

TECHNICAL MANUAL
888-2765-001
PA Diagnostics Unit

PA Diagnostics Unit



T.M. No. 888-2765-001

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Rev: **B**

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Technical Assistance

Technical and troubleshooting assistance for HARRIS Transmission products is available from HARRIS Field Service (factory location: Quincy, Illinois, USA) during normal business hours (8:00 AM - 5:00 PM Central Time). Telephone **+1-217-222-8200** to contact the Field Service Department; FAX **+1-217-221-7086**; or E-mail questions to ***tsupport@harris.com***.

Emergency service is available 24 hours a day, seven days a week, by telephone only.

Online assistance, including technical manuals, white papers, software downloads, and service bulletins, is available at ***http://support.broadcast.harris.com/eservice_enu***.

Address written correspondence to Field Service Department, HARRIS Broadcast Communications Division, P.O. Box 4290, Quincy, Illinois 62305-4290, USA. For other global service contact information, please visit: ***http://www.broadcast.harris.com/contact***.

NOTE: For all service and parts correspondence, you will need to provide the Sales Order number, as well as the Serial Number for the transmitter or part in question. For future reference, record those numbers here: _____/_____

Please provide these numbers for any written request, or have these numbers ready in the event you choose to call regarding any Service, or Parts requests. For warranty claims it will be required, and for out of warranty products, this will help us to best identify what specific hardware was shipped.

Replaceable Parts Service

Replacement parts are available from HARRIS Service Parts Department 7:00 AM to 7:00 PM Central Time, Monday through Friday, and 8:00 AM to 1:00 PM Central Time on Saturday. Telephone **+1-217-222-8200** or email ***servicepartsreq@harris.com*** to contact the Service Parts Dept.

Emergency replacement parts are available by telephone only, 24 hours a day, seven days a week by calling +1-217-222-8200.

Unpacking

Carefully unpack the equipment and perform a visual inspection to determine if any apparent damage was incurred during shipment. Retain the shipping materials until it has been verified that all equipment has been received undamaged. Locate and retain all PACKING CHECK LISTs. Use the PACKING CHECK LIST to help locate and identify any components or assemblies which are removed for shipping and must be reinstalled. Also remove any shipping supports, straps, and packing materials prior to initial turn on.

Returns And Exchanges

No equipment can be returned unless written approval and a Return Authorization is received from HARRIS Broadcast Communications Division. Special shipping instructions and coding will be provided to assure proper handling. Complete details regarding circumstances and reasons for return are to be included in the request for return. Custom equipment or special order equipment is not returnable. In those instances where return or exchange of equipment is at the request of the customer, or convenience of the customer, a restocking fee will be charged. All returns will be sent freight prepaid and properly insured by the customer. When communicating with HARRIS Broadcast Communications Division, specify the HARRIS Order Number or Invoice Number.

Manual Revision History

PA Diagnostics Unit

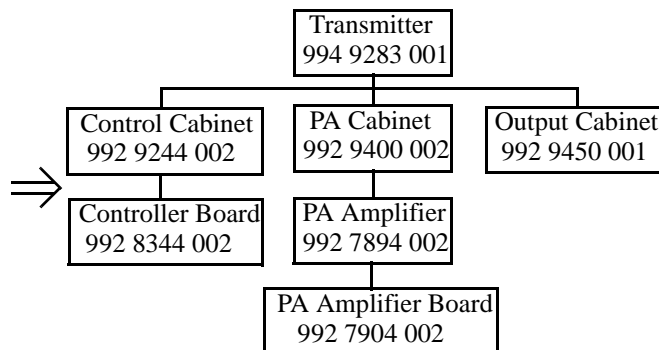
REV.	DATE	ECN	Pages Affected
A	2010 April		Creation
B	2011 November	P51563	Add PA software update information.

Guide to Using Harris Parts List Information

The Harris Replaceable Parts List Index portrays a tree structure with the major items being leftmost in the index. The example below shows the Transmitter as the highest item in the tree structure. If you were to look at the bill of materials table for the Transmitter you would find the Control Cabinet, the PA Cabinet, and the Output Cabinet. In the Replaceable Parts List Index the Control Cabinet, PA Cabinet, and Output Cabinet show up one indentation level below the Transmitter and implies that they are used in the Transmitter. The Controller Board is indented one level below the Control Cabinet so it will show up in the bill of material for the Control Cabinet. The tree structure of this same index is shown to the right of the table and shows indentation level versus tree structure level.

Example of Replaceable Parts List Index and equivalent tree structure:

Replaceable Parts List Index	Part Number	Page
Table 7-1. Transmitter	994 9283 001	7-2
Table 7-2. Control Cabinet	992 9244 002	7-3
Table 7-3. Controller Board	992 8344 002	7-6
Table 7-4. PA Cabinet	992 9400 002	7-7
Table 7-5. PA Amplifier	994 7894 002	7-9
Table 7-6. PA Amplifier Board	992 7904 002	7-10
Table 7-7. Output Cabinet	992 9450 001	7-12




The part number of the item is shown to the right of the description as is the page in the manual where the bill for that part number starts. Inside the actual tables, four main headings are used:

- Table #-#. ITEM NAME - HARRIS PART NUMBER - this line gives the information that corresponds to the
- Replaceable Parts List Index entry;
- HARRIS P/N column gives the ten digit Harris part number (usually in ascending order);
- DESCRIPTION column gives a 25 character or less description of the part number;
- REF. SYMBOLS/EXPLANATIONS column 1) gives the reference designators for the item (i.e., C001, R102, etc.) that corresponds to the number found in the schematics (C001 in a bill of material is equivalent to C1 on the schematic) or 2) gives added information or further explanation (i.e., “Used for 208V operation only,” or “Used for HT 10LS only,” etc.).

