TECHNICAL MANUAL

HTEL CD

994 9822 XXX

888-2001-762

T.M. No. 888-2001-762

Rev. D: 04-13-2007

Returns And Exchanges

Damaged or undamaged equipment should not be returned unless written approval and a Return Authorization is received from HARRIS CORPORATION, Broadcast Systems 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 Systems Division, specify the HARRIS Order Number or Invoice Number.

Unpacking

Carefully unpack the equipment and preform a visual inspection to determine that no apparent damage was incurred during shipment. Retain the shipping materials until it has been determined that all received equipment is not damaged. 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.

Technical Assistance

HARRIS Technical and Troubleshooting assistance is available from HARRIS Field Service during normal business hours (8:00 AM - 5:00 PM Central Time). Emergency service is available 24 hours a day. Telephone 217/222-8200 to contact the Field Service Department or address correspondence to Field Service Department, HARRIS CORPORATION, Broadcast Systems Division, P.O. Box 4290, Quincy, Illinois 62305-4290, USA. Technical Support by e-mail: *tsupport@harris.com*. The HARRIS factory may also be contacted through a FAX facility (217/221-7096).

Replaceable Parts Service

Replacement parts are available 24 hours a day, seven days a week from the HARRIS Service Parts Department. Telephone 217/222-8200 to contact the service parts department or address correspondence to Service Parts Department, HARRIS CORPORATION, Broadcast Systems Division, P.O. Box 4290, Quincy, Illinois 62305-4290, USA. The HARRIS factory may also be contacted through a FAX facility (217/221-7096).

NOTE

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

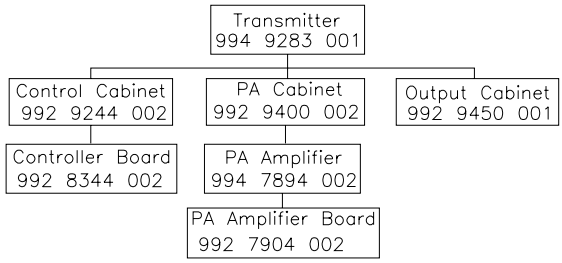
Guide to Using Harris Parts List Information

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

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.

HARRIS Broadcast Systems Division
P.O. Box 4290, QUINCY, IL 62305

PARTS ORDER FORM

HARRIS PHONE: 217-222-8200
HARRIS FAX: 217-221-7096

BILLING INFORMATION

CUSTOMER NAME: _____

ADDRESS: _____

_____

_____

_____

TELEPHONE NUMBER: _____

FAX NUMBER: _____

PREFERRED PAYMENT METHOD: _____

SHIPPING INFORMATION

SHIP TO: _____
(if different from billing information)

ADDRESS: _____

_____

_____

_____

TELEPHONE NUMBER: _____

FAX NUMBER: _____

SHIPPING METHOD PREFERRED: _____

FREQUENCY (If required): _____

EQUIPMENT NAME: _____

EQUIPMENT PART NUMBER: _____

EQUIPMENT SERIAL NUMBER: _____

GUIDE FOR ORDERING PARTS

Please use the following parts order form, filling is as much information as possible. The complete informaiton will allow double checking the part number for correctness or locating a substitude if the part is not available.
The equipment name, part number, and serial number will be found on the metal ID plate on the back of the unit. The serial number MUST be included for any parts ordered under warranty.
Describe the part using the description in the parts list if possible. Include the schematic information, schematic number, or number of next higher assembly. The next higher assembly is usually a 992-xxxx-00x type.

ITEM #	QTY ORD	HARRIS PART NUMBER	DESCRIPTION OF PART (PART'S NAME, DESCRIPTION, SPECIFICATION FROM PARTS LIST IF AVAILABLE)	SCHEMATIC REFERENCE REFERENCE NAME (e.g. C001, R100, etc)	ITEM USED ON (NEXT HIGHER ASSEMBLY IF KNOWN) (e.g. C001 used on 992 8025 001, SCHEMATIC 839 8099 991)	COMMENTS

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.

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.

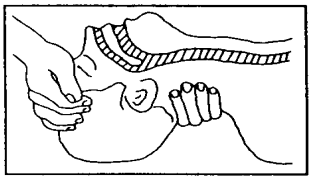
TREATMENT OF ELECTRICAL SHOCK

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

PLACE VICTIM FLAT ON HIS BACK ON A HARD SURFACE

(A) AIRWAY

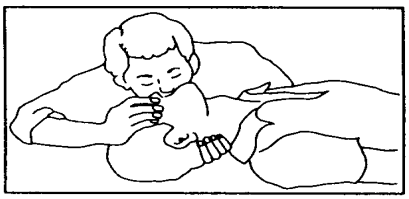
IF UNCONSCIOUS,
OPEN AIRWAY



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

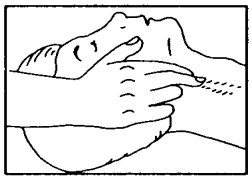
(B) BREATHING

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

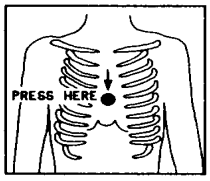
CHECK
CAROTID PULSE



IF PULSE ABSENT,
BEGIN ARTIFICIAL
CIRCULATION

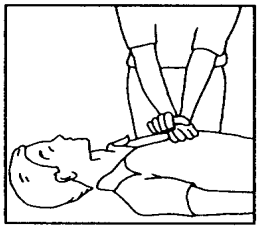
(C) CIRCULATION

DEPRESS STERNUM 1 1/2 TO 2 INCHES



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

APPROX. RATE OF COMPRESSIONS --60 PER MINUTE
- TWO RESCUERS
- 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 thereby 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)

Table of Contents

Section 19
Troubleshooting

Section 1
Introduction/Specifications

1-1 General Description

The HTEL CD transmitters broadcast a DTV signal on VHF US television channel assignments. The transmitters contain a DTV exciter modulator that drives a driver module and up to four RF power amplifier modules. The transmitter contains 50 Volt power supplies for the RF modules, logic DC power supplies, a logic control assembly, and cooling fans. The HTEL CD operates on an AC supply of 208-240VAC at 50 or 60 Hertz. All assemblies are internal to the cabinet except the externally mounted low pass filter, directional couplers, and DTV mask filter.

1-2 Basic Signal Flow

Refer to the basic HTEL CD RF block diagrams located in separate drawing package 843-5275-416 sheets 1 and 2. The HTEL CD transmitter family can use up to four parallel PA modules or may use only a single driver module. Consult the model number for the appropriate RF block diagram for your system. Refer to 839-8106-596 for the overall control and interface block diagram. The exciter modulator generates an on-channel RF DTV signal that is amplified by one or more amplifier modules. In a CD1 exciter non-linear pre-correction is done by exciter adjustment. Linear pre-correction is also available in the exciter and also actively performed by the RTAC circuitry of the exciter. When an Apex exciter is installed all correction is performed automatically. The low pass filter removes harmonics and the DTV mask filter ensures FCC mask compliance.

1-3 RF Amplifier Modules

Driver and power amplifier modules contain self-protecting circuitry and status reporting. Power amp modules may be interchanged. Appendix A contains complete information about the RF amplifier modules.

1-4 Power Supplies

The power supply module contains two 50 Volt 4000 watt regulated supplies for the power amplifier modules. The power supply module also contains a +/-12 and a +5 volt DC supplies for logic control systems.

1-5 Cooling

The main cooling air intake is through the rear door and exhausts out the top and right side. There are five supply and five exhaust fans for RF module cooling. There is also a fan on the heat pipe assembly for reject load cooling when more than one power amplifier is installed. Removing one module will not affect the cooling for the remaining modules. The power supply module contains two fans to cool the power supplies proper. Power supply cooling air is drawn from the front of the transmitter. All fans are powered from the 50 Volt power supplies.

1-6 RF Output System

(Refer to diagram 843-5275-416)

Four way dividers are used in systems with more than one power amplifier module to split the driver module output power to each power amp input. Unused divider ports are loaded with 50 Ohm resistors mounted on the heat pipe assembly in 2 and 3 PA module systems. Each power amp combiner port has a dedicated 50 Ohm, 800 watt dump load resistor. A Mask Filter and a low pass filter ensure the system is compliant to FCC rules. Directional couplers are provided for transmitter metering, automatic gain control, RTAC adaptive linear correction, and monitoring purposes.

1-7 Optional Equipment

Dual exciters with automatic switching are available as a purchased option. Precision frequency lock can be achieved by supplying the exciter/s with a 10 MHz reference signal. Power supply module and RF module extenders are also available for purchase to assist in transmitter maintenance.

1-8 Specifications

Table 1-1 lists the specifications for the HTEL CD transmitter systems.

NOTE *Specifications subject to change without notice.*

Specifications	**HTEL CD Series**
Average DTV output power Using a "Sharp Tuned" mask filter.	HTEL CD1000 1000 Watts (4 PA modules) HTEL CD750 750 Watts (3 PA modules) HTEL CD500 500 Watts (2 PA modules) HTEL CD250 250 Watts (1 PA module) HTEL CD100 100 Watts (1 driver module)
Operating Frequency	Channel 2-6 DTV low band VHF US channels Channel 7-13 DTV high band VHF US channels
RF output	50 Ohms 1 5/8" unflanged connector
DTV program input	SPMTE 310M 75 Ohms, BNC connector
Precise frequency control input	10 MHz 0 to +10dBm, BNC connector
Cabinet Mechanical	Width 26" Height 72" Depth 35"
Weight	Cabinet 435 (empty) Amplifier module 26 lbs (each) Exciter 36 lbs (each) Power supply module 125 lbs
Operating temperature range	0-45 degrees C inlet cooling air Max temperature range decreases 2 degrees per 1,000 feet above mean sea level.
Humidity	0-95% non-condensing
AC power input	208-240VAC 50-60 Hz single phase power
Exhaust temperature rise	Maximum +10 degrees C above inlet
Acoustic noise	65dB @ 3' in front of cabinet using "A" weighting scale
Inlet and exhaust air flow	1225cfm

Table 1-1

Section 2
Mechanical Installation Planning

2-1 Introduction
This section contains information necessary for installation planning, installation, and initial checkout of the HTEL CD transmitter. The information contained in this section is to be used as a general guideline only. The information contained does not cover local building or electrical codes.

2-2 Space Requirements
(Refer to Transmitter Outline drawing: 843-5275-421)
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 (heating, ventilation and air-conditioning), equipment, storage, and a workbench. To allow for servicing the transmitter, a minimum clearance of 3 feet in front of and 20 inches behind the cabinet is recommended. The Transmitter Outline drawing shows the air exhaust hole pattern locations. Do not obstruct these exhaust areas. Leave side exhaust areas unobstructed for at least 8 inches.

2-3 Approximate Shipping Weights
Cabinet 435 lbs
Exciter 36 lbs
RF modules are 26 lbs each. Module quantity is model dependent.
Power module 125 lbs
Be sure to include this information in your planning for the building and verify that the structure is capable of safely supporting the total weight of the transmitter and peripheral equipment.

2-4 RF System Layout
The 1 5/8 EIA unflanged RF output is on the top of the cabinet. Use the block diagrams and component outline drawings to plan the installation for the site requirements. Locate the transmitter close to the mask filter to minimize the interconnection line losses.
A support system should be installed so that the RF components are completely supported, to minimize the weight carried by the transmission line. This will prevent possible damage to components and connectors. Mask filters are normally supplied with a frame that is self supporting for floor mounting, or the filter can be hung with customer supplied uni-strut framework from the ceiling. Directional couplers for metering and automatic gain control are in the transmitter cabinet. External directional couplers provide samples for RTAC adaptive correction, and monitoring and maintenance purposes. Be sure all components necessary for installation are available on site.

2-5 Air System

Minimum transmitter air cooling requirements are 1200 cubic feet per minute. Additional flushing air is recommended for the removal of heat from any equipment surrounding the transmitter. A good guideline is to keep input air no greater than 5°C above ambient. The maximum transmitter operating temperature is 45°C at sea level (derate the temperature 2°C for each 1000 feet above sea level). Hot air rises, one approach would be to use exhaust duct(s) or louvers at the highest point of the room and use a supply fan and filter frame to keep the room at a positive pressure.

Section 3
Electrical Installation Planning

3-1 Electrical Codes

The national and local applicable standard for the AC power installation should be followed.

3-2 Power Requirements

The transmitter is designed to operate from 208 to 240 volts, 50 or 60 Hz, single phase. If voltage variations in excess of +10% are anticipated, it is recommended that the transmitter AC mains be equipped with automatic voltage regulators capable of correcting the primary voltage. All control wiring and signal inputs are located at the I/O panel in the cabinet. Additional access is provided in the cabinet floor for AC wiring only. AC power to the transmitter should be run in metallic conduit, connected to earth ground for safety and to provide shielding against interference. The power wiring must terminate in a power distribution panel, this panel must also be connected to earth ground. A transmitter cabinet ground strap connection is located at the lower rear edge for the cabinet.

3-3 Circuit Breaker or Fuse Selection

The transmitter 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.

A short-duration surge, due to transformer inrush current, will occur at turn-on or during a short AC power loss. This surge can be as high as 400 amps. During this surge, the line voltage at the cabinet must not drop below 80% of the rated line voltage. Selection of 40 amp circuit breakers or fuses must take into account the above inrush current information.

3-4 AC mains Disconnect Location

The circuit breaker panel should be located near the transmitter in a well lit area. As a safety precaution, controls for disconnecting the main power service supplying the transmitter must be convenient to the operator and maintenance personnel. AC power tag-out and lock-out safety procedures are recommended. **Ensure your safety by removing power to the unit before servicing and placing the unit in local control**. Breakers must be clearly labeled. Provisions for emergency lighting should be made.

Section 4
Unloading and Unpacking

4-1 Equipment Required for Unloading
Examine the weights listed on the Transmitter Outline drawing for guidance on the equipment needed.

4-2 Unpacking, Equipment Inventory and Inspection
A “check-off” box is available to help the installer track the steps that have been completed. 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. Locate the packing check list when the shipment arrives. Each transmitter shipment will be accompanied by a packing check list identifying which equipment is packed in the various crates and boxes.

- ❑ LOCATED PACKING CHECK LIST

The contents of the shipment should be inventoried with the packing list. Carefully unpack the unit and perform a visual inspection to determine if any apparent damage has been incurred during shipment. Retain all shipping materials until it has been determined that all items on the list are on site and no damage occurred during shipment. It may be necessary to search packing material for parts initially missed during unpacking.
The carrier may also wish to examine the packing material. If the contents are incomplete, or if the unit is damaged electrically or mechanically, notify the Harris Customer Service Department by phone at 217-222-8200, FAX at 217-222-9443 or the following address:
Harris Corporation,
Broadcast Division
P.O. Box 4290
Quincy, Il 62305
Attn. Customer Service Department

- ❑ INVENTORY OF EQUIPMENT COMPLETED

The equipment becomes the property of the customer when the unit is delivered to the carrier. Claims for damaged equipment must be filed promptly; otherwise the carrier may not accept the claim.

4-3 Factory Test Data Sheets
Factory test data is supplied with each transmitter. It lists parameters for operation of the transmitter. These readings were recorded during factory testing. Locate the test data and place it in the manual at the end of the maintenance section. Record the same readings periodically to establish and maintain an information base from which to work in the event of future changes or problems.

- ❑ FACTORY TEST DATA LOCATED

4-4 Cabinet Placement and Leveling
Four bolts hold the cabinet to its skid. They are located two per side, front and rear. When the cabinet is in its final position, you may need to level the cabinet. The HTEL CD cabinet has leveling jacks in the corners to aid in leveling the cabinet on uneven floors. The four 0.5 inch hold-downs in the bottom of the cabinet used to bolt the cabinet to the shipping skid that may be used to bolt the unit to the floor. Level the cabinet using shims under the bottom, this is important to avoid deforming the cabinet when bolting it to the floor. Install the power module assembly in the bottom of the rack. It will slide into mating electrical connectors. Install the Exciter(s) and connect power and signal cables to the exciter(s). Refer to wiring diagram 843-5275-417 for connections to exciter(s).

NOTE:
DO NOT INSTALL RF MODULES AT THIS TIME

WARNING: Disconnect primary power prior to servicing.

Section 5
Electrical Installation

5-1 Grounding
Located in the lower left rear corner of the cabinet is a ground strap. Connect the station ground to this strap with 2 inch copper strap.

- ❑ GROUND STRAP CONNECTED

5-2 AC Primary Wiring
(Refer to drawing 843-5275-417.)
AC power is connected to terminal block A14TB1 located on the right wall inside the rear door. Use #8 AWG wire at a minimum. Use larger wire if required by Wiring Codes for the AC main. Connect the “hot” side of the ac line to A14TB1-1, the neutral side to 1A14TB1-2 and connect 1A14TB1-3 to the safety or protective ground wire.

- ❑ PRIMARY WIRING CONNECTED

5-3 Input Signals

The program and reference input signals and remote control inputs and outputs are located on I/O panel A12. The I/O panel is located at the bottom rear of the transmitter cabinet. See table 5-1, A12 I/O for functions.

A12 I/O PANEL		
FUNCTION	**EXCITER A**	**EXCITER B (OPTIONAL)**
SMPTE 310 M INPUT	J1	J11
10 MHz REFERENCE INPUT (optional connection)	J5	J15
RS232 DIAGNOSTIC PORT (optional connections)	J8	J18
PA SAMPLE (Apex exciter only)	J10	
HIGH POWER FILTER CORRECTION SAMPLE	J12	
REMOTE COMMAND INPUT	J21	
REMOTE STATUS OUTPUT	J22	
REMOTE ANALOG OUTPUT	J23	

Table 5-1

- INPUT SIGNALS CONNECTED

5-4 Control Logic Jumpers

A7 control logic jumpers are normally shipped from the factory in the recommended positions. Jumper position functions are shown in table 5-2. They may be changed as required. The interface logic module is located between the RF modules and exciter A in the front of the cabinet and is mounted on slides for access.

