

TECHNICAL MANUAL
888-2004-028
Platinum HT10HS-I &
HT5HS-I M/S Control System

Platinum HT10HS-I & HT5HS-I M/S
Control System



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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.** On-line 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 from 7:00 AM to 11:00 PM Central Time, seven days a week. Telephone **+1-217-222-8200** or email ***servicepartsreq@harris.com*** to contact the Service Parts Department. **Emergency replacement parts are available by telephone only**, 24 hours a day, seven days a week by calling **+1-217-222-8200**. **NOTE:**

The # symbol used in the parts list means used with (e.g. #C001 = used with C001).

Unpacking

Carefully unpack the equipment and preform 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
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Control System Technical Manual*

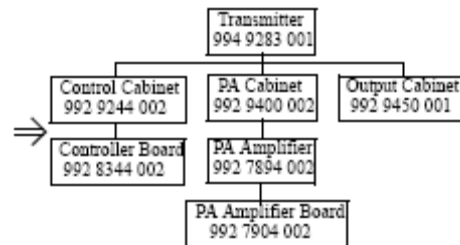
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Guide to Using Harris Parts List Information

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.).

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.

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.

▲ WARNING:

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.

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Section 1

Analog Platinum-i Series Main/Standby Transmitter System

1.1 Introduction

This manual describes the Harris *Analog Platinum-i™ Main/Standby Control System*. The MS cabinet controls (2) Harris Platinum-i transmitters.

MODEL	POWER
HT10HS	10 KW
HT5HS	5 KW

1.1.1 Transmitter Configurations

The Control cabinet contains an intelligent control board used to automatically switch the on-air HT10HS Main transmitter to the HT5HS Standby transmitter in the event of a failure. The system can also be controlled manually to perform maintenance and transmitter checks of either transmitter by allowing full power operation into the station test load.

1.1.2 Organization of Transmitter Documentation

- **The documentation consists of:**
 - a. *Platinum-i Analog Control Cabinet* Technical Manual (this manual)
 - b. *Platinum-i Analog* documentation package for each transmitter
 - c. Exciter Manual (a separate manual and drawing package).

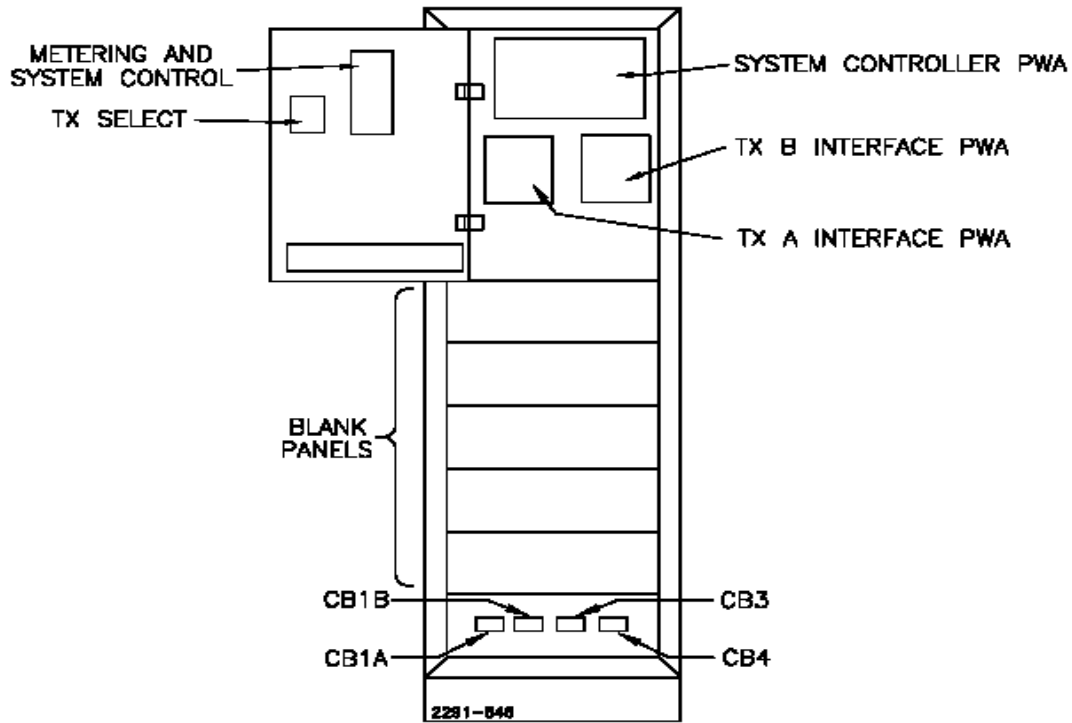


Figure 1-1
Main/Standby Controller and Auto Switching Cabinet

1.2 General Description

The *Analog Platinum-i™ Main/Standby Control System* consists of a control cabinet, one HT10HS Platinum-i Main Transmitter, one HT5HS Platinum-i Standby Transmitter, and dual RF output systems. Each transmitter RF system includes a color notch filter/notch diplexer to combine sound and vision and a harmonic filter. Both systems feed an automatic coax switch controlled by the M/S Center Control Cabinet. The outputs of the coax switch feed the antenna system and a 10KW test load. The switch configuration is set up to allow simultaneous on-air operation of one transmitter while the other transmitter can operate into the station test load.

1.2.1 AC Power Distribution

The Control Cabinet is set up to operate from either of 2 separate 230V AC sources. Control cabinet breaker CB-1, located along the bottom panel, protects the wiring in the control cabinet. A phase monitor guards against low voltage, loss of one phase, and reversal of the phase sequencing. Line voltage samples are provided for the system monitor. All logic supplies and fan in the control cabinet are controlled by CB-1 and CB-2. CB-3 protects the Coax Switch Assembly. CB-4 protects the Test Reject Load Fan.

1.2.2 Transmitter Control System

See Figure 1-1. The control system for the transmitter consists of a system controller mounted in the control cabinet, plus individual interface controllers. Data from the system is interfaced through the monitor board to the front panel. Transmitter ON/OFF, LOCAL/REMOTE, Transmitter Auto/Manual Switcher, and Transmitter Select to Air switches are all located on the front panel.

1.2.3 Display Meter

Vision and Sound Forward Power plus total Reflected Power can be monitored on the front panel meter using the METER SELECT buttons to sequence through the desired selection. The main control system samples each cabinet and gathers all of the status and analog data for the panel indicators.

1.2.4 System Controller

The transmitter system control unit provides a central point for control and monitoring the entire system. The system controller board is connected to both transmitter interface boards for transmitter ON/OFF commands and auto switching function commands.

Peak detectors collect aural and visual RF samples and send them to the system controller for power metering.

The system controller has a power fail recovery system to restore the transmitter system to its previous operating condition after a temporary AC power failure. A power down timer will automatically turn the transmitter off if the power is not restored within approximately two hours. Remote status and analog outputs are provided by the main controller to a series of D connectors in the rear of the control cabinet.

1.2.5 Interface Control Boards

The interface control boards are mounted on each side of the system control board. Each is responsible for controlling and monitoring Transmitter A and Transmitter B respectfully.

1.3 Transmitter System Overview

1.3.1 Control System

The transmitter uses a distributed architecture control system. This means that some transmitter sub-systems include self monitoring and protection and report to the Main Controller for display.

1.3.1.1 Main System Controller Board

This board is responsible for transmitter switching and status monitoring. This printed wiring board is mounted just below the top of the control cabinet and also serves as the customer and system Input and Output, I/O. It gathers status and fault data from the individual sub-systems and reports that information to the operator locally and by remote control.

1.3.1.2 Transmitter Interface

The transmitter interface boards are located just below the system controller board near the top of the control cabinet. One board acts as an interface between transmitter A and the main controller board and the other interfaces the main controller board to transmitter B.

Section 2

2

Platinum-i Series Analog Switching Control Cabinet Installation

2.1 Introduction

This section contains information necessary to install and to perform initial checkout procedures on the Main and Standby Platinum-*i* Series television transmitters

2.2 Installation Planning

The information in this section is intended to be used only as a general guideline in planning installation. Since all installations differ in some respects, and in order to conform to local building and electrical codes, the information contained herein must be adapted for each particular installation.

Planning and preparation are the most important factors in a successful, efficient, and safe installation phase of a new transmitter. Study equipment manuals beforehand and become thoroughly familiar with the installation requirements for each piece of equipment.

The transmitter equipment installation phases should be planned carefully before the equipment arrives and a detailed plan worked out and written down. Know what installation equipment and materials Harris is supplying with the transmitter and what equipment and materials the station must supply. In general, a transmitter installation requires that the following areas be addressed:

- a. Have a clear plan for transmitter system monitoring and make provision for any needed RF monitoring samples. Make sure the monitoring equipment will be suitably located for convenient operation and monitoring. STL and remote control equipment should also be planned early. While not part of the transmitter, monitoring and control equipment (and the STL) must be available when installation is completed to test the transmitter and to put it into service.
- b. Plan a star point grounding system for the building and equipment cabinets. This grounding system should incorporate the grounding system for the AC service entrance and the grounding system for the tower.
- c. When considering the sequence of events during an installation, it is important to approach the transmitter, its peripherals, and the building as a system. “typical” drawings are used as references. It must be assumed special requirements will cause deviations from the published installation drawings in order to accommodate a particular configuration or building requirement.

