

Section 5

Maintenance and Alignments

5

This section contains the maintenance and alignment procedures for the Maxiva UAX-C Series UHF transmitter. This includes routine maintenance, PA module replacement, PA module repair, transmitter calibration and PC Board replacement procedures.

**WARNING:**

THE SERVICE WORK DESCRIBED IN THIS SECTION MUST BE CARRIED OUT BY TRAINED STAFF ONLY.

5.1 Technical Assistance

Refer to the page *iii* at the front of the manual for further information regarding technical assistance.

5.2 PA Module Removal and Replacement

⚠ CAUTION:

TOXIC BERYLLIUM

SOME COMPONENTS IN THE PA MODULE CONTAIN TOXIC BERYLLIUM. THIS LIMITS MODULE REPAIR TO A MODULAR LEVEL CONSISTING OF PALLETS AND PC BOARDS ONLY.

HOT SURFACE

MAXIVA PA MODULES ARE DESIGNED TO HANDLE VERY HIGH TEMPERATURES AND MAY BE EXTREMELY HOT, UP TO 58° F (32° C) ABOVE ROOM TEMPERATURE. DO NOT TOUCH THE MODULE WITH BARE HANDS AFTER THE TRANSMITTER HAS BEEN RUNNING, ESPECIALLY IN HIGH AMBIENT TEMPERATURE ENVIRONMENTS. PROTECTIVE GLOVES CAN BE OBTAINED FROM HARRIS, PART #0990006483 OR GRAINGER ITEM #4JF36.

RADIO FREQUENCY HAZARD. DO NOT ATTEMPT TO OPERATE THE TRANSMITTER OR AMPLIFIER WITH THE COVER REMOVED.

5.2.1 PA Module Removal

Required Tools:

WAGO extractor tool
#1 Phillips screw driver
8 mm (5/16") open end wrench

The type of PA module will vary depending on transmitter model. PA and PS modules must be removed (or installed) with the transmitter turned off and unplugged.

STEP 1 Turn off the transmitter and disconnect AC power.

STEP 2 Remove the four screws from the top cover on the UAX-C and slide the cover toward the rear of the unit to remove it.

⚠ CAUTION:

THE PA MODULE MAY BE HOT. ALLOW THE COMPONENTS TO COOL OR USE PROTECTIVE GLOVES TO PROTECT HANDS.

STEP 3 See Figure 5-1. Remove the two screws from the rear panel on either side of the output connector.

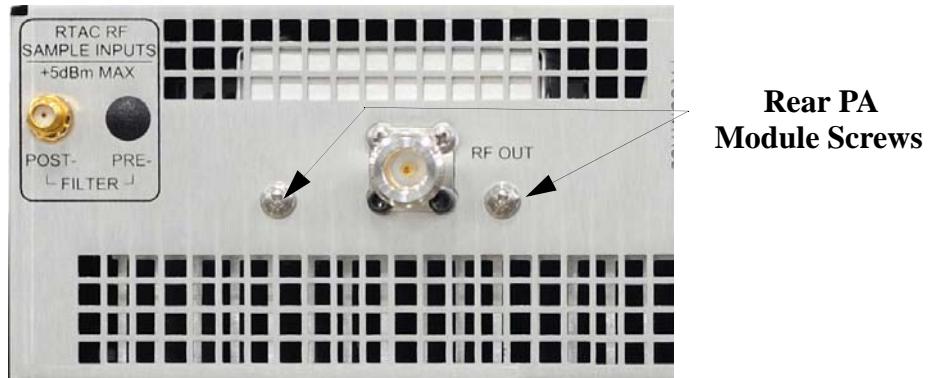


Figure 5-1 RF Output Connector

STEP 4 Remove the two PA module screws from the right side of the chassis. These screws thread into L brackets attached to the side of the PA module heat sink. (Note: the right screw in the photo below may not be present in some versions).



STEP 5 Loosen the two screws that hold the L brackets to the PA module heat sink and then rotate the L brackets 90° to allow maximum clearance during module removal. (Note: the right bracket may not be used in some versions).



Figure 5-2 PA Module L Brackets (rotated)

- STEP 6** Remove the two nuts (Figure 5-3) that fasten the PA module to the bottom of the chassis.
- STEP 7** Disconnect ribbon cable from PA interface board (J1) shown in Figure 5-3. The ribbon cable should be pulled back through the interface board (out of the PA section) and secured to keep it out of the way during module removal.
- STEP 8** Slide PA module toward front of chassis output until RF connector clears the rear of the chassis.



CAUTION:
DO NOT DAMAGE COMPONENTS ON PA INTERFACE BOARD WHEN INSTALLING THE PA MODULE FROM THE CHASSIS.

- STEP 9** Remove the RF input cable J2 from PA module front.
- STEP 10** Lift the PA module partially out of the chassis (tip PA interface board upward)
- STEP 11** Remove the two RF connectors J5 & J6 that attach to the coupler.
- STEP 12** Use a WAGO tool to disconnect power supply wires 43 & 44 from TB1 on the interface board.
- STEP 13** Remove the A9J4 ribbon cable from the J4 connector on the PA interface board.
- STEP 14** Remove the A9J3 ribbon cable from the J3 connector on the PA interface board.

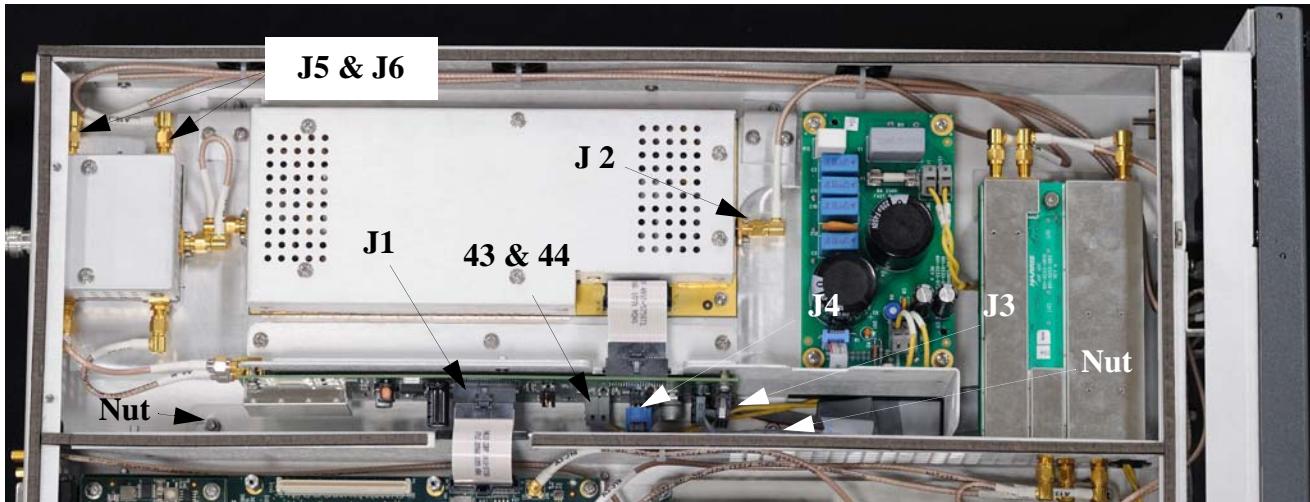


Figure 5-3 Amplifier Compartment

STEP 15 Remove the amplifier from the chassis.

STEP 16 End of procedure.

5.2.2 PA Module Installation

Required Tools:

WAGO extractor tool
#1 Phillips screw driver
8 mm (5/16") open end wrench
M7 nut driver

The type of PA module will vary depending on transmitter model. PA and PS modules must be removed (or installed) with the transmitter turned off and unplugged.

STEP 1 Turn off the transmitter and disconnect AC power.

STEP 2 Remove the four screws from the top cover on the UAX-C and slide the cover toward the rear of the unit to remove it.

STEP 3 Place PA module partially into chassis with PA interface board tilted upward.



CAUTION:

DO NOT DAMAGE COMPONENTS ON PA INTERFACE BOARD WHEN REMOVING THE PA MODULE FROM THE CHASSIS

STEP 4 Connect yellow power supply wires numbered 43 & 44 (or 54 & 55 depending on version) to PA interface board WAGO connector TB1.

STEP 5 Connect the ribbon cable A9J4 to connector J4 on the PA interface board (red wire in ribbon cable goes toward pin 1 side of connector).

STEP 6 Position the PA module flange mounting holes go over the studs in the bottom of the chassis. Lower the PA module onto the transmitter chassis backplane.



NOTE:

Installation tip, When placing the PA into the system, place it into the chassis with the module angled so the outside part of the PA goes in first. Then drop the PA interface side into the unit. Also make sure the RF cables that run along the side of the unit are out of the way as the PA is placed into the unit.

STEP 7 Connect the two RF connectors J5 & J6 to coupler (J6 is closest to the output connector).

STEP 8 Attach the RF connector J2 to the input of the PA module.

STEP 9 Slide the PA module toward the rear of the chassis. Be sure that the RF output connector (type N bulkhead) and fasteners pass completely through the chassis back panel.

STEP 10 Attach the ribbon cable to connector J1 at the center top of the PA interface board.

STEP 11 Install the two back panel screws (one on each side of output connector). Tighten the screws.

STEP 12 Rotate the heat sink L brackets to align with the mounting holes in the right side of the chassis.

STEP 13 Install the PA mounting screws (one or two depending on version) in the right side of the chassis. These screws thread into the L brackets. Tighten the screws.

STEP 14 Tighten the L bracket screws on the heat sink.

STEP 15 Install the two nuts on the mounting studs on the inside edge of the PA module. Tighten them.

STEP 16 Check the tightness of all connectors and hardware.

STEP 17 Replace cover and tighten screws.

STEP 18 End of procedure.

5.3 PS Module (AC/DC Converter) Removal and Replacement

Required Tools:

- WAGO extractor tool
- #1 Phillips screw driver
- Isopropyl alcohol
- Heat sink compound or pad.
- Paper towel or cloth.

STEP 1 Turn off the transmitter and disconnect AC power.

STEP 2 Remove the four screws from the top cover on the UAX-C and slide the cover toward the rear of the unit to remove it.

STEP 3 Remove the 8A fuse and check it. If blown replace and test the transmitter to confirm operation before proceeding.

STEP 4 Use a WAGO tool to remove the yellow AC input (17 & 18, 41 & 42 or 59 & 60 depending on version) and DC output wires (43 & 44, or 54 & 55 depending on version) from the WAGO connectors on the PS board.

STEP 5 Remove ribbon cable A7J1 from J1 on PS board.

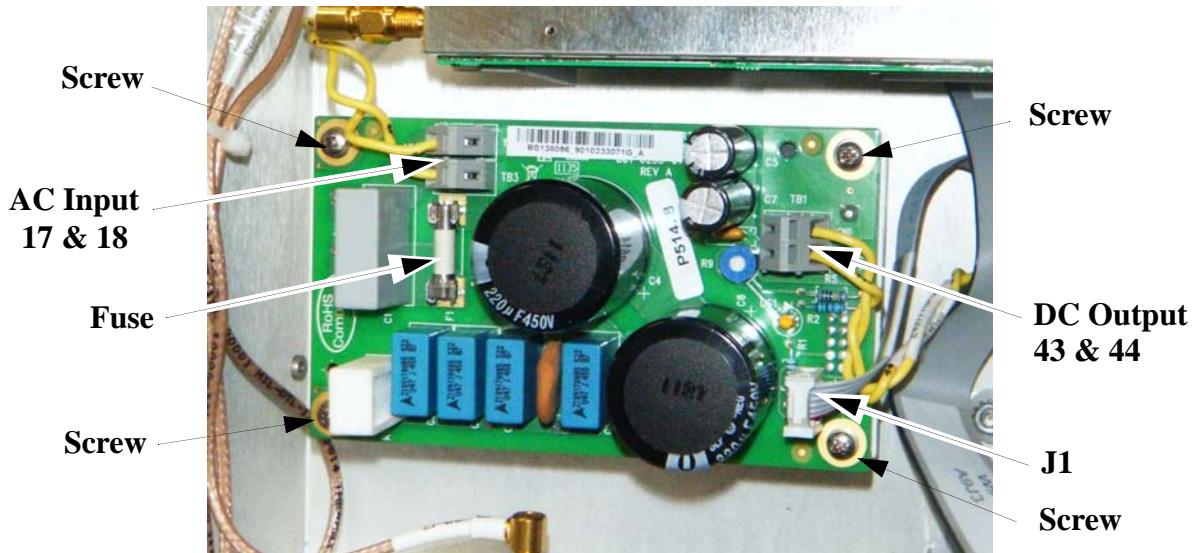


Figure 5-4 PS Module

STEP 6 Use a Phillips screwdriver to remove the four screws (one in each corner) from the PS board.

STEP 7 Lift the PS board and heatsink assembly up to remove them from the chassis.

STEP 8 Gently lift upward on the PS assembly to separate it from the heat sink.