A7 CONTROL LOGIC JUMPER FUNCTIONS			
JUMPER	**FUNCTION**	**POSTION**	**POSITION**
JP1	Exciter RF 2dB pad	1-4, 2-3 in circuit	1-2, 3-4 out of circuit
JP2	Exciter RF 3dB pad	1-4, 2-3 in circuit	1-2, 3-4 out of circuit
JP3	AGC reference 3dB pad	1-4, 2-3 in circuit	1-2, 3-4 out of circuit
JP4	System AGC	1-2 enable	2-3 disable
JP5	AGC reference 2dB pad	1-4, 2-3 in circuit	1-2, 3-4 out of circuit
JP6	AGC reference select	1-2 final output	2-3 AGC input J13
JP7	VSWR power foldback	1-2 enable	2-3 disable
JP8	High VSWR shutdown	1-2 enable	2-3 disable
JP9	Remote status common	1-2, +12V	2-3, ground

Table 5-2

- JUMPERS SET FOR CORRECT CONFIGURATION

5-5 Control Logic Switches

A7 control logic switches are shipped from the factory in required positions. These switches are transmitter model dependent and not normally changed unless the system configuration is changed. Table 5-3, A7 control logic switch positions is included for reference only. See schematic 843-5460-201 for details.

ASSEMBLY	SWITCH	POLES 1-4	POLES 2-3	FUNCTION
A11 50 VOLT P\S	S3	ON	NA	P/S 3 current measure enabled
	S3	OFF	NA	P/S 3 current measure disabled
A2 RF MODULE 1	S4	ON	OFF	RF module installed
	S4	OFF	ON	Blank module installed
A3 MODULE 2	S5	ON	OFF	RF module installed
	S5	OFF	ON	Blank module installed
A4 MODULE 3	S6	ON	OFF	RF module installed
	S6	OFF	ON	Blank module installed
A5 MODULE 4	S7	ON	OFF	RF module installed
	S7	OFF	ON	Blank module installed
A6 MODULE 5	S8	ON	OFF	RF module installed
	S8	OFF	ON	Blank module installed

Table 5-3

5-6 Interlocks

The external interlock is connected to the remote command input at A12J21-7. A contact closure to ground must be present to satisfy the interlock and turn on the transmitter. If this interlock is not used, A12J21-7 must be connected to ground. Open circuit voltage is +5V.

Operation note: If the transmitter is off it will not accept an on command with the external interlock open. If the transmitter is on and the external interlock opens, the AC power will be removed from the 50 Volt power supplies.

- ❑ INTERLOCK WIRING INSTALLED

Section 6
Transmitter Check Out

6-1 Pre-Turn On Checks
CAUTION BEFORE PROCEEDING WITH CHECK OUT, INSPECT THE TRANSMITTER FOR AC POWER SHORTS, LOOSE HARDWARE, WIRING ERRORS, UNCONNECTED WIRES, MISSING PARTS, AND DEBRIS.

6-2 Initial Turn-on Sequence
The following procedures are the sequential steps to safely turn on the transmitter, and must be performed in the order listed. It is recommended that the installation personnel read the general description in section one, the controls and operation material in section eight, and these procedures before starting.

DO NOT INSTALL MODULES AT THIS TIME!

a) Turn on transmitter circuit breakers and AC power to the transmitter.
b) Verify the logic power supplies by checking the power supply presence LED's on the interface logic assembly A7. They are located on the PWA right hand side.
c) Press transmitter ON pushbutton.
d) Open the external interlock. The external interlock lamp should be illuminated and the 50 Volt power supplies should shut off. Press the ON button. The 50 Volt supplies should not come on. Close the interlock circuit. The external interlock lamp should extinguish and 50 Volts should come on.
e) Verify the power RAISE and LOWER switches on A7 control exciter power level. If the transmitter is equipped with dual exciters select the alternate exciter and check that the interface logic raise and lower control the alternate exciter.
f) If the system has a remote control, place transmitter in the REMOTE mode and check for operation of transmitter ON/OFF and RAISE/LOWER from the remote inputs.
g) Verify that LOCAL mode inhibits remote commands.
h) Return exciter to minimum power by depressing and holding LOWER command until exciter power meter measures 0. If the transmitter is equipped with dual exciters select the alternate exciter and set the power to 0.
i) Measure the 50 volt P/S by using the meter on the front of the transmitter. The amplifier voltage should measure 50 volts.
j) Press transmitter OFF pushbutton.

6-3 Module Installation

The modules may now be installed. Refer to factory test data for placement of modules by serial number and slot number. There are two types of modules, drivers and power amplifier modules. Drivers are keyed and will not fit into a PA slot. Use of a PA in a drive slot is for emergency only. When starting out it is best to reassemble them in the same locations as tested. Keep a record of any changes for future reference. Make sure each module is completely seated.

CAUTION
DO NOT USE EXCESSIVE FORCE INSTALLING MODULES INTO THE SLOTS.

6-4 Control System Check Out

a) Depress and hold the power lower control until the exciter power meter reads 0.
b) Press transmitter ON pushbutton.
c) Check that all modules are enabled. The driver (A2) will show a full green LED. PA modules will illuminate half of the green LED. The half green LED indicates that a module is enabled (50 volts applied to RF devices) but has no input drive. It is normal for the red module LEDs to come on momentarily as the transmitter 50 volt supplies come up to voltage at turn on. They also will come on at shut down, gradually fading out as the supplies discharge.
d) Open the back door and verify that all fans are functioning.
e) Check MODULE FAULT status for each module. A fault is displayed as a blinking red LED. Check to see that all modules are enabled (green LED on); press transmitter ON to enable any modules that are not already on. See table 16-1 for module fault blink code definition.
f) Squeeze the disable switch in the handle of the first module. The module LEDs should go out. You should see the red MODULE FAULT led on at the control panel. Re-enable the module by pressing transmitter ON at the control panel. The MODULE FAULT lamp on the control panel should go out. Repeat this procedure for each module.

6-5 Initial Application of RF Power

a) Lower the exciter to minimum drive as measured on the exciter meter.
b) Press the transmitter ON pushbutton.
c) Check to see that all RF amplifier modules are enabled, as indicated by green LED.
d) Slowly raise exciter drive power while observing and forward & reflected power metering. Stop at approximately 25% forward power.
e) Using an external power meter and calibrated directional coupler confirm power output, slowly increase power to 100% on external power meter. If external power meter and panel readings and factory measured current readings do not reasonably agree, refer to the calibration procedures.
f) After normal power output level is established measure the auto correction input sample level to each exciter. Pad the RF input at the I/O panel J10 or the RTAC sample coupler port for a nominal level of +5dBM measured at the down-converter input to each CD1A exciter at A18 J1. Apex exciters require -30 to +5dBM max for PA sample and high power filter sample for automatic correction as measured at the rear panel inputs of each exciter.
g) At full operating power measure the Error Vector Magnitude and out of channel performance with a Tektronix RFA-300 or equivalent and compare with the factory test data. Out of channel performance may also be checked with a spectrum analyzer and compared with the factory test data. If performance has changed significantly see the separate CD1-A exciter manual for adjustment procedures. The CD1-A exciter has user pre-corrector adjustments for non-linear distortions caused by amplifier modules. The exciter contains user adjustments for amplitude and group delay distortions caused by the FCC mask filter. The exciter also contains automatic correction, RTAC real time adaptive linear correction circuitry to actively correct for amplitude and group delay caused by the mask filter. If the transmitter is equipped with Apex exciter(s) automatic correction algorithms for both linear and non-linear distortions and will continuously correct for transmitter distortions.

Section 7
Remote Control

7-1 Remote Command Inputs

The command inputs are optocoupled and must be asserted low to turn on the function. The optocoupler is supplied by the +5 volt supply and requires a current sink. The table 7-1 defines the function and connections.

A12J21 Remote Command Inputs		
Pin #	Function	Description
J21-1	Transmitter On	Pull low to command on
J21-2	Transmitter Off	Pull low to command off
J21-3	Power Raise	Pull low to raise power of active exciter
J21-4	Power Lower	Pull low to lower power of active exciter
J21-5	NC	*
J21-6	NC	*
J21-7	External Interlock	Ground return satisfies interlock. Must be connected if not used.
J21-8	Spare	Spare command input not currently used.
J21-9	Exciter RS232 Enable	With optional dual exciters used to enable the active exciter and disable the inactive exciter communication. Controlled by the optional exciter switcher.
J21-10	Equalization (RTAC) reset	With optional dual exciters used as a flag for RTAC settings of the off air exciter. Exciter may be set for RTAC bypass or hold when not actively driving the system. Controlled by the exciter switcher.
J21-11	Equalization (RTAC) hold	Pull this line low to hold the current exciter pre-correction coefficients.
J21-12	NC	*
J21-13	Exciter Switcher Auto Select (option)	Pulled low to place exciter switcher in automatic exciter changeover operation.
J21-14	Exciter Switcher Manual Select (option)	Pulled low to disable automatic exciter changeover operation.
J21-15	Exciter Switcher A Exciter Select (option)	Pull low for exciter A to be the on air exciter.
J21-16	Exciter Switcher B Exciter Select (option)	Pull low for exciter B to be the on air exciter.
J21-17-19	NC	*
J21-20-35	Common/Ground	*

Table 7-1

7-2 Remote Status Outputs

The Status outputs are open-collector drivers. An internal voltage source of +12 volts can be made available to the outputs by placing controller jumper JP9 in the 1-2 position. The open collector uses 20 volts DC maximum, and maximum current must be limited to 100 milliamps each output. Each output is asserted low for status true condition. See table 7-2 for function and definitions of remote status connections.

A12J22 Remote Status Outputs		
Pin #	Function	Description
J22-1-16	Common (+12V or Gnd)	Interface logic A7 JP9 1-2 +12 Volts JP9 2-3 ground
J22-17-19	NC	*
J22-20	Transmitter On Status	Low when transmitter is on
J22-21	Local/Remote Status	Low in local control (Remote commands are disabled) High in remote control (Local commands are always enabled)
J22-22	NC	*
J22-23	Frequency Unlock Status	Low when the active exciter Phase Lock Loop has a faulted condition.
J22-24	NC	*
J22-25	RF Muted Status	A low indicates that the active exciter has been RF muted.
J22-26	Air Fault Status	Indicates a cooling system failure when low.
J22-27	High VSWR Status	A low indicates that the reflected power is higher than comparator set point.
J22-28	Power Foldback Active Status	A low indicates that the transmitter power is being reduced because of high reflected power.
J22-29	Module Fault Status	Indicates that one or more modules have faulted off when low.
J22-30	50 Volt Power Supply Fault Status	A low indicates that one or both 50 volt supplies are faulted or the 50 volts is low.
J22-31	External Interlock Status	Low when the interlock is open.
J22-32	Exciter Switcher Auto Selected (option)	A low indicates that exciter automatic changeover is enabled.
J22-33	Exciter Switcher Manual Selected (option)	A low indicates that exciter automatic changeover is inhibited.
J22-34	Exciter Switcher A Selected (option)	A low indicates that exciter A is driving the transmitter.
J22-35	Exciter Switcher B Selected (option)	A low indicates that exciter B is driving the transmitter.

Table 7-2

7-3 Remote Analog Outputs
The analog outputs on the I/O panel provide both calibrated and un-calibrated readings. . See Table 7-3 for wiring and levels.

A12J23 Remote Status Outputs		
Pin #	Function	Description
J23-1	Forward Power	3.5VDC Nominal
J23-2	Reflected Power	0.6V @ 2W
J23-3, 4	NC	*
J23-5	50V P/S Voltage Sample	3.5VDC Nominal
J23-6	Total 50 Volt power supply current sample	Adjustable 1-2V
J23-7	+5 Volt logic supply voltage sample	3.5VDC Nominal
J23-8	+12 Volt logic supply voltage sample	3.5VDC Nominal
J23-9	-12 Volt logic supply voltage sample	-3.5VDC Nominal
J23-10-14	NC	*
J23-15	NA	
J23-16	NA	
J23-17-19	NC	*
J23-20-35	common/ground	*

Table 7-3

Section 8
Operation

8-1 Introduction
This section identifies all controls and indicators associated with HTEL CD transmitter. The logic interface local control panel contains the local operator controls, indicators and metering for the transmitter. The optional exciter switcher tray contains local controls and indicators to select and monitor dual exciter operation.

8-2 Interface Logic Controls and Indicators
The controls and indicators associated with day-to-day standard operation of the transmitter are located on the front panel of the interface logic and exciter switcher if equipped with dual exciter option.

8-3 Interface Logic Local Control

Interface Logic Module A7 front panel control switches and status indicators:

Meter select- scrolls through the four different meter selections.
Power Raise- interfaces to the active exciter power raise circuitry
Power Lower- interfaces to the active exciter power lower circuitry
Transmitter On- Commands the control logic to turn on the transmitter and shows a green LED status when the transmitter is on.
Transmitter Off- Commands the control logic to turn off the transmitter.
Local Control- Disables remote command inputs. LED indicates that local control only is enabled.
Remote Control- Enables the remote control inputs (local control is always enabled). Remote status LED indicates system is accepting remote control commands.

8-4 Interface Logic Meter Status

Interface Logic Module A7 front panel meter selected green LED indicators indicate the current meter function:

Forward Power (average watts)
Reflected Power (average watts)
Amplifier Voltage (volts)
Amplifier Current (amps)

8-5 Interface Logic Fault Status

Interface Logic Module 1A7 front panel status indicators:

Air Fault- red LED indicates cooling failure
50V Fault-red LED indicates a 50 Volt P/S failure
Module Fault-red LED indicates a reported fault from one or more RF modules
External Interlock-red LED indicates an open interlock
VSWR Foldback Active-Yellow LED indicates that power is being folded back because of high reflected power.

8-6 Interface Logic Logic Power Supply Presence LEDS

Power supply presence LED indicators are located on the interface logic printed wiring assembly. These LEDS are viewed by pulling out the logic interface tray and are located at the front right hand side of logic assembly printed wiring board. Test points are also included for a more accurate measurement of the logic power supplies.

+5 Volt DS6 & TP40
+12 Volt DS5 & TP37
-12 Volt DS4 & TP32

8-7 Local Turn On and Turn Off

The local control panel on the front of the logic assembly contains all the operator controls and fault indicators. To turn the transmitter on, ensure the external interlock circuit is satisfied and press the transmitter on button. Select forward power by scrolling with the meter select switch if necessary. Press the power raise or power lower switch to set the power output level. To operate the transmitter by remote control press remote control button to enable the remote control command inputs. To disable the remote control command inputs press local control. To turn the transmitter off, push the transmitter off button.

8-8 Remote Control Operation

Verify that the HTEL is in remote control. The transmitter can be operated remotely by connecting any command input line to common/ground at connector A12J21. If the transmitter fails to operate begin analyses by checking the status of the indicator LED's on the control panel. Detailed descriptions and connections are in section 7 of this manual.

8-9 Exciter Switcher Controls and Indicators

The "on-air" exciter can be selected from the front panel of the exciter switcher by toggling the select exciter switch. The active exciter is indicated by the green A & B LED's on either side of the exciter select switch. Automatic change over of exciters is selected by the mode switch on the right hand side of the exciter switcher. Automatic changeover is indicted by a green status LED and manual mode is indicated by a red LED. The red Exciter RF presence LED's indicate that the RF power out of the exciter is below the adjustable changeover setting. The red fault LED's indicate that the power is below the RF changeover point when in automatic mode. In automatic mode if the "on-air" exciter RF power level falls below the changeover threshold the alternate exciter will be switched to active.

Section 9
System Theory of Operation

9-1 Introduction
This section provides theory of operation for the HTEL CD DTV transmitter. For purposes of discussion, the circuitry is divided into functional subassemblies in the following text. Refer to the separately packaged diagrams as required.

9-2 System Overview
(Reference block diagram 843-5275-416)
The transmitter is composed of subassemblies mounted in a common cabinet. The exciter modulator generates a nominal 200-400mW peak DTV on channel signal. If equipped with dual exciters each exciter's output is routed thru an RF detector and RF transfer switch. The reserve exciter routes to a load and the active exciter's modulated RF signal is routed to the AGC circuit located in the Interface Logic. This signal is then amplified in a Driver Module. The Driver module output can be wired several ways depending on the transmitter model and power level. The driver module output can be the final output of the transmitter or the driver module can drive a single power amplifier module, which then becomes the final output. In multiple PA module systems the driver output is wired to a 2, 3, or 4 way divider. The output of the divider drives parallel power amplifier modules, which are then combined in a 2, 3, or 4 way Gysel combiner. The Gysel combiner features a constant 50 Ohm input and a high degree of isolation between modules. This allows removal of one module without impacting the others. In a single driver module system or one PA module system the final transmitter output sample is fed back and compared to the exciter reference sample to develop an AGC attenuator control voltage. In transmitters with two or more power amplifier modules the driver module output sample is used as the AGC reference sample. The driver module reference is used to ensure that the failure of a power amplifier module does not cause the remaining power amplifiers to be overdriven. The output forward and reflected powers are sampled and detected by the transmitter for meter readings and reflected power protection. The power supplies consist of two 50 Volt switching supplies connected in parallel for the RF modules and a small supply for the interface logic. The optional Exciter Switcher contains level sensing circuitry, logic, and a transfer relay for automatic exciter switching in event of a failure.

9-3 Exciter and RF Power Amplifier Modules
See separate technical manual and drawing package for detailed information and schematics on the exciter modulator. See Appendix A for detailed information on the RF power amplifier modules.