- d. In a new installation, interior walls should be in place, ceiling work should be complete, concrete floors should be aged and well sealed, and all painting be completed before arrival of the equipment or the transmitter is placed in the room. Transmitters and other electronic equipment can be damaged or made inoperable by dust and dirt entering the equipment. Even a plastic covering placed over the transmitter rarely keeps out concrete dust and plaster dust created from drywall installation.
- e. In a new installation, will electrical power be available when needed? Often transmitter installation and checkout is held up because primary power is not available.
- f. In an existing facility, must an existing transmitter remain on the air during installation of the new equipment? Plan how this is to be done to minimize off-air time.
- g. A staging area should be chosen and set aside to place the boxes and crates that contain all the smaller parts and assemblies not shipped attached to the transmitter. A separate area should be used to stage all installation materials (plumbing materials, wire, conduit and accessories, loose hardware, etc.)
- h. Each piece of equipment should be inspected for shipping damage. Inventory all equipment and the contents of each box and compare to the packing check list that comes with the equipment.
- i. Think about how the equipment will be unloaded. Will the proper lifting and moving equipment be there when the truck containing the transmitter arrives? Will there be enough workers there to help?
- j. Equipment placement must be worked out carefully. Use a station layout drawing to determine equipment placement and the order in which the equipment should be set in place. If possible, lay out equipment location with lines marked on the floor.
- k. When planning placement of the output RF system, make certain the ceiling or overhead framing will support the weight of the RF components. If not, structure modification or floor-mounted components may be required.
- l. The electrical and RF plumbing work should begin at the start of the installation in order not to delay completion, however the transmitter, RF output system and cooling system plumbing should be installed prior to running electrical conduits or air handling ducts in the transmitter space. This will prevent interference issues between RF lines and electrical conduit and cooling ductwork.
- m. Hanging hardware must be on-hand to avoid delays. Ensure that all pipe hangers, conduit hangers, threaded rod, beam clamps, Unistrut and Unistrut hardware are on site.
- n. Ensure that all necessary tools are on site and in good shape when needed. Check transmitter and other equipment technical manuals to see if any specialized tools are required. Make arrangements to obtain them if necessary.

2.2.0.1 Space Requirements

(Refer to Transmitter Outline drawings.)

To allow for servicing the transmitter, a minimum clearance of 4 feet in front of and 5 feet behind the cabinets is recommended. Minimum clearances are shown in the drawings.

Planning for the transmitter room should allow space for program input, monitoring, remote control, and test equipment as well as the transmitter. Additional area may also be required for tower lighting, HVAC equipment, storage, and a workbench.

2.2.1 Electrical Power

Two standards are commonly used as a source of data for AC power systems: the National Electrical Code published by the National Fire Protection Association in the United States, and the Canadian Electrical Code published by the Canadian Standards Association. These standards should be followed since they are referenced in most state and local codes.

The transmitter system is designed to operate from 208, 220/240 or 480 volts, 60 Hz or 80/415 volts, 50 Hz. If voltage variations in excess of +/-10% are anticipated, the transmitter power input must be equipped with automatic voltage regulators (optional) capable of correcting the primary AC mains voltage.

The transmitter system requires a relatively stable source of input power. For this reason, the primary power for the transmitter should originate at the main power distribution system and remain isolated from other electrical distributions.

All wiring and signal inputs are at the top of the cabinets. Overhead cabling is used. No access is provided in the cabinet floors for under-floor or trench wiring.

AC power to the transmitter should be run in metallic conduit, connected to earth ground for safety and to provide shielding against interference. All phases should be run within the same conduit to cancel induced magnetic fields. The power run must be terminated in a power distribution panel, whose enclosure must also be connected to earth ground.

2.2.4.1 Circuit Breaker Selection

Refer to AC Distribution Diagram for the connection and breaker sizing information. It is important that the circuit breakers withstand the listed inrush current. Each cabinet is fed from the distribution panel through a separate circuit breaker. If fuses are used, contact Harris Field Service for guidance on fuse sizing and phase loss protection.

⇒ NOTE: Starting Surge Requirement

A short-duration starting surge, due to transformer inrush current, will last for a portion of the first few cycles after power is turned on. During this surge, the line voltage at the cabinets must not drop below 80% of the rated line voltage.

⇒ NOTE: Disconnect Location

The circuit breaker panel should be located near the transmitter in a well lighted area. As a safety precaution, controls for disconnecting the main power service supplying the transmitter must be convenient to the operator and maintenance personnel. Emergency lighting should be provided.

2.2.4.2 Isolation Transformer

If a separate isolation transformer is used, it should be connected to the highest potential primary source available to minimize voltage fluctuations on the secondary. The isolation transformer must have both primary and secondary taps so that power input variations and changes in loads can be compensated. The isolation transformer must maintain the rated output during the transmitter starting surge. The transformer should be located as closely as possible to the transmitter.

No load other than the transmitter should be connected to the transformer secondary.

⇒ NOTE: Isolation Transformer Loading

Any other loads connected to the isolation transformer, especially from line to neutral may not tolerate the sine wave distortion inherent in an isolation transformer.

The feed line to the transformer must be protected by a main line circuit breaker to protect against a transformer short. Individual cabinets are protected by branch breakers.

2.3 Unpacking and Equipment Inventory

2.3.1 Shipping Weights & Equipment Needs for Unloading

Before the truck arrives with the new transmitter system, have ready on site a fork lift truck or a suitable unloading dock, a pallet jack, heavy duty two wheel cart, and any other equipment necessary to unload up to 1100 pounds (500 kg) at the site in question. The cabinets and power supplies are too heavy to be safely unloaded by hand. An area large enough to store the boxes should be prepared in advance to help the unloading process.

Remove the cabinets from the truck and set in a location where they cannot be damaged. If any modules are shipped in individual boxes, save these to ship modules back for repair.

⇒ IMPORTANT:

DO NOT USE THE ROUNDED EDGES OF THE CABINETS FOR PUSHING, PULLING OR LIFTING!

The Control cabinet and skid together weigh approximately 470 pounds (215 kg).
The skid itself weighs 30 pounds (14 kg).

PA cabinet with skid weighs approximately 990 pounds (450 kg).

The amplifier cabinet skids weigh 65 pounds (30 kg) each.

Weights are generally marked on each box. Check the markings on each container before lifting.

⇒ **IMPORTANT:**

As each piece is unloaded, inspect for visible damage to unit or packing container. If any damage is observed unpack and inspect for damage show delivery damage and note damage on bill of lading. Claims for damage must be filed promptly (48 hours) or claim may be denied. Retain shipping materials until all parts have been located or as proof of shipping damage.

When the transmitter is delivered to the site, the shipment should be inspected and inventoried before installation is begun. This section provides information to assist unpacking and inventory.

2.3.2 Inventory and Inspection

2.3.2.1 Packing Check List

Each transmitter shipment will be accompanied by a packing check list identifying which equipment is packed in the various crates and boxes. Be sure to locate this document when the shipment arrives.

The contents of the shipment should be as indicated on the packing lists. If the contents are incomplete, or if any part is damaged electrically or mechanically, notify the Harris TV Customer Service Department:

Phone at 217-222-8200

FAX at 217-221-7086

Harris Corporation,
Broadcast Division
PO Box 4290
Quincy, IL 62305
Attn. Customer Service Department

2.3.2.2 Factory Test Data Sheets

A set of factory test data is supplied with each transmitter. It lists parameters for operation of the transmitter at your power level and channel. These readings were recorded during factory testing. Locate the test data, copy, and file the original so that copies may be made as needed.

Record the same readings periodically to establish and maintain an information base from which to work in the event of future changes or problems.

2.4 Cabinet Placement and Leveling

Four bolts hold each cabinet to its skid. They are located two per side, front and rear. Also, remove the blocks that support the bottom of each rear door.

Use a chalk line or similar method to mark the floor position for each cabinet to ensure even alignment.

▲ WARNING:

CAUTION: DO NOT USE THE ROUNDED EDGES OF THE CABINETS FOR PUSHING, PULLING OR LIFTING!

Using proper lifting equipment, remove each cabinet from its skid. If equipment is not available to lift the cabinet off the skid, you may want to remove the back doors to lighten the load.

▲ CAUTION:

THE DOOR WEIGHS 175 POUNDS (80 KG).

Removing doors will require three people. Remove the block used to support the door during shipment. Open the door and block it up at the bottom. Disconnect the fan wiring. Two people wearing gloves should support the door while the third person removes the hinge pins starting at the bottom and working up. Then, the door may be set aside and rollers (pipe) and a ramp used to remove the cabinet from the skid.

▲ WARNING:

SLIDE CABINET OFF TO THE FRONT OR BACK OF SKID (NOT THE SIDE) TO AVOID BENDING BOTTOM PANEL.

Replace the door after the cabinet is set in place. Have two people position the door on suitable blocking material while the third person inserts the hinge pins starting from the top down. Reinstall the fan wiring.

Starting with one end cabinet, move each cabinet to the approximate location.

When each cabinet is in its final position, you may need to level the cabinet. Check the level in all three planes. Metal plates shims under the cabinet edges can be used for leveling.

Bolt the cabinets together using the two holes at the top and two at the bottom of each cabinet.

2.5 Grounding

The ground strap runs along the top of the cabinets, then forward and over to the control cabinet. The station ground may be installed up the side of the PA cabinet or between the first PA and control cabinet.

2.10 UPS Installation

Remove the UPS from the shipping box, locate the manual for the UPS and review the installation section of that manual. The UPS manufactures recommend that the batteries not be charged before final installation. Therefore the UPS is not installed or tested with the transmitter.

Install the UPS on the shelf below the GUI computer, the power connections to the cabinet rear. The bracket above the supply is used to hold the UPS in place. Align the front fold of this bracket with the front of the UPS. Tighten the screws to hold the UPS in place. Checkout the UPS following the UPS manual instructions.

2.11 Inter-cabinet Wiring

(Refer to the Cabinet Interconnect Drawing)

A cable tray (not furnished) should be installed along the top of the transmitter for cabinet interconnecting. Install the control and monitor cables in this tray. It may be plastic or metal, and attached to the top of the cabinet with screws or bolts.

Run the cables from the control cabinet through the cable tray to each PA cabinet. Observe the mechanical keying of the ribbon cable.

The RF sample lines may be installed in the cable tray as well. Use the RF sample lines furnished if they are long enough. Longer RF sample lines should be constructed from double shielded cable. Make sure each pair of RF sample lines is of equal length. The line length is not critical but should be kept reasonably short. Directional couplers are set to level with maximum length of 50 feet for RG223/U coax. Make forward and reflected sample cable pairs from the same roll of coax if possible to keep insertion losses equal. If the transmitter architecture utilizes two or more drive paths, the cables used for PA Drive A & B samples should be of equal length as well if furnished cables are too short.