STEP 9 Clean up the heat sink compound or pad residue on the heatsink. Use alcohol to remove completely.

STEP 10 Apply a thin, even coat of heat sink compound or a new heat sink pad to the heat sink surface.

STEP 11 Place the replacement PS module on the heatsink. Be sure to carefully align the holes in the PS module with the holes in the heatsink.

STEP 12 Install and tighten four corner screws that hold the PS and heatsink to the chassis base.

STEP 13 Use a WAGO tool to install the AC input and DC output wires.

STEP 14 Attach ribbon cable to J1. Note that the red wire in the ribbon cable goes to the pin 1 side of the connector.

STEP 15 Replace PA module cover and tighten cover screws.

STEP 16 End of procedure.

5.4 Power Calibrations

⇒ NOTE:

The following calibration procedures are for digital modes.

Factory FWD/Rfld calibration has been performed during factory test at 665 MHz center frequency and the calibration is valid for the entire UHF band. Factory FWD/Rfld calibration should be required only if a PA interface board, directional coupler, or sample cable is replaced. Factory FWD/Rfld calibration is simple and can be done whenever it is deemed necessary. Simply follow the instructions given in the calibration menus.

Field Fwd/Rfld calibration can be performed as required at any operating frequency or power level to insure precision. Follow the instructions given in the Field Fwd/Rfld calibration menus.



CAUTION:

FORWARD AND REFLECTED POWER CALIBRATIONS SHOULD ONLY BE DONE WHILE OPERATING THE TRANSMITTER INTO A KNOWN GOOD LOAD SUCH AS A STATION DUMMY LOAD. BE CERTAIN THAT THE LOAD IS A CONFIRMED 50 OHMS AND HAS THE CAPABILITY TO HANDLE THE POWER THAT WILL BE GENERATED BY THE TRANSMITTER.

Power calibrations can be performed using the local LCD screen or the web browser interface. Calibration performed via web browser interface require a user login and password at the admin level. Transmitters ship from the factory with the default login "admin" and the default password "admin" (do not include quotation marks in login or password, login and passwords are case sensitive). If you change passwords be sure to retain them in a secure location. You will not be able to make changes to transmitter settings via web browser without a valid password.

Harris recommends the Firefox web browser but Chrome or IE8 (or greater) can be used as well.

Refer to Figure 3-9 on page 3-12. In the 'System Configuration' screen select soft key 'Cal'. If logged in via web browser, the following screen (in HTML format) will be displayed to facilitate Calibration.

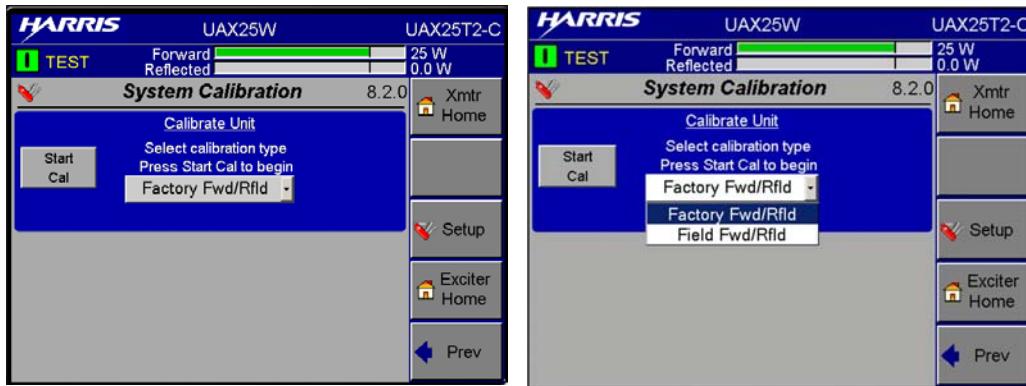


Figure 5-5 *on left - System Calibration on right - System Calibration options*

The procedures described below assume use of the UAX-C LCD menus screens. Power calibrations include:

- Factory Fwd/Rfld - System forward and reflected power at output of transmitter before band pass filter (BPF). Typically performed at 665 MHz.
- Field Fwd/Rfld - System forward power at output of transmitter before BPF. Typically performed at operating frequency for maximum accuracy.

Equipment Used:

- An averaging power meter (with probe) similar to the Agilent E4418B with appropriate adapters. Meter should be capable of displaying measured values in Watts or in dBm.
- Precision directional coupler (precision meaning the coupling value have been measured for the operating frequency of 665 MHz).

⇒ NOTE:

Read and understand the applicable power calibration procedure before beginning. The procedures below assume use of the LCD display and the control buttons on the front of the UAX-C. The procedure can also be performed using web browser screens. Web browser calibration screens are shown in Figure 5-5.

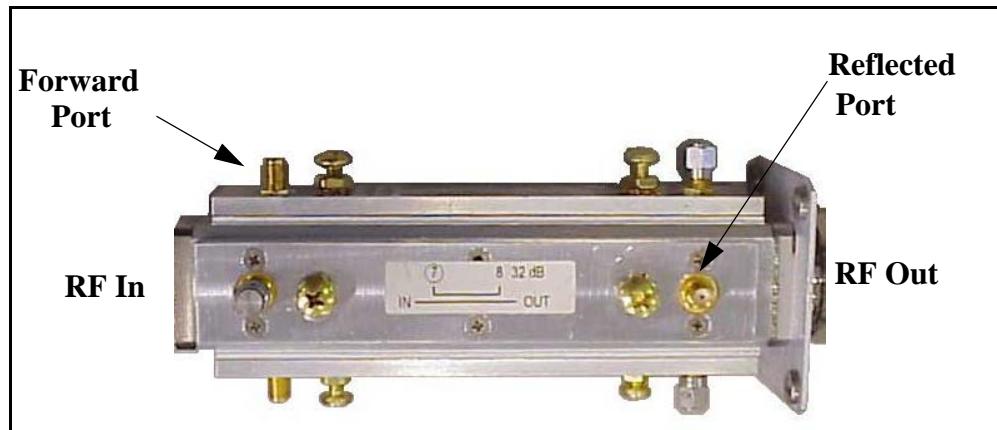


Figure 5-6
Typical Output Directional Coupler and Connections

5.4.1 System Factory Fwd/Rfld Calibration

System factory forward power is calibrated over a range of 10dB below model power to full model power (i.e., 5W to 50W for a 50W digital system.) The forward power reference sample is taken from the internal directional coupler and regulates the power of the transmitter output before any filter losses. Reflected power is automatically calculated as the calibration routine is processed. Calibration data is stored on a PA interface board EEPROM.

The system detectors utilize a linear (in mV/dB) output, so by performing the two-point calibration at 665 MHz, the detector slope and coupling factors are calculated and thus provide good accuracy over the 10%-100% power range across the UHF band.

STEP 1 Zero and calibrate the RMS power meter, following the manufacturer's procedures for that specific model.

STEP 2 Install a directional coupler at the output of the transmitter. The directional coupler must be capable of handling the rated transmitter output power and have defined coupling values to allow accurate measurements of forward power levels. A typical coupler is shown in Figure 5-6.

⇒ **NOTE:**

Couplers like the one shown in Figure 5-6 use one port as a coupled port while the opposite port is terminated in an external 50 ohm load. The load must be installed in order to perform accurate measurements.

⚠ CAUTION:

DO NOT APPLY EXCESSIVE DOWNWARD PRESSURE (WEIGHT) ON THE TYPE N OUTPUT CONNECTOR. IF A DIRECTIONAL COUPLER IS ATTACHED DIRECTLY TO THE OUTPUT CONNECTOR IT SHOULD BE ADEQUATELY SUPPORTED.

EXCESSIVE STRESS ON THE CONNECTOR MAY CAUSE INTERNAL DAMAGE AND RESULT IN HIGH VSWR CONDITIONS THAT COULD CAUSE ARCING OR HEATING.

STEP 3 Once the coupler coupling value is determined, enter this value as a power meter off, set the meter's display to read in dBm or Watts and connect the power meter sensor to the forward coupler port.

⇒ NOTE:

The sample level present at this coupler port (TPO - coupling value) must not exceed the maximum input range of the power sensor in use.

⇒ NOTE:

Calibration must be performed with the transmitter operating into a known good load or antenna system. If reflected power rises to a level that exceeds 10% of forward power stop raising power. Turn off the transmitter and begin checking the output components (transmission line, load, antenna) for faulty components that produce high VSWR (voltage standing wave ratio) levels.

STEP 4 Connect the transmitter output to a known good load. If required, use a short, high quality, low VSWR, 50 ohm cable preferably RG-213 or better.

STEP 5 Apply AC power to the transmitter chassis.

STEP 6 Press Remote Disable on the front of the transmitter.

STEP 7 Press and hold the Power Lower button for 20 seconds to lower transmitter output power at turn on.

STEP 8 Press the transmitter ON button while monitoring transmitter forward power on the external power meter. Monitor reflected power on the LCD screen. Slowly raise the power to the desired operational power level and allow the transmitter to run for several minutes until output power is stable.

STEP 9 Compare the external power meter value with the forward power displayed on the LCD screen. If the values do not agree proceed with calibration.

STEP 10 Use the LCD screen and control buttons to navigate to the calibration menu SETUP> XMTR POWER SETTINGS> POWER CAL>

FACTORY FWD/RFLD. Press Enter one time to highlight the menu then use the up/down keys to select Factory Fwd/Rfld.

STEP 11 Start the calibration procedure by pressing the Enter button again.

STEP 12 Follow the instructions on the LCD screen and use the power Raise/Lower buttons to adjust the transmitter output to the desired low level. When a stable reading is attained on the power meter, select Save and then press Enter.

⇒ **NOTE:**

It is helpful to check the RF DAC value displayed (in Hex) on the calibration screen. In a system which is properly configured and operating correctly a DAC value that exceeds 860 without reaching the desired low power level indicates a possible problem, verify the system is configured correctly.

STEP 13 Follow the instructions on the screen and use the Raise/Lower buttons to adjust the transmitter output to the desired high level. When a stable reading is attained on the power meter, select Save and then press Enter.

⇒ **NOTE:**

It is helpful to check the RF DAC value displayed (in Hex) on the calibration screen. In a system which is properly configured and operating correctly a DAC value that exceeds A73 without reaching the desired high power level indicates a possible problem, verify the system is configured correctly.

STEP 14 Procedure complete.

5.4.1.1 Calibration Errors

If any components in the amplifier section are faulted during the calibration, the system will consider it invalid and discard it. Replace any faulty components and perform the calibration again.

5.4.2 Field Fwd/Rfld Calibration

Field Fwd/Rfld calibration can be performed any time greater accuracy is required at any specific frequency or power level. Field calibration is a one point calibration performed at a customer specified power level and frequency. The forward power reference sample is taken from the internal directional coupler and regulates the power of the transmitter output before any filter losses. Reflected power is automatically calculated as the calibration routine is processed. Calibration data is stored on a PA interface board EEPROM.

STEP 1 Zero and calibrate the RMS power meter, following the manufacturer's procedures for that specific model.

STEP 2 Install a directional coupler at the output of the transmitter. The directional coupler must be capable of handling the rated transmitter output power and have defined coupling values to allow accurate measurements of forward power levels.

**CAUTION:**

DO NOT APPLY EXCESSIVE DOWNWARD PRESSURE (WEIGHT) ON THE TYPE N OUTPUT CONNECTOR. IF A DIRECTIONAL COUPLER IS ATTACHED DIRECTLY TO THE OUTPUT CONNECTOR IT SHOULD BE ADEQUATELY SUPPORTED. EXCESSIVE STRESS ON THE CONNECTOR MAY CAUSE INTERNAL DAMAGE AND RESULT IN HIGH VSWR CONDITIONS THAT COULD CAUSE ARCING OR HEATING.

STEP 3 Once the coupler coupling value is determined, enter this value as a power meter offset, set the meter's display to read in dBm or Watts and connect the power meter sensor to the forward coupler port.

**NOTE:**

The sample level present at this coupler port (TPO - coupling value) must not exceed the maximum input range of the power sensor in use.

**NOTE:**

Calibration must be performed with the transmitter operating into a known good load or antenna system. If reflected power rises to a level that exceeds 10% of forward power stop raising power. Turn off the transmitter and begin checking the output components (transmission line, load, antenna) for faulty components that produce high VSWR (voltage standing wave ratio) levels.

STEP 4 Connect the transmitter output to a known good load. If required, use a short, high quality, low VSWR, 50 ohm cable preferably RG-213 or better.

STEP 5 Apply AC power to the transmitter chassis.

STEP 6 Press Remote Disable on the front of the transmitter.

STEP 7 Press and hold the Power Lower button for 20 seconds to lower transmitter output power at turn on.

STEP 8 Use the LCD and front panel controls to navigate to SETUP>PFRU (PLL)>CENTER FREQ. (MHZ) and set frequency and offset to desired values. Press the Power menu button (below the LCD screen).