Section 10
Exciter Switcher Theory of Operation
(Optional Equipment)

10-1 Exciter Switcher Overview

The exciter switcher controls an RF transfer switch to route the active exciter output to the RF amplifier chain and the reserve exciter to a load. Control relays switch the exciter status and control indications to the active exciter. Front panel switches and status LED's are used by the operator for local control. Remote exciter switcher operation and status are routed through the interface logic to the exciter switcher. An additional 12 volt power supply PS4 is installed for the exciter switcher option. The exciter switcher runs on +/-12 volt and + 5volt power supplies.

10-2 Exciter Switcher RF Detectors A9D3 & A9D4

(Reference schematic diagram 815-5476-003 for RF detectors)
The exciter RF output is routed through the detector and a small portion is diode detected and filtered. This proportional DC sample is used by the logic to determine RF presence or low RF level.

10-3 Exciter Switcher Logic and RF Switching

(Reference schematic diagram 843-5460-101 & diagram 843-5275-417)
The exciter switcher logic assembly can be used in an analog transmitter or a DTV transmitter. While viewing schematic 843-5460-101 disregard aural designations. The visual circuits are used for DTV. None of the circuitry on sheet one of 843-5460-101 is used in this application. Sheet two of 843-5460-101 has visual and aural designators and not all circuits apply. Refer to 843-5275-417 sheet one for overall exciter switcher wiring and refer to sheet 6 for exciter control and status relay mapping in the digital application. Jumper JP1 is installed in the exciter switcher logic board to route the VSWR foldback voltage to both exciters. This is to ensure that automatic exciter switching is not invoked when the exciter drive power is lowered to protect the transmitter from a high VSWR condition as the power of both exciters will be lowered. Both exciters are set to begin folding back power at the same reference point and reduce the power to equal levels during a high VSWR condition.

Refer to 843-5460-101 sheet 3. For digital applications DS4 & DS7 aural presence LED's are not installed. Red LEDs DS3 & DS6 indicate that the RF level of the exciter is below the fault threshold. Pots R28 & R31 are not installed and the threshold detectors are defeated by pulling the negative reference of the comparators low, and tying the positive input samples of the comparators to 10 volts. The automatic switch level for DTV is adjusted for R26 and R30 front panel adjustments. Connector J6 routes the detected RF exciter power reference to threshold detector U4.

Refer to 843-5460-101 sheet 4. Auto/manual and A/B commands are active low. Commands can be from the front panel switches or routed through J5 from the interface logic for remote control. Status is also routed through J5 to the interface logic fro remote control access. U8 contains the software for exciter switcher decoding. As shown all status LED's are active low. Latching relays K10 & K11 provide memory in case of power failure. J6-12 is the active low B exciter command for the transfer switch. J6-5 (sheet 5) provides +12 volts to the RF transfer switch K2. See 843-5275-417 sheet 2 for transfer switch wiring and RF cabling.

Section 11
Interface Logic Assembly Theory of Operation

11-1 Interface Logic Assembly Overview
The interface logic assembly provides local transmitter control, status, and metering. The interface logic also contains remote metering, status and control. The interface logic has automatic gain circuitry plus protection circuits for the transmitter.

11-2 Local Command and Status (Part of A7 Logic)
(Reference schematic diagram 843-5460-241 for front panel interface)
All local commands are a switch contact to ground. The local panel status LED anodes are tied together pulled up to +5 Volt logic supply. The local control interface panel J1 is connected to the logic assembly J7 with a ribbon cable.

11-3 Local Control Interface
(Reference schematic diagram 843-5460-201 sheet 1 & 2)
The local control front panel connects to J7 of the logic assembly for local command inputs and status LED outputs. The local command inputs are pulled high to +5 Volts with 10Kohm resistors. Command inputs are active low. Open collector IC's connect to local status LED cathodes through current limiting resistors.

11-4 Meter Interface
(Reference schematic diagram 843-5460-201 sheet 1)
The transmitter front panel meter is a 3 ½ digit panel mount unit located on the logic assembly A7. The meter is connected to J8 of the control logic. The meter reads forward and reflected power, and 50 volt power supplies total current and voltage. Pressing the meter select button creates a pulse on the output of U21 monostable that is counted by U12. U12 creates a meter address from the meter count that selects the signal routed to the output of analog multiplexer U9. Meter address decoder U13 activates the meter selected status LEDS of the front panel through drivers and current limiting resistors. The meter address decoder controls switches U1, U3, and U5 for meter annunciators and the decimal point. The meter address decoder controls switches U14 and U46 to route the meter voltage through squaring IC U10 when measuring forward or reflected power, and bypasses the squaring IC when the power supply is metered. R110 "zeroes" the power meter readings.

11-5 Command Input Logic
(Reference schematic diagram 843-5460-201 sheet 2)
Local and remote commands are activated by pulling an input pin of programmed IC U8 to ground. The external interlock input is satisfied by a low. Local/remote memory and on/off memory is done by latching relays K2 and K3. U8 status and control outputs are also active low signals. U34 pins 2 and 4 lock out on and off commands when the reset line is high. When in local control remote control operation is inhibited by removing the 5 volt supply from the optocoupler remote control inputs.

11-6 Transmitter Control
(Reference schematic diagram 843-5460-201 sheet 3)
Transmitter control inputs and outputs are routed to programmed IC U15. Switches S4-S8 are used to enable or disable the module fault input lines. When a blank module is installed set the switches to ground the module fault status input lines. Inputs and outputs to and from U15 are active low. U15 monitors faults reported from the RF modules, 50 Volt power supply status, and cooling system status. U15 outputs enable the RF modules and provide summary fault reporting. U15 pin 15 is control line used to reduce the transmitter power when a failure of one of the two 50 Volt power supplies occurs to a level that one power supply can deliver. IC U39 is a pulse stretcher that provides proper timing sequence.

11-7 Power Up Reset
(Reference schematic diagram 843-5460-201 sheet 4)
The power up reset circuit is U33 which forms a voltage comparator referenced to the 1.23 volts of CR34. Normal power fail detection point is about 4.6 volts. When the voltage of U33-5 is more than U33-6 then U33-7 will assert a high removing the power up reset signal.

11-8 Clock
(Reference schematic diagram 843-5460-201 sheet 4)
U24 generates a 200Hz clock signal that is applied to the programmed IC's U8, U15, and U19 at pin 1.

11-9 Fault Encode

(Reference schematic diagram 843-5460-201 sheet 4)

The programmed IC U19 is the fault encoder. The fault encoder commands the contactor to apply AC to the 50 Volt supplies when the external interlock is satisfied and the transmitter is commanded to turn on. An enable is sent to the 50 Volt power supplies when an on command is sent. Reflected power monitoring circuits signal the encoder when they are active. VSWR foldback status is sent to the local and remote control circuits. The high VSWR signal can be used for status reporting only when JP8 is set to position 2-3. When JP8 is set 1-2 the high VSWR will report status and shut the transmitter off. K1 is the high VSWR memory relay. U19 pin 18 is used to preset the AGC attenuator to prevent a module overdrive condition at turn on by limiting the drive for a short time.

Note: If JP8 is set to position 1-2 the transmitter will not automatically come on after a reduction of reflected power or an AC fault.

11-10 50 Volt Power Supply Monitoring

(Reference schematic diagram 843-5460-201 sheet 6)

Power supply current samples from RF module power supplies 2 & 3 are brought to the interface logic assembly and buffered. The two current samples are summed together at U18. R106 is a “meter zero” adjustment. Local current calibration is done with R109 and the remote reading is calibrated with R118. The 50 Volt local meter is zeroed with R94 and calibrated with R232. The 50 Volt OK comparator is set with R226 to go out at approximately 48 volts. At 50 volts set R226 for 2.6 volts at TP23. The remote voltage sample is a nominal 3.5 Volts.

11-11 Power Detectors

(Reference schematic diagram 843-5460-201 sheet 7)

There are two RF peak detectors that convert the forward and reflected RF samples from the directional coupler in to a DC value for uses by the logic. Each RF input is coupled by a 4:1 step up transformer to a HP2800 hot carrier diode detector were the RF is turned into a DC value. The cathode of the detector is passed on through a low pass filter to a LM324 voltage follower buffer. The output for the voltage follower is connected to a calibration pot to set a reference voltage for the meter. A first order temperature correction uses a second HP2800 diode to supply a negative bias voltage to the negative input of the buffer. The gain of the remote power meter output circuits is settable with switch S1.

11-12 Reflected Power and Power Reduce Circuits
(Reference schematic diagram 843-5460-201 sheet 7)
Following the reflected power detector calibration pot is an amplifier/buffer. When JP7 is in position 1-2 the foldback is enabled. If the reflected voltage at U7 pin 3 rises above the reference set by R77 at U7 pin 2 it will be applied the exciter foldback voltage control line. This line will reduce the drive power proportional to the amount of reflected power. R158 is used to set the reduction in drive to the modules to a level that can be supplied by one 50 volt power supply in the event of a failure of the other 50 volt power supply. The high VSWR comparator set point is adjusted by R178 and can be used as a status indicator or be configured to turn the transmitter off if this level is exceeded.

11-13 Automatic Gain Control
(Reference schematic diagram 843-5460-201 sheet 8)
Exciter RF drive is connected at J11 and passes through a directional coupler, level setting pads, and a voltage controlled attenuator. An exciter sample from DC1 is detected by CR8 and amplified by U4. A detected AGC reference sample is selected by JP6. JP6 position 1-2 is selected when there are two or more power amplifier modules running in parallel. If the transmitter RF line-up is a single driver module or a driver module driving one power amplifier then JP6 2-3, the final output is selected. The detected exciter reference and AGC reference are buffered and then compared at U2 pins 12 and 13. U2 pin 14 controls the voltage controlled attenuator and will keep the gain of the system constant by varying the attenuation. R73 and CR12 supply a voltage to set attenuation at a “cold” turn on to keep from overdriving the RF modules and allow a step start.

11-14 Logic Power Supply Inputs
(Reference schematic diagram 843-5460-201 sheet 9)
The power supplies required by the logic assembly are +/-12 volts and +5 volts. The 1SMC devices at each power supply voltage input provide clamping and reverse voltage protection.

Section 12
Power Supply Module Theory of Operation

12-1 Power Supply Module A11
(Reference diagram 839-7994-269 sheets 1 and 2)
The Power Module A11 contains the 50 Volt supplies PS 2 and PS 3 and logic power supply PS 1. Contactor K1 supplies AC to the 50 volt power supplies. K1 is controlled by interface relay K2 receiving the AC on command from the interface logic assembly. Filter capacitors C1 and C2 are on PS 2 and PS 3 respectively. The supplies are rated for 50 volts at 60Amps full load. There is one user adjustment on the back of supply used to set the supply voltage to 50 volts. The supply has current foldback, temperature fold-back, and over-voltage protection. If an over-voltage fault should occur the supply will shut down and remain off until AC power is removed and reapplied again.

12-2 Logic Supply A11PS1

The interface logic power supply is located in the power module chassis. The linear regulated logic supply provides +5V and +/-12V for the Interface Logic Module A7 and AC ON relay A11K2. The logic supply has voltage adjustments on the PC boards for all three voltages and should be set to deliver 5V +/-0.1V, and +/-12V +/-0.3V to the Interface Logic tray. Terminal board TB1 sets the AC input line voltage tap to 208/220 or 240VAC.

Section 13
Circuit Breakers

13-1 Fifty Volt Power Supply Breakers

There are three ac circuit breakers that provide line feed protection to power supply module. Breaker A1CB1 is a 20A breaker for the 50 Volt power supply PS 2. Breaker A1CB2 is a 20A breaker for the 50 Volt power supply PS 3.

13-2 Logic Power Supply Breaker

This 2A breaker A1CB4 supplies power to the logic supply in the power supply module PS 1. Opening A1CB4 removes power from the Logic supply.

13-3 Exciter Circuit Breaker

A1CB3 supplies power to the exciter/s. Opening A1CB3 removes power from the exciter or exciters in dual exciter applications.

13-4 Power Supply Monitor Circuit Breaker

Power Supply Module A11CB1 provides protection for the interface logic circuit board 50 volt power supply sample. This breaker is rated at 1 amp.

13-5 Cooling Fans Circuit Breaker

Power Supply Module A11CB2 provides overload protection for 50 Volt cooling fans for the transmitter cabinet and heat pipe assembly. This breaker is sized at 10 amps.

Section 14
Maintenance and Alignments

14-1 Introduction

This section provides preventive maintenance checks, cleaning and corrective Maintenance information for the Platinum™ Series BROADCAST TRANSMITTER.
Maintaining a transmitter consists of several phases:
Routine maintenance
Performance checks and adjustments
Control circuitry checks and metering calibration
Keeping proper station records
The information contained in this section is intended to provide guidance to establish a comprehensive maintenance program to promote operational readiness and eliminate downtime. Particular emphasis is placed on preventive maintenance and record keeping functions.

14-2 Station Records

The importance of keeping station performance records cannot be overemphasized. A logbook should be maintained for operation and maintenance activities. These records can provide data for predicting potential problem areas and analyzing equipment malfunctions.

14-3 Transmitter Logbook

As a minimum performance characteristic, the transmitter should be monitored (using front panel meters) and the results recorded in the transmitter logbook.

14-4 Maintenance Logbook

The maintenance logbook should contain a complete description of all maintenance activities required to keep the transmitter operational. A list of maintenance information to be recorded and analyzed to provide a data base for a failure reporting system is as follows:
DISCREPANCY
Describe the nature of the malfunction. Include all observable symptoms and Performance characteristics.
CORRECTIVE ACTION
Describe the repair procedure used to correct the mal-function.
DEFECTIVE PART(S)
List all parts and components replaced or repaired.
Include the following details:
a. Component Part Number
b. Component Schematic Number
c. Component Reference Designator
d. Assembly Serial Number

14-5 Safety Precautions
It is very dangerous to attempt to make measurements or to replace components with power on. Before attempting any measurements or maintenance procedure, consider the voltage and current hazards that may exist. It is very important to remove primary power to the transmitter when AC mains voltage is exposed. The information and procedures in this section is to be used by trained and experienced personnel. Good judgment, Alertness, and common sense are the best accident preventives.

14-6 Preventive Maintenance
Preventive maintenance is a systematic series of operations performed periodically on equipment. As these procedures cannot be applied indiscriminately, specific instructions are necessary.

14-7 Visual Inspection. Inspection is the most important preventative maintenance operation because it determines the necessity for the others. Become thoroughly acquainted with normal operating conditions in order to recognize and identify abnormal conditions readily. The remedy for most visible defects is obvious. However, care must be taken if heat damaged components are located. Overheating is usually a symptom of trouble. It is essential to determine the actual cause of overheating before the heat damaged component is replaced, otherwise the damage will be repeated.
Inspect for the following:
1. Overheating, indicated by discoloration, bulging of parts and peculiar odors.
2. Oxidation.
3. Dirt, corrosion, rust, mildew and fungus growth.

a) Feel. Check parts for overheating, especially rotating parts such as fans. The lack of proper ventilation can be detected and corrected before serious trouble occurs. Become familiar with operating temperatures in order to recognize deviations from the normal range.
b) Tighten. Tighten loose screws, bolts, and nuts. Do not tighten indiscriminately as fittings that are tightened beyond the pressure for which they are designed may be damaged or broken.
c) Clean. Clean parts when inspection shows that cleaning is required.
d) Adjust. Make adjustments when inspection shows that adjustments are necessary to maintain normal operation.
e) Paint. Paint surfaces with the original type of paint (use prime coat if necessary) when inspection shows rust, worn or broken paint film.

14-8 Air Filter Maintenance
A disposable air filter is used for cabinet air filtration. They must be changed as necessary to allow sufficient cooling airflow. Additional filters may be ordered from HARRIS to assist in maintenance. Harris filter part number is 448-0974-000. This filter is a standard filter size 14in. X 30in. X 1in. The filter media is a coated fiberglass mat. The power supply filter Harris part number is 943-5285-126.

14-9 Metal Oxide Varistors
Periodically visually inspect all MOV's to ensure proper transient clamping protection. In addition to regular inspection, check after thunderstorms. Replace any suspect units exhibiting physical damage. MOV's can take a limited amount of transients and will eventually wear out while protecting the AC input line.

14-10 Semiconductors
Routine checking of semiconductors used in the transmitter is not required. The best check of semiconductor performance is actual operation in the transmitter. When semiconductors are replaced, check circuit operation that may be affected. Replacement semiconductors should be of the original type or a recommended direct replacement.

Preventive maintenance of transistors is accomplished by performing the following steps:
a. Inspect the semiconductors and surrounding area as accumulations of dirt or dust could form leakage paths. Dirt on heat sink surfaces can reduce airflow and be a thermal barrier raising operating temperature.
b. Examine all semiconductors for loose connections or corrosion. RF and other power transistors have specific fastener torque requirements that must be followed. See Appendix A RF power amplifier module torque specifications.

14-11 Capacitors
Preventive maintenance of capacitors is accomplished as follows:
A) Examine all capacitor terminals for loose connections or corrosion.
b) Ensure that component mountings are tight.
c) Examine the body of each capacitor for swelling, discoloration, or other evidence of breakdown.
d) Inspect electrolytic capacitors for leakage signs.
e) Use standard practices to repair poor solder connections with proper soldering tools.

14-12 Fixed Resistors
Preventive maintenance of fixed resistors is accomplished by the following steps:
a) When inspecting a chassis, printed-circuit board, or discrete component assembly, examine resistors for dirt or signs of overheating. Discolored, cracked, or chipped components indicate a possible overload.
b) When replacing a resistor ensure the replacement value corresponds to the component designated by the schematic diagram.
c) Clean dirty resistors with a small brush.