2.12 Input Signal Wiring

All input, RF inter-cabinet and remote control connections are made at the I/O panel on top of the control cabinet. Use the silkscreen as a guide to connect cables during installation.

2.13 Interlocks and Interfaces

Refer to individual transmitter documentation packages for External and fail-safe interlocks. The Coax Switcher Assembly connects to the Main controller board, 1A4, which interfaces with the 2 transmitter interface boards, 1A3A and 1A3B, to shut off the transmitters during the switch transition time. Refer to drawing 839-8115-078 for J35 connections.

2.14 Auto Switching Control System Check Out

STEP 1: Apply power to both transmitters and peripherals.

STEP 2: Turn on all transmitter breakers.

STEP 3: Be sure both transmitters are in the *Remote Enable* mode. (The yellow lamps on each transmitter control cabinet will be illuminated if LOCAL mode is activated. See section 3.2).

STEP 4: On the System Controller panel press the MANUAL and then the LOCAL buttons.

STEP 5: Press transmitter A AIR button. (allow a few seconds for the coax switch to switch to the A AIR position.

STEP 6: Press the TX ON button.

STEP 7: Transmitter A should turn on to its set power level.

STEP 8: Check to see if transmitter A is operating correctly with all modules on etc. The red TRANSMITTER A FAULT led on the system control panel should be off.

STEP 9: On the system control panel press the AUTO button.

STEP 10: Go to the Transmitter A control cabinet and turn Transmitter A off. Several things should happen: The red TRANSMITTER A fault led, on the system control panel, should light. The coax switch will now change connecting Transmitter B to the antenna system. Transmitter B should turn on automatically and ramp up to set power level. The system controller will also switch to MANUAL. This is to prevent the system from auto switching back to Transmitter A before Transmitter A can be checked out.

STEP 11: To verify the reverse operation, be sure Transmitter A is in Remote Enabled mode.

STEP 12: Press the AUTO button on the system controller front panel.

STEP 13: Go to the Transmitter B control cabinet and turn Transmitter B off. The system controller should now put Transmitter A on the air.

3

Section 3

Operation, Controls, Indicators

3.1 General Description

All transmitter control logic circuits are located in the transmitter control cabinet.

The center Main/Standby Switching Control Cabinet contains 3 logic boards: a system control board, a Transmitter A interface board, and a Transmitter B interface board. The system level control board interfaces with each transmitter via of the Transmitter A and Transmitter B Interface Boards. The interface boards connect to each transmitter controller board respectively.

The system controller board controls and monitors the RF switching system, provides for automatic transmitter switching, and provides for system level parameter monitoring and reporting.

3.2 Individual Transmitter Control Panel

TRANSMITTER ON: Pressing the transmitter ON button turns on the transmitter. The exciter is unmuted and all main controller functions are enabled. Cabinet ON signals are sent to the slave controllers in the amplifier cabinets, which will in turn activate the cabinets. The ON button is illuminated green to indicate ON command given.

TRANSMITTER OFF: Depressing the red transmitter OFF button starts the shut down sequence. The exciter is muted and cabinet OFF signals are sent to the SLAVE controllers in the amplifier cabinets.

LOCAL: Activation of the LOCAL switch disables the remote control system's commands. Status and analog information will continue to be made available. The yellow lamp will be illuminated if LOCAL mode is activated. Pressing the switch a second time will re-enable remote control and extinguish the indicator.

POWER RAISE/LOWER SWITCHES: Pressing the raise or lower buttons will affect the visual or aural power output of the transmitter by adjusting the exciter power output.

3.3 System Control

TX ON

When depressed, activates one or both transmitters under the following conditions:

1. The transmitter(s) to be activated must be set to its CONTROL-SYSTEM mode.
2. If the RF system is set to the A AIR mode, only the transmitter A will be activated by the SYSTEM CONTROL- TX ON command. The indicator will illuminate only if the TRANSMITTER ON indicator of A transmitter illuminates.
3. If the RF system is set to the B AIR mode, only transmitter B will be activated by the SYSTEM CONTROL- TX ON command. The indicator will illuminate only if the TRANSMITTER ON indicator of transmitter B illuminates.

TX OFF

When depressed, shuts off one or both transmitters under the following condition: the transmitter to be shut off must be set to its CONTROL-SYSTEM mode.

LOCAL

When depressed and the indicator illuminated, control of the transmitter system from the remote control terminals is blocked. The transmitter system will respond only to SYSTEM CONTROL panel controls or the individual transmitter controls.

REMOTE

When depressed & the indicator illuminated, control of the transmitter system may occur from the SYSTEM CONTROL panel, from the system remote control terminals, or from the individual transmitter controls.

3.3.1 Mode Control

A AIR

1. When depressed, the coaxial high power switch in the RF system is commanded to the position that routes the power of the A transmitter to the antenna and the power of the B transmitter to a test load. The illuminated indicator shows that the coaxial switch has completed it's travel and is resting in the proper position.
2. If the SYSTEM CONTROL TX ON pushbutton had been previously depressed, depressing the A AIR pushbutton will activate transmitter A and shut off transmitter B.

B AIR

1. When depressed, the coaxial high power switch in the RF system is commanded to the position that routes the power of the B transmitter to the antenna and the power of the A transmitter to a test load. The illuminated indicator shows that the coaxial switch has completed it's travel and is resting in the proper position.
2. If the SYSTEM CONTROL TX ON pushbutton had been previously depressed, depressing the B AIR pushbutton will activate transmitter B and shut off transmitter A.

3.3.2 TX Switcher

TX READY Indicator

When illuminated, indicates the vision and sound power level from each transmitter is greater than the automatic switch power level setting.

AUTO

1. When depressed and the indicator is illuminated, the automatic transmitter switching circuit is set to the automatic mode; a failure of the ON-AIR transmitter will cause a switch to the other transmitter. The failed transmitter is routed to a test load and is switched off.
2. The AUTO mode can only be engaged under the following conditions:
 - a. The RF system is in A or B AIR mode
 - b. Both vision & sound power levels of both transmitters exceed the trip levels as indicated by the TX READY indicator being illuminated.
 - c. The CONTROL for both main and standby transmitters are set to the SYSTEM mode.

MANUAL

When depressed and the indicator is illuminated, the automatic switch portion of the transmitter switcher is defeated.

The following will cause the transmitter switcher to switch to the MANUAL mode:

1. An automatic switch from the A or B AIR mode.
2. A manual switch from the A or B AIR mode.
3. The A or B transmitter purposely shut off at the individual transmitter control panel.
4. Either A or B transmitter CONTROL set from the SYSTEM mode to the LOCAL mode.

3.3.3 Fault(Red Indicators)

TRANSMITTER A

When illuminated, indicates one or both of the following:

1. One or more of the transmitter A FAULT indicators are illuminated.
2. Transmitter A vision or sound RF power output levels are below the automatic switch level threshold.

TRANSMITTER B

When illuminated, indicates one or both of the following:

1. One or more of the transmitter B FAULT indicators are illuminated.
2. Transmitter B vision or sound RF power output levels are below the automatic switch level threshold.

3.3.4 Meter Select Pushbuttons

Depressing the up or down METER SELECT pushbuttons selects the parameter whose value is to be displayed on the digital meter. An indicator illuminates next to the parameter description to indicate the choice.

VISION FORWARD (kW)

When illuminated, indicates the transmitter vision forward power level, in kilowatts, is being displayed on the digital meter.

TOTAL REFLECTED (W)

When illuminated, indicates the transmitter total reflected power level, in watts, is being displayed on the digital meter.

SOUND FORWARD (W)

When illuminated, indicates the transmitter sound carrier forward power level, in watts, is being displayed on the digital meter.

Section 4

4

Control System Theory

4.1 Control System Overall Description

The switching control system for the Harris Platinum analog VHF TV transmitters consists of a Switching Control Cabinet that contains a main controller board, 2 transmitter interface boards, front panel interface, and I/O panel. The main controller printed wiring board is mounted on the back of the front panel located at the top of the control cabinet.

Each transmitter has a control cabinet that communicates with the interface boards in the switching control cabinet over parallel bus and command lines. Refer to drawing: 839-8115-027 sheet 4 of 5.

⇒ NOTE:

The schematics of the switching control system include circuits used with other transmitter models and configurations. Discussions here are limited to the circuits that apply to the Main/Standby switching modes of this system.

4.1.1 Functional Block Diagram

Refer to Block Diagram 843-5285-301 sheet 1.

This drawing functionally shows the relationship of the system controller logic with the individual transmitter controllers and other functional areas of the system.

The control logic is mostly implemented in EPLD U401 and U402. (An EPLD is an Erasable Programmable Logic Device. The logic circuit is designed and then programmed into the device.) Much of the rest of the circuitry is used to buffer the data entering and leaving the logic EPLDs. On the left of the block diagram the system control panel, remote control command functions, and individual transmitter controller functions are represented. RF sample inputs and DC voltages from external RF detectors are shown near the bottom of the drawing.

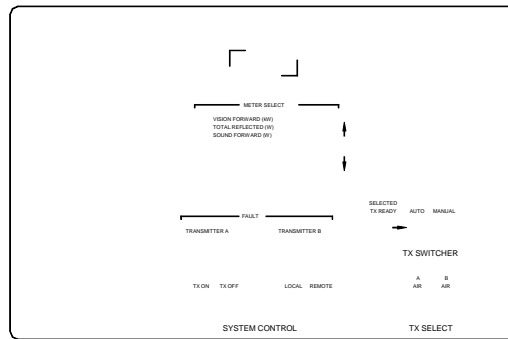
On the right side of the diagram, remote control status & analog functions are shown along with outputs and data from the exciter or exciter switcher, and the RF switching system devices.

The system meter/control panel block in the upper left portion of the drawing represents the printed circuit assembly attached to the rear of the control panel mounted on the

transmitter control cabinet. It mounts the buttons and indicators needed to control the transmitter and RF system locally. The system meter/control panel assembly also contains the A/D converter for metering along with the digital display.