STEP 9 Press the transmitter ON button while monitoring transmitter forward power on the external power meter. Monitor reflected power on the LCD screen. Slowly raise the power to the desired operational power level and allow the transmitter to run for several minutes until output power is stable.

STEP 10 Compare the external power meter value with the forward power displayed on the LCD screen. If the values do not agree proceed with calibration.

STEP 11 Use the LCD screen and control buttons to navigate to the calibration menu SETUP> XMTR POWER SETTINGS> POWER CAL> FIELD FWD/RFLD. Press Enter one time to highlight the menu then use the up/down keys to select Field Fwd/Rfld.

STEP 12 Start the calibration procedure by pressing the Enter button again.

STEP 13 Follow the instructions on the LCD screen and use the power Raise/Lower buttons to adjust the transmitter output to the desired level. When a stable reading is attained on the power meter, select Save and then press Enter.

⇒ **NOTE:**

It is helpful to check the RF DAC value displayed (in Hex) on the calibration screen. In a system which is properly configured and operating correctly a DAC value that exceeds A775 without reaching the desired power level indicates a possible problem, verify the system is configured correctly.

STEP 14 Procedure complete.

5.4.2.1 Calibration Errors

If any components in the amplifier section are faulted during the calibration, the system will consider it invalid and discard it. Replace any faulty components and perform the calibration again.

5.5 Changing Frequency

This procedure describes manual change of the channel frequency to a new value. Save the settings on the initial channel before proceeding with frequency change. Once operation on the new frequency has been established, a second set of settings should also be saved. This will greatly facilitate changing between frequencies in the future by simply duplicating the previously recorded settings. The settings can be saved using the web browser and navigating to Tx Home>Exciter Home>Setup>ISP>Save Settings.

This discussion assumes that the frequency will be changed manually and somewhat infrequently.

Required Tools:

- Spectrum Analyzer
- Network Analyzer (use for re-tuning of output filter and determination of coupling values)
- Directional coupler and average power meter or other precision power measurement means. This is only required if the user would like to do a power calibration at the new frequency, but it is not required.



CAUTION:

COAXIAL DIRECTIONAL COUPLERS MAY NOT BE COMPENSATED VERSUS FREQUENCY. THAT IS, THEY WILL EXHIBIT A MONOTONIC RISE IN COUPLING VALUE ACROSS THE UHF BAND. ACCORDINGLY, ANY COUPLING VALUES WRITTEN ON COUPLER PORTS MAY NOT BE APPLICABLE TO A NEW OPERATING FREQUENCY. CONSULT COUPLER FACTORY TEST DATA SHEETS (IF FURNISHED) OR RE-MEASURE THE COUPLER WITH A NETWORK ANALYZER TO DETERMINE THE COUPLING VALUES AT THE NEW FREQUENCY.

The caution above does not apply to internal UAX-C power measurements, which are frequency compensated.

Procedure:

STEP 1 Turn off transmitter via OFF button on UAX-C front panel.

STEP 2 Use the LCD and front control buttons to navigate to POWER>LINEAR and select BYPASS. Then navigate to POWER>NONLINEAR and select BYPASS.

STEP 3 Tune output filter (if present) to new frequency. Consult filter test data, specification sheet, or other manufacturer-supplied information for more details. Some output filters are band limited and may not be adjustable across the UHF band. In cases where the filters are band limited a replacement filter will be required.

**WARNING:**

HARRIS DOES NOT RECOMMEND FIELD TUNING OF FILTERS. CONSULT THE MANUFACTURER OF THE FILTER BEFORE ATTEMPTING ANY FREQUENCY TUNING OF FILTERS. HARRIS RECOMMENDS ACQUIRING A FILTER TUNED TO THE FREQUENCY OF CHANGE BEFORE PROCEEDING WITH A FREQUENCY CHANGE.

STEP 4 Use network analyzer to confirm performance of test load, filter, transmission line and antenna at new frequency.

STEP 5 Use the LCD and front control buttons to navigate to the SETUP >PFRU>CENTER FREQUENCY menu and enter the new frequency (MHz). Example: if the desired frequency is 500.5, MHz enter '500' as the center frequency and enter the FREQUENCY OFFSET value as "500000" (Hz). If the web browser is being used navigate to Tx Home>Exciter Home>PFRU>Frequency (MHz) and enter the value as a whole number and decimal. Example: if the desired frequency is 500.50 MHz select the white Frequency box, it will turn light yellow, and then type in the new value 500.5 and press the enter key. A confirmation box will open to ask "Are you sure? Press the OK button to proceed.

STEP 6 Press the power down button for 40 seconds.

STEP 7 Use the LCD and control buttons to navigate to SETUP>XMTR>POWER SETTINGS menu. Adjust the power settings in this menu to the new levels.

STEP 8 Turn transmitter on.

**NOTE:**

Steps 9-11 are not absolutely required, the system run at the new desired frequency and will be very close to the desired TX power. If you desire to calibrate the system follow step 9-11.

STEP 9 Use a calibrated, averaging power wattmeter and a directional coupler (with known coupling factor) to measure and monitor the transmitter output power.

STEP 10 Slowly raise the transmitter power (using the raise button) until the desired power reading is observed on calibrated power meter connected

to directional coupler at transmitter output (or at the front panel on some models).

STEP 11 Navigate to the SETUP>XMTR POWER SETTINGS>POWER CALIBRATION MENU. Select FIELD FWD/RFLD and perform calibration.

STEP 12 With transmitter set to nominal power output use power meter to confirm RTAC sample level (-5dBm optimal).

STEP 13 Use the LCD and front control buttons to navigate to POWER>LINEAR and select ADAPT. Then navigate to POWER>NONLINEAR and select ADAPT.

STEP 14 Confirm signal quality.

STEP 15 Procedure complete.

5.6 Fan Replacement

There are two 12Vdc fans on the front of the Maxiva UAX-C. The fans can be replaced while the transmitter is on air.

STEP 1 Loosen the two screws that attach the UAX-C front panel to the chassis.

STEP 2 Remove the front cover to expose the two fan assemblies.

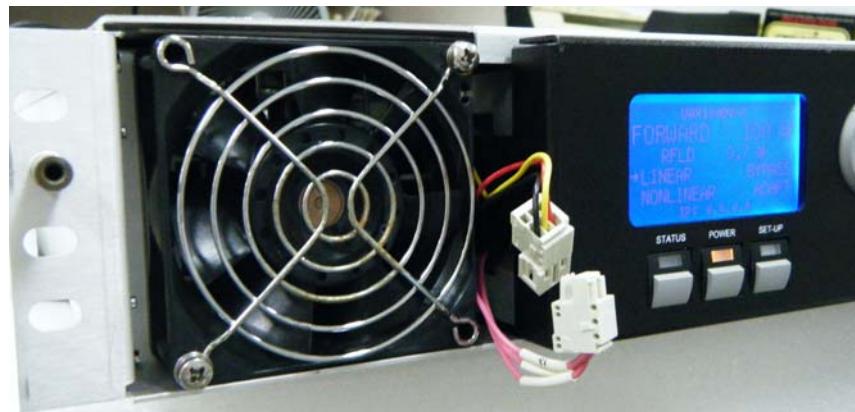


Figure 5-7 UAX-C Fan Connection

STEP 3 Unplug the connectors that supply DC to the fan. The unplugged connectors are shown in Figure 5-7.

⚠ CAUTION:

THE FANS MAY CONTINUE TO ROTATE FOR SEVERAL SECONDS AFTER REMOVAL. FANS WILL START UP AS SOON AS THEY ARE PLUGGED IN.

STEP 4 Remove the fan mounting screws and the fan assembly.

STEP 5 Place the new fan in position, then install and tighten the mounting screws.

STEP 6 Reconnect the connectors that supply DC to the fan. The fan will immediately begin rotating if the power is on.

STEP 7 Replace the UAX-C front panel assembly and tighten the two mounting screws.

STEP 8 End of procedure.

5.7 Air Filter Replacement

Monthly inspection and cleaning of the air filter is recommended. Clean filters more often in dusty environments. The filters can be easily removed from the front panels and then cleaned. The filter must be thoroughly dry before reuse. The part number for the filter material used in the UAX-C is 061-0115-000. The filter material is 1/4" thick, 10ppi.

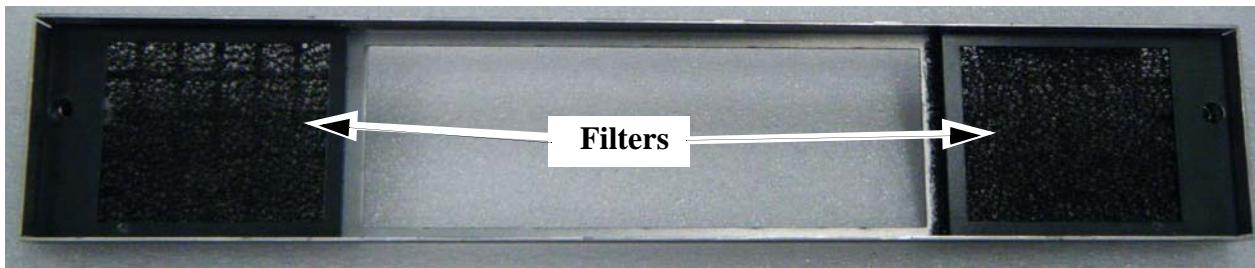


Figure 5-8 Filter in UAX-C Front Panel

STEP 1 Loosen the two front panel connectors and remove the front panel. The two filters are captive inside the front panel and slide toward the center for removal.

STEP 2 Remove the filter material. The notch in the filter material aligns with the fasteners on the front panel. The filter must be re-installed with the same orientation.

STEP 3 Clean filter material with compressed air or wash with detergent & water, or replace as necessary.

CAUTION:
DRY THE FILTER MATERIAL THOROUGHLY BEFORE REINSTALLATION.

STEP 4 Reinstall by reversing the order of the above steps.

5.8 Cleaning

Occasionally the UAX-C circuit boards should be cleaned. All precautions against static should be observed. The technician should be grounded, either through conductive shoes or through a static ground strap.

The UAX-C should be powered down and disconnected from AC mains power before the cleaning process is started. A vacuum cleaner should be used to remove dust from the assemblies. A natural bristle brush with a metal band (needed to ground static electricity) and a wooden handle can be used to dislodge dust. A vacuum cleaner hose can develop static due to the air rushing through the hose. The hose should have a metal nozzle, which should be grounded.

Do not use compressed air to blow dirt from the UAX-C because the dirt will settle on something else. Fast moving air could damage or dislodge delicate circuit board components, and it could also cause static problems.

5.9 Changing Date and Time Battery

STEP 1 Remove power from the UAX-C.

STEP 2 If the UAX-C is installed in a rack, remove it and place on bench.

STEP 3 Remove the top cover.

STEP 4 Remove the old battery and insert a new battery with positive side toward clip. Battery slides out from under the clip. See Figure 5-9 for battery location.

⇒ **NOTE:**

Dispose of battery properly. Follow applicable local regulations.

STEP 5 Replace the top cover of the UAX-C and remount in transmitter. Continue on to the next section to set the time and date.

- The Harris part number for the date and time battery is 660005400 (lithium, 3V, CR2032, 20mm).

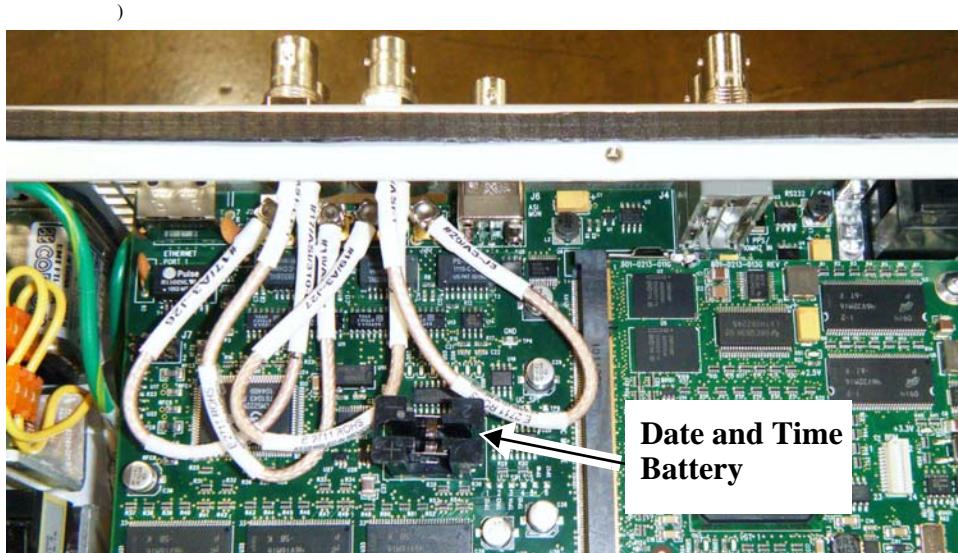


Figure 5-9 Date and Time Battery Location

5.9.1 Setting UAX-C Date and Time

The UAX-C date and time should be set after the date and time battery is installed. The date/time can be set using either the web browser or the LCD screen and control buttons. Use the following procedure to set the date and time using the web browser.