14-13 Relays
Replace hermetically sealed relays if defective. Check other relays as follows:
a) The relay mounting is secure.
b) Connecting leads not frayed and the insulation is not damaged.
c) Terminal connections are tight and clean.
d) Moving parts travel freely.
e) Spring tension is correct.
f) Contacts are clean, adjusted properly and make good contact.
g) The coil shows no signs of overheating.
h) Clean any dirty or corroded terminal connection.

Section 15
Performance Check

15-1 Performance Check
Performance checks of error vector magnitude and out of channel performance will indicate if adjustments are needed for CD1A exciters. The pre-correction circuitry for linear and non-linear distortions is located in the exciter. Check the out of channel performance using a Tektronix RFA300 or equivalent VS the FCC mask template or factory test data. If out of band performance is found to be out of tolerance check operating output power level and current for normal levels. If power and current are normal adjust the non-linear pre-correction circuitry of the CD1A per the instructions in the exciter technical manual. Manual and automatic pre-correction circuitry for linear distortions also resides in the exciter. Reference the exciter manual for detailed information on the correction circuits. The Apex exciter has automatic correction for linear and non-linear distortions. Checks of control circuit operation and metering calibration are recommended annually.

Section 16
Meter Calibrations

16-1 Introduction
The following are adjustment and alignment procedures. It is strongly suggested that each procedure be read completely before attempting any adjustments. The abbreviation CW is clockwise and CCW is counter-clockwise.

16-2 Amplifier Volts Meter Calibration
a) Select the amplifier voltage meter on the front panel. Turn off the transmitter and allow the 50 volts to bleed off and the meter reading to stabilize.
b) Adjust R94 for a front panel reading of 0.
c) Turn on the transmitter.
d) On the Interface Logic Board A7 connect a Digital Voltmeter (DVM) to TP25 and Ground. The DVM should read 50 Volts +/-0.25 volts.
e) Adjust R232 on the interface logic for a front panel meter reading to equal measured voltage.

16-3 Amplifier Current Meter Calibration

Use a precision DC clamp on ammeter for measurement.

a) Select amplifier current on the meter.

b) With transmitter off adjust R106 of the logic assembly for 0 meter reading.

c) Turn the transmitter on and verify normal operating output power level.

d) Carefully connect the current clamp around the positive 50 Volt supply wires of each installed RF amplifier module at the module connector pins 3 & 4. Pins 3 and 4 are wired with #8 and located on the same side of the connector as the RF in coax. Refer to diagram 843-5275-417 for wire numbers. Record each installed module current reading.

e) Measure the total current supplied to the cooling fans by clamping around the 50 volt supply wire at A18 TB2. Record this value.

e) Adjust R109 for a current meter reading equal to the total measured values in the previous two steps.

f) Adjust remote current calibration if required.

16-4 Power Meter Calibration Initial Setup

The transmitter must be operational with the output connected through a precision directional coupler with known calibration factors. The forward and reflected ports of the coupler will be connected to a RF power meter. The coupler calibration factors are used to calculate the forward and reflected power. Perform a power meter zero and self-calibration as described in the power meter operation manual. Use the calibration factors for the power meter head for the operating frequency and calibration frequency as described in the power meter manual. Derive the forward power from a power meter offset or by a calculated offset method.

16-5 Power Meter Zero Adjustment

Select the reflected power meter position on the interface logic assembly A7. With the transmitter off adjust R110 to “zero” the meter reading.

16-6 Forward and Reflected Power Calibration

The transmitter power meters are calibrated in **average power**. Adjust the forward power average meter reading with R64 of A7 interface logic to equal the measured or calculated power. Temporarily place JP7 and JP8 in position 2-3 to disable reflected power protection circuits. Install a 10dB pad in the forward power meter sample path. Move the forward power sample from A7J9 to A7J10. Calibrate the reflected power for 10% reading of the nominal forward power with R65. Recalibrate the remote control system if the local power calibration is changed. Remove the 10dB pad, install the sample cables in the proper locations, and restore JP7 and JP8 to the previous settings.

Section 17
VSWR Protection Calibration

17-1 Setup for VSWR Protection Calibration
Note: The following procedure assumes the transmitter power meters are calibrated. If both following procedures are not being performed be sure to put any connections changed back to normal.
a) Start with the transmitter off.
b) Reduce Exciter drive output to zero.
c) Place JP7 & JP8 in position 2-3 to disable reflected power protection circuits.

17-2 High VSWR Overload/Status Adjustment
a) Move the forward power coax cable from A7J9 to A7J10.
b) Select the reflected power meter position.
c) Turn on the transmitter and slowly increase output power until the reflected power meter reads a power level of 10% of the normal forward power level. For example if the normal power level is 500 watts average, adjust the power control until the reflected power reading is 50.
d) Adjust R178 (high VSWR set point), on A7 (Interface logic Board), until the high VSWR status led DS1 just illuminates.

17-3 VSWR Foldback Adjustment
a) Reduce the exciter drive power to zero.
b) Move the jumper JP7 to 1-2 position to enable the power foldback function.
c) Slowly increase the exciter drive power until the reflected power meter reads 3% of the normal forward power level. For example if the normal power level is 500 watts average, adjust the power control until the reflected power reading is 15 watts.
d) Adjust R77 foldback set point on A7 (Interface Logic Board), until the foldback active led DS2 just lights.
e) Restore the forward and reflected sample coaxes and jumpers to original positions as required.

Note: For dual exciter applications the point where VSWR power foldback begins and the amount of power reduction should be equal for exciter A and exciter B. Refer to the exciter technical manual for adjustment procedures.

Note: If JP8 is set to position 1-2 the transmitter will not automatically come on after a reduction of reflected power or an AC fault.

Section 18
AGC, P/S OK, & P/S Failure Power Reduce Adjustment

18-1 Transmitter AGC Adjustment

Note: There are level setting pads on the exciter drive input, the AGC reference detector input, and possibly on the directional coupler ports. These pads are factory selected for an exciter drive level meter reading of 200-400mW and are not normally changed unless the operating power level of the transmitter has changed from the factory test power. By keeping the exciter at 300mW nominal level the proper exciter pre-correction range and exciter performance are maintained.

Note: Normal AGC overdrive capability is 1.8dB. Do not exceed this amount of overdrive. Setting higher AGC overdrive capability can lead to RF modules being overdriven, degrading performance.

Note: Perform any power meter calibrations if required before performing the following adjustment.

a) Preset the following with the transmitter off:
Set JP4 to position 2-3, AGC off.
Set R35 exciter sample and R63 reference sample to full CW.
Set exciter drive power to 0mW.

b) Turn on the transmitter and increase the exciter drive to operating power level.

c) Let the transmitter run for 10 minutes to allow the RF modules sink temperature and gain to stabilize.

d) Adjust the exciter drive level for forward power output level required after the temperature has stabilized.

e) Measure the exciter DC reference voltage at TP2 (R35) and the output reference at TP3 (R63) to determine which AGC sample level is the highest.

f) Move JP4 to position 1-2 AGC enabled.

g) Monitor the forward power level and adjust the pot associated with the highest measured voltage from step e for a reduction of 66% (-1.8dB) in output power level. Only one pot should be adjusted, the other should remain maximum CW.

h) Raise the exciter drive power to the required power level.

i) When properly completed the exciter power level should be 200-400mW on its meter and the AGC control voltage (TP1) should be approximately 6 volts.

18-2 Power Supply OK adjustment

a) Verify that the 50 Volt power supply meter reads 50 Volts +/-0.25 Volts

b) Adjust R226 for a level of 2.6 volts measured with a DVM at test point TP23 with the 50 volt power supply at the nominal operating voltage.

18-3 Power Supply Failure Power Reduce Adjustment

If one of the two power supplies in the power module should fail, this circuit will lower the drive such that the transmitter will continue to operate at a reduced power with the remaining power supply.

a. Preset R158 fully CW (maximum power reduction).

b. Turn OFF the AC circuit breaker for one of the 50 Volt power supplies PS2 or PS3.

c. Adjust R158 for a power output level that requires 50 Amps of power supply current Max. If required power level can be achieved under 50 amps of current then turn R158 max CCW.

d. Turn ON the P/S AC circuit breaker and the output power should return to nominal.

Note: The power reduce feature utilizes the VSWR foldback circuitry to reduce the power with a power supply failure. For dual exciter applications the point where VSWR power foldback begins and the amount of power reduction should be equal for exciter A and exciter B. Refer to the exciter technical manual for adjustment procedures.

18-4 Exciter Switcher RF Presence Adjustment

Ensure that the transmitter is operating at the required output power level with no module faults and normal operating parameters with both exciters before doing this adjustment.

a. Select manual exciter switcher mode and exciter A to be the active exciter. Verify normal operating parameters and power.

b. Lower exciter A power to the desired changeover power level is reached. Adjust exciter A RF presence set (R26) until the red presence LED comes on. Raise exciter A back to normal transmitter output power.

c. Select exciter B. Verify normal operating parameters and power. Lower exciter B power to the desired changeover level is reached. Adjust exciter B RF presence set (R30) until the red presence LED comes on. Raise exciter B back to normal transmitter output power.

d. Select Auto mode. Slowly lower the power of exciter B and stop when the exciter switcher switches to A. Go to manual mode. Select exciter B and verify that the switch level is appropriate. Make a slight adjustment if required. If no adjustment is required raise exciter B back to normal power level.

e. Select exciter A and auto mode. Slowly lower the power of exciter A and stop when the exciter switcher switches to B. Go to manual mode. Select exciter A and verify that the switch level is appropriate. Make a slight adjustment if required. If no adjustment is required raise exciter B back to normal power level.

e. Ensure both exciters are operating the transmitter at the required power and set the exciter switcher mode to automatic.

Section 19
Troubleshooting

19-1 Introduction
In general a reported fault condition can be reset by a transmitter on command. For example if a power amplifier module has faulted off from an overdrive condition and the drive has been reduced, then the module fault can be cleared by pressing the on button. The exceptions to this are a 50 Volt power supply over-voltage and a high VSWR shutdown. See the 50 Volt Fault and High VSWR fault sections for specifics. See general troubleshooting tips section following for additional information.

19-2 Air fault
Check for tripped cooling fan DC circuit breaker, cooling fan failure, obstructed air filter, or obstructed cooling exhaust.

19-3 50 Volt Fault
Check power supply fault status LEDS on the power supply module front panel to determine if one power supply or both supplies are faulted.

If both power supplies are faulted check for tripped circuit breakers, faulty AC power input, short circuit on DC output, or power supply cooling fan faults. Also check that the power module is fully seated. There is a mechanical interlock switch on the power module that when open will drop the AC contactor supplying the power supplies AC if the power module is not fully seated. To reset power supplies after an over voltage condition remove the AC power from the power supplies by turning off the AC supply for 1 minute and then reapplying the AC. Check for a low at the power supply AC control line on at the interface logic U17 pin 18. Check for a low at U17 pin 17 the power supply enable control line. If the control lines are OK check the interface relay K1and the AC contactor K2 in the power supply module proper.

If one power supply is faulted check for tripped circuit breaker or power supply cooling fan fault. To reset a power supply after an over voltage condition remove the AC power from the power supply by turning off the AC breaker to the supply for 1 minute and then reapplying AC. If the power supply has failed, the transmitter can run at reduced power until a replacement can be obtained.

19-4 External Interlock
Determine why the interlock circuit has opened. A ground is required to satisfy this interlock. If the transmitter was on when the interlock opened then the AC power will be removed from the power supplies when this interlock opens. If the transmitter is off an on command will not be accepted with an open interlock.

19-5 VSWR Foldback Active
Check the transmission line, RF mask filter, or antenna past the transmitter reflected power output coupler located at the top of the cabinet for abnormalities such as kinked heliax cable, water in the transmission line, open or short circuit, or icing of the antenna system that would cause an increase in reflected power.

19-6 High VSWR Fault and Status
With JP8 interface logic in position 2-3 the high VSWR is a status warning only. If JP8 is set 1-2 a high VSWR condition will cause the transmitter to turn off. When the transmitter is turned off by this fault an off command must be given to reset the fault before an on command will be acknowledged.

Note: If JP8 is set to position 1-2 the transmitter will not automatically come on after a reduction of reflected power or an AC fault.

19-7 Module Fault
The module fault LED on the interface logic assembly is a summary fault. View the fault blink code on the failed module/s. Determine the failure indicated from the table 16-1. This info can help identify the root cause of the fault. After identifying the reported blink code see the detailed info following on each reported module fault.

Module Fault Codes	
1 Blink	High VSWR Condition
2 Blinks	RF Input Overdrive
3 Blinks	High ISO Voltage (high internal module reject load power)
4 Blinks	Power Supply Volts High or Low
5 Blinks	Over Temperature
6 Blinks	Pass FET Failure

Table 16-1

19-8 Module High VSWR
Check for shorted or open coaxes from the module output/s to the transmitter output directional coupler, loose connectors, or failed module combiner reject/dump loads in parallel amplifier module systems.

19-9 Module RF Input Overdrive
Verify exciter drive power is normal and adjust if necessary. Check AGC circuit operation and adjustment by reducing exciter power to half of normal and setting the AGC to manual with logic AGC jumper JP4 position 2-3. Raise transmitter power to operating level. Place AGC in operation by moving JP4 to position 1-2. Power should reduce to approximately 66% if AGC is set properly and functioning. Adjust per the procedure in this manual or trouble shoot as required.

19-10 Module High ISO
This is an internal module problem. Refer to Appendix A for assistance or obtain replacement module.

19-11 Module Power Supply Fault
See power supply fault section above.

19-12 Module Over Temp: Remove the module and ensure that cooling fins on the heatsink are not obstructed with dirt. Also check the items listed under air fault this section.

19-13 Module Pass FET Failure: Internal module problem. Refer to Appendix A for assistance or obtain replacement module. The pass FET is a switch that applies the power supply voltage to the RF amplifier devices.

19-14 General Troubleshooting Tips
The first rule of troubleshooting is to check the AC supply voltage and the DC power supplies. In general the trouble shooting method is to isolate the problem to a subassembly. For RF problems verify proper exciter performance. If the exciter is OK use a directional coupler between the driver and PA modules and verify operation of the driver amplifier module etc. PA modules can be swapped as an experiment to verify a module problem versus a problem in the module slot or associated circuitry.

19-15 Troubleshooting Assistance
Assistance with troubleshooting is available from the Harris Customer Service Department either by letter to the following address or by telephone (217-222-8200) 24 hours a day.
Harris Corporation, Broadcast Division
P. O. Box 4290
Quincy, IL 62305
ATTEN: Customer Service Department

It is necessary to have the model number and serial number of the unit to retrieve certain information. Organize material before calling or writing, listing all observable symptoms and characteristics, sequence of events, meter readings, revision level of circuit boards.

19-16 Returns

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

a. The customer name, address, and telephone number.
b. The return authorization number.
c. A description of the problem or why the unit was returned.

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

Harris Corporation, Broadcast Division
P. O. Box 4290
Quincy, IL 62305

Units not under warranty may be returned for repair without return authorization. Contact our Repair Dept. for information on our current rates, estimates, and scheduling. If a quick turn around is needed for emergencies consult the Repair Dept. Supervisor by phone at 217-222-8200.

Appendix A
RF Amplifier Modules, *Platinum Series*®

A.1 General Information

This procedure is intended to be used as a guide in isolating faults and troubleshooting *Platinum Series*® TV RF power amplifiers with passive bias.

Module faults are most easily verified by swapping the suspected faulty module with a known working module in another slot. If the fault follows the module, then the problem is probably internal to the module. If the fault remains at the same slot after substituting modules, then the search for the problem should probably focus on the slot and the rest of the transmitter system.

A.1.1 Factory Module Repair

If a failure of a module occurs, the module may be returned to the factory for repair.

To return a module, contact Harris Repair Department:

By phone: 217-222-8200

By FAX: 217-221-7086

By mail:

Harris Repair Department
P.O. Box 4290
Quincy, Illinois 62305-4290

By email: tsupport@harris.com

Include the part number and serial number of the module when requesting service. Instructions to ship the module will be processed and communicated to you.

Please provide as detailed information as possible about the nature of the failure and the operating condition of the module at the time of failure. This data will help our Repair Department service your module promptly and efficiently.

If you do not stock a spare module and require another unit for operation, a spare may be obtained as a loaner/rental unit from the Harris Repair Department while your unit is shipped to our factory for repair.

If you are located within the United States, you will be billed for shipping charges, and if your warranty has expired a nominal fee will be charged for use of the module.

If you are located outside the United States, the same loaner service will be offered wherever feasible, but in addition to any shipping charges you will be responsible for all import duties, transfer fees or international tariffs.

A.1.2 Local Module Repair

If local repair is necessary, the following troubleshooting guide and repair procedures are recommended. We strongly recommend reading the appropriate parts of the Theory of Operation before proceeding.

Optional PA Module Test Fixture (992-8556-002) is needed for local testing or repair. The fixture will allow testing of a PA or driver module while using the transmitter as the source of DC power and RF drive.

A.2 RF Amplifier Modules Theory of Operation

Two types of RF amplifier modules are used in a digital *Platinum Series*® transmitter:

- Driver Modules are multiple-stage, high gain RF amplifiers used primarily to amplify an exciter output and drive subsequent amplifier stages.
- PA Modules are single-stage, high-power, high-efficiency amplifiers which use four parallel amplifiers modules to achieve peak output power levels of 1 kW each.

Both drivers and PAs share some common features. Drivers and PAs both contain smaller amplifier subassemblies called quarter modules.

A multi-pin connector on the rear of each module feeds RF drive, 50 Volts DC, and ENABLE commands to the module, and passes a fault status signal back to the slave controller. RF output is passed through a separate coaxial connector. The rear panels of drivers and PAs are keyed differently, so those driver units cannot be plugged into PA slots.