4.2 Front Control Panel

This is the panel located in the control cabinet below the GUI display panel.



AutoCAD FILED: 8435285512 REV A

Figure 4-2 Controller Panel

4.2.1 Interface Circuits: Local (system) Control Panel, Remote Control Commands

Refer to schematic 843-5285-301 sheet 2.

J1 is the interface to the system control and metering panel. Switch closures received directly from the control panel are debounced by U201. Status outputs are buffered by open collector drivers U202, U203 and U204. Other J1 signals include meter address, indicator test and the metering analog voltage obtained from an on-board analog meter multiplexer.

Debouncing circuit U201 also provides one of two 100hz clock frequencies used on the board. U202, shown on the same sheet, provides the second clock frequency. U214 is a Schmitt trigger that improves the clock pulse rise times.

The network of internal diodes shown within U202, U203 and U204 is used to activate all the status indicators on the system control panel during the indicator test function.

J3 is the interface connector for command inputs from a remote control system. A cable from J3 connects to one of the remote control connectors on the I/O panel at the rear of the cabinet. The commands are opto-isolator coupled. U208 and U213 passes or blocks

the remote control commands, depending whether the control system is set to local or remote. This is controlled by U401 pin 61, its logic responding to the local or remote status of the system control panel. A logic 1 level inhibits the remote control signals from passing through. If the remote commands are allowed to pass through the inhibit gates, they are OR gated with those from the system control panel at U209, U210 so either control source will command the system logic. The OR gate output signal is then debounced by U202 before being applied to the EPLD logic.

4.2.2 Interface Circuits: Transmitter A and B, RF System Devices, Remote Control Status

Refer to schematic 843-5285-301 sheet 3.

J9 is the interface connector to the transmitter A controller, J10 to the transmitter B controller.

J6 is the interface connection to the output RF system. Switch position commands sent to the coaxial switches in the RF system are buffered by U302. Each Rf switch, when it reaches the end of its travel, will report its position back to the controller by closing a contact within the coaxial switch. LED indicators DS302 thru DS309 on the controller board monitor the status of each readback line, and the status is opto-coupled into the logic.

J11 is the interface connector to the exciter or exciter switcher. Inputs are opto-isolated and control lines are buffered by U305 and U306.

J4 and J7 are the remote control status interface connectors. A cable connects these connectors to the remote control connection plugs at the rear of the cabinet. cables to the remote control unit the mode status.

4.2.3 EPLDs and AC Fail Circuits

Refer to schematic 843-5285-301 sheet 4.

AC Mains Failure: At the lower left corner of sheet 4, capacitor C404 (1.0 farad) provides +5v for the AC fail memory circuits during loss of mains power. During normal operation, three flip-flops formed by U405, U408 are set to reflect the condition of the system transmitter on/off command, the switching system auto/manual status and the control assignment (local/remote). When the main +5v power begins to drop during an AC mains failure, U411 senses when the main +5v drops 300mv below the voltage on C404 and causes a logic low at U411, pin 3 to occur. This logic low prevents any further mode changes from reaching the U405/U408 flip-flops by gating off any further commands at U404/U405. Since U404, U405, and U408 operate from C404, the system mode information is stored until power returns or the charge on C404 depletes (approximately 4 days). When power returns and the main +5v power exceeds that of C404, pin 3 of U411 goes to logic 1 causing monostable U410 to produce a 1 second pulse that opens the gates of U406/U412 and allows the stored mode information in flip-flops U405/U408 to be applied to the system transmitter on/off, auto/manual switch and

local/remote command inputs. This resets the system to the conditions that existed before the mains failure.

Test and calibration Functions: S401 is a momentary pushbutton switch that activates the light test function. When depressed it will illuminate the transmitter front panel indicators and cause the meter selection LEDs to cycle.

S402 is a toggle switch used to set up a metering mode that allows the forward RF power sample to be used to calibrate reflected power. When S402 is thrown to the CALIBRATE position, the VSWR foldback function is disabled and the VSWR foldback indicator flashes to indicate the disabled condition. The control mode is forced to the local mode (and held there until the calibrated switch is returned to normal). At the same time, the VSWR metering circuit sensitivity is decreased by a factor of 10. The calibrated forward power sample may now be fed to the reflected power input and the metering calibrate pot set for a power level 10 times less than the forward power. This is equivalent to a VSWR of 1.92:1.0.

Switch S403 is used to set the number of metering positions displayed on the system meter/control panel. The switch should be set to the binary number representing 1 less than the number of meter selection LEDs. For example, if the front panel has 7 LEDs installed to exhibit 7 metering functions, then S403 should be set to binary 6 (0110). Switch S404 is used to set the delay, in seconds, before an automatic mode switch takes place. The time delay begins when a monitored transmitter power level falls below the auto switch set level. Set the binary number desired from 1 to 15 seconds. Do not set the switch for 0 seconds; auto switching will not take place.

Jumper plug JP402 determines whether the logic board will function in a main/standby mode or in a dual transmitter mode. In addition, the setting of jumper plug JP402 determines whether the Dual RF system uses coax switches or a switchless combiner. Default positions are 1-8 for a main/standby system or 2-7 for a dual combined system.

4.2.4 Analog Metering Circuits

Refer to schematic 843-5285-301 sheet 5.

This sheet shows the peak detectors and RF metering circuits. Six of the seven power metering input circuits have RF peak detector circuits available; the remaining input requires an external RF detector to provide a DC voltage. Jumper plugs after each peak detector circuit can be moved to use the internal peak detector or an external unit. As an example, examine the VIS FWD peak detector. JP501 allows the choice of internal or external detection. R503 is used to bias the diode for best linearity. With no RF input, R503 should be adjusted to produce 195mVdc at pin 1 of JP501. JP507 allows the gain of U501 to be set to one or two as determined by the input level. U502 is an analog multiplier used to square the detected voltage to represent power. More specifically, the output voltage at pin 8 is equal to the square of the input voltage (pin 10) divided by 10

and is now directly proportional to the RF power into the peak detector. R1 is used to set the offset of the squaring circuit to remove the effect of the diode bias and the operational amplifier offset voltages. With no RF input, R1 should be set to produce a 0000 reading on the digital meter after the detector bias is set.

The potentiometers and buffer operational amplifiers following the squaring circuits are used to calibrate the digital meter reading.

All of the metering voltages are inputs to analog metering multiplexer U512 or U513. A 3 bit binary address (determined by the meter select circuit in EPLDU401) is applied to A0 thru A2 of U512 and U513 to specify which input switch of U512 or U513 will route the analog metering voltage to the multiplexer output. The output of U512 is routed to the system control and metering panel via connector J1.

Analog multiplexer U513 selects either total vision and total sound or individual transmitter power metering voltages to be sent to the system digital meter. Individual transmitter power levels are displayed on the total system power meter only when the dual system is in the single transmitter mode.

4.2.5 Auto Switch Set Level and Remote Control Analog Metering Interface Circuits

Refer to schematic 843-5285-301 sheet 6.

Automatic Transmitter Switching: DC voltages, originating from each transmitter controller, are compared to a auto switch set level voltage developed by potentiometers R606 through R609. If the voltages representing transmitter power exceed the set point voltage, LEDs DS601 through DS604 illuminate indicating sufficient vision and sound power. These signals are also monitored by the automatic switching circuits built into EPLD U402. If the sampled voltage falls below the set level, the corresponding LED will extinguish and the signal being monitored by U402 will initiate the automatic transmitter switch process. Whether or not the system actually switches depends upon the status of the rest of the system. (i.e. System set to Auto mode, dual or M/S configuration, present RF system mode, etc.).

Remote Control Analog Signals: J5 shown on sheet 6 is the interface connector for the analog signals that may be used with a remote control system. The analog signals are buffered by U604 and U605.

4.2.6 -5V Regulator and Device Bypassing Circuits

Refer to schematic 843-5285-301 sheet 7.

The purpose of this sheet is to show the power supply buses and the integrated circuit bypassing capacitors.

Also shown is U701, used to regulate -12 volts to -5 volts.

Unused portions of integrated circuits are also shown on this sheet. Four green LEDs, DS701 through DS704, monitor the status of the logic power supplies.

4.3 System Meter/Control Panel Assembly

4.3.1 Master Transmitter Control and System Metering

Refer to schematic 843-5285-361, sheet 1.

The control panel is a mechanical location for the buttons and indicators for the control functions of the system transmitter controller. Sheet 1 shows controls that directly affect the transmitter. The functions of the controls are covered in the operation section of the manual.

The commands and status are communicated to the logic board via J1. Seven red LEDs indicate fault status. Switches for several control functions have a readback LED to indicate the status of the controlled function.

The Analog to Digital Converter (A/D) U102 and the digital display DS101 and DS102 are used to display the analog voltage that is selected by the analog multiplex circuitry of the controller.

The Meter select UP and DOWN command switches, S105 and S106 step the meter address counter up and down. The address is used to control the analog multiplexer and the meter selection indicator LEDs. Each indicator LED has a steering diode in package CR5 or CR6 that with the selection jumpers controls the decimal point selection of the A/D converter.

Section 5

5

Troubleshooting

5.1 Introduction

Most troubleshooting consists of visual checks. Use all of the indicators and metering. Think of the whole system, is the problem in the exciter, the signals feeding the exciter or the transmitter which requires a different amount of RF drive or non-linearity correction. Once the problem has been isolated refer to Section IV for a detailed explanation of the circuit theory and the diagrams in the drawing package. Confirm that there has been no failure of components before making any adjustments.

Troubleshooting assistance is available from the Harris Customer Service Department by:

Letter to- Harris Corporation Broadcast Division
P.O. Box 4290
Quincy Illinois 62305
Attention Customer Service Department

Fax to- Customer Service
(217) 221-7086

Via Internet tsupport@harris.com

Telephone (217) 222-8200
Off Air Telephone Emergency service is available 24 hours a day

It is necessary to have the model and serial number of the unit to retrieve certain information. This information is recorded on the product identification tag affixed to the rear door of the exciter cabinet. Before contacting Harris record all observable symptoms, sequence of events, and meter reading.