- STEP 1** Use the web browser to log into the UAX-C using the front or rear ethernet connectors.
- STEP 2** Navigate to Tx Home>Exciter Home>Setup>System Settings>Next. To manually set time and date select None as UTC Source. If the transmitter is attached to a network NTP settings can be selected that will automatically set the time. If a GPS is connected the GPS time can be used to set the time.
- STEP 3** Set the time and date by clicking in each box.
 - a. A keyboard will appear. Type in the value for that box, then press enter.
 - b. Repeat step A for each box.
 - c. The time is entered in the 24 hour format.
 - d. This screen does not indicate the correct time. Correct time and date are indicated in the Status > Signal Processor screen.

5.9.2 Battery Backup (UPS) Option

The following procedure describes installation of the UAX-C Battery Backup (UPS) option 9710051012G. The battery backup board described is compatible with the 9710051011G ASM-Power Module which contains the 901-0215-241G PWA, LVPS Distribution board.

The battery backup (UPS) option is useful in systems that require synchronized timing as in SFN networks. The UPS battery pack keeps modulator section operational for one minute and holdover components (clock oven and the GPS receiver) operating for approximately 45 minutes if the batteries are fully charged.



Figure 5-10 Battery Backup (UPS) Location

The optional battery backup kit 9710051012G includes:

- Qty 4, 3020803006, Screw, Mach M3-0.5 X 6 SEMS
- Qty 1, 6600179000, PWA, 9.6V Battery Pack

Instructions:

STEP 1 Turn off transmitter.

STEP 2 Disconnect AC mains power from the UAX-C chassis.

⚠ WARNING:
REMOVE ALL POWER TO THE UAX-C BEFORE PERFORMING THE FOLLOWING PROCEDURE.

⚠ CAUTION:
FOLLOW APPROPRIATE ESD (ELECTROSTATIC DISCHARGE) PROCEDURES TO PREVENT DAMAGE TO SENSITIVE ELECTRONIC COMPONENTS WHEN HANDLING CIRCUIT BOARDS.

STEP 3 If the unit is not mounted in a rack proceed to step 4. If rack mounted the UAX-C must be removed from the rack. Remove cables from the back of the transmitter using a 5/16" (8mm) open end wrench and a small

straight slot screwdriver. Remove the UAX-C front cover and remove the four Phillips screws that hold the UAX-C in the rack. Slide the UAX-C out of the rack and place it on a sturdy table or bench.

- STEP 4** Remove the four Phillips screws on the top, rear of the UAX-C that secure the cover chassis. Remove the cover by sliding it toward the rear of the UAX-C and lifting it upward.
- STEP 5** Be sure that the connector on the back of the battery backup board aligns and seats properly on the power supply board connector. The power supply board standoffs are located on the front left side of the UAX-C.
- STEP 6** Install the battery backup board and tighten the four Phillips mounting screws. The battery backup board, standoffs, and mounting screws are shown in Figure 5-10.
- STEP 7** Replace the UAX-C cover and tighten hardware.
- STEP 8** If rack mounted, slide the UAX-C into the rack.
- STEP 9** Reconnect all cables to the rear of the UAX-C and tighten connectors as required.
- STEP 10** Restore AC mains power to the UAX-C.
- STEP 11** If dual UAX-Cs are used switch the Drive Control to Auto.

⇒ **NOTE:**

Operation of the battery backup board can be monitored on the UAX-C Battery Backup GUI screen. Refer to 3.10.5 on page 3-85 for a detailed description of the Battery Backup status screen.

- STEP 12** End of procedure.

5.10 Changing Feature Key

The feature key unlocks optional features or other modulation standards. It is an alpha-numeric number. Changes to the feature key are only needed if additional features or modulation standards are purchased. Contact your Harris sales representative for a quotation. A new feature key is not required to reload existing software or to load an updated version of existing software.

Changing modulation type, adding GPS, SFN or MH options require new feature keys. The LCD control panel on the UAX-C can't be used to enter a new feature key. The feature key must be installed using the web GUI. The GUI screen containing the feature key is shown in Figure 3-24 on page 3-39.

In order to purchase a new feature key the user must provide Harris with the front MAC address from the UAX-C(s) being updated. The front MAC address can be found on the Remote Communications web browser GUI screen shown in Figure 3-21 on page 3-35.

The new feature key is activated after the UAX-C transmitter is rebooted. Rebooting can be accomplished by disconnecting and then reconnecting AC power or by using the web browser to navigate to the Tx Home>Exciter Home>ISP page and pressing Reset.

5.11 Connecting To The UAX-C

This section describes connection to the UAX-C with a PC (Windows XP operating system) via ethernet for setup, operation, and software downloads.

⇒ **NOTE:**

Harris recommends the Firefox browser for use with this transmitter but Internet Explorer version 8.0 or later can also be used.

Use of IE version 8.0 or higher may require a change in the IE8 Compatibility View Settings screen. Open the IE8 browser and select Tools>Compatibility View Settings and configure the settings as shown in Figure 5-11.

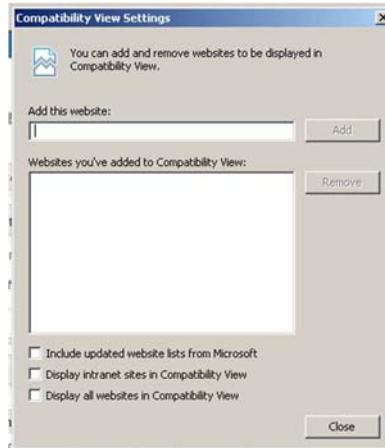


Figure 5-11 IE8 Compatibility View Settings

5.11.1 UAX-C Front and Rear RJ45 Connectors

The Front RJ45 Connector - UAX-C front RJ45 Ethernet connector has a fixed (static) IP address which is 192.168.117.88. The front RJ45 connector of the UAX-C is intended for direct connection to a computer which is operated in the DHCP (Dynamic Host Configuration Protocol) client mode. The front connector is driven by a DHCP server which will automatically provide a proper IP address to a directly connected computer (operated in the DHCP client mode). This address will be 192.168.117.yyy, where yyy ranges from 129 to 135.

When connecting to the UAX-C front panel ethernet port, if the computer being used does not auto-detect for cross connection, a crossover cable must be used to connect the

UAX-C front ethernet port to the computer. For additional information see "5.11.4 Connection Via Front Ethernet Connector" on page 5-31.

**CAUTION:**

DO NOT CONNECT THE UAX-C'S FRONT RJ45 CONNECTOR TO A NETWORK BECAUSE THE DHCP SERVER IN THE UAX-C WILL CONFLICT WITH THE DHCP SERVER IN THE NETWORK.

The rear RJ45 connector - UAX-C rear RJ45 Ethernet connector can operate in the DHCP client mode or with a static IP. It is intended for connection to an Ethernet network which is serviced by a DHCP server. That Ethernet network will supply the UAX-C rear connector with an appropriate IP address when it is in the DHCP client mode. For additional information see "5.11.5.2 Direct Connection, Computer To UAX-C Rear Ethernet Connector" on page 5-35.

**NOTE:**

DHCP Client Mode Computer: A computer operated in the DHCP client mode will be assigned an IP address if connected to a network or device which is configured as a DHCP server.

**NOTE:**

Static Mode Computer: A computer operated in the static mode has a fixed IP address and will not accept a new address offered by a DHCP server driven network. To connect a Static Mode set computer to the rear connector, the computer IP address must be within the DHCP range and must be an otherwise unused IP address. See "5.11.5.2 Direct Connection, Computer To UAX-C Rear Ethernet Connector" on page 5-35.

5.11.2 Log- In Authorization Levels & Passwords

When the Ethernet connection is established to the UAX-C, three levels of login are available. They are:

- Two "Secure" level logins, Engineer1 and Engineer2, which allow full access to the UAX-C programming functions.
- One "Administrator" level login that allows the administrator to view and change existing passwords.
- Multiple "Monitor" level logins, which allow viewing only and does not allow programming or attribute setting.

Table 5-1 Default Passwords

User Level	Username	Password
Engineer1	admin	admin
Engineer2	user2	pass2
Administrator	netadmin	harris
Monitor	-	-

5.11.3 Changing Passwords

UAX-C Usernames, Passwords and Session Time Out duration can be changed using the Tx Home>Exciter Home>Setup>User Settings>Active User screen. Login to the UAX-C using the netadmin username and password is required to access the User Management screen.

⇒ NOTE:

The netadmin login is an administrative login used to change engineer level user-names/passwords and session time out. Changes to other transmitter parameters are not allowed using the netadmin login.

After UAX-C administrator login navigate to Tx Home>Exciter Home>Setup>User Settings>Active User screen. The Active Users screen in Figure 5-12 on left will be displayed. Pressing Edit will display the NetAdmin - User Management screen (see Figure 5-12 on right). The screen shows the current usernames and passwords. Engineer 1 and 2 usernames/passwords a can be changed by typing the new names in the boxes to right.

The NetAdmin username and password can't be changed at this time.

Values of Session Time Out from zero to 1440 minutes can be also set here (15 minutes is a typical setting). If zero is entered there is no limit on time out as long as the user requests data more frequently than every 5 minutes. If data is not requested within the five minute window then log out occurs automatically. If a value from 1-1440 minutes is entered then logout occurs automatically after that time value is exceeded.

If a browser session is closed or a network interruption occurs then the user will be logged out after 5 minutes. During the 5 minute period no user can log in using the same password.

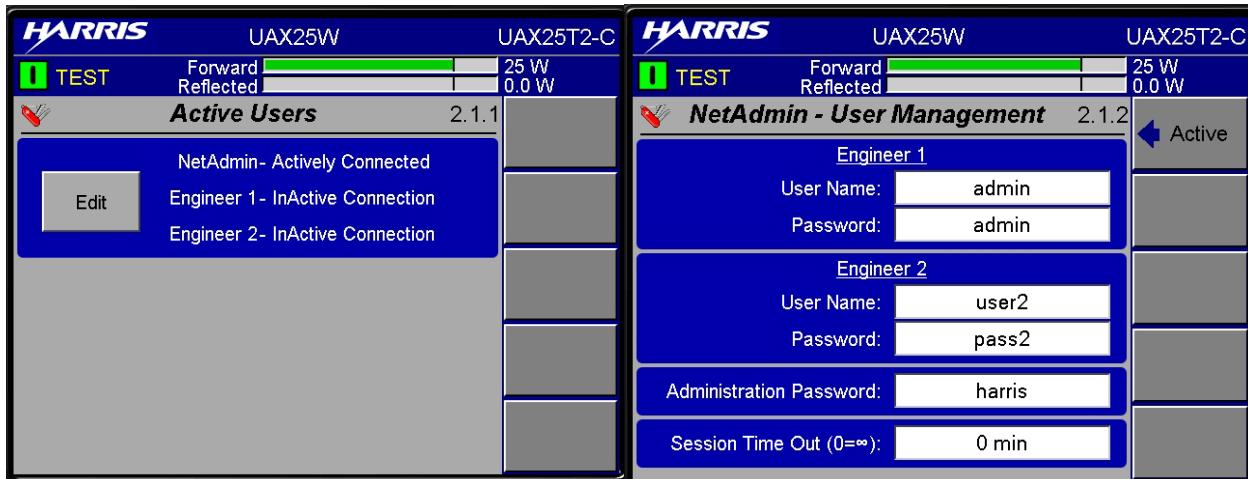


Figure 5-12 NetAdmin Active Users Screen NetAdmin - User Management Screen

Once the desired changes have been made to the NetAdmin-User Management screen press the Active button to return to the Active users screen where the current connection information is provided. Access to other screens is not allowed while logged in as an administrator. If access to other screens is desired the user must Logout and then Login as an engineer.

5.11.4 Connection Via Front Ethernet Connector

When connecting to the UAX-C front panel RJ45 connector, the connecting computer can be setup as a DHCP client, where the DHCP server associated with the UAX-C front RJ45 port will assign an address to the computer. This method of obtaining a computer address is described in Section 5.11.4.1.

The computer can also be set to Static IP mode, where its address must be assigned manually. In this mode, the address must be assigned as 192.168.117.yyy, where yyy is any value between 2 and 254, except 88.

When the computer has been assigned an IP address, connect to the UAX-C using the procedure in Section 5.11.4.3.

When connecting to the UAX-C front panel ethernet port, if the computer being used does not auto-detect for cross connection, a crossover cable must be used to connect the UAX-C front ethernet port to the computer.

5.11.4.1 Assigning Computer IP Address in DHCP Client Mode

If the computer is in the DHCP client mode, it will automatically obtain an address from the front panel RJ45 (Ethernet) connector. Use the following procedure to obtain an address for the computer. To avoid reboot of the computer refer to Section 5.11.4.2 for an alternate method.

