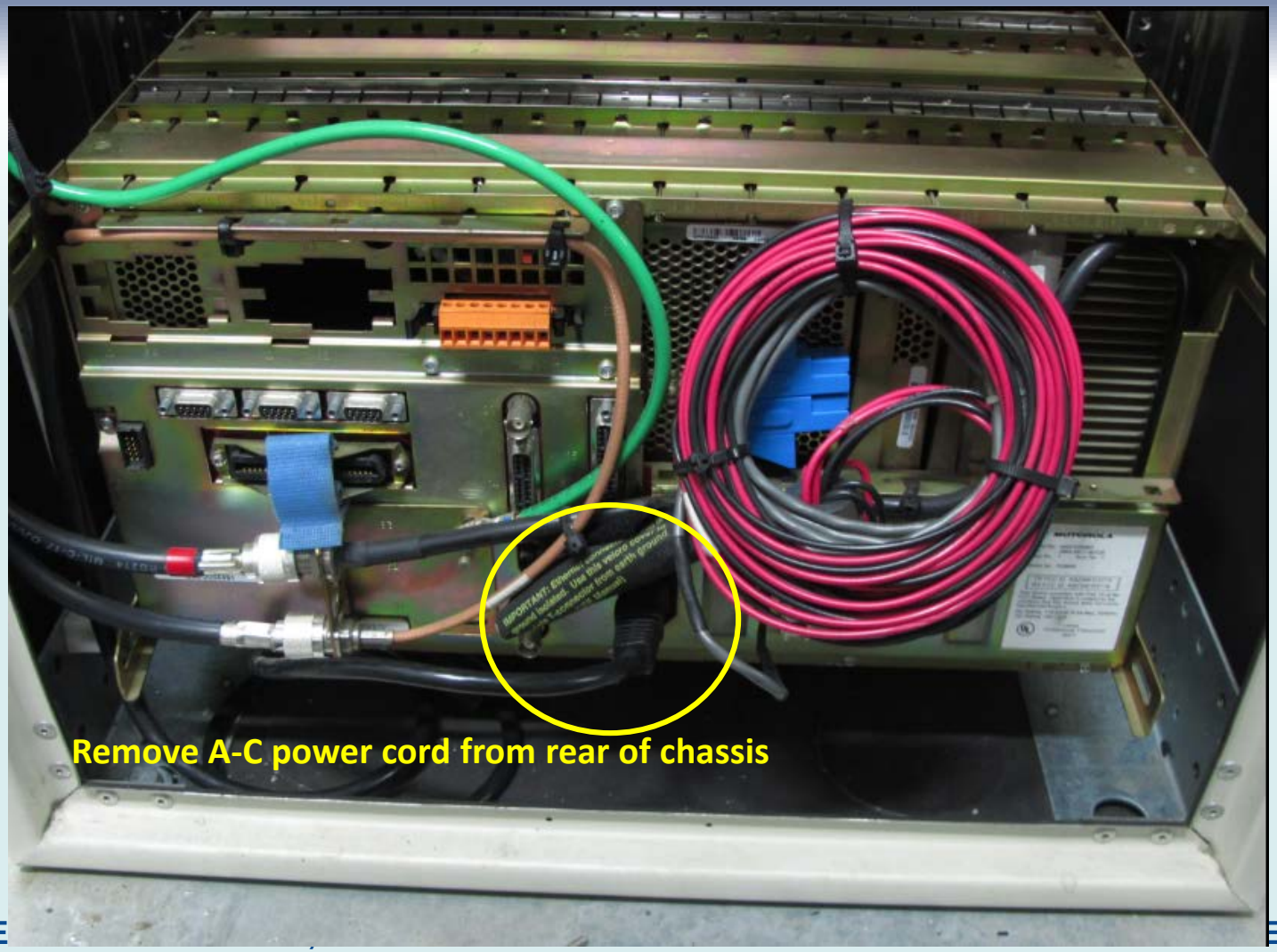


- Green “Power On” LED illuminated:
  - A-C power is present and power switch is turned ON
- Red “Module Fail” LED illuminated:
  - Module malfunction has occurred
  - Remove A-C power cord (see next slide)
  - Remove power supply module (Torx #15 fasteners) and return to NTC

Quantar Repeater Field Troubleshooting

Step 1 Quantar Repeater

a. Status Lights Check, Power Supply, continued



Quantar Repeater Field Troubleshooting

Step 1 Quantar Repeater

b. Status Lights Check, Control Module



Normal Indications:

- Station On—illuminated
- Station Fail—off
- Intcm/ACC D—off
- Control Ch—off
- RX 1 Active—off until appropriate signal is received
- RX Fail--off
- V.24 Modem—not used in this model

Quantar Repeater Field Troubleshooting

Step 1 Quantar Repeater

b. Status Lights Check, Control Module, continued

“Station On”