NOTE: Inside the individual tables some standard conventions are used:

- A # symbol in front of a component such as #C001 under the REF. SYMBOLS/EXPLANATIONS column means that this item is used on or with C001 and is not the actual part number for C001.
- In the ten digit part numbers, if the last three numbers are 000, the item is a part that Harris has purchased and has not manufactured or modified. If the last three numbers are other than 000, the item is either manufactured by Harris or is purchased from a vendor and modified for use in the Harris product.
- The first three digits of the ten digit part number tell which family the part number belongs to - for example, all electrolytic (can) capacitors will be in the same family (524 xxxx 000). If an electrolytic (can) capacitor is found to have a 9xx xxxx xxx part number (a number outside of the normal family of numbers), it has probably been modified in some manner at the Harris factory and will therefore show up farther down into the individual parts list (because each table is normally sorted in ascending order). Most Harris made or modified assemblies will have 9xx xxxx xxx numbers associated with them.

The term “SEE HIGHER LEVEL BILL” in the description column implies that the reference designated part number will show up in a bill that is higher in the tree structure. This is often the case for components that may be frequency determinant or voltage determinant and are called out in a higher level bill structure that is more customer dependent than the bill at a lower level.


 **WARNING:**
THE CURRENTS AND VOLTAGES IN THIS EQUIPMENT ARE DANGEROUS. PERSONNEL MUST AT ALL TIMES OBSERVE SAFETY WARNINGS, INSTRUCTIONS AND REGULATIONS.

This manual is intended as a general guide for trained and qualified personnel who are aware of the dangers inherent in handling potentially hazardous electrical/electronic circuits. It is not intended to contain a complete statement of all safety precautions which should be observed by personnel in using this or other electronic equipment.

The installation, operation, maintenance and service of this equipment involves risks both to personnel and equipment, and must be performed only by qualified personnel exercising due care. HARRIS CORPORATION shall not be responsible for injury or damage resulting from improper procedures or from the use of improperly trained or inexperienced personnel performing such tasks. During installation and operation of this equipment, local building codes and fire protection standards must be observed.

The following National Fire Protection Association (NFPA) standards are recommended as reference:

- Automatic Fire Detectors, No. 72E
- Installation, Maintenance, and Use of Portable Fire Extinguishers, No. 10
- Halogenated Fire Extinguishing Agent Systems, No. 12A

 **WARNING:**
ALWAYS DISCONNECT POWER BEFORE OPENING COVERS, DOORS, ENCLOSURES, GATES, PANELS OR SHIELDS. ALWAYS USE GROUNDING STICKS AND SHORT OUT HIGH VOLTAGE POINTS BEFORE SERVICING. NEVER MAKE INTERNAL ADJUSTMENTS, PERFORM MAINTENANCE OR SERVICE WHEN ALONE OR WHEN FATIGUED.

Do not remove, short-circuit or tamper with interlock switches on access covers, doors, enclosures, gates, panels or shields. Keep away from live circuits, know your equipment and don't take chances.

 **WARNING:**
IN CASE OF EMERGENCY ENSURE THAT POWER HAS BEEN DISCONNECTED.

IF OIL FILLED OR ELECTROLYTIC CAPACITORS ARE UTILIZED IN YOUR EQUIPMENT, AND IF A LEAK OR BULGE IS APPARENT ON THE CAPACITOR CASE WHEN THE UNIT IS OPENED FOR SERVICE OR MAINTENANCE, ALLOW THE UNIT TO COOL DOWN BEFORE ATTEMPTING TO REMOVE THE DEFECTIVE CAPACITOR. DO NOT ATTEMPT TO SERVICE A DEFECTIVE CAPACITOR WHILE IT IS HOT DUE TO THE POSSIBILITY OF A CASE RUPTURE AND SUBSEQUENT INJURY.

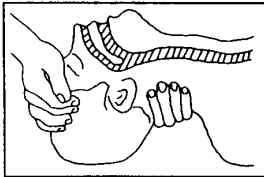
TREATMENT OF ELECTRICAL SHOCK

1. IF VICTIM IS NOT RESPONSIVE FOLLOW THE A-B-C'S OF BASIC LIFE SUPPORT.

PLACE VICTIM FLAT ON HIS BACK ON A HARD SURFACE

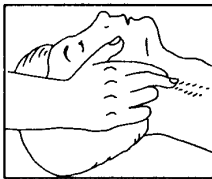
(A) AIRWAY

IF UNCONSCIOUS,
OPEN AIRWAY



LIFT UP NECK
PUSH FOREHEAD BACK
CLEAR OUT MOUTH IF NECESSARY
OBSERVE FOR BREATHING

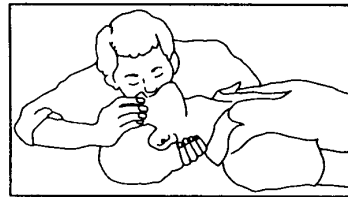
CHECK
CAROTID PULSE



IF PULSE ABSENT,
BEGIN ARTIFICIAL
CIRCULATION

(B) BREATHING

IF NOT BREATHING,
BEGIN ARTIFICIAL BREATHING



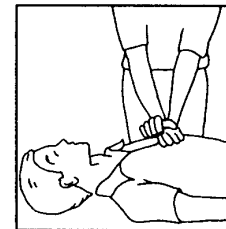
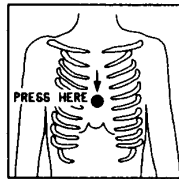
TILT HEAD
PINCH NOSTRILS
MAKE AIRTIGHT SEAL
4 QUICK FULL BREATHS
REMEMBER MOUTH TO MOUTH
RESUSCITATION MUST BE
COMMENCED AS SOON AS POSSIBLE

(C) CIRCULATION

DEPRESS STERNUM 1 1/2 TO 2 INCHES

APPROX. RATE
OF COMPRESSIONS { ONE RESCUER
--80 PER MINUTE { 15 COMPRESSIONS
2 QUICK BREATHS

APPROX. RATE
OF COMPRESSIONS { TWO RESCUERS
--60 PER MINUTE { 5 COMPRESSIONS
1 BREATH



NOTE: DO NOT INTERRUPT RHYTHM OF COMPRESSIONS
WHEN SECOND PERSON IS GIVING BREATH

CALL FOR MEDICAL ASSISTANCE AS SOON AS POSSIBLE.