- STEP 1** Connect an ethernet cable between the computer's RJ45 connector and the UAX-C front panel RJ45 connector.
- STEP 2** Reboot the computer. The computer's address should now be 192.168.117.yyy, where yyy ranges from 129 to 135.
- STEP 3** It should be possible to connect to the UAX-C using the procedure in 5.11.4.3 .

If this procedure fails to assign a compatible IP address to the PC, use the procedure listed below at 5.11.4.2 on page 5-32.

5.11.4.2 Assigning Computer IP Address Without Rebooting

- STEP 1** Connect an ethernet cable between the computer's RJ45 connector and the UAX-C front panel RJ45 connector.
- STEP 2** Press Start > Run.
- STEP 3** The Run window should open.
- STEP 4** The run window open box should display 'cmd'. If not, type 'cmd', then press OK.
- STEP 5** The cmd.exe window will open.
- STEP 6** Type in 'ipconfig /release', then hit enter.
 - a. This will disassociate the computer from the previous ethernet network to which it was connected.
- STEP 7** Type in 'ipconfig /renew', then hit enter.
 - a. This associates the computer with the UAX-C front panel RJ45 ethernet connector.
 - b. The UAX-C will assign an address to the computer, which is 192.168.117.yyy, where yyy ranges from 129 to 135.
- STEP 8** To verify the new address type in 'ipconfig /all', then hit enter.

a. The new IP computer ethernet address should be set.

STEP 9 Connect to the UAX-C using the procedure in 5.11.4.3 .

To reconnect to another Ethernet network, connect the computer to the desired network and perform either of the above procedures.

5.11.4.3 Making the Connection to the UAX-C

STEP 1 Connect an ethernet cable between the computer's RJ45 connector and the UAX-C front panel RJ45 connector.

- a. If the computer being used does not auto-detect for cross connection, a crossover cable must be used to connect the UAX-C front ethernet port to the computer.
- b. If necessary perform the DHCP procedure found in "5.11.4.1 Assigning Computer IP Address in DHCP Client Mode" on page 5-32 or "5.11.4.2 Assigning Computer IP Address Without Rebooting" on page 5-32.

STEP 2 Open Mozilla Firefox and enter the UAX-C's front connector address: (192.168.117.88).

STEP 3 The Log In Screen should appear.

STEP 4 Log in using user name and password.

- a. The default user name and password for Engineer1 is admin, admin. Provisions to change the login user names and passwords are given in 5.11.2 .

STEP 5 The UAX-C web GUI is now displayed and can be navigated as needed.

5.11.4.4 Obtaining Rear Ethernet Connector Address

The UAX-C rear RJ45 connector should have already been connected to the existing ethernet.

Connect a computer to the UAX-C front panel RJ45 connector and log in as described above.

STEP 1 Navigate, on front panel LCD to the Setup > Communications Tab.

STEP 2 The rear panel Ethernet connector address will be given on this page in the Ethernet #2 sub window.

STEP 3 The Ethernet #1 window gives the front Ethernet parameters.

5.11.5 Connecting Via UAX-C Rear Panel Ethernet Connector

Two methods are used to connect to the rear panel RJ45 connector, they are as follows:

- Connecting through an existing ethernet network.
- Direct connection, computer to UAX-C rear RJ45 connector.

Both of these connection methods are described below.

5.11.5.1 Connecting To UAX-C Via Existing Ethernet Network

When connecting to an UAX-C through an existing ethernet network, the connecting computer can be setup on static IP if it has already been assigned an address on the network in question. If it has not already been assigned an address on that network, it must be setup as a DHCP client so the network can assign it an address.

STEP 1 Connect the UAX-C rear RJ45 connector to the existing ethernet network.

STEP 2 Connect the computer to a connector on the existing ethernet network.

STEP 3 Go to Internet Explorer and type the UAX-C rear RJ45 connector address found in "5.11.4.4 Obtaining Rear Ethernet Connector Address" on page 5-33.

STEP 4 Log In Screen should appear.

STEP 5 Log in using user name and password.

STEP 6 The UAX-C web GUI is now displayed and can be navigated as needed.

⇒ NOTE:

Some network switches utilizing secure connections will require the MAC address to be given to the switch to allow traffic to pass to and from it. The MAC address can be found just above the IP address Field.

5.11.5.2 Direct Connection, Computer To UAX-C Rear Ethernet Connector

Direct connection to the UAX-C's rear RJ45 connector is not recommended, but it can be done. The front panel, with its DHCP server is recommended for direct connection.

When directly connecting a computer to the UAX-C rear panel ethernet connector, the connecting computer must be setup on Static IP mode with the first three segments of its address set the same as the first three segments of the address of the rear connector of the UAX-C. **For example**, assume the UAX-C rear panel address is 137.237.242.138. The computer address must be set to 137.237.242.yyy, where yyy is any number below 255, excluding 138 and 0. In other words, the Static IP address must be within the DHCP range and must be an otherwise unassigned IP address.

Direct connection to the rear panel by a computer set to the DHCP client mode **may** work if both had been connected to the same network. This assumes the DHCP assigned IP address has not changed.

- STEP 1** Connect an ethernet cable between the computer and the UAX-C rear panel RJ45 connector.
- STEP 2** Go to Internet Explorer and type the rear RJ45 connector address. Using the example given above, the rear connector address will be 137.237.242.138
- STEP 3** Log In Screen should appear.
- STEP 4** Log in using user name and password.
- STEP 5** The UAX-C web GUI is now displayed and can be navigated as needed.

5.11.6 Changing PC Operating Mode Static/DHCP

- STEP 1** Connect an ethernet cable between the computer and the UAX-C rear panel RJ45 connector.
- STEP 2** On the computer, click Start > Settings > Network Connections. The network connections window will appear.
- STEP 3** In the network connections, right click on the network connections soft key, a drop down list will appear.
- STEP 4** From the drop down list, select properties. The Local Area Connection Properties window will appear.

STEP 5 In the local area connection properties window, scroll down in the sub window until the Internet Protocol (TCP/IP) selection appears.

STEP 6 Click on the Internet Protocol (TCP/IP) selection.

STEP 7 Click on the Properties soft key below and to the right of the sub window.

STEP 8 The Internet Protocol (TCP/IP) Properties window will appear.

STEP 9 In this window, two choices appear, they are:

- Obtain an IP address automatically. This choice sets the computer in the DHCP client mode.
 - If this choice is selected, the ethernet network to which the computer is connected will automatically give it an IP address for that network, as long as that network has a DHCP server.
- Use the following IP address. This choice sets the computer in the Static address mode.
 - If this choice is selected, enter the desired IP address in the space provided. The first three sections of the address must be the same as the network or UAX-C to which the computer is connected
 - The last section of the address must be a number which is not already in use by that network. It can range from 1 to 254.
 - The subnet mask address will automatically be entered when its space is entered.

5.11.6.1 Verifying The Computer IP Address

When the previous procedure has been completed, the computer's IP address can be verified using the following procedure.

STEP 1 On the computer press Start > Run.

STEP 2 The Run window should open.

STEP 3 The run window open box should display cmd.

- If cmd is not displayed, type 'cmd'.
- Next press OK.

STEP 4 The cmd.exe window will open.

STEP 5 Type in 'ipconfig /all', then hit enter.

- The present computer IP address and other information will appear.

5.11.6.2 UAX-C Screen Captures

UAX-C GUI screens can easily be captured using the Alt - Print Screen keys. The procedure is as follows.

STEP 1 Connect a computer to the UAX-C.

STEP 2 Select the screen to be captured.

STEP 3 Press and hold the Alt key while pressing the print screen key.

a. Earlier Windows programs copied the captured screen to the clipboard.

b. The Windows XP program opens a window which offers many choices including copying the captured screen to the clipboard or saving it as a file to a specified directory.

STEP 4 It may be necessary to change the computer screen resolution if a portion of the UAX-C GUI screen is cut off when it is captured.

STEP 5 If desired, the captured screen may be edited, using a user supplied program, to remove the undesired information which surrounds the captured screen.

Another option for screen captures is a Firefox add-on called screen capture elite. It allows selection and capture of an active window and minimizes the amount of cropping needed.

5.12 Updating UAX-C Software

The latest revision of UAX-C software is available at the Harris Broadcast Customer Portal web site.

⇒ **NOTE:**

The transmitter will go off-air during software updates.

⇒ **NOTE:**

If changing modulation type, enter a new 'feature key' before programming.

⇒ **NOTE:**

Should this procedure result in a crashed or incomplete software download/ update, refer to 5.13 on page 5-45, 'Bootloader Recovery Procedure'.

When the software file is located and saved on your computer, use the following instructions to load the software into the UAX-C.

⇒ **NOTE:**

The DVB-T2 software update requires two files to be downloaded from the customer portal and the two files need to be loaded into the UAX-C sequentially. First load part 1 following the directions below and then after the UAX-C reboots load part 2 in the same manner.

STEP 1 Connect to the front ethernet connector of the UAX-C. The front connector IP address is static 192.168.117.88.

⇒ **NOTE:**

Instructions for connecting directly to the UAX-C front Ethernet connector is given in Section 5.11.4, Connection Via Front Ethernet Connector, on page -31.

STEP 2 When connected the UAX-C login screen, shown in Figure 5-13, will appear. The default username is 'admin' and the password is: admin. Logging in to the UAX-C must be done prior to loading software.



Figure 5-13 UAX-C Login Screen

STEP 3 Press the Exciter Home soft key on the Xmtr Home page.

STEP 4 Press the Setup soft key on the Exciter Home page.

STEP 5 Press the ISP soft key on the right side of the Setup page. The In System Programming screen, shown in Figure 5-14, will be displayed.

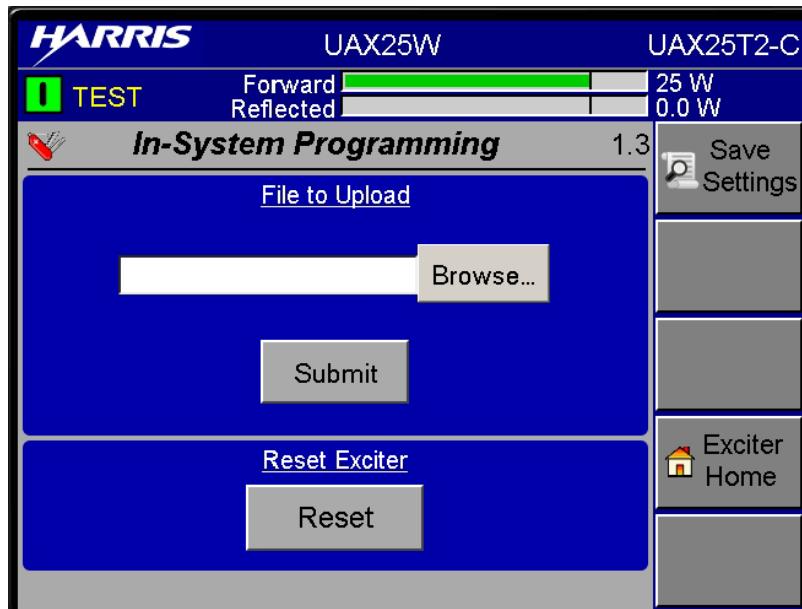


Figure 5-14 UAX-C In-System Programming Screen

STEP 6 Press the Browse soft button to the right of the file to upload box on the In-System Programming screen. This will bring up the File Upload sub window, shown in Figure 5-15.

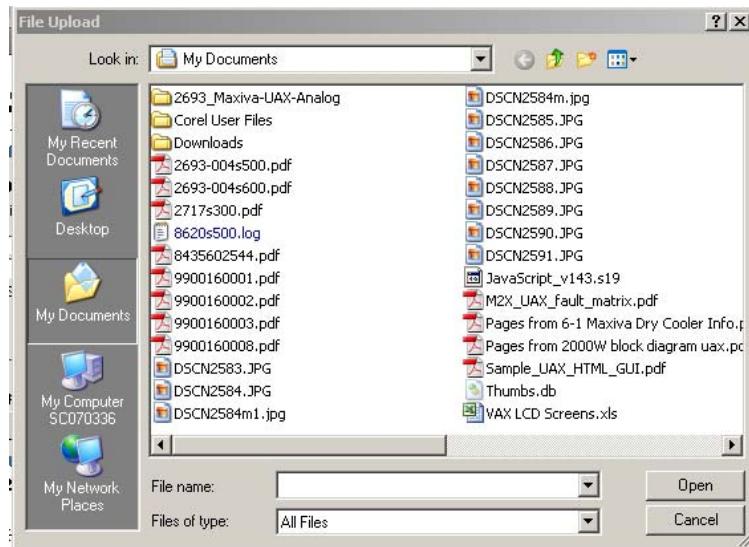


Figure 5-15 File Upload Window

STEP 7 From the File Upload sub window, locate the software file to be downloaded (.s19 file extension). This is the file which was previously down loaded and saved to the computer. When the correct file has been highlighted, press Open.