5.2 Warranty Returns

To return material to Harris under warranty, a return authorization number must be obtained from the Harris Customer Service Department before returning any unit for warranty purposes. The return authorization will assure speedy and accurate handling of your return. A written description including the following information must accompany all returns.

Return Authorization Number.

Customer name, address, contact and contacts phone number.

A description of the problem or reason for the returning the unit.

Ship or return the product, transportation and insurance prepaid to:

Harris Corporation, Broadcast Division
3200 Wisnann Lane
Quincy, IL 62301
Attention: Warranty Return

5.3 Factory Repair

Units that are not under warranty may be returned for repair without a Return Authorization.

Contact the repair department by phone or fax to 217-221-7086 for current rates, estimates and scheduling. If a quick repair is needed for an emergency, consult the repair department supervisor by phone.

5.4 Ordering Parts

There are thousands of parts in a typical transmitter. To assist in the speedy shipment of parts the following information is needed to identify your unit:

Equipment Name
Equipment Part Number
Equipment Serial Number

To identify your part please furnish as much information as possible:

Quantity needed
Harris part number, include all information from parts list
Schematic reference name and schematic number
Assembly part is used in by description and part number

An order form is included in the front of this manual.

6

Section 6

Parts List

6.1 Replaceable Parts

Replaceable Parts List Index

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Table 7-1 CTLR CAB, CENTER, PLATINUM M/S - 992 9511 883 (H)

Harris PN	Description	Qty UM	Ref Designators
266010002	GROMMET STRIP, 0.090	0.32 FT	
411310030	GASKET, RUBBER	10.5 FT	
250 0274 000	CORD, AC, 3C, NEMA/IEC PLUG	2 EA	
302 0699 000	SCR, 10-24 X 1/4	4 EA	
302 0700 000	SCR 10-24 X 1/4	4 EA	
350 0105 000	RIVET 3/16 ALUM .126/.25	38 EA	
350 0128 000	RIVET, POP 3/16 DIA	6 EA	
354 0035 000	LUG, SOLDER RING #6 HOLE	10 EA	
358 1214 000	SCREWLOCK, M/F 4-40X3/16	1 EA	#1A735
358 1866 000	BUMPER, MOLDED	2 EA	
358 2598 000	CABLE TIE MOUNT, 4-WAY	23 EA	
358 2635 000	CABLE TIE, PUSH MOUNT SNAP IN	22 EA	
358 2995 000	FLANGE, GREY (261)	1 EA	
358 3000 000	PLATE, END STOP, DIN RAIL MT	4 EA	
358 3139 000	STUD, 1/4-20 X 3 BRASS	2 EA	
358 3190 000	PLUG, WHT .500 HOLE	8 EA	
358 3203 000	BOLT, CARRIAGE, 1/2-13X8	2 EA	
358 3223 000	FEMALE SCREWLOCK .564-40	10 EA	#1A7J26 #1A7J28 #1A7J29 #1A7J30 #1A7J31 #1A7J32 #1A7J33 #1A7J34 #1A7J36
424 0007 000	GROMMET 0.813 GROOVE DIA	2 EA	
424 0502 000	BUMPER 5/8 DIA X 1/4 THK	4 EA	
430 0031 000	FAN CARAVEL CL3T2/020191	1 EA	
430 0202 000	FAN GUARD, 254MM WIRE-FORM	1 EA	#1B001
448 0729 000	STRIKE MAGNETIC CATCH	1 EA	
448 0921 000	FILTER MEDIA 16 X 20 X 1	2 EA	
448 0922 000	FILTER FRAME, 16 X 20 X 1	1 EA	
448 0923 000	LATCH, WINGHANDLE W/NUT	1 EA	
448 0937 000	HINGE DOOR POSITIONING	2 EA	
448 0999 000	HINGE DOOR POSITIONING	2 EA	
448 1005 000	CATCH, CONCEALED TOUCH	1 EA	
583 0160 000	SW, COAX 1-5/8 4-PORT 50 OHM	1 EA	
606 0824 000	CB, 3 POLE, 7.5 AMP 277/480VAC	2 EA	
614 0787 000	TERM BLK, THRU, 4-POLE, BLUE (261)	7 EA	
614 0808 000	*TERM BLK, 2C MODULAR 283	8 EA	
620 2109 000	JACK, BNC 75 OHM BULKHEAD	2 EA	J001 J006
620 2570 208	ELEMENT, 50DB, HB, 1-5/8	3 EA	
620 2572 000	LINE SECT, 1-5/8 3PORT	1 EA	
646 0665 000	LABEL, INSPECTION	1 EA	
646 1353 000	NAMEPLATE, XMTR EQUIPMENT	1 EA	
646 1426 000	END PLATE 283 FRONT ENTRY	2 EA	
646 1483 000	NAMEPLATE, HARRIS LOGO	1 EA	
827 6893 001	PLATE	1 EA	
839 7900 098	GROUND STRAP, CAB	1 EA	
839 7900 261	GND STRAP-CONT CAB	1 EA	
917 2100 272	CABLE GND CONT CAB	1 EA	
917 2100 948	CBL, RBN, RMT SYS COMMAND	1 EA	
917 2100 949	CBL, RBN, RMT SYS STATUS	1 EA	

917 2100 950	CBL, RBN, RMT SYS ANALOG	1 EA
917 2100 951	CBL, RBN, RMT COMMAND A	1 EA
917 2100 952	CBL, RBN, RMT STATUS A	1 EA
917 2100 953	CBL RBN	1 EA
917 2100 954	CBL, RBN, RMT COMMAND B	1 EA
917 2100 955	CBL, RBN, RMT STATION B	1 EA
917 2100 956	CBL, RBN, RMT ANALOG B	1 EA
917 2100 958	CBL, RBN, RMT SYS STATUS	1 EA
917 2100 960	CBL, EXC SWITCH/SYS LOGIC	1 EA
917 2100 965	CBL, RIBBON, 1A4J9/1A3AJ7	1 EA
917 2100 966	CBL, RIBBON 1A4J10/1A3BJ7	1 EA
917 2100 967	CBL, RIBBON, 1A13J1/1A4J1	1 EA
917 2100 969	CBL RIBBON 1A13J3A/1A13J3	1 EA
917 2300 630	LABEL, CONTROL CAB, REAR, CS	1 EA
922 0900 099	EXC/CONT-TOP/BASE TRIM	2 EA
922 0900 100	CAB VERTICAL TRIM	2 EA
922 0900 121	TRIM MOUNTING PLATE	10 EA
922 0900 366	FOAM, DOOR LOWER	1 EA
922 1195 010	RAIL TERM BLOCK MTG	2 EA
922 1195 011	GLASS, WINDOW DISPLAY	3 EA
922 1311 007	FOAM, DOOR, SIDE	2 EA
939 7900 531	BRKT-Z-HINGE MST CONT PNL	2 EA
943 4999 079	FOAM, INNER DOOR	1 EA
943 4999 105	KICKPLATE, FRONT	1 EA
943 5285 174	BRACKET, MOV PCB MTG	2 EA
943 5285 219	PLATE, AC TERM BLOCK MTG	1 EA
943 5285 220	COVER, AC SAFETY	2 EA
943 5285 221	PLATE, HINGE MTG.	2 EA
943 5285 241	BRACKET, C.B. PANEL MTG.	2 EA
943 5285 255	PANEL, LOGIC PCB MTG	1 EA
943 5285 257	COVER, BASE SAFETY	1 EA
943 5285 258	SHELF, PCB MTG	1 EA
943 5285 378	PLATE, AC TERM BLOCK MTG	1 EA
943 5285 511	PANEL, CONTROL M/S, CS	1 EA
943 5494 509	DOOR, REAR	1 EA
943 5494 510	SKIN, REAR DOOR	1 EA
943 5494 511	HAT, FAN MTG	1 EA
952 9193 028	CABLE, MAIN CTRL CAB.	1 EA
952 9200 004	CABINET ASSY CONT.	1 EA
952 9200 013	PANEL, LEFT SIDE CONT CAB	1 EA
952 9200 014	PANEL RIGHT SIDE CONT CAB	1 EA
992 8553 001	PWA, MOV-AC 198-250 VAC	2 EA
992 9223 001	ASSY, SYSTEM CONTROLLER	1 EA
992 9223 010	ASSY, METER/CONTROL, M/S, TRINIDAD	1 EA
992 9511 506	PWA, INTERFACE, DUAL TRAN	2 EA
992 9511 512	KIT, INTERCONNECT, DUAL TRAN	1 EA
992 9511 568	KIT, DUAL POWER SUPPLY	1 EA
992 9511 581	KIT, BREAKER PANEL	1 EA
992 9511 884	KIT, SINGLE CARRIER SOUND, PLATINUM M/S	1 EA
992 9511 913	KIT, RACK ASSY	1 EA
999 2868 001	HARDWARE LIST, CONTROL CABINET	1 EA
999 2869 001	WIRE/TUBING LIST, CONTROL CAB	1 EA

Table 7-2 PWA, MOV-AC 198-250 VAC - 992 8553 001 (E1-)

Harris PN	Description	Qty UM	Ref Designators
2960345000A	*TUBING, SHRINKABLE 3/4	1 FT	
560 0111 000	MOV, 275WVAC, 140J, 20MM DISC	12 EA	CR001 CR002 CR003 CR004 CR005 CR006 CR007 CR008 CR009 CR010 CR011 CR012
610 1066 000	CONN, .25 FASTON PC MOUNT	3 EA	
646 2110 000	BARCODE, SN_ITEM_REV	1 EA	
839 7900 606	PWB, MOV-AC PROTECTOR	1 EA	
839 7900 614	SCHEM, MOV-AC PROTECTOR	0 DWG	
999 2710 001	WIRE/TUBING LIST	0 EA	