2. IF VICTIM IS RESPONSIVE.

- A. KEEP THEM WARM
- B. KEEP THEM AS QUIET AS POSSIBLE
- C. LOOSEN THEIR CLOTHING
- D. A RECLINING POSITION IS RECOMMENDED

FIRST-AID

Personnel engaged in the installation, operation, maintenance or servicing of this equipment are urged to become familiar with first-aid theory and practices. The following information is not intended to be complete first-aid procedures, it is a brief and is only to be used as a reference. It is the duty of all personnel using the equipment to be prepared to give adequate Emergency First Aid and there by prevent avoidable loss of life.

Treatment of Electrical Burns

1. Extensive burned and broken skin
 - a. Cover area with clean sheet or cloth. (Cleanest available cloth article.)
 - b. Do not break blisters, remove tissue, remove adhered particles of clothing, or apply any salve or ointment.
 - c. Treat victim for shock as required.
 - d. Arrange transportation to a hospital as quickly as possible.
 - e. If arms or legs are affected keep them elevated.

⇒ NOTE:

If medical help will not be available within an hour and the victim is conscious and not vomiting, give him a weak solution of salt and soda: 1 level teaspoonful of salt and 1/2 level teaspoonful of baking soda to each quart of water (neither hot or cold). Allow victim to sip slowly about 4 ounces (a half of glass) over a period of 15 minutes. Discontinue fluid if vomiting occurs. (Do not give alcohol.)

2. Less severe burns - (1st & 2nd degree)
 - a. Apply cool (not ice cold) compresses using the cleanest available cloth article.
 - b. Do not break blisters, remove tissue, remove adhered particles of clothing, or apply salve or ointment.
 - c. Apply clean dry dressing if necessary.
 - d. Treat victim for shock as required.
 - e. Arrange transportation to a hospital as quickly as possible.
 - f. If arms or legs are affected keep them elevated.

REFERENCE:

ILLINOIS HEART ASSOCIATION
AMERICAN RED CROSS STANDARD FIRST AID AND PERSONAL SAFETY
MANUAL (SECOND EDITION)

Glossary:

LCD - Liquid crystal display

LDMOS - Lateral Double diffused Metal Oxide Semiconductor

LED - Light-emitting diode

PA - Power amplifier

PDU - PA Diagnostics Unit

Table of Contents

Section 1 Introduction

Purpose of This Manual	1-1
Features / Benefits.	1-2
General Description.	1-2
Operating voltages:	1-4

Section 2 Installation / Initial Turn-On

Introduction	2-1
Returns and Exchanges	2-1
Documentation	2-1
Unpacking	2-2
Installation Steps	2-2
Disconnecting the PA Diagnostics Unit	2-2

Section 3 Operation

Introduction	3-1
LCD Display and Control	3-1
LCD Display.	3-1
Control Buttons.	3-2
Navigation	3-3
Status LED's.	3-3
LCD Menu	3-4

Section 4 Theory of Operation

Introduction	4-1
------------------------	-----

Section 5 Maintenance and Alignments

Introduction	5-1
PA Diagnostic Unit Maintenance and Repair	5-2
LCD Contrast Adjustment.	5-2
Updating PA Diagnostics Unit Software.	5-3
Uploading PA Module Software to PDU	5-7
Using PDU to Update PA Module Software.	5-9
Technical Assistance	5-9

Section 6 Diagnostics

Introduction.	6-1
-----------------------	-----

Section 7 Parts List

PA Diagnostic Unit Parts List	7-1
---	-----

Table of Contents

Section 1

Introduction

1

1.1 Purpose of This Manual

This technical manual contains the information pertaining to the Maxiva PA module diagnostics unit. The various sections of this technical manual provide the following types of information.

- Section 1: Introduction, describes the product and provides photos of the components.
- Section 2: Installation, details the procedures to receive, install and set up the diagnostics unit.
- Section 3: Operation, describes operation of the diagnostics unit.
- Section 4: Theory of Operation, is included to help service personnel to understand the inner workings of the system.
- Section 5: Maintenance, lists and explains adjustments and component replacements that could be required for the PA diagnostics unit.
- Section 6: Troubleshooting is included as a servicing aid to be used by qualified service personnel to identify and correct an equipment malfunction.
- Section 7: Parts List, a listing of the diagnostics unit components that may be replaced in the field.

1.2 Features / Benefits

The PA module diagnostic unit is not included with the Maxiva or Platinum transmitters. It is available for purchase as an option. The handheld unit can be used to measure PA module operating parameters that are operating in a transmitter or in a Harris PA module test system. The PA module test system is also available for purchase as an option.

- The diagnostics unit can be used to measure either digital or analog PA modules.
- The handheld diagnostic unit requires a cable to connect the unit to the PA module being measured.
- Parameters that can be measured include: RF power (in, out and reflected), power supply voltages, LDMOS currents, pallet and controller temperatures, and PA module voltage settings (44, 46, 48 or 50V).
- The PA module diagnostic unit can be used to update PA module software. See Figure 5.6 on page 5-9 for instructions.

1.3 General Description

The PA module diagnostic unit is a handheld device that allows measurement of PA modules that are operating in a ULX or VLX transmitter or in a Harris PA module test system. This section includes detailed descriptions of the diagnostics unit.

The Harris part numbers associated with the diagnostics unit are:

- Unit, PA Diagnostics 971-00040-080
- PA Diagnostics Unit Cable 256-0346-000
- Cable Assy, USB-A/B, 1.5M 256-0166-015
- Doc Pkg, 988-2765-001
- Kit, PA Diagnostics Unit, Interconnect 50C Cable, USB-A/B Cable and Documentation 971-0040-081.