STEP 8 Press Submit when the In-System Programming screen reappears with the selected file showing in the File to Upload window.

STEP 9 There will be a delay of a minute or two and the screen, shown in Figure 5-16, will appear. When it appears, select Program.

⇒ **NOTE:**

Selecting Upload New would bring up the File Upload screen to select a different file.

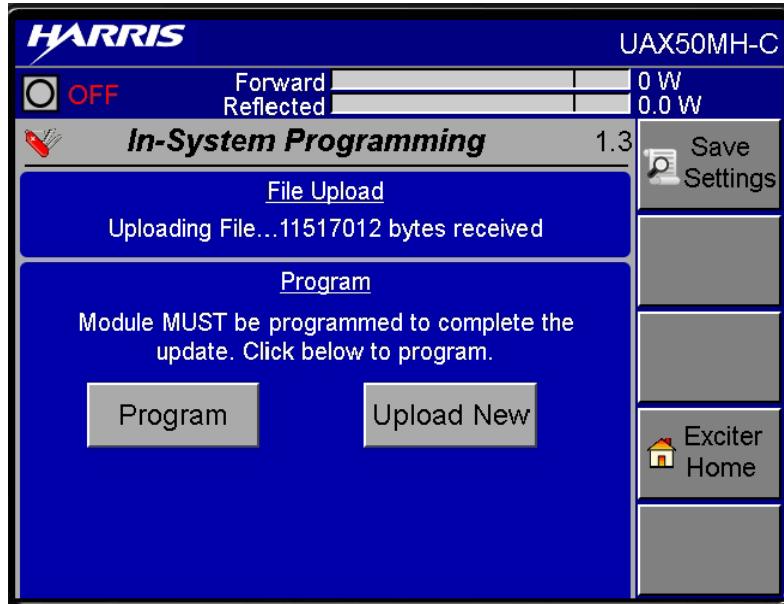


Figure 5-16 In-System Programming Window

STEP 10 The screen shown in Figure 5-17 will appear. Select OK to continue with programming.

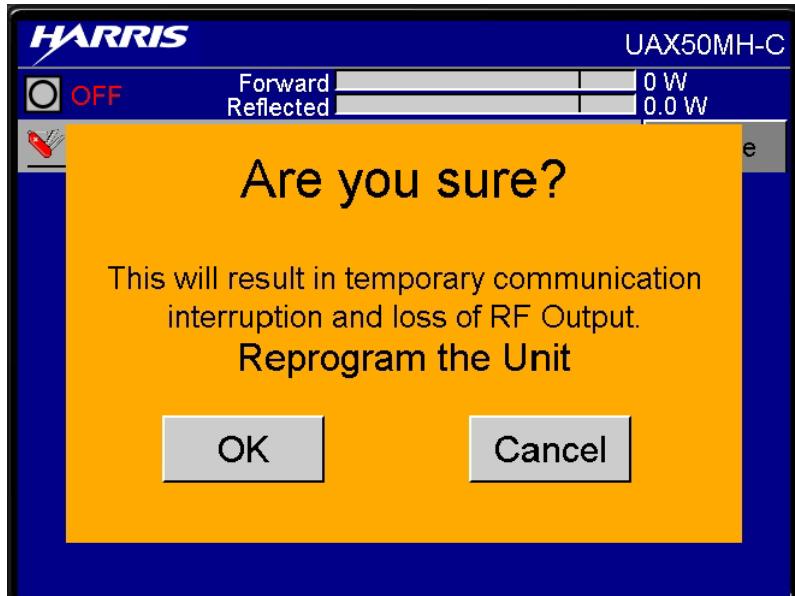


Figure 5-17 Are You Sure Window

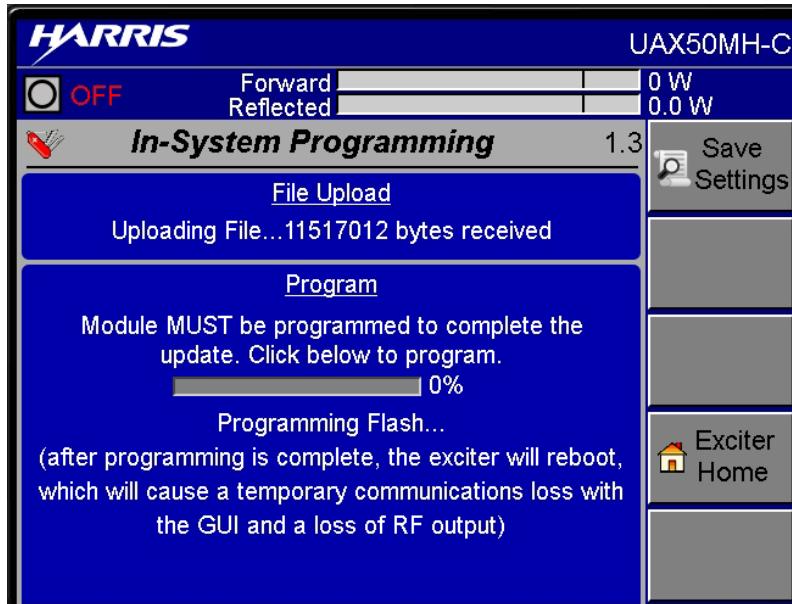


Figure 5-18 Programming Screen

STEP 11 The screen shown in Figure 5-18 will appear indicating that programming has begun. This process will take several minutes. Once programming is complete the web connection to the UAX-C will be broken and communication with the UAX-C will cease (a yellow error screen will be displayed).

STEP 12 When communications is reestablished a login screen will open.

⇒ **NOTE:**

In some instances it may be necessary to exit and then restart the Web browser to establish a new connection. Remember that DVB-T2 software updates require a second file to be uploaded before the update is completed.

STEP 13 Log into the UAX-C (name and password required). Use the web browser to navigate to Tx Home>Exciter Home>Status >Revisions screen. The new Build version will be displayed there. If Customer Special appears as the Build Version it indicates a possible problem and the software should be reloaded. The current modulator type can be identified by navigating to the Tx Home>Exciter Home>Setup>Signal Processor box.

STEP 14 End of procedure.

5.12.1 Saving and Recalling Settings

The Save Settings soft key can be used to save a copy of the current user settings stored in EEPROM in the LPU. All settings with the exception of the front and rear MAC addresses and feature key, are included. These stored settings can be used to restore a system to known user settings.

⇒ NOTE:

The EEPROM data does include calibration data, so if using to duplicate user settings on a second system, the calibration data will be copied over as well. As Calibration data is system specific this will corrupt the calibration; power readings will be inaccurate until they are recalibrated.

To save the current EEPROM settings, select the Save Settings soft key. A new browser tab will open showing the EEPROM file in text format. To save the file, from the Save settings data page, select File> Save Page As

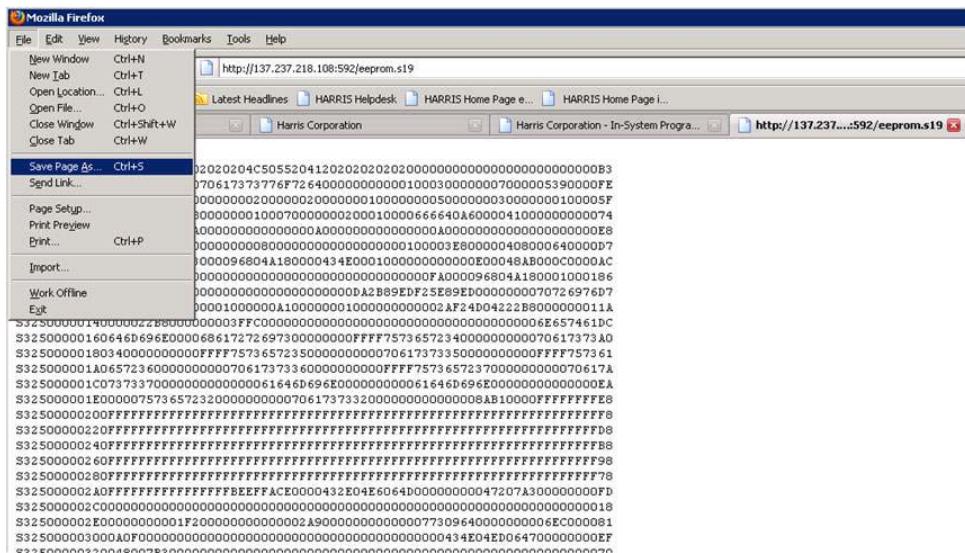


Figure 5-19 Save Settings Screen

Choose where to save EEPROM file, and name the file as desired. Make sure the file extension is '.s19'

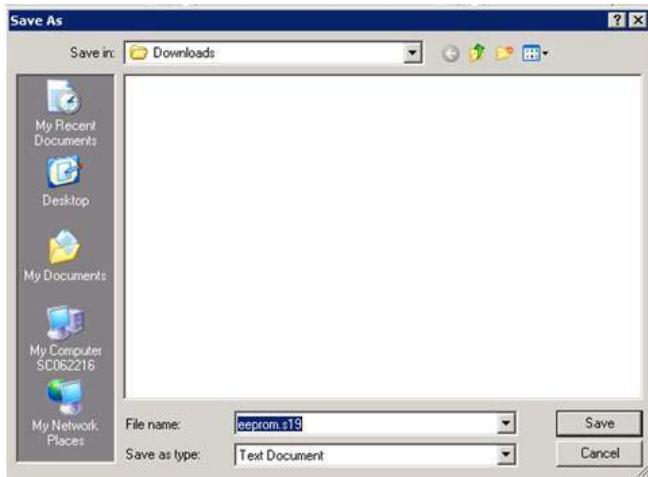


Figure 5-20 Save As Screen - eeprom.s1p file

In order to restore the settings that are saved in the file, follow the process described in "5.12 Updating UAX-C Software" on page 5-38. Use the .s19 file saved in the previous step as the file to upload.

5.12.2 Web Browser Screen Captures

Web browser GUI screens can easily be captured using the Alt - Print Screen keys. The procedure is as follows.

- STEP 1** Connect a computer to the UAX-C.
- STEP 2** Select the screen to be captured.
- STEP 3** Press and hold the Alt key while pressing the print screen key.
 - a. Earlier Windows programs copied the captured screen to the clipboard.
 - b. The Windows XP program opens a window which offers many choices including copying the captured screen to the clipboard or saving it as a file to a specified directory.
- STEP 4** It may be necessary to change the computer screen resolution if a portion of the GUI screen is cut off when it is captured.
- STEP 5** If desired, the captured screen may be edited, using a user supplied program, to remove the undesired information which surrounds the captured screen.

5.13 Bootloader Recovery Procedure

Recovery from a crashed or incomplete ISP (In-System Programming) download (software update) by invoking the bootloader.

In most cases this can be accomplished using the following procedure:

STEP 1 Connect to the front Ethernet port using instructions in Section 5.11.4.

STEP 2 Open a web browser session via the UAX-C front Ethernet port by entering 192.168.117.88/isp in the navigation box.

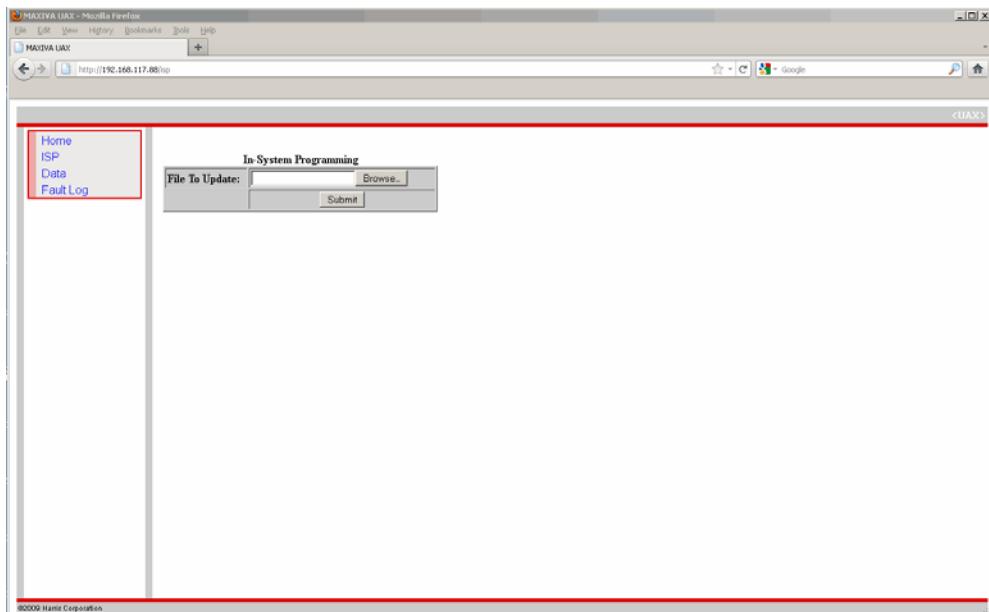


Figure 5-21 Bootloader ISP Screen

STEP 3 Use the Browse button to locate the software file on your PC. The filename will be similar to APEXM2X_ATSC_REVAK.s19. The modulation type and the revision level will vary.