Table 7-3 ASSY, SYSTEM CONTROLLER - 992 9223 001 (G)

Harris PN	Description	Qty UM	Ref Designators
354 0685 000	TERMINAL, MALE	9 EA	
358 1928 000	JUMPER 1/4 LG 1/8H	17 EA	JP201 JP202 JP203 JP204 JP206 JP301 JP302 JP303 JP304 JP305 JP306 JP307 JP403 JP701 JP702 JP703 JP704 JP705 JP706
358 3223 000	FEMALE SCREWLOCK .564-40	2 EA	J11
382 0367 000	*IC, CD4049 (DIP-16)	1 EA	U403
382 0605 000	IC, LM7905C (TO-220)	1 EA	U701
382 0609 000	IC, DG509A	1 EA	U513
382 0618 000	IC, 4081/14081, ESD	2 EA	U209 U210
382 0619 000	IC, CD4050/MC14050, ESD	2 EA	U312 U313
382 0711 000	*PRECISION IC MULTIPLIER, ESD	7 EA	U502 U503 U504 U505 U506 U507 U508
382 0719 000	*IC, LM324A, (DIP-14)	10 EA	U501 U509 U510 U511 U601 U602 U603 U604 U605 U606
382 0768 000	IC, 74HC00 DIP-14	5 EA	U404 U405 U406 U408 U412
382 0812 000	IC 74HC221, ESD	1 EA	U410
382 0817 000	*IC, 74HC244 (DIP-20)	2 EA	U208 U213
382 0853 000	IC, 74HC4050, ESD	1 EA	U409
382 0976 000	IC, 14490, ESD	2 EA	U201 U202
382 1002 000	IC, DG508A	1 EA	U512
382 1070 000	IC, ILQ1	8 EA	U206 U207 U211 U212 U301 U303 U304 U307
382 1192 000	IC, MC14584BCP, ESD	1 EA	U214
382 1307 000	IC, 2597 SINK DRIVER, ESD	10 EA	U203 U204 U205
U302 U305 U306 U308 U309 U310 U311			
382 1407 000	IC, ICL7673, ESD	1 EA	U411

384 0205 000	*DIODE, RECT 1N4148/914	22 EA	CR201 CR202 CR203 CR204 CR305 CR306 CR307 CR402 CR403 CR404 CR405 CR406 CR407 CR408 CR601 CR602 CR603 CR605 CR607 CR609 CR610 CR611
384 0321 000	*DIODE, SCHOTTKY, 5082-2800	12 EA	CR501 CR502 CR503 CR504 CR505 CR506 CR507 CR508 CR509 CR510 CR511 CR512
384 0431 000	*DIODE, RECT 1N4001	5 EA	CR205 CR303 CR304 CR401 CR702
384 0719 000	DIODE, TVS (UNIDIR), ICTE-5	2 EA	CR701 CR703
384 0780 000	LED, RED T1 VERT	8 EA	DS302 DS303 DS304 DS305 DS306 DS307 DS605 DS606
384 0837 000	DIODE, TVS (UNIDIR), ICTE-12	2 EA	CR704 CR705
384 0854 000	DIODE ARRAY, 8 ISOLATED, ESD	4 EA	CR206 CR207 CR301 CR302
384 0904 000	LED, GRN T1 VERT	9 EA	DS301 DS601 DS602 DS603 DS604 DS701 DS702 DS703 DS704
404 0673 000	SOCKET, DIP, 8 PIN (DL)	1 EA	XU411
404 0674 000	SOCKET, DIP, 14 PIN (DL)	18 EA	XU209 XU210 XU214 XU404 XU405 XU406 XU408 XU412 XU501 XU509 XU510 XU511 XU601 XU602 XU603 XU604 XU605 XU606
404 0675 000	SOCKET, DIP, 16 PIN (DL)	21 EA	XU201 XU202 XU206 XU207 XU211 XU212 XU301 XU303 XU304 XU307 XU312 XU313 XU403 XU409 XU410 XU512 XU513

404 0767 000	SOCKET, DIP, 20 PIN (DL)	12 EA	XU203 XU204 XU205 XU208 XU213 XU302 XU305 XU306 XU308 XU309 XU310 XU311
404 0823 000	SOCKET, PLCC-68, THROUGH HOLE	2 EA	XU401 XU402
494 0389 000	INDUCTOR, 2.70UH 10% (9250)	6 EA	L501 L502 L503 L504 L505 L506
506 0236 000	CAP 4700PF 5% 100V	2 EA	C201 C203
506 0239 000	CAP 0.022UF 5% 100V	6 EA	C503 C508 C513 C518 C523 C528
506 0244 000	CAP 0.220UF 5% 63V	1 EA	C405
506 0245 000	CAP, 0.33UF 63VDC 5%	9 EA	C702 C733 C734 C735 C736 C737 C738 C739 C740
516 0453 000	CAP 0.100UF 10% 100V X7R	62 EA	C707 C708 C709 C710 C711 C712 C713 C714 C715 C716 C718 C728 C729 C730 C731 C732 C741 C742 C743 C744 C745 C746 C747 C748 C749 C750 C751 C752 C753 C754 C755 C756 C757 C758 C759 C760 C762 C763 C764 C765 C766 C767 C768 C769 C770 C771 C772 C773 C774 C775 C777 C778 C779 C780 C781 C782 C783 C784 C785 C786 C788 C789
516 0530 000	CAP 0.010UF 10% 100V X7R	17 EA	C202 C204 C401 C402 C403 C407 C531 C532 C533 C534 C535 C536 C537 C601 C602 C603 C604
516 0736 000	CAP 1000PF 10% 100V X7R	18 EA	C501 C502 C505 C506 C507 C510 C511 C512 C515 C516 C517 C520 C521 C522 C525 C526 C527 C530
516 0813 000	NTWK, CAP .01UF 50V 20% SIP	2 EA	C545 C605
522 0531 000	CAP 1UF 50V 20% 5MM NON-POLAR	1 EA	C703
522 0548 000	CAP 10UF 50V 20% (5X11)	1 EA	C701

522 0552 000	CAP 2.2UF 50V 20% 5MM NON-POLAR	1 EA	C406
522 0588 000	CAP 100UF 25V 20% 8MM NON-POLAR	2 EA	C704 C705
526 0108 000	CAP 4.7UF 35V 20%	6 EA	C504 C509 C514 C519 C524 C529
526 0374 000	CAP 1.0F 5.5V	1 EA	C404
540 1375 000	RES NETWORK 1000 OHM 2%	8 EA	R306 R307 R407 R601 R643 R644 R648 R649
540 1380 000	RES NETWORK 10K OHM 2%	14 EA	R204 R205 R206 R207 R210 R211 R212 R213 R305 R310 R311 R313 R602 R645
540 1386 000	RES NETWORK 10K OHM 2%	1 EA	R401
540 1392 000	RES NETWORK 4700 OHM 2%	1 EA	R408
540 1416 000	RES NETWORK 10K OHM 2%	1 EA	R411
540 1427 000	RES NETWORK 4700 OHM 2%	2 EA	R301 R302
540 1495 000	RES NETWORK 1.8K	9 EA	R201 R202 R208 R209 R304 R308 R309 R312 R614
540 1496 000	RES NETWORK 100 OHM	4 EA	R527 R528 R573 R574
548 2400 001	RES 1 OHM 1/2W 1%	9 EA	R524 R592 R593 R594 R595 R597 R598 R619 R620
548 2400 101	RES 10 OHM 1/2W 1%	1 EA	R403
548 2400 168	RES 49.9 OHM 1/2W 1%	6 EA	R501 R505 R509 R513 R517 R521
548 2400 230	RES 200 OHM 1/2W 1%	2 EA	R640 R641
548 2400 234	RES 221 OHM 1/2W 1%	2 EA	R703 R704
548 2400 266	RES 475 OHM 1/2W 1%	2 EA	R701 R702
548 2400 301	RES 1K OHM 1/2W 1%	22 EA	R303 R405 R525 R526 R533 R534 R541 R542 R547 R548 R555 R556 R561 R562 R567 R568 R575 R615 R616 R617 R618 R639
548 2400 305	RES 1.1K OHM 1/2W 1%	16 EA	R530 R531 R537 R538 R544 R545 R551 R552 R558 R559 R564 R565 R570 R571 R637 R638
548 2400 342	RES 2.67K OHM 1/2W 1%	6 EA	R504 R508 R512 R516 R520 R596
548 2400 368	RES 4.99K OHM 1/2W 1%	5 EA	R412 R629 R631 R633 R634
548 2400 369	RES 5.11K OHM 1/2W 1%	7 EA	R578 R580 R582 R584 R586 R588 R591

548 2400 401	RES 10K OHM 1/2W 1%	22 EA	R402 R406 R410 R413 R532 R536 R540 R546 R550 R554 R560 R566 R572 R625 R626 R627 R628 R630 R632 R642 R646 R647
548 2400 415	RES 14K OHM 1/2W 1%	1 EA	R404
548 2400 434	RES 22.1K OHM 1/2W 1%	4 EA	R055 R056 R057 R058
548 2400 501	RES 100K OHM 1/2W 1%	6 EA	R502 R506 R510 R514 R518 R522
548 2400 566	RES 475K OHM 1/2W 1%	8 EA	R409 R577 R579 R581 R583 R585 R587 R590
548 2400 601	RES 1MEG OHM 1/2W 1%	9 EA	R008 R009 R010 R011 R012 R013 R014 R623 R624
548 2400 642	RES 2.67MEG OHM 1/2W 1%	6 EA	R610 R611 R612 R613 R635 R636
550 0398 000	POT 1K OHM 1/2W 10%	6 EA	R503 R511 R515 R519 R523 R576
550 0929 000	POT 50K OHM 1/2W 10%	7 EA	R001 R002 R003 R004 R005 R006 R007
550 0935 000	POT 2K OHM 1/2W 10%	6 EA	R606 R607 R608 R609 R621 R622
550 0995 000	POT 5K OHM 1/4W 10%	11 EA	R051 R052 R053 R054 R529 R535 R543 R549 R557 R563 R569
574 0477 000	RELAY 4PDT 12VDC 2A NON-LATCH	1 EA	K601
604 0852 000	SW, RKR DIP 4-SPST	1 EA	S404
604 0853 000	SW, RKR DIP 3-SPST	1 EA	S403
604 0904 000	SW, TGL SPDT VERT PCB MNT	1 EA	S402
604 0935 000	SW, PB SINGLE SECT	1 EA	S401
610 0829 000	*HEADER, 60C TWO ROW VERTICAL	1 EA	J001
610 0830 000	*HEADER, 10C TWO ROW VERTICAL	2 EA	J012 J013
610 0900 000	HDR, 3C VERT 1ROW UNSHR	17 EA	JP205 JP401 JP501 JP502 JP503 JP504 JP505 JP506 JP507 JP508 JP509 JP510 JP511 JP512 JP513 JP601 JP602
610 0910 000	HOUSING, PLUG 9 POS	1 EA	J002
610 0933 000	TEST POINT, OVAL-LOOP THRU	19 EA	TP401 TP501 TP502 TP503 TP504 TP505 TP506 TP507 TP508 TP601 TP602 TP603