The modules are “hot-pluggable”, they can be removed or inserted during transmitter operation without turning the transmitter off. A disable switch is located in the front handle of each module for this purpose, turning off the 50 volt in the module. The modules protect themselves by automatically disabling themselves if an improper operating condition is detected. A protection, control, and monitor (PCM) system monitors the module’s operating conditions. If all of the conditions are acceptable, upon an ENABLE signal from the slave controller, the PCM system will enable the module. If a fault condition arises or the ENABLE signal is interrupted, the PCM system disables the module by shutting off the 50 Volts DC.

Descriptions of the various subsystems of *Platinum Series*® modules are given below. First, the RF signal paths of the modules are traced; then, the subsystems are described in more detail.

Refer to the cover sheet of the drawing package for your transmitter to locate the necessary drawing numbers for the modules and subassemblies.

A.2.1 Driver Module, Low Band

(Refer to the Low Band Driver Amplifier Schematic 843-4999-638)

The low band driver module consists of a class A stage, driving a second stage consisting of two parallel class A amplifier blocks.

A pi input attenuator (R4, R5, R6 on the Driver RF input assembly) is used to set the overall gain of each low band driver

WARNING: Disconnect primary power prior to servcing.

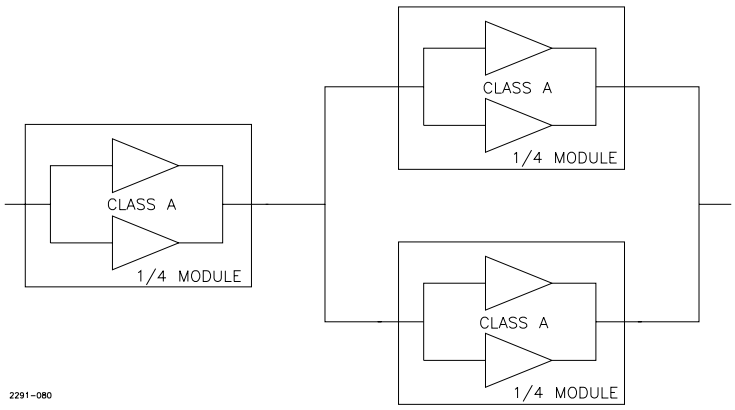


Figure A-1. Low Band Driver Module, Simplified Block Diagram

to 35 dB. The input attenuator also serves to improve the modules input return loss.

The attenuator output feeds the first amplifier stage, which produces about 24 dB gain. The output passes to a 2 dB fixed attenuator, used to improve the output match seen by the first stage.

The RF signal then feeds the 2-way Divider assembly. On this divider assembly there is in the signal path a microstrip directional coupler (which provides a forward drive power sample for overdrive protection), a microstrip trombone line section (for phase adjustment), and a foreshortened Wilkinson 2-way microstrip divider. The divider's two outputs drive two parallel Class A amplifiers. The outputs are recombined using a foreshortened Wilkinson microstrip combiner, which passes the signal through a directional coupler to the module output. The directional coupler provides a reflected power sample to the modules protection, control and monitor (PCM) system.

On the input and output Driver RF Intraconnection assemblies are provided optional capacitors for response correction. On the input assembly, A5A4, are C1 and C15. On the driver RF intraconnect assembly is C4. A capacitor may be added where needed for frequency response correction and or input matching.

The low band drivers output is rated at 200 Watts peak.

A.2.2 Driver Module, High Band

(Refer to the High Band Driver Amplifier Schematic 843-4999-639)

The high band driver module consists of two cascaded class A stages, driving a third stage consisting of two parallel class A amplifier blocks.

A pi input attenuator (R4/R5/R6 on the input Driver RF intraconnection assembly) is used to set the overall gain of each high band driver to 35 dB. The input attenuator also serves to improve the modules input return loss.

The attenuator feeds the first amplifier stage, which produces about 17 dB gain. Its output passes to a 2 dB fixed attenuator, used to improve the output match seen by the first stage. The signal then passes through a L-section matching network to the second class A stage.

The RF signal then feeds the 2-way Divider assembly. On this divider assembly there is in the signal path a microstrip directional coupler (which provides a forward drive power sample for overdrive protection), a microstrip trombone line section (for phase adjustment), and a Wilkinson 2-way microstrip divider. The dividers two outputs drive two parallel Class A amplifiers. The outputs are recombined using a Wilkinson microstrip combiner, which passes the signal through a directional coupler to the module output. The directional coupler provides a reflected

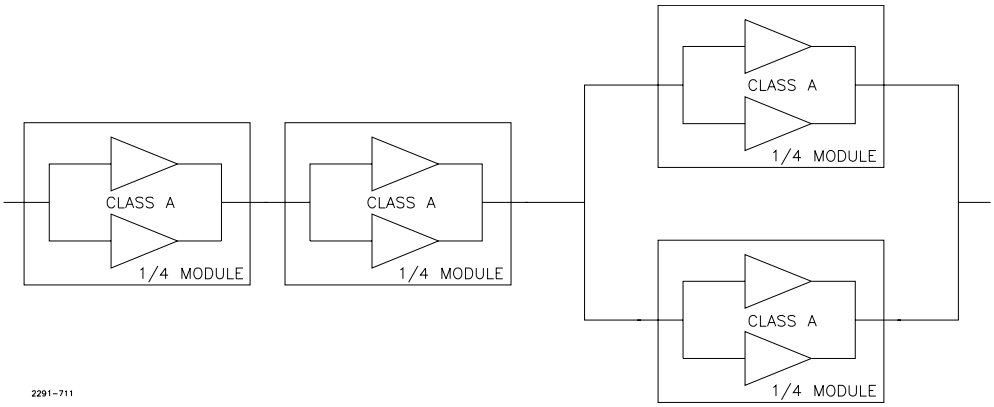


Figure A-2. High Band Driver Module, Simplified Block Diagram

WARNING: Disconnect primary power prior to servcing.

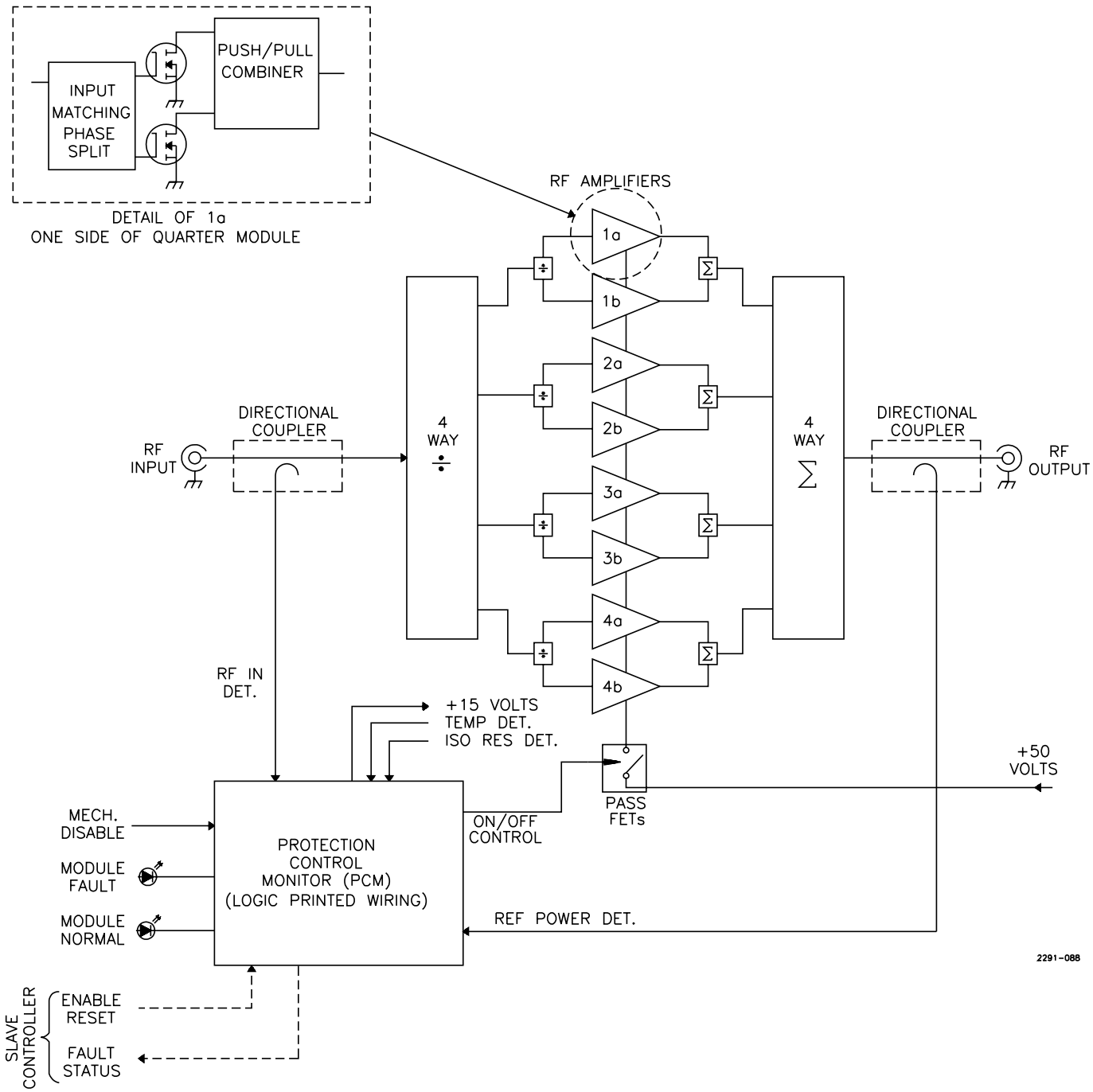


Figure A-3. PA Module Block Diagram

power sample to the modules protection, control and monitor (PCM) system.

On the input and output Driver RF Intraconnection assemblies are provisions for response correction. On the A5A6 assembly are C4 and C12. On the A5A4 RF intraconnection assembly is C13. On the two way divider RF Intraconnection assembly is C14. These capacitors are added as needed for response correction.

High band drivers are rated at 100 Watts peak.

A.2.3 PA Module

(Refer to the RF PA Module Schematic 843-4999-637)

PA modules consist of four parallel class AB amplifier blocks. Low Band PA modules produce 18.5 dB gain overall, and the gain for a high band PA is 13.7 dB.

The module RF input signal feeds the 2-way Divider assembly. On this divider assembly there is in the signal path a microstrip directional coupler (which provides a forward drive power sample for overdrive protection), a microstrip trombone line section

WARNING: Disconnect primary power prior to servcing.

(for phase adjustment), and a Wilkinson 2-way microstrip divider.

The Wilkinson combiner in the Low Band module is a foreshortened Wilkinson combiner. Resistors are used in the Wilkinson divider and combiner circuits to provide isolation between ports.

The Wilkinson dividers two outputs feeds the two 2-way Wilkinson microstrip/stripline dividers on the 2X2-Way Divider assembly. The 2X2-Way Divider assemblys four outputs feeds the four class AB amplifiers.

The outputs of the four amplifiers feed into the two 2-way Wilkinson combiners on the 2X2-way Combiner assembly. The output of the two combiners feeds into the two inputs of the 2-way Wilkinson Combiner assembly. The output of this combiner passes through a directional coupler to the RF output jack. The directional coupler sends a voltage sample of the output port reflected power to the PCM system.

The Low Band and High Band PA modules are rated at 1050 Watts peak.

A.2.4 RF Quarter Modules

The RF amplifier subassemblies within a driver or PA module are called "quarter modules". The quarter modules use n-channel Field Effect Transistors, or FET's, as their active devices. FETs offer several advantages over bipolar junction transistors (BJTs), including improved ruggedness, better linearity, and less susceptibility to thermal runaway.

N-channel FETs operate similarly to NPN Bipolar Junction Transistors. In a common-emitter bipolar amplifier, a small change in base-emitter voltage results in a small change in base current. The base current modulates the collector current, and the output is taken at the collector. Similarly, in a common-source FET amplifier, a small change in gate-source voltage modulates the drain current, and the amplifier output is taken at the drain.

Each quarter module uses four RF FETs. The input contains a gain matching pad, a phase matching coax line and a two-way power divider. Divider outputs each drive a push-pull FET pair. The FET outputs are recombined in a two way combiner, whose output is the output of the quarter module.

Temperature compensated bias voltage for each RF FET is generated from a 15 Volt supply. The supply is part of the module control card (PCM) and switches on with application of 50 Volts to the quarter modules. The quarter module supplies voltages representing temperature and ISO voltage to the module PCM system.

For any given channel, class A and class AB amplifier blocks use the same quarter module circuit. The bias voltage adjustment potentiometer controls the quiescent drain current for each FET, which determines each quarter modules class of operation.

In cases where quarter modules are biased class AB, as in the 1 kW PA module, each quarter module is capable producing 280 Watts peak output into a 50 ohm load. The excess power is necessary to overcome losses in the combining stage.

When the quarter modules are biased class A, as in driver modules, they exhibit improved linearity and about 1-2 dB higher gain. The tradeoff, however, is lower power output capability and reduced efficiency. Thus, class A stages are used as pre-amp and driver stages, and class AB stages are used as intermediate and final power amplifier stages.

Because low band and high band quarter modules utilize slightly different architectures, the circuits are described individually below.

A.2.5 Low Band Quarter Module

(Refer to Low Band Quarter module Schematic 839-7900-001)

The RF input signal first passes through TL1 (Phase setting coax) and then through AT1 which sets the gain of the quarter module to 19.25 dB. The RF input signal then passes to T1, a two-way coaxial power divider that also performs an impedance transformation. R5 provides isolation between the two divider output ports.

The upper and lower RF amplifier halves are identical. In the upper circuit, C1 blocks DC from the input. Components T2/T3 continue the impedance transformation from the divider to the gates of RF transistors Q1 and Q2. T3 also establishes a 180 phase relationship between the signal voltages sent to the two transistors, which is the basis for push-pull operation.

R2 and R3 "swamp" the transistor gate input impedance, which is highly capacitive. C6/C7/C9/C10 block the DC gate bias from reaching the quarter module input. C8/C5/C11 complete the input impedance transformation.

An R, L, and C drain-to-gate negative feedback loop exists around each FET. The feedback will ensure stability at low frequencies. C25 and C24 block the 50 Volts present at the drains from reaching the gates through the feedback loops.

L5/L6/C23 form a balanced L-network, which act as both a low-pass filter and an impedance transformer between the FETs and T6. T6 continues the output impedance transformation and combines the transistor outputs in series. C28, C29/R19, and C4 bypass one port of T6 to ground, and C30 and C31 couple the RF to T8.

T8 is a two-way combining transformer, which combines the outputs of the upper and lower amplifier halves and completes the output match. R15 provides isolation between T8s input ports.

If any phase or amplitude difference exists between the signal in the upper and lower amplifier halves a voltage will develop across R15.

This RF voltage will be coupled through toroidal transformer T9, to CR1, an RF detector that produces a DC signal proportional to the amount of imbalance. This DC signal is called the ISO voltage sample, and it is sent to the PCM system through J1-2.

A.2.6 High Band Quarter Module

(Refer to High Band Quarter Module Schematic 839-7900-702)

The RF input to the quarter module passes through TL1 (Phase setting coax) and AT1 (Attenuator which sets the gain of the

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quarter module to 14.25 dB). The RF input then passes through a two-way Wilkinson power divider, consisting of two 75 ohm microstrip sections. R1 provides isolation between the divider outputs.

The upper and lower amplifier halves on the schematic are identical. In the upper amplifier, C9 couples RF into the amplifier while blocking DC. T1 is a coaxial balun transformer, which provides both a step-down impedance transformation and an unbalanced-to-balanced transformation. Its two output signals differ in phase by 180, which establishes push-pull operation in the RF FET pair Q1 and Q2.

R3 and R4 shunt load the highly capacitive gate input impedance of the FETs. C2 completes the input impedance transformation. An adjustable voltage divider feeds bias voltages to the gates of the RF FETs, controlling their quiescent drain currents.

Series inductors feed 50 Volts to the FET drains, and act as RF chokes, blocking the RF from appearing on the power supply lines.

The sliding short section form small inductances. Together with C4/C5/C37 they form a balanced L-net, which provides both a low-pass response and an impedance step-up transformation between the FET drains and the input of T3.

T3 is a coaxial balun, fabricated from semi-rigid coax. It adds the output voltages of Q1 and Q2 in series, and continues the output impedance transformation. Its outer conductor is grounded by C13, and the RF output is coupled through C15.

A two-way Wilkinson combiner, composed of two 75 ohm microstrip sections recombines the outputs of the two amplifier halves.

If any phase or amplitude difference exists between the signal in the upper and lower amplifier halves, an RF voltage develops across R11 and L9. L9 is the primary of a toroidal transformer, whose secondary is L10. Any RF voltage will be coupled through the toroidal transformer to R12/CR1/C33 an RF peak detector, which produces a DC signal proportional to the amount of imbalance. This signal is called the ISO voltage sample, and it is sent to the PCM system through J1-2.

A.2.7 Quarter Module Bias

(Refer to Lowband Quarter Module schematic 839-7900-701 and HighBand Quarter Module schematic 839-7900-702.

A step-down regulator in the Protection, Monitoring and Control Subsystem furnishes the +15 Volts for the FET bias voltage divider. This regulated voltage switches with the switched 50 Volts.

Thermistor R1 is mounted to the heat sink between RF FETS Q2 and Q3 and completes a resistive voltage divider between the +15 Volts and ground. As the heatsink temperature increases the resistance of the thermistor decreases.

The change in thermistor resistance changes the voltage reference for the bias adjustment. This change in reference tracks the change in bias current with temperature. This proportional voltage is divided down by the four bias adjust controls R24, R25, R26 and R27 for precise adjustment of the static current of the individual RF FETS.