Figure 1-1 PA Module Diagnostic Unit

1.4 Operating voltages:

The diagnostic unit operating voltages are provided by an operating PA module. The diagnostic unit will only become operational when attached to an operating PA module via the interconnect cable. The diagnostic unit contains no batteries or fuses.



Figure 1-2 PA Diagnostics Unit and Cable

Section 2

Installation / Initial Turn-On

2

2.1 Introduction

This section includes the information necessary to install and turn on a PA diagnostics unit.

2.2 Returns and Exchanges

Damaged or undamaged equipment should not be returned unless written approval and a Return Authorization is received from HARRIS CORPORATION, Broadcast Division. Special shipping instructions and coding will be provided to assure proper handling. Complete details regarding circumstances and reasons for return are to be included in the request for return. Custom equipment or special order equipment is not returnable. In those instances where return or exchange of equipment is at the request of the customer, or convenience of the customer, a restocking fee will be charged. All returns will be sent freight prepaid and properly insured by the customer. When communicating with Harris Corporation, Broadcast Division, specify the Harris Order Number or Invoice Number.

2.3 Documentation

The following is a list of documentation that included with the documentation package . Find and save all documentation.

- Documentation package, Harris part number **988-2765-001**

A document package includes this technical manual: **888-2765-001**

2.4 Unpacking

Upon receipt of the PA diagnostics unit and associated components, carefully unpack the components and perform a visual inspection to ensure that no apparent damage was incurred during shipment. Retain the shipping materials until it has been determined that the unit is not damaged. The contents of the shipment should be as indicated on the packing list. If the contents are incomplete or if the unit is damaged electrically or mechanically, notify the carrier and Harris Corporation, Broadcast Division.

2.5 Installation Steps

The PA diagnostics unit is designed for indoor use only. It should be stored in a location that is free from exposure to condensation, dust, and dirt. Avoid dropping the diagnostics unit. Do not support the diagnostics unit with the interconnect cable.

- STEP 1** Attach one end of the interconnect cable to the PA diagnostics unit.
- STEP 2** Attach the other end of the interconnect cable to the PA module under test. The PA module can be located either in the transmitter or in the optional PA module test system.
- STEP 3** Activate the PA module.
- STEP 4** The PA diagnostics display LCD screen should display the main menu and the green power on LED above the ON button should light as shown in Figure 1-2 on page 1-4. If there are no active faults on the PA module then the green RF Input OK LED on the PA diagnostics unit should also be lit.

2.6 Disconnecting the PA Diagnostics Unit

- STEP 1** Press the sides of the connector that is attached to the PA module and pull the connector away from the PA module connector.
- STEP 2** Press the sides of the connector that is attached to the PA diagnostics unit and pull the connector away from the unit.
- STEP 3** Store the diagnostic unit and interconnect cable in a safe place.

Section 3

Operation

3

3.1 Introduction

This section gives more detailed operational information for the Maxiva PA Diagnostic Unit. This information pertains to the operation and navigation of the display unit.

3.2 LCD Display and Control

The handheld PA diagnostics unit is designed to connect to the 50 pin connector on the front of the PA module under test with a test cable. The test set contains a 4-line LCD text screen.

3.2.1 LCD Display

Line 1 identifies the current menu.

On the right side of line 1, a status indicator shows whether there are active faults. If the indicator is a blinking exclamation mark (!), there are active faults. If no faults, the indicator is a smiley-face.

Lines 2-4 show the items in the current menu.



Figure 3-1 Handheld PA Diagnostics Unit

3.2.2 Control Buttons

ON - Button is not active when in transmitter mode. If in test bench mode it will turn PA module RF ON. Green LED indicates module is ON.

OFF -Button is not active when in transmitter mode. If in test bench mode it will turn PA module RF OFF. Red LED indicates module is OFF.

Navigation Buttons - Navigation through the LCD menu is done with the up, down, left & right buttons which are arranged in a circle below the six status LEDs. The black button in the center is used to enter a selection or expand a menu. The left button is primarily used as a back button to return to a previous menu selection. The up and down buttons are used to move the arrow cursor which indicates the menu line which will be activated by pressing the black enter button.

3.2.3 Navigation

Up/Down buttons scroll through the current menu items.

Right button or Enter (center) button selects the currently highlighted menu item (if selectable).

Left button navigates out of the current menu to the next level up (i.e. the parent menu).

A circular marker on the LCD line indicates the currently highlighted menu item

A right-pointing triangle/arrow after an LCD menu item indicates that it is a submenu that can be entered by pressing the Right or Enter button.

On line 1, the first column will show a left-pointing triangle/arrow to indicate that the operator can press the left arrow to exit to the next-higher menu level.

On the far-right column of row 2, an up-pointing triangle/arrow indicates that the operator can scroll upward through the menu items (by pressing the UP button) to reveal more menu items.

On the far-right column of row 4, a down-pointing triangle/arrow indicates that the operator can scroll downward through the menu items (by pressing the DOWN button) to reveal more menu items.

3.2.4 Status LED's

- Power Supply - Normally not lit. Red indicates a power supply fault.
- LDMOS - Normally not lit. Red indicates an LDMOS (FET) fault.
- VSWR - Normally not lit. Red indicates an input VSWR fault (VSWR is outside the operational range)
- Overload - Normally not lit. Red indicates an overload fault.
- Temperature - Normally not lit. Red indicates a temperature fault (temperatures are above normal range).
- RF Input OK - Normally lit green. Green indicates that the RF input level is within range. The LED lights amber when RF input is out of range.

3.2.5 LCD Menu

The following table summarizes the status and control information found on the diagnostic unit LCD menus.