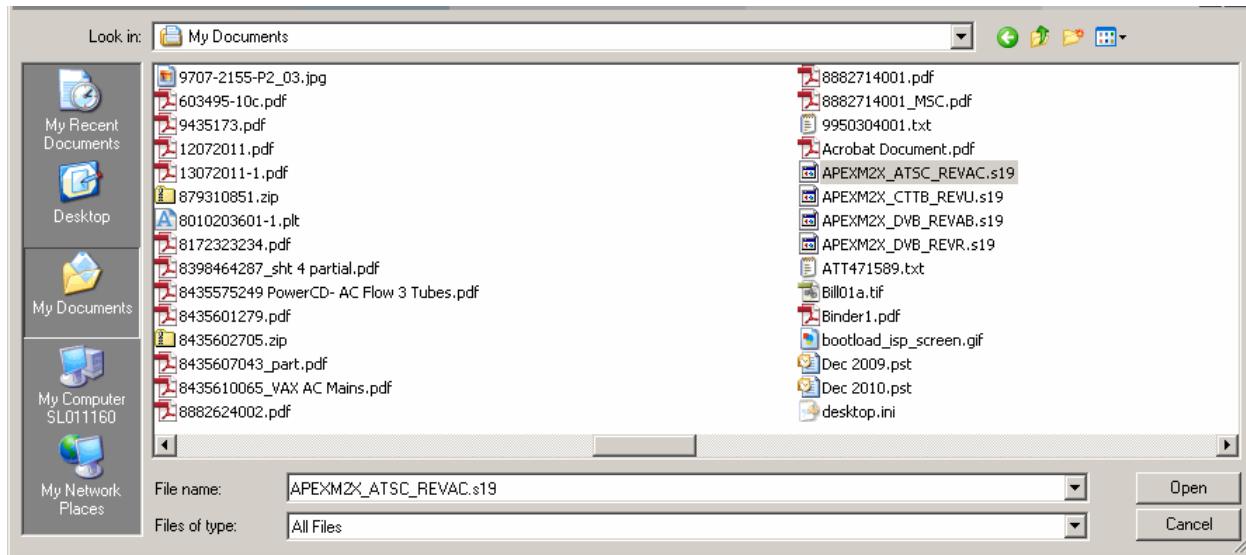


Figure 5-22 Bootloader Browse Screen

STEP 4 Highlight the desired file then press Open.

STEP 5 The bootloader ISP screen will be displayed and the 'File to Update:' window will display the filename. Press 'Submit'. The update will take several minutes. Do not disrupt the process.

STEP 6 Upon completion of the process open a web browser session to reestablish the connection to the UAX-C transmitter.

STEP 7 End of procedure.

In instances where the IP address is unknown or when the above procedure fails the following procedure may be used:

STEP 1 Connect a serial cable from PC / laptop to the UAX-C.

STEP 2 Start a terminal program (115,200,N,8,1) and make sure it is the active PC window/program.

STEP 3 Hold down the escape (ESC) key and power cycle the transmitter by either plugging and unplugging the unit or by using the reset button behind the front panel. Hold the escape key until you see the message 'Starting Ethernet Downloader' at the bottom of the screen. It should appear right away.

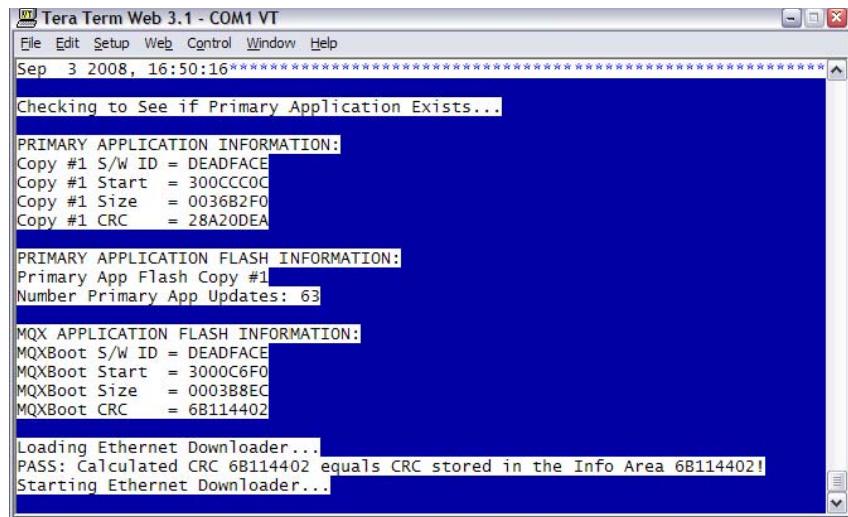


Figure 5-23 Ethernet Downloader Screen

STEP 4 Double strike the enter key to bring up the basic Ethernet screen.

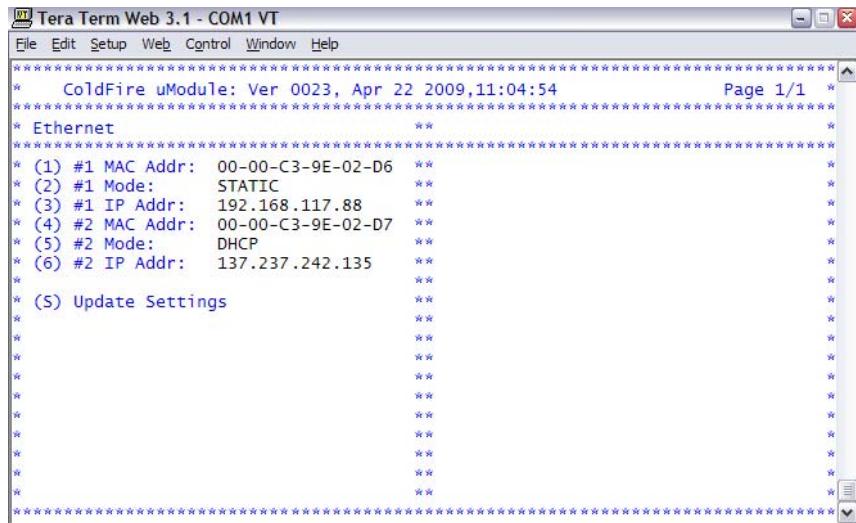
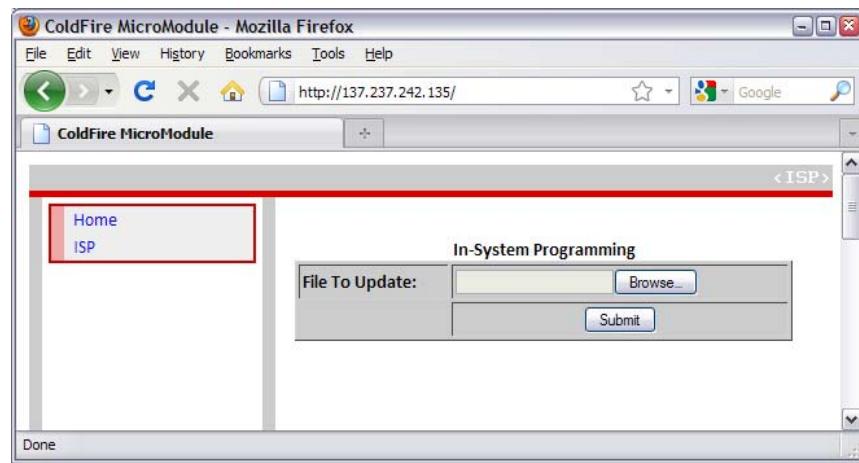


Figure 5-24 Tera Term Ethernet Screen

STEP 5 Use the static IP from the front panel or network settings of the rear IP port that may have been previously configured. Open a web browser and type in the appropriate IP address. The In-System Programming (ISP) screen will appear.



STEP 6 Proceed to load the complete *.s19 file.

STEP 7 End of procedure.

5.14 SNMP Connectivity

⇒ **NOTE:**

This section assumes a good working knowledge of networking and SNMP connectivity. The information contained here is not meant to teach networking or how to setup/operate a network manager application but merely provide the information necessary for a network administrator to connect and operate the UAX using the SNMP connection.

The UAX has an embedded SNMP (Simple Network Management Protocol) Agent that can be used to connect to a Network Manager application, such as the CSS Navigator. The UAX comes with a base MIB (Management Information Base) that contains 30 status and control variables common to all of the supported Harris transmitters, allowing basic control and monitoring functionality.

5.14.1 SNMP Configuration

To navigate to the UAX-C SNMP setup screen use the UAX-C Web browser interface. See connection procedures beginning at Section 5.11.4. Navigate to 'Remote Communications Setup Screens' beginning at Section 3.5.2.8.

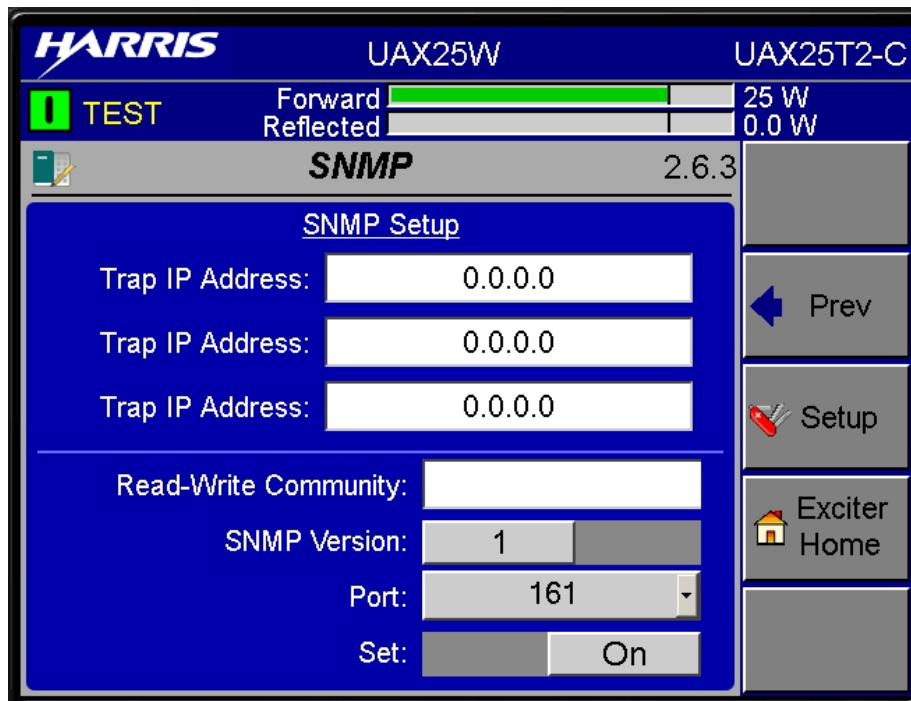


Figure 5-25 UAX-C SNMP Setup Screen

⇒ **NOTE:**

Figure 5-25 on page 5-50 is in the newer HTML screen format. All UAX transmitter screens are in process of conversion to this format. Newer firmware will incorporate this format.

The SNMP setup screen allows location setting for connection identification, destination IP address for trap messages, R/W community, Enable/Disable of Set commands, Port, selection of V1 or V2 traps and deletion of IP addresses.

5.14.2 Accessing the MIBs

The MIBs (Management Information Base) can be accessed in two ways:

1. Direct access (UAX is on the same LAN as user's MIB browser)
2. UAX is behind firewall.

5.14.3 General MIB Description

The Harris transmitter family supports monitoring and alarming functionality via SNMP (Simple Network Management Protocol). Basic control of the equipment is possible after activation in the equipment. SNMP versions V1 and V2c are implemented.

The Harris MIB is usable in all NMS (Network Management Systems) and is provided in text-format. The advantage of this monitoring system is, that there is no difference between the monitoring of various Harris equipment. Once the MIB is integrated into the NMS, all different devices can be monitored via the central station.

For complete control and monitoring functionality, an Internet browser has to be opened in the NMS, and various devices can be accessed.

5.14.3.1 MIB Functionality

Monitoring:

Main keys of the MIB 2 are supported (e.g. name, location), to classify the device. The Harris specific MIB allows monitoring of the main values of the device (e.g. Error, Warning, Output present) via SNMP.

Control:

Only rudimentary commands are included in the Harris MIB (e.g. switch transmitter on/off). For security, the device control via SNMP has to be activated in the equipment.

Traps:

The user can setup remote alarming via SNMP traps. Depending on the setup, the device will send a trap if an error, warning or info appears or disappears in the device.

5.14.3.2 Supported MIBs

Harris can serve four different MIBs:

- Harris transmitter base MIB (basic functionality for all Harris transmitters)
- IRT DVB Single Transmitter MIB
- IRT DAB Single Transmitter MIB
- FLO Modulation MIB

⇒ NOTE:

Harris extended MIB is not yet available.