The module control board also monitors this reference voltage, excessive heat sink temperature will result in a temperature fault. R2(HB)or R16(LB) is used to set the temperature trip point. The voltage is factory adjusted for 5.30 Volts when the heatsink temperature is 25C. Any adjustment of R2 or R16 will affect the FET static current bias settings.

A.2.8 Protection, Control and Monitor Subsystem

(Refer to Logic Printed Wiring schematic, 839-7900-700.)

Each module is controlled and monitored by a module protection, control, and monitor (PCM) subsystem. Drivers and PA modules utilize essentially the same PCM subsystem. It consists of sensors and control logic within each module, and provides protection against improper operating conditions. The heart of the module PCM subsystem is a printed circuit assembly commonly known as the module “logic board”.

The module logic board performs protection from different detrimental operating conditions through an essentially common scheme. It collects voltage samples that provide indications of the operating parameters, and compares these samples to reference voltages. Voltage comparators (U4, U6, U7, and U13) are used to compare the samples to the references, and their outputs are digital signals, which indicate either a normal operating condition or a fault.

These digital signals drive PALs (Programmable Array Logic) (U1, U2, U3), which are ICs consisting of hundreds of digital logic gates. The PALs perform two functions. They send signals to the 50V FETs, (called “pass FETs” on the drawing) which are used as high-current switches to turn on or off the 50 Volts DC supplied to the quarter modules. They also determine the operating status indications given by the front panel LEDs.

Upon a module ENABLE signal, after the cabinet DC power supply reaches 44 Volts, the control logic turns on the 50V FETs. If a fault is detected, the control logic will turn off the 50V FETs, disabling the module.

The PCM subsystem performs several functions:

- Monitors input power level and protects the module from being overdriven. A sample from the coupler at the input of the power divider is received at J1-9. If the sample is above the reference established by voltage divider R20-R21, U6 pin 14 will go low, indicating normal drive in a PA module. If the sample goes above the reference set by R101, U6 pin 1 will go low, indicating an overdrive fault.
- Monitors output reflected power, and protects the module from elevated load VSWR. Output reflected samples from the output directional coupler assembly are received at J1-22. The VSWR fault threshold is established by R8. If the voltage at U6 pin 5, determined by the reflected power, is greater than the voltage at pin 4, then pin 2 will go low, indicating a VSWR fault.
- Monitors the DC power supply voltage, and protects the module from high and low voltage extremes. The DC supply is sampled at J1-23, and is scaled down by R48, R47, and R42. A maximum voltage reference is established by

the +15 Volt regulated supply, R43, and R44. If the sample exceeds the reference, U7 pin 1 will go high, indicating an overvoltage fault.

Likewise, a minimum voltage reference is established by R45 and R46. If the reference exceeds the DC supply sample, U7 pin 2 is driven high, indicating an undervoltage fault.

- Monitors ISO voltage samples of the quarter modules, protecting the amplifier from damage due to imbalances between the two halves of a quarter module. The ISO voltage samples are combined by a OR circuit and collected at J1-3, 4, 16 and 17 on the controller board.

R38 and R81 establish a reference. If the ISO voltage sample exceeds the reference, U6 pin 13 is driven low, indicating a fault.

- Monitors the temperature of the quarter modules, turning off the amplifier if excessive temperatures are encountered. A voltage is developed on each module by the thermistor circuitry that is proportional to the heat sink temperature. These voltages are routed to the module controller board, J1-5, 6, 7 and 8. The voltages are compared to a reference by comparator U13. If any quarter module temperature voltage is lower than the reference, the comparator output will go low. This switches the output of the Schmitt trigger high.
- Enables the 50 Volts DC to the quarter modules by controlling a pair of high-power switching FETs (50V FETs) located on the module rear panel. If no faults are present, PAL U1 pin 12 sends a signal to U7 pin 8, which controls a circuit that turns on the 50V FETs, a pair of n-channel switching FETs. If a fault condition occurs, the 50V FETs are turned off.

R39 and U10 reduce the switched 50 Volts dc to 15 Volts. This 15 Volts is routed to each quarter module for bias circuitry power.

The incoming 50 Volt DC power is switched on and off by the 50V FET assembly, controlling the application of 50 Volts to the Quarter Modules. This switched 50 Volts is reduced to 15 Volts by regulator U10. The +15 is supplied to each module to be used for temperature sensing and FET biasing.

The logic will not allow the module to enable if a fault condition exists, to protect the module from damage.

A.2.9 Module Status LEDs

Each module uses two front panel LEDs to display its current operating status. The LEDs are driven by signals from the PALs and as the 2N700 buffers. The status can be interpreted from the LEDs as follows:

a. **Steady Red** - 50 Volts applied to the module, but the module is not enabled. This will normally occur if a module is removed and then reinserted in the slot.

   The red LEDs will illuminate then fade out as the supply capacitors discharge each time the transmitter is turned off.

b. **1/2 Green LED Illuminated** - Module is enabled but little or no RF drive is supplied to the module.

Note

There may be systems where the normal RF level is too low to operate the drive detection circuitry. The jumper plug J5 may be set to the 2-3 position, this connects the drive section of the LED buffer to the enable signal. This will result in a total green LED when the module is enabled.

c. **Full Green LED Illuminated** - A full green LED illuminated indicates normal module operation. - Module is enabled and the presence of RF drive is indicated.

d. **No LEDs Illuminated** - The 50 Volt DC power is not reaching the module, or the module has been turned off by pulling on the front handle (mechanical disable).

In some cases this could be the symptom of a module control fault. If you have not disabled the module, turn off the transmitter (PA cabinet) momentarily while removing the module. This will prevent possible arcing of the input connector pins if the module was in fact on but not lighting any LEDs.

A.2.9.1 Red LED Fault Blink Codes

If a module fault occurs, the red light will blink on and off. The number of blinks between a longer off state is the blink code, and is used to determine the type of fault. The blink code is as follows:

a. **1 Blink** - High VSWR condition at the module output.

b. **2 Blinks** - RF input overdriven

c. **3 Blinks** - An elevated ISO voltage resulted from an imbalance between halves of a quarter module.

d. **4 Blinks** - The power supply voltage applied to the module is too high or too low.

e. **5 Blinks** - The quarter module temperature is too high.

f. **6 Blinks** - The pass FET transistors that switch the 50 Volts to the quarter modules have failed.

A.2.9.2 Combination Blink Codes (New Software Version)

A combination code can result if some fault condition occurred which would normally fault the module off but could not remove the 50 volts due to shorted FETs.

For example, a shorted RF FET could generate a module fault and the 50 volt FET shorts when attempting to interrupt the short circuit current.

This should create a 3 blink ISO fault code followed by a 6 blink 50V FET failure code.

The 3 blink code will cycle once, followed by repeated 6 blink code. This code warns that the cabinet needs to be powered down to remove a 6 blink module. If a module is re-enabled, it will show the 3 blink first , followed by the 6 blink code.

A.2.9.3 Latent Blink Codes (New Software Version)

When a fault occurs, the module protects itself by turning off and then indicating the appropriate blink code. The module logic remembers the fault condition until the transmitter ON button is pressed which then resets the module and the fault memory. If the fault is still occurs, it will turn off the 50 volts and latch the fault in memory.

If the fault has cleared, the module will turn on, the fault flasher will finish the count. Sensing there is no further fault, it will stop blinking. This is normal operation for this version of the software.

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A.3 Module Troubleshooting

CAUTION

USE EXTREME CARE WHEN REPAIRING OR TESTING RF AMPLIFIER MODULES. BECAUSE THEY ARE CAPABLE OF PRODUCING OVER 1000 WATTS OF OUTPUT POWER, SERIOUS RF BURNS CAN RESULT FROM COMING IN CONTACT WITH ANY HIGH POWER POINTS INSIDE THE MODULE WHILE IT IS OPERATING.

IMPORTANT

THESE MODULES OPERATE WITH 50 VOLT POWER SUPPLIES CAPABLE OF VERY HIGH CURRENTS. ACCIDENTAL SHORT CIRCUITS OCCURRING INSIDE THE MODULES CAN CAUSE SERIOUS DAMAGE DUE TO THE HIGH CURRENTS INVOLVED. CAREFULLY INSPECT THE MODULE FOR ANY DEBRIS THAT COULD CAUSE A SHORT TO OCCUR AFTER ANY REPAIR ACTIVITY.

IMPORTANT

Failure to use proper soldering techniques or materials can cause damage to the replacement components, or may result in joints with poor electrical or mechanical integrity, causing subsequent damage to the module. Please read the section entitled Soldering Precautions before attempting any repair activity.

A.3.1 TV Module Test Fixture (992-8556-002)

Refer to Figures A-4 & A-5

The TV Module Test Fixture consists of a table top assembly with a interconnect cable ending in a plug assembly that is inserted into an empty module slot. The cable to the test load is routed through the end cover opposite the fan and connected inside the test fixture by reaching through the cooling slot.

An interlocked Safety Cover must be in place to activate RF drive to the module under test.

Breaker CB1 limits the current to 50 amps, protecting the cable. Breaker CB2 at the test fixture trips from excess module current and can be used as module power switch. Interlock switch S2 and driver relay K1 prevent application of RF drive until the cover is closed.

Fuse F1 provides protection for the small signal wiring in the extender and the 50 Volt DC fan.

Enable switch S1 allows local control of the module on the extender while the transmitter is on.

CAUTION

AN EXTERNAL RF LOAD MUST BE CONNECTED TO THE MODULE AT ALL TIMES DURING TEST.
BE SURE TO DISABLE AND REMOVE THE MODULE OR TURN OFF THE BREAKER BEFORE REMOVING THE EXTENDER FROM THE CABINET.

A.3.2 Troubleshooting Based on Module Swapping

Many situations exist in which a problem exhibited by a module could be due to a problem either with the module itself, or somewhere else in the transmitter. For example, VSWR faults could be due to either a failure or mis-adjustment of the VSWR sensing circuitry in the module, or due to a problem with the transmitter cabinet RF connector, combiner cables, reject loads, etc. In fact, either module or system could cause most fault indications problems. Thus it is desirable to first isolate the problem to the module or system before continuing the troubleshooting process.

Since the modules are designed for interchangeability with other modules of the same type, one easy test to determine whether a problem lies in the system or in the module is the swap test, which

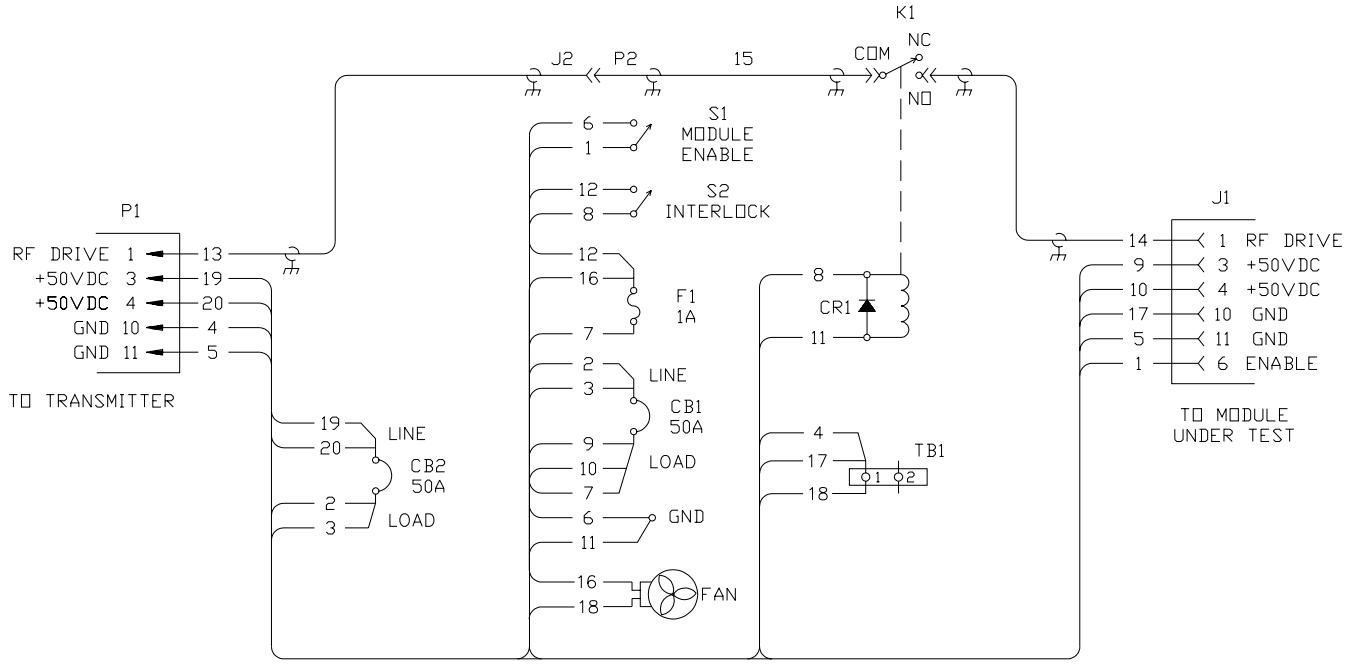

Figure A-4. Wiring Diagram PA Module Extender (Harris PN 992-8556-001) (Drawing 843 5285 162)

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involves swapping the suspect module with another and observing whether the symptom follows the module.

A.3.3 Troubleshooting Based on Module Blink Codes

The general procedure for troubleshooting based on a module blink code involves several steps.

The first is to check for causes consistent with the blink code (such as checking the DC supply voltage if blink code 4 occurs). Often, this will give an indication of whether the problem lies within the system or the module.

If this does not locate the problem, then the next step is to check for correct threshold voltages on the module logic board. Fault blink codes result from a sample voltage taken within the module exceeding some preset threshold. Thus, if no other module or system problem is found, the problem may be due to an incorrectly set fault threshold (as in the case of thresholds set with potentiometers), or a defective component (such as a resistor) used to establish a threshold. Section A.2.8, on the theory of operation of the module Protection, Control and Monitor subsystem, gives detailed descriptions of how these thresholds are derived and compared against the corresponding voltage samples.

Finally, if neither of these steps yields success, the problem may lie in a PAL or logic gate on the module control board. This type of problem is generally rare. Measuring voltages at various points in the logic circuitry on the module control board can isolate this type of problem.

A set of troubleshooting procedures, one procedure for each fault code, is given below:

High Output VSWR Fault (1 blink) The cause for this fault is often external to the module. First, check the system VSWR on the display panel, and check for a VSWR foldback or VSWR overload condition on the transmitter. Check the other modules in the same cabinet for VSWR faults as well. If either is found, suspect a problem in the system outside the cabinets.

If not, then the problem is either in the suspect module or its cabinet. The swap test is the easiest way to isolate the problem. Swap the VSWR faulting module with a properly working one from another slot. If the problem remains in the same slot, check the RF output cable, connector, and combiner reject load for that module slot.

If the problem follows the module, check the solder connections at the directional coupler and the RF output jack inside the module. If no problem is found, the problem could be an improp-

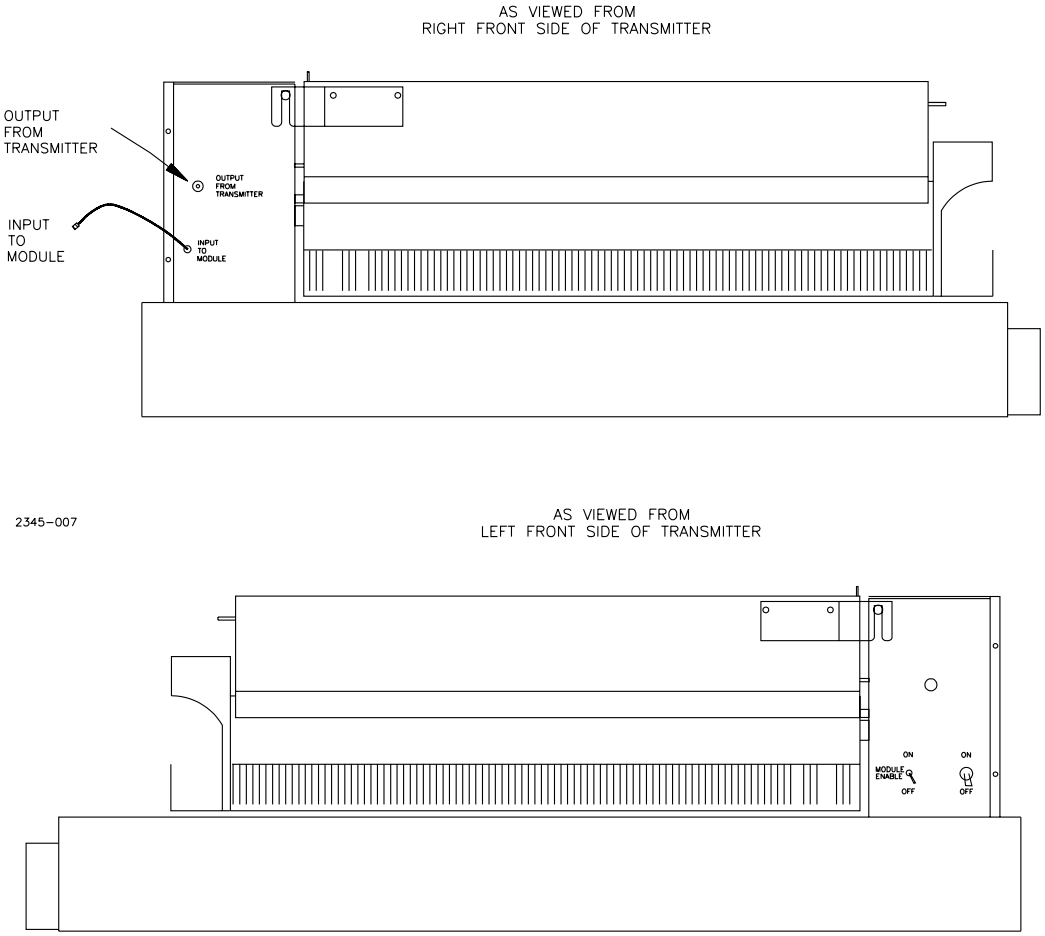

Figure A-5. Module Test Fixture

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erly set VSWR fault threshold or a defective module logic board. See paragraphs giving procedure used to check and set the VSWR threshold located on page A-18.