Table 3-1

<i>Main Menu:</i>	<i>Secondary Menu</i>	<i>Parameter</i>	<i>Remarks</i>	
STATUS	RF POWER	OUT	RF power out of module(Watts).	
		IN	RF power into module (Watts).	
		RFLD	Reflected power into module (W).	
	PS VOLTAGES	SELECTED operating voltage & measured PS 1-8 voltages	Selected PS voltage output (44,46, 48 or 50Volts). Set by transmitter in transmitter mode. Selected via diagnostics unit in test bench mode.	
		LDMOS CURRENT	TOTAL	Combined LDMOS current for module (Amps).
	TEMPERATURE S	PAL 1-4	FET 1 & 2	LDMOS current for indicated pallet (Amps).
			FET 1 & 2	LDMOS current for indicated FET (Amps).
		CTRL	Temperature (C ^o) of module controller board.	
	CONTROL	PA VOLTAGE	44, 46, 48 or 50V	Used to select desired PS voltage when in Test Bench mode of operation. Not functional in Transmitter mode.
DIAGNOSTIC MODE		Transmitter	Select this mode if PA module is operating in transmitter.	
		Test Bench	Select this mode if PA module is operating in a PA module test system.	
FIRMWARE	Stored Ver	00xx	Current version of PA software stored in diagnostic unit.	
	PA Ver	00xx	Current version of PA software stored in diagnostic unit.	
	UPDATE		Transfers software from diagnostic unit to PA module.	
VERSION INFO	DIAG. HW:	V0XXX	Hardware version number.	
	DIAG. SW:	V0XXX	Software version number.	

Section 4

Theory of

Operation

4

4.1 Introduction

Consult the Maxiva ULX or Platinum VLX technical manuals for detailed theory of operation for PA modules. Section 4 in the transmitter manuals contains detailed information about IPA and PA modules. The manuals also contain detailed information about the LED's on the front of the modules.

Section 5

Maintenance and Alignments

5

5.1 Introduction

This section contains maintenance and alignment procedures for the PA Diagnostic Unit.

Refer to the Maxiva ULX or Platinum VLX Transmitter Technical Manuals for more information about PA module testing and repair. Repair of modules should only be attempted by qualified, trained personnel. Hazardous voltages and RF radiation hazards exist.

 **CAUTION:**

TOXIC BERYLLIUM

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

HOT SURFACE

MAXIVA PA MODULES ARE DESIGNED TO HANDLE VERY HIGH TEMPERATURES AND MAY BE EXTREMELY HOT, UP TO 90° F (32° C) ABOVE ROOM TEMPERATURE. DO NOT TOUCH THE MODULES 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.

WEIGHT

THE PA MODULE WEIGHS APPROXIMATELY 26.5KG AND CAN BE AWKWARD TO HANDLE. USE CAUTION WHEN REMOVING, HANDLING AND REPLACING PA MODULES.

 **CAUTION:**
RADIO FREQUENCY HAZARD. UNQUALIFIED PERSONNEL SHOULD NOT ATTEMPT TO OPERATE THE PA MODULE WITH THE COVER REMOVED.

5.2 PA Diagnostic Unit Maintenance and Repair

The PA diagnostic unit requires no maintenance. Repair of the unit should only be attempted by qualified personnel. Repair of the diagnostic unit should be limited to replacement of circuit boards. Calibration and alignment are not required.

5.3 LCD Contrast Adjustment

Later models of the PA diagnostic unit may be equipped with an LCD contrast adjustment. The LCD screen contrast can be adjusted via adjustment of a small potentiometer which can be found in an access hole on the left side of the unit. Simply insert a small flat-blade screwdriver or plastic tuning tool into the hole and slowly adjust the pot to the desired contrast level.

5.4 Updating PA Diagnostics Unit Software

Older versions of the PDU are not capable of software updates without modification. Newer versions of the PDU can be identified by the presence of a part number sticker on the PDU case.

STEP 1 Download the required programs and drivers from the Harris Customer Web Portal <http://support.broadcast.harris.com>

The files are located under Self Service>Download Software Updates>Television Transmission>Maxiva>PDU. The files should be placed on the local computer in a single folder named ULX PDU Files.

File structure of ULX PDU Files folder shown in Figure 5-1:

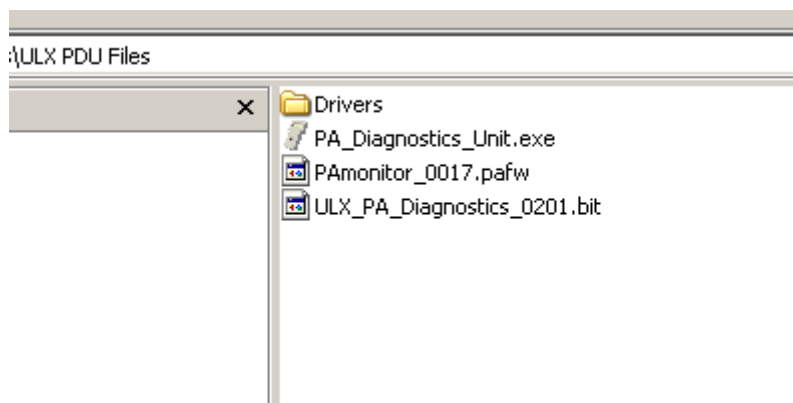


Figure 5-1 PDU Software Folder

The files and folders in the Drivers folder are shown below:

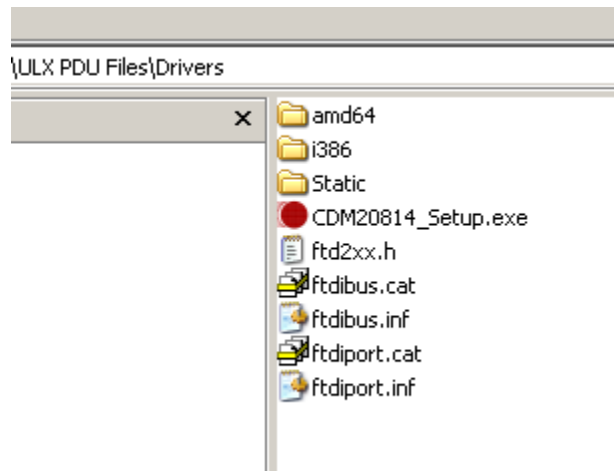


Figure 5-2 PDU Driver Folder

- STEP 2** Load drivers by running CDM20814_Setup.exe on the computer that will be used with the PDU. The numerical part of the filename will change depending on revision level. Running this executable opens a DOS window for a few seconds and it indicates that the files are loading and when load is complete.
- STEP 3** Connect the PDU to the computer containing the software files with the USB-AB, 1.5M cable (256-0166-015).
- STEP 4** Run PA_Diagnostics_Unit.exe. This will open the program that interfaces with the PDU. See screen below.

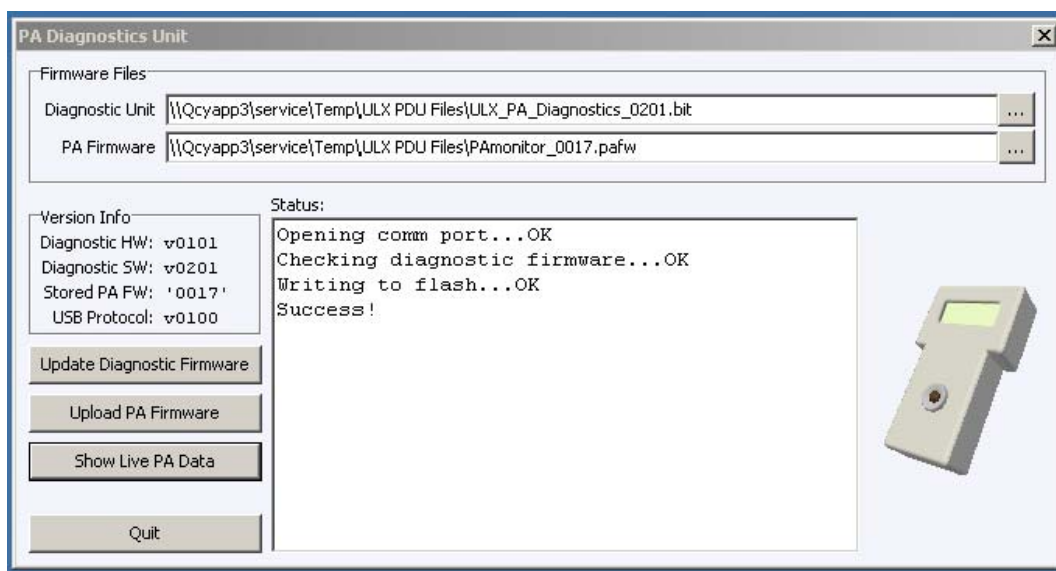


Figure 5-3 Diagnostics Unit Software Screen

- STEP 5** Under the Firmware Files submenu browse to the Diagnostics unit file named ULX_PA_Diagnostics_0201.bit. The numerical part of the filename will change depending on revision level.
- STEP 6** To upload new diagnostic firmware to the PDU, use the mouse to press the Update Diagnostic Firmware software button. The Status screen in Figure 5-4 displays when the program is updated.

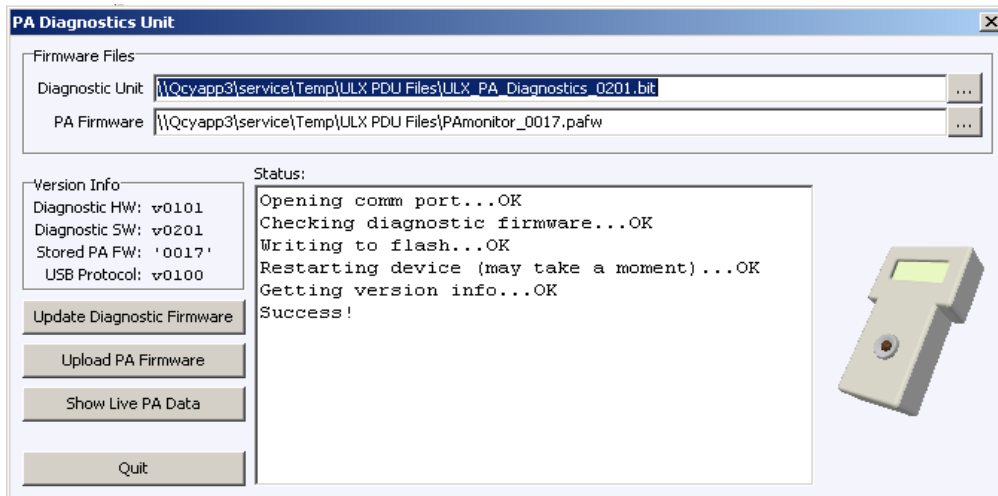


Figure 5-4 PDU Software Status Screen

- STEP 7** End of PDU software update procedure.

The updated PDU software allows access to a summary of PA module parameters by connecting the PDU to the computer using the USB-AB, 1.5M cable (256-0166-015) and then running the PA_Diagnostics_Unit.exe program. Connect the PDU to an operating PA module using the PA Diagnostics Unit Cable (Harris part no. 256-0346-000). Use the mouse to select the Show Live PA Data button on the screen.