			TP604 TP605
			TP606 TP701
			TP702 TP703
			TP704
610 1079 000	HEADER 20C 2 ROW STRAIGHT	1 EA	J006
610 1082 000	HEADER 16C 2 ROW STRAIGHT	2 EA	J009 J010
610 1083 000	PLUG, 'D', 37C VERT PCB PLASTIC	3 EA	J003 J004 J005
610 1088 002	LATCH .474 FOR UNIV. EJECTION	6 EA	2/J006 2/J009 2/J010
610 1110 000	HDR, 8C VERT 2ROW UNSHR	1 EA	JP402
610 1223 000	HEADER 3 POSITION	1 EA	J008
612 1184 000	JUMPER SHUNT, 2C, 0.1" PITCH	18 EA	
612 1295 000	RECP, 'D', 37C VERT PCB PLASTIC	2 EA	J007 J011
620 1677 000	JACK, BNC STRAIGHT PCB	6 EA	J014 J015 J016 J017 J018 J019
843 5285 245	SCHEMATIC, EPLD U401	0 DWG	
843 5285 277	SCH, EPLD U402	0 DWG	
843 5285 278	DIAG, SIGNAL FLOW, DUAL &	0 DWG	
843 5285 301	SCH, HTEL SYSTEM	0 DWG	
843 5285 302	COMP LOCATOR, DUAL & MAIN	0 DWG	
843 5285 303	PWB, HTEL SYSTEM CONTROL	1 EA	
917 2315 179	FIRMWARE, DUAL LOGIC U401	1 EA	
917 2315 201	FIRMWARE, DUAL LOGIC U402	1 EA	

Table 7-4 ASSY, METER/CONTROL, DUAL, - 992 9223 005 (A)

Harris PN	Description	Qty UM	Ref Designators
358 1928 000	JUMPER 1/4 LG 1/8H	1 EA	JP101
358 3441 000	SPACER, MTG, T-1.75 LED	14 EA	
382 0719 000	*IC, LM324A, (DIP-14)	1 EA	U103
382 1002 000	IC, DG508A	1 EA	U101
382 1147 000	CONVERTER A/D 3-1/2 DIGIT, ESD	1 EA	U102
384 0205 000	*DIODE, RECT 1N4148/914	2 EA	CR106 CR107
384 0689 000	LED, RED RECTANGULAR, ESD	2 EA	DS114 DS117
384 0719 000	DIODE, TVS (UNIDIR), ICTE-5	2 EA	CR101 CR102
384 0824 000	LED DISPLAY .560 INCH, ESD	2 EA	DS101 DS102
384 0837 000	DIODE, TVS (UNIDIR), ICTE-12	2 EA	CR103 CR104
384 0854 000	DIODE ARRAY, 8 ISOLATED, ESD	1 EA	CR005
384 0869 000	LED GREEN RECTANGULAR, ESD	4 EA	DS103 DS104 DS105 DS123
386 0394 000	*ZENER 1N5231B 5.1V 5% 0.5W	1 EA	CR105
506 0244 000	CAP 0.220UF 5% 63V	1 EA	C105
506 0246 000	CAP 0.470UF 5% 63V	1 EA	C104
516 0453 000	CAP 0.100UF 10% 100V X7R	6 EA	C102 C114 C115 C116 C117 C118
516 0530 000	CAP 0.010UF 10% 100V X7R	5 EA	C103 C106 C107 C108 C109
516 0765 000	CAP 10PF 5% 100V C0G	1 EA	C101
522 0239 000	CAP 10 UF 25V	4 EA	C110 C111 C112 C113
540 1392 000	RES NETWORK 4700 OHM 2%	2 EA	R128 R131
540 1418 000	RES NETWORK 150 OHM 2%	5 EA	R103 R104 R105 R126 R127

540 1460 000	RES NETWORK 510 OHM 2%	1 EA	R101
548 2400 234	RES 221 OHM 1/2W 1%	2 EA	R120 R124
548 2400 366	RES 4.75K OHM 1/2W 1%	1 EA	R129
548 2400 369	RES 5.11K OHM 1/2W 1%	4 EA	R109 R110 R118 R122
548 2400 401	RES 10K OHM 1/2W 1%	4 EA	R107 R108 R119 R123
548 2400 418	RES 15K OHM 1/2W 1%	1 EA	R112
548 2400 468	RES 49.9K OHM 1/2W 1%	2 EA	R115 R117
548 2400 501	RES 100K OHM 1/2W 1%	1 EA	R114
548 2400 566	RES 475K OHM 1/2W 1%	1 EA	R121
548 2400 601	RES 1MEG OHM 1/2W 1%	1 EA	R116
550 0953 000	TRIMPOT 20K OHM 1/2W 10%	1 EA	R113
604 1111 000	SW PB GRAY MOM W/O LED	6 EA	S105 S106 S107 S108 S109 S110
604 1112 000	SW PB GRAY MOM W/GRN LED	11 EA	S103 S104 S111 S112 S113 S114 S115 S116 S117 S118 S119
604 1119 000	SW PB RED MOM W/O LED	1 EA	S102
604 1120 000	SW PB GRN MOM W/GRN LED	1 EA	S101
610 0827 000	*HEADER, 20C TWO ROW VERTICAL	2 EA	J003 J003A
610 0829 000	*HEADER, 60C TWO ROW VERTICAL	1 EA	J001
610 0830 000	*HEADER, 10C TWO ROW VERTICAL	2 EA	J002 J002A
610 0933 000	TEST POINT, OVAL-LOOP THRU	3 EA	TP101 TP102 TP103
843 5285 361	SCH, METER/CONTROL, DUAL	0 DWG	
843 5285 362	COMP LOCATOR, METER/	0 DWG	
843 5285 363	PWB, METER/CONTROL, DUAL	1 EA	

Table 7-5 PWA, INTERFACE, DUAL TRAN - 992 9511 506 (E)

Harris PN	Description	Qty UM	Ref Designators
10	B/M NOTE:	0 DWG	
314 0003 000	LOCKWASHER, SPLIT #4 SST (ANSI)	12 EA	
354 0685 000	TERMINAL, MALE	9 EA	
358 1928 000	JUMPER 1/4 LG 1/8H	6 EA	JP002 JP005 JP009 JP010 JP011 JP012
358 3817 001	JACKSCREW, 4-40 FEMALE HEX	12 EA	
380 0726 000	XSTR, 2N7000, , ESD	3 EA	Q001 Q002 Q003
382 1043 000	IC UDN2595, , , , ESD	3 EA	U002 U006 U010
382 1070 000	IC, ILQ1	5 EA	U001 U003 U005 U007 U008
384 0431 000	*DIODE, RECT 1N4001	1 EA	CR005
384 0719 000	DIODE, TVS (UNIDIR), ICTE-5	1 EA	CR008
384 0780 000	LED, RED T1 VERT	14 EA	DS004 DS005 DS006 DS007 DS008 DS009 DS010 DS011 DS012 DS013 DS014 DS015 DS016 DS017

384 0837 000	DIODE, TVS (UNIDIR), ICTE-12	1 EA	CR006
384 0854 000	DIODE ARRAY, 8 ISOLATED, ESD	4 EA	CR001 CR002 CR003 CR004
384 0904 000	LED, GRN T1 VERT	2 EA	DS001 DS003
404 0675 000	SOCKET, DIP, 16 PIN (DL)	5 EA	XU001 XU003 XU005 XU007 XU008
404 0766 000	SOCKET, DIP, 18 PIN (DL)	3 EA	XU002 XU006 XU010
516 0453 000	CAP 0.100UF 10% 100V X7R	5 EA	C005 C006 C007 C008 C009
516 0736 000	CAP 1000PF 10% 100V X7R	2 EA	C001 C003
522 0548 000	CAP 10UF 50V 20% (5X11)	1 EA	C012
522 0588 000	CAP 100UF 25V 20% 8MM NON-POLAR	1 EA	C010
540 1375 000	RES NETWORK 1000 OHM 2%	5 EA	R001 R004 R010 R015 R020
540 1380 000	RES NETWORK 10K OHM 2%	5 EA	R003 R007 R012 R017 R022
540 1495 000	RES NETWORK 1.8K	5 EA	R002 R005 R011 R016 R021
540 1496 000	RES NETWORK 100 OHM	4 EA	R006 R008 R013 R018
548 2400 101	RES 10 OHM 1/2W 1%	2 EA	R009 R014
548 2400 162	RES 43.2 OHM 1/2W 1%	1 EA	R019
548 2400 501	RES 100K OHM 1/2W 1%	3 EA	
548 2400 513	RES 133K OHM 1/2W 1%	1 EA	
610 0910 000	HOUSING, PLUG 9 POS	1 EA	J013
610 0933 000	TEST POINT, OVAL-LOOP THRU	14 EA	TP001 TP002 TP003 TP004 TP005 TP006 TP007 TP008 TP009 TP010 TP011 TP012 TP013 TP014
610 1411 004	PLUG, D STRT 37C PCB	5 EA	J008 J009 J031 J032 J033
610 1441 016	HDR, 16C 2ROW VERTICAL	2 EA	J005 J007
612 2139 004	RECP, D STRT 37C PCB	1 EA	J010
843 5460 251	SCH, INTERFACE, DUAL TRAN	0 DWG	
843 5460 253	PWB, INTERFACE, DUAL TRAN	1 EA	