Input Overdrive Fault (2 blinks) Normally, this protects the module from damage due to excess RF drive (at least 3 dB above the drive required to drive the module to full power). To isolate the cause of fault, reduce the visual exciter RF output to zero, then enable the module with a transmitter ON command. If the fault remains, the problem is likely to be with the module control board.

If the fault clears when RF drive is removed, check to see that the module is not being overdriven. If not, then the overdrive threshold on the control board may be misadjusted. See procedure located on page A-18 in this section to check the Overdrive Threshold.

ISO Voltage Fault (3 blinks) The RF input to the quarter module passes through a two-way divider on the quarter module, and is then fed to two parallel amplifiers on the quarter module. The outputs of these two amplifiers are recombined in a two way combiner on the same board. The combiner contains a 10 Watt reject load resistor, called an ISO resistor because it is used to provide isolation between the combiner input ports.

If outputs of the two parallel amplifiers are equal in amplitude and phase, the voltage across the ISO resistor will be very small. Should some component fail on one of the amplifiers, its output would decrease to a level much lower than the other parallel amplifier, which would cause the voltage across the ISO resistor to increase significantly. If the ISO voltage of any quarter module exceeds about 1.9 Volts, the control board shuts the power amplifier module down and indicates an ISO fault.

An ISO fault will almost always be caused by a component failure in a quarter module (RF FET, chip cap, ISO resistor, or open solder connection). The common cause is a damaged RF FET.

Damaged FETs are sometimes caused by problems in the module output combiner, examine this area first before trying to re-enable the module to avoid further damage. With DC power and RF drive removed, visually inspect the connections between the quarter module outputs and combiner inputs, between the combiner sections, between the combiner output and the directional coupler, and between the coupler and the output connector. An inspection mirror aids the examination greatly. Next, use an ohmmeter to confirm an open between the output connector center pin and chassis, and continuity between the center pin and each quarter module output. Also examine each quarter module, especially the area near its output.

If no problems are found with the output circuitry, try to confirm the ISO fault with the module on the test fixture. Put the safety cover down (applying RF drive), switch on the DC power and attempt to enable the module. If the ISO fault does not occur again, there may be a problem in the system rather than with the module (for example, an open cabinet combiner dump load or a damaged module RF power input connector).

If the ISO fault is confirmed, check the bias current of each quarter module, one at a time with no drive applied (lift the safety cover to remove RF drive). A quarter module with open FET(s) will have lower bias current than others. Check the section on bias current setting to confirm the correct bias current for each quarter module. If a quarter module with low bias current is found, first record its total bias current, then observe the current while turning off bias to each FET one at a time with the bias adjustment pots. Record the current after turning each pot off and look for one or more FETs whose bias current is zero or lower than the others.

If no quarter modules or FETs indicate low bias current, there are two possibilities: either a shorted, open or damaged component on a quarter module, or a problem with the PCM (logic) board. Try to rule out a problem with the PCM board first. If a storage oscilloscope or peak-holding DMM (e.g. Fluke 87) is available, try to confirm an ISO voltage greater than about 1.9 Volts. Remove DC power, clip a probe onto the ISO voltage line close the safety cover, connect the probe to the scope or DMM, apply DC and enable the module. If the ISO voltage does not appear, look for problems on the module PCM board (check for 0.9-1.0 Volts on U6 pin 10). If no storage scope or peak-holding DMM is available, proceed to looking for problems on the quarter modules after checking for 0.9-1.0 Volts on U6 pin 10 of the PCM board.

To find a problem on a quarter module, first try to locate one quarter module that is the source of the ISO fault. With DC power off and RF drive removed, connect a scope or meter to the ISO voltage line, and disconnect the 50 Volt wires from all but quarter module #1 (nearest the back of the module). Cover the exposed ends of the loose 50 Volt lines with electrical tape to prevent them from shorting within the module. Close the safety cover (applying RF drive), turn on the DC power and try to enable the module, observing whether or not an ISO fault occurs. Shut off the DC, remove the 50 Volt connection from quarter module #1, reconnect the 50 Volt line for quarter module #2, and again try to enable the module. Repeat with each of the remaining quarter modules. The module should ISO fault during one of these trials (the quarter module with the problem is the one with its 50 Volts connected when the fault occurs), and the ISO voltage should read a low value (several tenths of a Volt or less) during the other trials.

Once a quarter module with a problem is located, perform a careful visual inspection, looking for burned or broken components, bad solder joints, solder splashes, loose hardware, open circuit board traces, etc. Check the output ISO resistor (low band R15; high band R11) by lifting one lead and measuring with an ohmmeter (should measure 190 to 210 ohms for low band or 95 to 105 ohms for high band).

See the procedure located on page A-18 in this section to check for the correct ISO Fault Threshold.

Power Supply Voltage Fault (4 blinks) The RF FET transistors operate on a nominal 50 Volt DC supply. If the power supply voltage is too high or too low, the devices could be damaged. The control board monitors the voltage, and reports a power

supply voltage fault if it is not between approximately 44 and 54 Volts.

There is a condition where a power supply voltage fault can be momentarily triggered and the red LED will show only one cycle of 4 blink code. This condition occurs when the transmitter is turned off and back on before the power supply voltage can decay to zero volts. If the red LED's fade out, then reapplying power should not momentarily trigger a 4 blink indication.

If several modules exhibit the same fault, check the voltage of the power supply and look for faulty connections. Remember that heavy current draw could cause the supply voltage to drop significantly lower than that measured with only a voltmeter loading the line. If only one module exhibits the fault, check the DC supply voltage and connections, plus the module power supply pins and the wiring to its slot. If no problem is found in the power supply or connections, then the problem could be on the control board, either in the control logic or the comparator thresholds. See the procedure for checking for correct Over/Under Voltage Fault Threshold located on page A-17 in this section.

Over Temperature Fault (5 blinks) The module can be damaged if it is not cooled properly while operating. To protect the amplifier, each quarter module has a temperature sensing circuit that signals the control board to disable the power amplifier if the temperature of any quarter module temperature exceeds 80^{o}C. When this occurs, the logic disables the module, and commands the red LED to blink five times.

First, check the cabinet air filters and module heatsink for accumulated dust. Verify that the cabinet air plenum is providing proper air flow to the module slot. Measure the air inlet temperature, it should be below the maximum temperature rating of 50C. If the temperature is more than a few degrees above outside temperature, the air supply system may not be adequate. If an improper module fault is suspected, allow the module to cool for a time, then try the following: Supply +50 Volts to the module and, without enabling it, check the voltages at test point TP-1 on each quarter module center board. This voltage represents the temperature of the heatsink at the location of the temperature sensor. The voltage is calibrated to be 5.30 Volts at a temperature of 25^{o}C. The calibration control is R2 on each quarter module board. The voltage at TP1 is compared against a reference voltage of 5.82 Volts generated by a voltage divider.

Measure the quarter module temperature reporting inputs at U13 pins 5,7,9, and 11. If any quarter module input is lower than the reference check for an overheated quarter module, an incomplete temperature reporting circuit, or failure of a quarter module bias and temperature reporting circuit. If the reference voltage is lower than all the temperature reporting lines, the outputs of U13 should be high, and the output of U5 should be low, and the module should not be reporting a temperature fault. If a temperature fault is reported check for proper operation of comparator U13, Schmitt trigger U5, or possible PAL failure.

Pass FET Failure Fault (6 blinks) (New Software)

The 50 volt switching FETs are 60 amp 100 volt MOSFETS used to enable and disable the module by applying or removing the 50 VDC from the quarter modules.

- Open Failure: when both FETs fail to an open condition, the module will not be able to turn on when enabled. This will be reported with a 6 blink code. (New version software only)
- Shorted failure: when either or both FETs short, the module will not turn off when a off command is received OR when another fault occurs.

Shorted FETs can only be detected in the following circumstances:

a. Module faulted: a fault condition exists and the logic attempted to turn the 50 volts off. Review combination blink codes.

b. Hot unplug: operator attempt to remove a module while transmitter is running. The mechanical disable switch on the module face will not be able to turn off the module due to shorted FETs.

When the mechanical disable switch is depressed, closing it, the module should turn off. The green and red LED's should extinguish. If a shorted FET is suspected, depress the module disable switch and wait several seconds. If the FET(s) is shorted, the 6 blink fault code will begin.

- Shorted FET's can **not** be detected in the following circumstances:

Normal transmitter operation including turn-on and turn-off.

CAUTION

IF A 50V FET FAILURE IS INDICATED, THE MODULE CANNOT BE TURNED OFF EXCEPT BY TURNING OFF THE PA CABINET OR BY DISABLING THE POWER SUPPLY WHICH POWERS THE PA. A MODULE INDICATING 50V FET FAILURE SHOULD NOT BE REMOVED FOR SERVICE WITH POWER APPLIED, AS COMPONENT DAMAGE COULD RESULT.

A shorted FET (drain-source short) is normally confirmed by measuring the resistance from the red 50 Volt wire of any quarter module to the +50 Volt pins of the input connector with an ohmmeter.

If open pass FETs are suspected check the voltage at collector (case) of Q1 of the Module Control Board as the module is enabled and disabled. This voltage is fed through resistance to the gate of the 50V FETs. When Q1 collector is high (enabled), +50 Volts should appear at the quarter modules. When Q1 collector is low (disabled), no voltage should be present at the quarter modules.

If a fault is suspected in the gate voltage circuit, trace signals back through CR4, R58, and C9 to the oscillator U4. Pin 7 should show a triangle wave with peaks at 0 and +15 Volts. Buffer U7 pin 14 should be low if enabled. PAL U1 pin 12 should be low if enabled, and +5 Volts if disabled.

A.3.4 Isolating Other Failures

This section includes troubleshooting procedures for situations where a problem is not indicated as a fault by the module logic and control circuit, and no blink code is given.

Amplifier Module Will Not Enable, Has 50 Volts Applied To It But No LEDs Will Light The cause could be a loss of the 15 Volt DC supply in the module. Check the following:

If fuse F1 on the module control board is open, check for a short circuit on the 15 Volt line after the 15 Volt regulator.

If resistor R80 on the module control board is open, look at the 15 Volt regulator U11 itself. The regulators tab is internally connected to its output, and thus must be isolated from the chassis. Use an ohmmeter to check whether the regulator tab has shorted to the chassis.

Amplifier Module Will Not Enable, Has a Steady Red LED Illuminated and Will Not Change to the Green LED Illuminated A possible cause could be that the module control board is not receiving the enable command from the slave controller. Try enabling the module on the bench or on extender, or try the swap test after reading the precautions in section A.3.2. If the module now enables, use a multimeter to check the enable wiring in the transmitter cabinet.

If the module still will not enable while in a different cabinet slot, check the continuity of the yellow enable wire inside the module. This wire runs from the black plastic power connector on the module rear panel to a feedthrough capacitor, then to J1-12 on the module control board. If this wire is intact, then the module control board is probably defective. The module is normally enabled by grounding this control line.

Module Has Only 1/2 Green LED Illuminated and Low or No RF Output The module has been enabled but little or no RF drive has been applied to the quarter modules. This indication is sometimes a normal condition in PA modules used in the drive chain of a transmitter. This PA may have the monitor and controller board jumper, J5, in the 2-3 position. This will illuminate both halves of the green LED when the module is enabled.

If this is not the case, then the cause for loss of drive could be either in the module or in the transmitter cabinet. First, check for normal exciter and transmitter output levels.

If the exciter drive level seems normal, try the module in a different cabinet slot that is known to have proper RF drive. If the problem doesn't follow the module, then inspect the cables leading to the module RF input for that transmitter slot. If the problem does follow the module, check the RF input cable inside the module, connected between the black power connector on the module inside rear panel and the 4-way power divider.

Module Has Full Green LED Illuminated But No RF Output

PA modules: Since an insufficient drive level causes one of the green LEDs to go out, that cause is ruled out. This condition would most likely be caused by a failure of the pass FET driving circuitry on the module control board. The control board logic has illuminated the green enable LED, but it is not turning on the pass FETs. This will not allow the quarter modules to receive the 50 Volts DC that they need in order to operate. See the paragraphs on 50V FET Failure Fault (6 blinks). R[P#,passfet]12 in this section.

Driver modules: The 50V FET driving circuitry could also be the culprit, as in PA modules. In driver modules, however, a more likely cause is insufficient or no drive.

Try swapping driver modules, if the problem follows the module, check the module RF path, starting with the RF input cable inside the module, then moving to the input attenuator (R4, R5, R6) on the interconnect board, then to the first stage. Also, check the connections between each stage and the next.

If this doesn't isolate the problem, check the DC voltage and current supplied to each quarter module, through the red wire connected to screw terminal TB1. Measure the applied voltages and normal idle currents for each quarter module.

If a quarter module indicates 50 Volts present but no current, check the 15 Volts supplied through J1-1.

If the problem stays in the same transmitter slot, the problem is within the transmitter (AGC module, phase and gain module if present, power divider if parallel drivers are used, or RF cables).

A.3.5 Locating Failed RF FETs

A.3.5.1 DC Resistance Test

The most common symptom of a bad FET is an ISO fault (3 blinks). Using a Simpson 260 (or equal), measure the DC resistance from the gate to ground of each FET. This is done with the module on the bench with neither RF or DC power applied. Compare the resistance measured from one FET to the next. The resistance indicated will vary with the voltage of the multimeter used. A resistance on one FET significantly lower than the others indicates a bad FET or leakage in a gate chip capacitor.

If no FET indicates a low gate to ground resistance proceed to idle current testing.

A.3.5.2 Idle Current Test

First, it is necessary to determine the original bias current per FET, and to determine on which quarter module the failed FET lies. For this procedure, no RF drive will be applied; however, a load resistor should still be placed at the module output to prevent oscillation.

Starting with the first quarter module (nearest the logic board) and working toward the front handle, measure the total idle current of each quarter module in turn. Either insert a current meter in line with the 50 Volt wire at TB1, or use a clamp-on DC current meter if available. With no RF drive applied, apply 50 Volts and enable the module. Note the quarter module current, disable the module, remove the 50 Volts and move the current meter to the next quarter module.

If no current meter of sufficient range is available, a small resistance can be placed in series with the 50 V line, and the voltage drop used to calculate current from ohm's Law (I=V/R). Values from 0.1 to 0.2 ohms should be satisfactory. At 0.1 ohms, the voltage drop across the resistor will indicate 0.1 Volts for

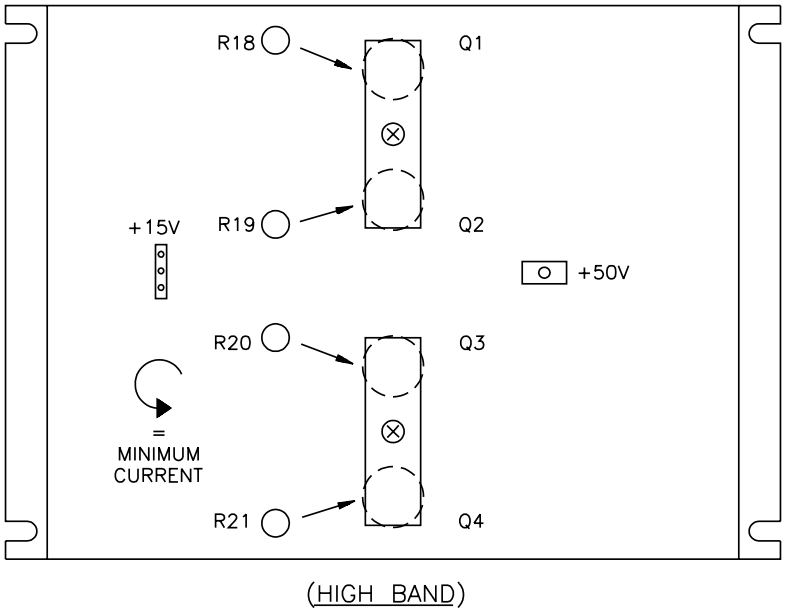
every 1 amp of current. A sensitive digital meter with a millivolts range is needed to use this technique.

After taking the current measurements on each quarter module, determine the correct bias current setting per FET.

The nominal bias current per FET is given in the Table A-1.

Now that the correct bias current is known and the quarter module with failed FET(s) has been located, one can locate the failed FET. Move the current meter to the quarter module showing abnormally low current. Again, apply DC power only and enable the module. While observing idle current, slowly rotate the bias control for each transistor **counterclockwise**, one at a time; this should reduce the current for the corresponding FET.

If the idle current does not drop when the pot is turned fully counterclockwise, then the RF FET is probably bad. To determine which pot affects the idle current of each FET, refer to



PLATINUM TV QUARTER MODULE

Figure A-6. Quarter Module RF FET Bias Pots

WARNING: Disconnect primary power prior to servcing.

Figure A-6. Note the difference between high band and low band quarter modules.

Procedure for setting bias current on a quarter module:

First, determine the correct bias current per FET. Connect a current meter in series with the 50 Volts to the quarter module. Next, set the bias pots fully counterclockwise, apply 50 Volts, and enable the module. The current meter connected to the quarter module being adjusted should read almost zero current (less than 20 mA). **Slowly** turn each bias pot clockwise to set the current for the corresponding FET, then adjust the next bias pot until a total of twice the current per FET is reached, and so on, until the last FET is adjusted such that the total current is four times the current per FET.