PA Diagnostics Unit - Live Data		
RF Power	PA Firmware	Diagnostic Info
RF Out : 775W	Stored: '0017'	Diagn HW: v0101
RF In : 6.0W	PA: '0017'	Diagn SW: v0201
RF Rfld: 21W		
Voltages	Currents	Temperatures
PS Sel: 50V	Tot PA Curr: 48.1A	Ctlr: 33.2°C
PS1: 50.0V	Pal1 Fet1 : 6.7A	Pal1: 47.1°C
PS2: 50.0V	Pal1 Fet2 : 5.8A	Pal2: 48.2°C
PS3: 50.1V	Pal2 Fet1 : 6.4A	Pal3: 48.9°C
PS4: 50.1V	Pal2 Fet2 : 5.9A	Pal4: 47.8°C
PS5: 50.1V	Pal3 Fet1 : 6.0A	
PS6: 50.0V	Pal3 Fet2 : 5.7A	
PS7: 50.1V	Pal4 Fet1 : 6.1A	
PS8: 50.0V	Pal4 Fet2 : 5.6A	

Copy to Clipboard OK

Figure 5-5 PDU Software Live Data Screen

If the PA module is operational in a transmitter or in a PA module test system the operational voltages and currents will be displayed as shown in Figure 5-5.

5.5 Uploading PA Module Software to PDU

Older versions of the PDU are not capable of software updates without modification. Newer versions of the PDU can be identified by the presence of a part number sticker on the PDU case.

- STEP 1** Connect the PDU to the computer containing the software files with the USB-AB, 1.5M cable (256-0166-015).
- STEP 2** The software level in the PDU is indicated on the PDU on the PA Firmware page. The PDU firmware ver: must be 201 or greater in order to use the PDU to update PA module software. The PA firmware rev 0017 or greater enables the display of the firmware revision on the PDU. The numerical part of the filename will change depending on revision level.
- STEP 3** Open the PA_Diagnostics_Unit.exe program.
- STEP 4** In the Firmware Files menu navigate to the new PA Firmware file that is located in the software update folder obtained from Harris. The file will be named PAMonitor_0017.pafw (the 0017 will change with later versions of software).
- STEP 5** Use the mouse to press the Upload PA Firmware button to begin the upload. When upload is complete the following screen is displayed.

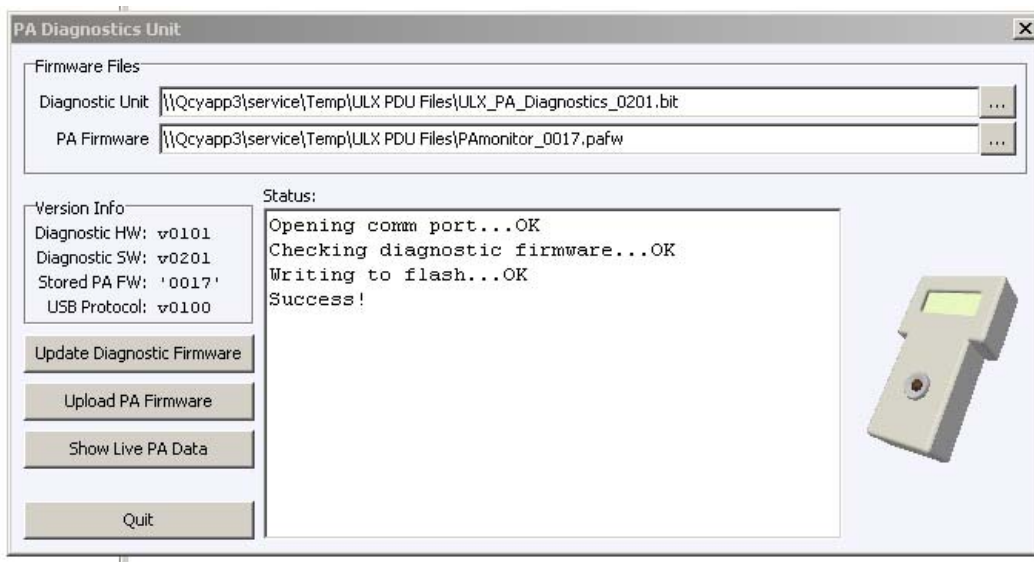


Figure 5-6 PDU Software Upload Screen

STEP 6 Confirm the upload of PA module software to the PDU by navigating to the PA Firmware screen on the PDU LCD screen. The Stored ver: should be the same version number as indicated in the .pafw file that was uploaded onto the PDU (for example 0017 in this case).

STEP 7 End of procedure.

5.6 Using PDU to Update PA Module Software

Older versions of the PDU are not capable of software updates without modification. Newer versions of the PDU can be identified by the presence of a part number sticker on the PDU case.

- STEP 1** The PA module must be installed in a test fixture or in an operating transmitter and have power applied in order to perform the software update
- STEP 2** Connect the PDU to the PA module to be updated using the PA Diagnostics Unit Cable (Harris part no. 256-0346-000). The PDU must contain the latest version of PA module software.
- STEP 3** Use the PDU LCD screen to navigate to the PA FIRMWARE menu. Confirm that the PA module Stored ver: is a higher version number than the PA ver: displayed below it. The PA ver: is the current version of software in the PA module. The Stored ver: is the version of software on the PDU that will be downloaded to the PA module.
- STEP 4** Use the LCD display and control buttons to navigate to the Update PA line and press the right arrow or center button on the PDU to open the UPDATE PA
- STEP 5** LCD screen. Program the module by using the down arrow key to select **'Overwrite'** and pressing the center enter button. Selecting **'Overwrite'** causes **'Erasing'** to display followed by **'Programming'**, **'Verifying'** and then **'Done'**. If update is not desired the **'Cancel'** option can be selected by pressing enter.
- STEP 6** Check the PA FIRMWARE LCD screen to confirm that PA ver: has been updated to display the desired software version.
- STEP 7** End of PA module software update procedure.

5.7 Technical Assistance

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

Section 6

*Diagnos*tics

6

6.1 Introduction

This section contains diagnostic and troubleshooting information for the PA diagnostic unit. Refer to the Maxiva ULX or Platinum VLX technical manuals for detailed information on PA module faults.