Table 7-6 KIT, INTERCONNECT, DUAL TRAN - 992 9511 512 (B)

Harris PN	Description	Qty UM	Ref Designators
253 0059 000	CABLE, 2C 22AWG AUDIO	24 FT	
917 2300 475	RIBBON CBL RMT COMMANDS A	1 EA	
917 2300 476	RIBBON CBL RMT STATUS A	1 EA	
917 2300 477	RIBBON CBL RMT ANALOG A	1 EA	
917 2300 478	RIBBON CBL RMT COMMANDS B	1 EA	
917 2300 479	RIBBON CBL RMT STATUS B	1 EA	
917 2300 480	RIBBON CBL RMT ANALOG B	1 EA	
917 2300 481	CABLE, DUAL TRAN TO RF SYSTEM	1 EA	

917 2465 024	CABLE RG-223/U 12.0FT LG	4 EA
917 2465 050	CABLE RG-223/U 25.0FT LG	3 EA

Table 7-7 KIT, DUAL POWER SUPPLY - 992 9511 568 (A)

Harris PN	Description	Qty UM	Ref Designators
384 0431 000	*DIODE, RECT 1N4001	1 EA	1CR002
560 0049 000	*MOV, 275WVAC, 75J, 14MM DISC	4 EA	CR013A CR014A CR013B CR014B
574 0470 000	RELAY 3PDT 12VDC COIL 10A	1 EA	1K003
614 0890 000	LINK, CROSS CONNECTION	1 EA	
736 0216 000	PSU, LINEAR SINGLE 12VDC 6.8A	2 EA	PS002A PS002B
736 0217 000	PSU, LINEAR TRIPLE OUTPUT	2 EA	PS001A PS001B
939 7900 747	TERM ASSY, DUAL, CONTROL	1 EA	1TB002
943 5285 461	PLATE, BASE, 480V	1 EA	
992 9104 002	ASSY, POWER SUPPLY GATING	1 EA	1A8

Table 7-8 KIT, BREAKER PANEL - 992 9511 581 (D)

Harris PN	Description	Qty UM	Ref Designators
2520006000A	*WIRE, MIL, 14AWG 1000V BLUE	60 FT	
354 0010 000	LUG RING #10 16-14AWG BLU	5 EA	
354 0765 000	LUG QC FEM 250 16-14AWG BLU	8 EA	
574 0539 000	RELAY, 3PDT 20A 240/220AC COIL	1 EA	
606 0825 000	CB, 3 POLE, 15 AMP 277/480VAC	2 EA	
943 5275 231	PANEL CIRCUIT BREAKER	1 EA	
943 5275 233	COVER CIRCUIT BREAKER	1 EA	
943 5285 241	BRACKET, C.B. PANEL MTG.	2 EA	

Table 7-9 KIT, SINGLE CARRIER SOUND, PLATINUM M/S - 992 9511 884 (A)

Harris PN	Description	Qty UM	Ref Designators
296 0263 000	TUBING, SHRINK 3/8 WHITE	0.5 FT	
358 1898 000	STANDOFF 6-32 X 1-3/8	6 EA	
917 2300 498	CABLE, COAX, 4FT N TO BNC	1 EA	
917 2315 172	CBL, COAX, 1A7J24/1A10AX1	1 EA	
917 2315 263	CABLE, COAX, 1A14HY1-2/1A10AX2	1 EA	
917 2315 320	CBL, COAX, 1A7J25/1A4J15	1 EA	
939 7900 757	CBL, RIBBON SYS MTR/LOGIC	1 EA	
943 5275 180	PANEL I/O DUAL SYSTEM	1 EA	
943 5285 234	PANEL, METER BD MTG	1 EA	
992 8731 004	PWR MTR ASSY SYS M-BTSC	1 EA	
992 9568 001	PNL LO DISTRIBUTION DUAL & M/S	1 EA	

Table 710 KIT, RACK ASSY - 992 9511 913 (A)

Harris PN	Description	Qty UM	Reference Designators
939 8221 011	PNL, 19.0X1.718X0.125 HF139	1 EA	
939 8221 012	PNL, 19.0X3.468X0.125 HF139	1 EA	
939 8221 014	PNL, 19.0X6.968X0.125 HF139	1 EA	
939 8221 019	PANEL, 19.0X17.468X.125, HF139	1 EA	
943 5285 394	RAIL, RACK PANEL	2 EA	
943 5285 395	BRACKET, C.B. PANEL MTG.	2 EA	
943 5285 396	PANEL, RACK	1 EA	

Table 711 HARDWARE LIST, CONTROL CABINET - 999 2868 001 (B)

Harris PN	Description	Qty UM	Ref Designators
300 1651 000	SCR, 1/4-20 X 1	4 EA	
302 0053 000	SCREW, PHMS 4-40 X 5/16 SST	11 EA	
302 0054 000	SCREW, PHMS 4-40 X 3/8 SST	6 EA	
302 0055 000	SCREW, PHMS 4-40 X 7/16 SST	3 EA	
302 0056 000	SCREW, PHMS 4-40 X 1/2 SST	4 EA	
302 0105 000	SCR, 6-32 X 5/16	14 EA	
302 0106 000	SCR, 6-32 X 3/8	43 EA	
302 0108 000	SCR, 6-32 X 1/2	9 EA	
302 0110 000	SCR, 6-32 X 3/4	24 EA	
302 0128 000	SCR, 8-32 X 1/4	8 EA	
302 0130 000	SCR, 8-32 X 3/8	13 EA	
302 0141 000	SCREW, HHMS 10-32 X 3/8 SST	22 EA	
302 0143 000	SCREW, HHMS 10-32 X 1/2 SST	6 EA	
302 0213 000	SCR, 1/4-20 X 1/2	8 EA	
302 0285 000	SCR, 8-32 X 1/2	47 EA	
304 0009 000	NUT, HEX 1/4-20	11 EA	
304 0098 000	NUT, HEX 10-32 SMALL PATTERN	1 EA	
306 0005 000	NUT, HEX 8-32	4 EA	
306 0014 000	NUT, STOP 1/4-20	2 EA	
306 0015 000	NUT, HEX KEP 4-40	14 EA	
306 0016 000	NUT, HEX KEP, 6-32 SST	12 EA	
306 0017 000	NUT, HEX KEP 8-32	4 EA	
306 0018 000	NUT, HEX KEP 10-32	43 EA	
308 0009 000	WASHER, FLAT 1/4 BRASS (ANSI REGULAR)	4 EA	
310 0003 000	WASHER, FLAT #4 SST (ANSI NARROW)	16 EA	
310 0009 000	WASHER, FLAT 1/4 SST (ANSI REGULAR)	8 EA	
310 0010 000	WASHER, FLAT 5/16 SST (ANSI NARROW)	2 EA	
310 0012 000	WASHER, FLAT #6 SST (ANSI NARROW)	62 EA	
310 0038 000	WASHER, FLAT #6 SST (ANSI REGULAR)	2 EA	
310 0039 000	WASHER, FLAT #8 SST (ANSI REGULAR)	47 EA	
310 0040 000	WASHER, FLAT #10 SST (ANSI REGULAR)	6 EA	
312 0003 000	WASHER, INT LOCK 4	2 EA	
312 0028 000	NO 10 EXT SHAKE BRZ	1 EA	
312 0030 000	.25 EXT SHAKE BRZ	2 EA	
312 0051 000	LOCKWASHER, SPLIT 1/4 PH-BRZ (ANSI)	12 EA	
312 0075 000	WASHER, SPRING 1/4	6 EA	
314 0003 000	LOCKWASHER, SPLIT #4 SST (ANSI)	20 EA	
314 0005 000	LOCKWASHER, SPLIT #6 SST (ANSI)	105 EA	
314 0006 000	LOCKWASHER, SPLIT #8 SST (ANSI)	50 EA	
314 0007 000	LOCKWASHER, SPLIT #10 SST (ANSI)	23 EA	
314 0009 000	LOCKWASHER, SPLIT 1/4 SST (ANSI)	8 EA	
335 0017 000	WASHER FLAT NYLON 1.000 ID	2 EA	
335 0059 000	WASHER FLAT NYLON 0.313 ID	27 EA	
336 0493 000	SCREW 8 X 3/8	32 EA	
350 0048 000	RIVET POP .093X.337	25 EA	
350 0105 000	RIVET 3/16 ALUM .126/.25	39 EA	
356 0082 000	CABLE TIE TY RAP	6 EA	
356 0087 000	CABLE TIE TY RAP	26 EA	
356 0089 000	CABLE TIE, 5.6''LG, NYLON	83 EA	

Table 7-12 WIRE/TUBING LIST, CONTROL CAB - 999 2869 001 (D)

Harris PN	Description	Qty UM	Ref Designators
2520005000A	*WIRE, MIL, 16AWG 1000V GRAY	8.9 FT	
2520006000A	*WIRE, MIL, 14AWG 1000V BLUE	0.9 FT	
254 0002 000	BUS WIRE, 20AWG, SOLID TINNED CU	0.2 FT	
296 0258 000	TUBING, TEFLON 19AWG STD WALL	0.92 FT	
296 0260 000	TUBING, SHRINK 3/32 WHITE	0.63 FT	
296 0262 000	TUBING, SHRINK 1/4 WHITE	0.2 FT	
299 0012 000	NYLON ROPE 1/8 IN D	1.25 FT	
354 0260 000	LUG #6 RECT YEL 12-10AWG	6 EA	
354 0765 000	LUG QC FEM 250 16-14AWG BLU	3 EA	