- Green (normal condition) when module is fully functional
- FLASHING when a front panel switch is pressed
- OFF for control module failure

“Station Fail”

- Red for control module failure
- OFF (normal condition) when control module is functional

“Intcm/ACC D”

- Yellow when station is in intercom mode
- FLASHING (once/second) in Access Disable Mode
- FLASHING (twice/second) in TX INHIBIT mode
- OFF (normal condition) when not in intercom mode

“Control Ch”

- (Trunking systems only—not used in this model)



Quantar Repeater Field Troubleshooting

Step 1 Quantar Repeater

b. Status Lights Check, Control Module, continued



"RX 1 Active"

- Green (normal condition) receiver is receiving a valid signal and PL tone
- OFF when proper signal is not being receiver

"RX Fail"

- Red or flashing when receiver is non-functional (only one receiver in this model)
- Off when receiver is functional but not receiving signal

Note: A receiver module is considered non-functional if a failure is detected during diagnostics at power-up or during normal operation.

"Aux LED"

Not used in this model

Quantar Repeater Field Troubleshooting

Step 1 Quantar Repeater

b. Status Lights Check, Control Module, continued



All LEDs flashing On and Off in Unison:

Station is in software download mode initiated by RSS programming software or due to a programming SW failure.

LEDs Flashing Up and Down in Sequential Pattern:

Station has received software files from RSS programming software to FLASH memory in the Station Control Module.

Quantar Repeater Field Troubleshooting

Step 1 Quantar Repeater

c. Status Lights Check, Exciter Module

“Tx Lock”

- Green (normal condition) when Exciter synthesizer is locked; module fully functional
- OFF when synthesizer is out of lock

-or-

either +5V or +14.5V are absent

“PA Full”

- Green when transmitter is keyed and PA output power is at expected level (as set by programming software)
- Off when PA is not keyed

-or-

PA **is not** at expected power level



Quantar Repeater Field Troubleshooting

Step 1 Quantar Repeater

c. Status Lights Check, Exciter Module, continued

"PA Low"

- ✸ Yellow when transmitter is keyed and PA output power is less than expected, but not shut down (for example during power cutback mode (temp or high SWR conditions)
- ✸ OFF when PA is not keyed

-or-

Transmitter is keyed and PA output power is normal



Quantar Repeater Field Troubleshooting

Step 1 Quantar Repeater

c. Status Lights Check, Exciter Module, continued



"PA Fail"

✸ Red transmitter is keyed and there is no PA output power
Note: this indicator is latched during current or previous key-up -or-
Overdrive alarm is generated by driver PA

Note: Any component associated with the PA could cause the LED to light: +5V/IPA Module, Driver PA Module, Final PA Module, and RF peripherals such as the circulator, low-pass filter, etc,

✸✸✸ Flashing when PA is in Test Mode (activated by RSS programming software, when in Test Mode, and power cutback , VSWR protection, and open loop protection are disabled.

✸ Off when PA output power is either at expected level or at at specific cutback level (any level other than shutdown)

Note: LED status is latched to indicate status during current or previous key-up

Quantar Repeater Field Troubleshooting

Step 1 Quantar Repeater

d. Normal Switch Functions

“Volume Up”
Increments speaker volume in 1-16 steps
Turns on local speaker, if off

“Volume Down”
Decrements speaker volume in 1-16 steps.

Hold for 2 seconds to turn speaker Off

“CSQ/PL/Off”
Toggles between squelch modes:
- Squelch off (open squelch)
- Carrier Squelch
- PL (CVTCSS tone squelch)

“Intercom/Shift”
Toggles Intercom mode On/Off



Quantar Repeater Field Troubleshooting

Step 1 Quantar Repeater

e. Audible Alarm Alert Tones

Four station alarm conditions are reported with audio alert tones:

- The alert tones are routed to the local speaker.
- The alert tones are recorded in the alarm log which can be accessed by the RSS programming software.

Number of beeps:

One (1) Battery Revert Alarm
- Station loses AC power and reverts to battery backup
- Alarm is cleared when AC power is restored

Two (2) PA Fail
- PA fails to key up to expected output power
- Alarm is cleared when PA is back to expected output power

Three (3) Synthesizer
- Either TX or RX sunthesizers fail to lock
- Alarm is cleared when both synthesizers lock

Four (4) Overvoltage
- Battery charging voltage is above +34.5V
- Alarm is cleared when voltage returns to normal range

Quantar Repeater Field Troubleshooting

Step 1 Quantar Repeater

This completes Step-1 of the Quantar Repeater field troubleshooting.

Additional troubleshooting modules address:

Step-2: Transmitter power and SWR measurements
Receiver sensitivity measurements

Step-3: Receiver / site de-sensitization measurements using an “Iso-Tee”


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