The diagnostic unit will not be operational unless it is connected an operating PA module. Should the diagnostic unit fail to operate be sure the PA module it is attached to is turned ON. If the module is in the ON condition be sure the interconnecting cable is fully connected at each end. The cable is wired 1:1 and an ohmmeter can be used to verify continuity from one connector to the other.

Section 7 Parts List

7

7.1 PA Diagnostic Unit Parts List

Table 7-1	"KIT, PA DIAGNOSTICS UNIT" - - - - -	971 0040 081 (A P)	7-3
Table 7-2	"UNIT, PA DIAGNOSTICS"- - - - -	971 0040 080 (E P)	7-3
Table 7-3	"PWA, PA INTERFACE, SWITCH" - - - - -	9010222411G (B P)	7-3
Table 7-4	"PWA, PA INTERFACE, CONTROL" - - - - -	9010222421G (C P)	7-3
Table 7-5	"DOC PKG, PA DIAGNOSTICS UNIT" - - - - -	988 2765 001 (A P)	7-4
Table 7-6	"DWG PKG, PA DIAGNOSTICS UNIT" - - - - -	943 5601 575 (A P)	7-4

Table 7-1 "KIT, PA DIAGNOSTICS UNIT" - 971 0040 081 (A P)

Harris PN	Description	Qty UM	Reference
		Designators	
256 0166 015	"CABLE ASSY, USB-A/B, 1.5M"	1 EA	
256 0346 000	"CABLE, 50C 0.050"" PLUG, 3M"	1 EA	
971 0040 080	"UNIT, PA DIAGNOSTICS"	1 EA	
988 2765 001	"DOC PKG, PA DIAGNOSTICS UNIT"	1 EA	

Table 7-2 "UNIT, PA DIAGNOSTICS" - 971 0040 080 (E P)

Harris PN	Description	Qty UM	Reference
		Designators	
303 4125 016	"SCREW, MACH M2.5 X 16"	4 EA	
307 0001 025	"NUT, STD HEX M2.5"	4 EA	
311 0011 025	"WASHER, FLAT M2.5 SST (DIN125)"	8 EA	
315 0021 025	"LOCKWASHER, SPLIT M2.5 SST (DIN127)"	4 EA	
344 0440 250	"SCREW, 4-40 X 1/4L SELF-TAP PPH"	4 EA	
344 0440 625	"SCREW, 4-40 X 5/8L SELF-TAP PPH"	4 EA	
406 0527 000	"DISPLAY, LCD 4 X 20"	1 EA	
409 0111 000	"SPACER, NYLON .312LG .188OD .115ID"	4 EA	
612 2580 001	"*SCREW LOCKS, FEMALE 2-56"	1 EA	
727 1519 002	"GROMMET, LIGHT PIPE"	6 EA	
727 1519 003	"LIGHT PIPE, 0.2"" L X 0.190"" DIA CLEAR"	6 EA	
861 1141 112	"SW/FW PA INTERFACE, CONTROL (FPGA)"	0 DWG	
861 1141 122	"SW/FW PA INTERFACE, CONTROL (USB)"	0 DWG	
9010222411G	"PWA, PA INTERFACE, SWITCH"	1 EA	
9010222421G	"PWA, PA INTERFACE, CONTROL"	1 EA	
943 5601 504	"MODIFICATION, ENCLOSURE"	1 EA	

Table 7-3 "PWA, PA INTERFACE, SWITCH" - 9010222411G (B P)

Harris PN	Description	Qty UM	Reference
		Designators	
14-567	"CONN,RJ45,8PIN,RT ANGL,TOP KEY"	1 EA	J1
603 0069 001	"SW COVER, GREEN ROCKER"	1 EA	1/S6
603 0069 003	"SW COVER, RED ROCKER"	1 EA	1/S7
603 0069 004	"SW BEZEL, ROCKER"	2 EA	"1/S6,1/S7"
603 0069 009	"SW COVER, GREY ROUND"	4 EA	"1/S1,1/S2,1/S4,1/S5"
603 0069 010	"SW COVER, BLACK ARC"	1 EA	1/S3
612 2297 000	"RECP, USB-B, RT ANGLE"	1 EA	J2
646 2110 000	"BARCODE, SN_ITEM_REV"	1 EA	
801 0222 411	"SCH, PA INTERFACE, SWITCH"	0 DWG	
9010222412G	"PWA, PA INTERFACE, SWITCH, SMT"	1 EA	

Table 7-4 "PWA, PA INTERFACE, CONTROL" - 9010222421G (C P)

Harris PN	Description	Qty UM	Reference
		Designators	
358 4037 000	"SPACER, PEM, 0.116 X 0.375 (KFSE-116-12)"	4 EA	
550 0967 000	TRIMPOT 10K OHM 1/2W 10%	1 EA	R10
610 1386 000	"HDR, 16C VERT 1ROW UNSHR"	1 EA	J4
612 2580 000	"RECP 50C, 2 ROW RT ANGLE"	1 EA	J1
646 2110 000	"BARCODE, SN_ITEM_REV"	1 EA	
801 0222 421	"SCH, PA INTERFACE, CONTROL"	0 DWG	
9010222422G	"PWA, PA INTERFACE, CONTROL, SMT"	1 EA	

Table 7-5 "DOC PKG, PA DIAGNOSTICS UNIT" - 988 2765 001 (A P)

Harris PN	Description	Qty	UM	Reference
			Designators	
888 2765 001	"TM, PA DIAGNOSTICS UNIT"	1	EA	
943 5601 575	"DWG PKG, PA DIAGNOSTICS UNIT"	1	EA	

Table 7-6 "DWG PKG, PA DIAGNOSTICS UNIT" - 943 5601 575 (A P)

Harris PN	Description	Qty	UM	Reference
			Designators	
801 0222 411	"SCH, PA INTERFACE, SWITCH"	0	DWG	
801 0222 421	"SCH, PA INTERFACE, CONTROL"	0	DWG	