5.14.3.3 Shortcuts

Following shortcuts are used in the MIB descriptions:

- OS:Octet String
- TT: Time Tick
- OID: Object Identifier
- G32: Gauge 32
- TRV: TRuth Value
- ENU: ENUMerations
- RO: Read Only
- RW: Read Write

5.14.3.4 Harris SMI (Structure of Managed Information)

Harris Transmission SMI

Harris Transmitters branch OID: 1.3.6.1.4.1.290.9.2.1

iso(1).org(3).dod(6).internet(1).private(4).enterprises(1).harris(290).bcd2(9).transmission(2)

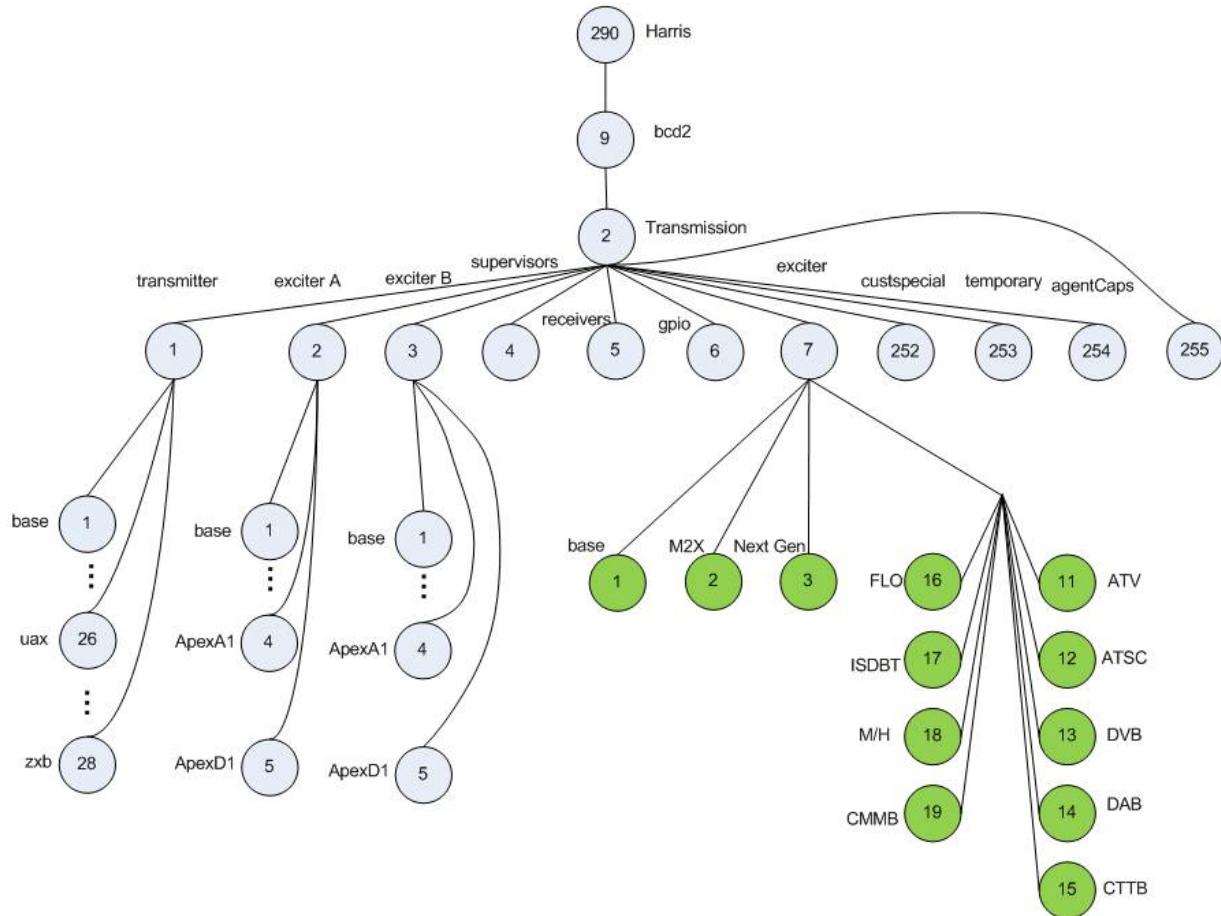


Figure 5-26 Harris SMI Block Diagram

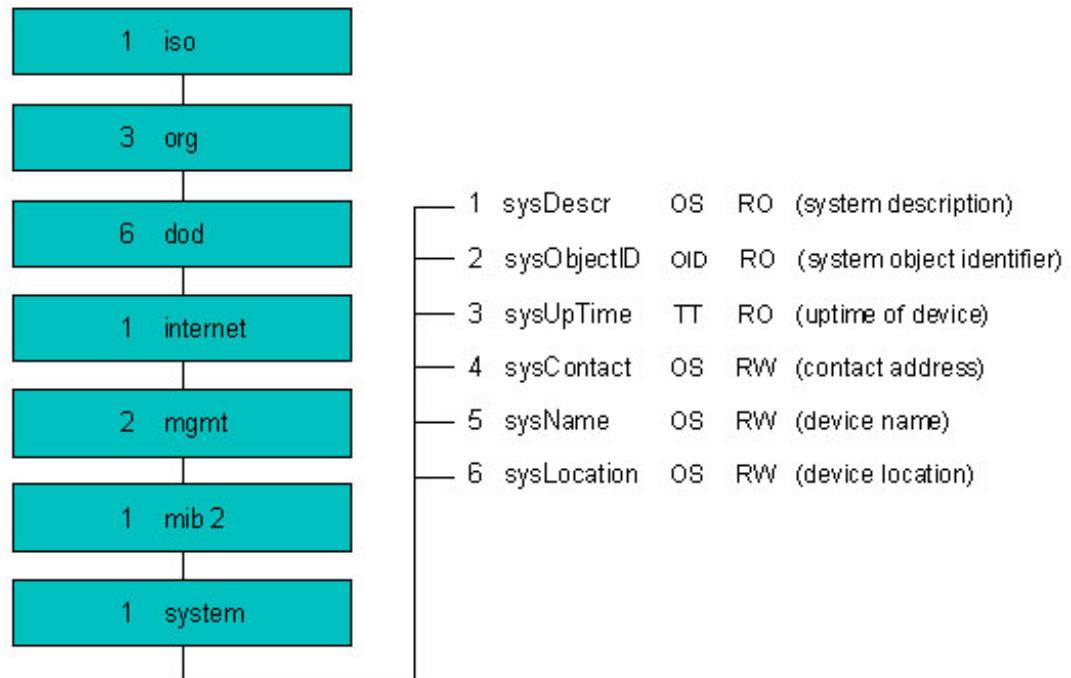
MB 2 description

Table 5-2 Harris Base MIB

1	driveChain	-	-	Drive chain branch
↳ 1	drvFaults	-	-	Drive chain faults
↳ 1	drvSumFault	TRV	RO	Drive chain summary fault
↳ 2	drvSumWarning	TRV	RO	Drive chain summary warning
↳ 2	drvStatus	-	-	Status of drive chain
↳ 1	drvInputOk	TRV	RO	Input signal ok
2	powerAmp	-	-	Power amplifier branch
↳ 1	paFaults	-	-	Power amplifier faults
↳ 1	paSumFault	TRV	RO	Power amplifier summary fault
↳ 2	paSumWarning	TRV	RO	Power amplifier summary warning
3	powerSupply	-	-	Power supply branch
↳ 1	psFaults	-	-	Power supply faults
↳ 1	psSumFault	TRV	RO	Power supply summary fault
↳ 2	psSumWarning	TRV	RO	Power supply summary warning
4	output	-	-	Output branch
↳ 1	outFaults	-	-	Transmitter output faults
↳ 1	outSumFault	TRV	RO	Output summary fault
↳ 2	outSumWarning	TRV	RO	Output summary warning
↳ 2	outStatus	-	-	Status of output
↳ 1	outOk	TRV	RO	Output signal ok
↳ 3	outMeters	-	-	Output measurements
↳ 1	outForwardPower	G32	RO	Transmitter forward power level in mW
↳ 2	outReflectedPower	G32	RO	Transmitter reflected power level in mW
↳ 3	outReflectionFactor	G32	RO	Transmitter reflection factor in dB/10 (formula: y = 100 * log (outReflectedPower/outForwardPower))
5	system	-	-	System branch
↳ 1	sysFaults	-	-	System faults
↳ 1	dataSourceOffline	TRV	RO	Link from to supervisor
↳ 2	sysSumFault	TRV	RO	System summary fault
↳ 3	sysSumWarning	TRV	RO	System summary warning
↳ 4	txSumFault	TRV	RO	Transmitter overall summary fault
↳ 5	txSumWarning	TRV	RO	Transmitter overall summary warning
↳ 6	trapPriority	INT	RO	Var binding (trap priority level: 1=fault, 2=warning, 3=info)
↳ 7	trapDescription	OS	RO	Var binding (trap details)
↳ 2	sysStatus	-	-	Status of the system
↳ 1	remoteEnable	TRV	RO	System in remote / local mode
↳ 2	txStatus	ENU	RO	Transmitter state: on (1) / off (2)
↳ 3	TxTest	TRV	RO	Var binding (test trap)
↳ 3	sysControl	-	-	System controls
↳ 1	txControl	ENU	RW	Switch transmitter: on (1) / off (2)
↳ 2	txControlValue	OS	RW	Value data of txControl
↳ 4	sysConfig	-	-	System configuration
↳ 1	deviceName	OS	RO	Transmitter name (GUI title bar)
↳ 2	modelNumber	OS	RO	Transmitter short name
↳ 3	txFrequency	G32	RO	Transmitter output frequency in Hz

Table 5-3 Base MIB Traps

Trap #	OID	Priority	Description
1	dataSourceOffline	1	Connection between transmitter and supervisor faulty
2	drvSumFault	1	Drive chain summary fault
3	drvSumWarning	2	Drive chain summary warning
4	drvInputOk	3	Drive chain input signal ok
5	paSumFault	1	Power amplifier summary fault
6	paSumWarning	2	Power amplifier summary warning
7	psSumFault	1	Power supply summary fault
8	psSumWarning	2	Power supply summary warning
9	outSumFault	1	Output summary fault
10	outSumWarning	2	Output summary warning
11	outOk	3	Output signal in optimal range (all ok)
12	sysSumFault	1	System section summary fault
13	sysSumWarning	2	System section summary warning
14	txSumFault	1	Over all summary fault
15	txSumWarning	2	Over all summary warning
16	remoteEnable	3	Transmitter in remote control mode
17	txTest	3	Test trap for SNMP configuration

5.15 Typical Test Equipment

Table 5-4 Recommended Test Equipment

Equipment Type	Manufacturer	Model Number	Options	Harris Part No. (if applicable)
TV Spectrum Analyzer	R&S	ETL	ETL-B203 RF pre-select.	
			FSL-B4 OCXO Ref. Freq.	
			FSL-B7 Nar. Res. Filters	
			ETL-K220 ATSC Demod.	
			DIV7 ETL-K208 Meas. Log	
Demodulator	R&S	EFA		instead of ETL
Spectrum Analyzer	Agilent	4402		instead of ETL
Power measurement	Agilent	E44182B power meter with E9300B sensor, 100 uW to 3 W		
Frequency measurement	Agilent	53131A or 53181A	010 high stability time base 015 range extension to 1.5 GHz, OR 030 range extension to 3.0 GHz	
Miscellaneous Test Equipment	Bird	APM-16 wattmeter, with 1W to 1kW elements		
	Narda	Directional coupler		620-0457-000
	Eagle	RLB-150 RF bridge		700-1289-000
	Eagle	TNF-200 UHF RF notch filter		484-0300-000
	Fluke	87 digital multimeter with 801-400 current probe		
Optional Adapters and connectors	Myat	3-1/8 inch to 4-1/16 inch adaptor		620-2395-000
	Dielectric	3-1/8 inch to 4-1/16 inch adaptor		620-1928-000
	Myat	3-1/8 inch to 6-1/8 inch adaptor		620-2297-000
		3-1/8 inch to type N adaptor		620-2859-000
Adapters and connectors		Type N to BNC, male to female		620-0128-000
		Type N to BNC, female to male		620-0547-000
		BNC barrel, female to female		620-0604-000
		BNC barrel, male to male		620-0564-000
		SMA to BNC, male to female		620-2611-000
		SMA to N, male to female		620-2562-000
		SMB (push on) to BNC		620-0628-000
		SMC to BNC, screw on jack to plug		620-2563-000
		BNC to TNC, jack to plug		620-2821-000
		BNC to TNC, jack to jack		620-2823-000
		TNC to N, plug to jack		620-2824-000
		TNC to N, jack to plug		620-2822-000
Attenuator		10 dB attenuator, type N, male to female		556-0074-000
Equipment Type	Manufacturer	Model Number	Options	Harris Part No. (if applicable)