Example: On a low band class AB stage, after determining that the correct bias for a given quarter module is 400 mA per FET, start with all bias pots fully counterclockwise. **Slowly** turn R25 clockwise until 400 mA is reached, then turn R26 clockwise until 800 mA is reached, then R27 until 1.2 A is reached, and finally turn R28, stopping at 1.6 A total.

CAUTION: Adjusting the bias pots too far clockwise or too quickly can destroy an RF FET due to excessive current. Go **slowly**.

A.4 Parts Replacement Procedures

A.4.1 Soldering Precautions

Please read the following precautions before attempting any repair activity:

a. Be sure to use the correct type of solder depending on the repair being made. For soldering coaxial cables, use a SN 96, AG 4 alloy for lowest loss and best mechanical strength. For all other joints, use SN 63, PB 37 for its low melting point.

b. Always use electrical solder with a rosin flux. Never use plumbing solder or acid fluxes, which can cause copper to corrode. Start with clean, tinned leads, which will minimize the need for flux. If it is necessary to use additional flux, use as little as possible.

c. Choose the correct soldering equipment for the job. Use tips that are the appropriate size for the components involved. Use a grounded iron when installing static-sensitive components (most semiconductors).

d. Choose a soldering temperature just hot enough to melt the solder quickly, while as low as possible to prevent damage to the new components. An iron with a temperature adjustment is best. Typical settings are:

   650EF for small chip caps
   750EF for RF FET tabs
   800EF for coax cables and wiring on large pads.

e. Make the new joint as mechanically sound as possible before making the electrical solder connection. Provide mechanical strain relief for leads on components, which are flange-mounted.

f. Clean all flux residue away from the area when finished. When working around devices where thermal compound is used, be sure not to allow solvents to flow between the device and the heat sink, which can cause the heat thermal compound to dissolve.

g. Be sure to search for and remove solder splashes, solder bridges, loose solder wire or wire lead clippings, and screws before replacing the cover. Loose metal inside the module can lead to short circuits, which can cause serious damage to the module and possible injury.

A.4.2 Quarter Module Replacement

CAUTION

DO NOT REPLACE ACTIVE QUARTER MODULES WITH PASSIVE BIAS QUARTER MODULES, THE PCMS ARE INCOMPATIBLE.

Quarter modules can be field replaced with another quarter module FACTORY TUNED to the same channel. The gain of each quarter module is adjusted by the value of the quarter module input pad. The input to output phase relationship is set by TL1, the phase setting coax. This coax must remain with the quarter module, use the replacement cable already attached to the REPLACEMENT quarter module for proper phasing. Replacement quarter modules are furnished with the bias for PA usage, for DRIVER usage the bias must be reset.

A.4.3 RF FET Replacement

IMPORTANT

The RF amplifier FETs are sensitive to damage from static electrical discharge, and should be handled in an anti-static environment. A grounded working surface, grounded iron, and electrostatic discharge bracelet should be used.

IMPORTANT

IN ORDER TO PROTECT THE NEW FETS FROM ACCIDENTAL DAMAGE TO OVERCURRENT, BE SURE TO TURN OFF THE BIAS (FULLY COUNTER-CLOCKWISE) TO ALL FOUR FET POSITIONS ON THE QUARTER MODULE BEFORE INSTALLING THE NEW FETS.

IMPORTANT

WHEN CLEANING THE OLD THERMAL COMPOUND FROM UNDERNEATH THE FET AFTER REMOVAL, USE A SWAB WITH JUST ENOUGH SOLVENT TO CLEAN THE SURFACE. DO NOT USE TOO MUCH SOLVENT, AND DO NOT USE AN AEROSOL SPRAY CLEANER, AS EITHER MAY SEEP UNDERNEATH NEARBY FETS AND DISSOLVE THE THERMAL COMPOUND FROM UNDER THEM, CAUSING PREMATURE FAILURE.

WARNING

RF TRANSISTORS, ISOLATION RESISTORS, AND INPUT ATTENUATORS CONTAIN BERYLLIUM OXIDE (BeO) CERAMIC, A HAZARDOUS MATERIAL. THE LIDS ARE MADE FROM Al2O3 AND ARE HARMLESS. THE BeO IS HARMLESS WHILE INTACT, BUT THE DUST IS TOXIC. AVOID CRUSHING OR BREAKING THE BeO CERAMIC, AND DISPOSE OF FAILED DEVICES PROPERLY.

The Philips FET (ON4402H) is used for both low band and high band modules. Each FET is marked with a gain code and a threshold code. For replacement the gain code is the most important. The quarter module has been assembled in the factory with FETs that have the same gain code. When the quarter module is aligned the gain is set with an attenuator on the input. Therefore the FET being replaced must have the same gain code as the other FETs on the quarter module for proper performance. The gain code is a number (3 through 7) located above and to the left of the ON4402H marking on the cap.

Each gain code has a part number assigned to it. These are shown in the following table:

Gain Code	Harris Part Number
3	380-0737-003
4	380-0737-004
5	380-0737-005
6	380-0737-006
7	380-0737-007

Once a failed FET is isolated, remove it from the board using the following procedure:

a. Turn off the bias to all four FETs by rotating the bias control pots counter-clockwise.

b. Remove the clamp holding down the transistors.

c. Using a 45 Watt soldering iron with a wide blunt tip, desolder the leads lifting them with a small knife. It is important to use enough heat to quickly flow the solder and work quickly so as not to damage the foil.

d. Remove the old heat sink compound. Use a small amount of solvent, such as Isopropyl Alcohol, on a swab, being careful not to allow it to run. Do not use sprays of any kind, as this may dissolve heat sink compound from underneath nearby FETs.

e. Re-flow the solder left on the foil where the tabs will seat. Be sure the surface is smooth and that no solder bridges remain.

To install the new FET:

a. Tin the bottom of the FET leads lightly with solder.

b. Use the following procedure for filling a syringe with thermal compound.

1. Required Equipment:
   a) A 5mL syringe
   b) Zinc oxide (Wakefield™) thermal compound
   c) A stirrer (clean, no lint)
   d) A clean cloth
2. Procedure:
   a) On a clean, dry surface open the heat sink compound jar and stir the compound thoroughly with a clean stirrer. Make sure there is no settling in the compound before proceeding.
   b) Assemble the syringe if necessary.
   c) Put syringe tip in the compound up to the beginning of the barrel of the syringe.
   d) Push and pull plunger several times while the tip is in the compound (2 to 4 times) to make sure there are no air gaps when filling the syringe.
   e) With the tip of the syringe still in the compound, begin swirling the tip around in the compound while drawing back the plunger to fill the syringe to 5mL.
   f) Remove syringe from compound and clean off carefully with the clean cloth.

c. Apply heat sink compound on the RF FET.

1. Required Equipment:
   a) Xacto™ knife (blade #11). Use only a fresh blade for this procedure (no nicks or mars, has not been used for anything else. When in doubt, change the blade)
   b) Cleaning solvent
   c) Q-tip
   d) Wakefield™ compound in new 5mL syringe
   e) A clean cloth
   f) **ESD equipment**
2. Procedure:
   a) **Make sure you are ESD safe through the entire procedure.**
   b) Take the FET to be installed and make sure the back side is clean. Make sure that the heat sink mounting surface is clean as well. If the surfaces are not clean, clean them with a Q-tip dipped in cleaning solvent. Make sure solvent is dry before proceeding.
   c) Get the Xacto™ knife (blade #11). Only use a clean, fresh blade (this blade should only be used for this procedure). Measure out a small amount (1-2mm from the tip of the syringe) of compound from the dispensing syringe onto the Xacto blade.
   d) Apply the compound evenly on the FET by moving the flat side of the blade in a circular motion on the back side of the FET. Clean excess compound off the blade.
   e) Holding the Xacto™ blade at a 45 degree angle or less from the FETs surface, gently press down with the blade edge.
   f) Continuing to hold the blade at 45 degrees or less, and starting at one end of the FET, sweep slowly across the FET. Made sure the blade does not lift up. There should be a thin opaque film left on the surface after sweeping. The gold flashed back of the FET is slightly concave, the heat sink compound should be thickest in the center. There should be excess heat sink compound on the blade. Carefully wipe the excess compound off on a clean cloth (do NOT try to re-use this compound).

g) Place FET firmly into the holes of the PC board. Try to pull the FET up, applying moderate force. If the FET resists being pulled up, it is well seated. If it is easily pulled up, clean both surfaces, inspect for surface irregularities, and try again.

d. Install spacer, levelers and leaf spring. Insure that leaf spring and levelers are centered over the FET packages and that the spacer is resting flush with the heatsink. Tighten the screw securely. The leaf spring should bottom out on the spacer and the split washer should be fully compressed.

e. Solder the leads using low-temperature solder. Inspect for solder bridges. Scrape away any flux using a small knife. Do not use any sprays or liquids that may run under the transistor and dissolve the heatsink compound. Inspect for proper flow of solder between the FET leads and the board foil.

f. Check to see that all bias pots of the quarter module have been turned fully counter-clockwise before applying any power.

Refer to the section on Idle Current Testing to set bias controls.

A.4.4 Testing and Replacing Isolation Resistors

WARNING

RF TRANSISTORS, ISOLATION RESISTORS, AND INPUT ATTENUATORS CONTAIN BERYLLIUM OXIDE (BeO) CERAMIC, A HAZARDOUS MATERIAL. THE LIDS ARE MADE FROM Al2O3 AND ARE HARMLESS. THE BeO IS HARMLESS WHILE INTACT, BUT THE DUST IS TOXIC. AVOID CRUSHING OR BREAKING THE BeO CERAMIC, AND DISPOSE OF FAILED DEVICES PROPERLY.

In order to test ISO resistors, it is necessary to desolder one of the leads before testing the resistor with an ohmmeter.

When replacing a flange-mounted ISO resistor, bend the resistor leads curving upward slightly to provide mechanical strain relief to allow for differing expansion between the circuit board and the heat sink. Be sure to clean away the old thermal compound from the heat sink surface, and apply just enough compound to the flange of the new device in order to assure a good thermal interface. After applying reasonable torque to the flange screws, solder the leads quickly.

A.4.5 Pass FET Replacement

If pass FET replacement is necessary, replace both FETs. If this is not done there may be a tendency for one FET to carry more of the current and lead to a repeated failure.

When pass FETs are replaced, change Q1 and R72 on the Module Control Board, and change the 5.6 ohm resistors and the zener diode on the pass FET buss bar assembly. These parts are typically stressed in the event of pass FET failure and replacing them will promote long term reliability.

Use the same ESD procedures outlined in the section on RF FET replacement. The FET drains are insulated from the chassis with SIL-PADS, silicon insulating pads that need no heat sink compound.

Before enabling the module, check to see that the drains are not shorted to the chassis using an ohmmeter.

A.4.6 Chip Cap Replacement

It is a common technique to use two irons with small tips (one on each side) when removing or installing chip caps. Both sides of the chip cap should be heated simultaneously to avoid residual stresses, which might later cause a failure.

Note that the capacitor values listed in the Parts List are typical values. Check the value of the capacitor to be replaced before ordering a replacement part.

A.5 Test Procedure Solid State TV Modules

Install transmitter section of module test fixture into transmitter.

Attach RF output cable to module test fixture through access slot in the fixture, and connect to wattmeter and 50 ohm load (1kW).

Install input wattmeter. Use RF input access cable on side of test fixture.

Attach extension section and install module onto fixture. (Do not install module protective cover at this time.)

Perform a complete visual inspection of the module to be repaired.

Remove red wire from TB1 and install a current meter in line. The current meter needs to be capable of measuring 400 mA steps accurately, and up to 10 Amps total. A clamp-on probe, if available, makes the task easier. Use an ammeter that is resistant to RFI.

A.5.1 Pre-operational Checks

A.5.1.1 Initial Power Up

Close CB2, this breaker is only to protect the wiring between transmitter and test fixture.

Apply 50 Volts DC only to module by turning on circuit breaker CB1. (Red LED on module front panel will be on.)

The +5 and +15 Volt PCM supplies can be checked when 50 Volts is applied.

A.5.1.2 Idle Current Check

The module cover section of the extender assembly should be removed so that no RF drive can be applied.

Enable module with MODULE ENABLE switch on test fixture.

Red LED will extinguish. One half of green LED will illuminate.

Note the current reading of the quarter module. Compare this reading to the values found in the Table A-1 located at the end of this section. Check all four quarter modules.

If quarter module currents are all OK, the module is ready for RF testing. If the current is incorrect, refer to Idle Current Test procedures.

A.5.1.3 Over/Under Voltage Check

Since there are no adjustments this is an operational check only. Measure the voltages at U7:

Pin 4 = 10.3V +/- 0.2V 50 Volt supply sample

approximately 1/5th ratio

Pin 5 = 11.1V +/- 0.2V Over threshold

Pin 6 = 8.9V +/- 0.2V Under threshold

To simulate over voltage fault, connect an isolated supply at the junction of R47 and R48. Monitor U7 pin 7 voltage to note trip point.

Inject increasing DC voltage until the circuit trips.

To simulate under voltage fault connect a 100k ohm variable resistor across R47.

Monitor U7 pin 7 and decrease the value of resistance until the circuit trips.

If an external 50 Volt source is available to operate the entire module you may check the trip points for operation at 44 Volts and 53.5 Volts.

A.5.2 RF Testing

CAUTION

IF THE UNIT BEING TESTED IS A DRIVER BE SURE IT IS IN A DRIVER POSITION IN THE TRANSMITTER. EXCESSIVE DRIVE WILL DESTROY THE INPUT ATTENUATOR IF A DRIVER IS OPERATED IN A PA SLOT.

Testing of drivers may be done in a PA slot if the drive cable access loop on the extender is removed and a external source of RF is applied (i.e. the standby exciter in dual configurations).

Note

IF YOU ATTEMPT TO OPERATE A PA IN A DRIVER SLOT, THE DRIVE LEVEL WILL BE INSUFFICIENT TO COMPLETE THE TESTS.

A.5.2.1 Application of Drive

To test a driver module it is recommended to adjust exciter power to minimum before applying RF.

Install protective cover on the module and note the power output on the wattmeter. PA module output should be in proportion to the others in the system.

A.5.2.2 Driver Gain Check

Driver gain may be checked in several ways. Calculate gain in dB using 10 log(P out/P in). The Bird type power meters will not accurately measure 8VSB power. They can be used for relative level comparison. Bird wattmeter units can be used if the RF input to the drivers is CW. The CD exciter will output a CW signal at pilot frequency by switching the data off with the switch on the Nyquist Filter board. The CW input can also be a generator, measure input and output level and calculate the gain.

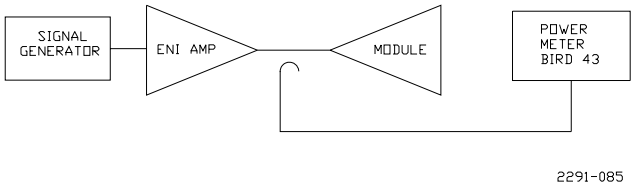


Figure A-7. VSWR Protection Test Setup

Another gain measurement method will require a calibrated directional coupler on the input and output of the test fixture. Narda directional couplers may be calibrated with a network analyzer at the channel frequency These calibrated couplers and the HP power meter will make accurate gain measurements. The standby exciter may be used for a signal source.

Gain for low and high band drivers is 35 ± ½ dB.

Low band driver gain is measured at 200 Watts average power.

High band driver gain is measured at 100 Watts average power.

A.5.2.3 PA gain check

Transmitter drive is needed for PA gain. A couple of working modules are tested on the fixture to measure output power at the normal drive level. Compare a repaired or suspect module to this normal power level. The input and output power can measured by a calibrated coupler. If a coupler and power meter are not available, a reference meter reading with a Bird type power meter will allow comparing the relative power reading between modules.

A.5.2.4 ISO Volts Check

Drivers

Use Driver gain setup

Use gain setup, measure the voltage at P1-2 on any one of the four quarter modules. (They are wired in parallel.) Verify the value to be 0.3 Volts DC or less.

To test the fault threshold, remove the RF Drive.

Using an isolated DC supply (possibly a 9 Volt battery and a variable resistance), inject voltage at P1-2 of any quarter module and slowly increase voltage until the module faults. The module should trip off between 1.7 and 2.1 Volts.

A.5.2.5 Overdrive Check

Perform this check only after verifying that the module gain is correct. See paragraph on Gain Check located elsewhere in this section.

The overdrive fault level for Low Band drivers is 140 mW CW.

The overdrive fault level for High Band drivers is 350 mW CW.

Verify the correct overdrive setting. Adjust the Overdrive Pot R101 if needed.

To set the trip point, adjust R101 until the module faults and gives a blink code 2 on the red LED.

The red LED display has a few seconds time delay before indicating. It may be helpful to observe the power meter or quarter module current that will react instantaneously, while setting the overdrive trip point.

Check the setting by reducing the power, enable the module, and increase power. The drive power level must trip within the allowed tolerance. If not readjust R101 as required.

A.5.2.6 VSWR Check

VSWR Protection Check

Precise Method:

WARNING: Disconnect primary power prior to servcing.

a. Connect a 50 ohm termination to the module RF input. Connect a signal generator, test amplifier, and power meter to the module output per Figure A-7.
b. Apply 50 V DC and enable the module.
c. Set the signal generator to the pilot frequency and apply 94.5 Watts CW into the PA module RF output.
d. Slowly adjust R8 CCW until the module disables and gives a blink code of one on the red LED.
e. Reduce the signal generator level and enable the module. Slowly raise the signal generator level while monitoring the power applied to the module. The module should disable between 90 and 100 Watts. If not, readjust R8 as required.
f. Turn off the 50 V DC and restore the test setup to normal configuration.

Alternate Procedure for approximated adjustment

PAs are set using 1050 Watts CW output as the forward reference.

For low band driver use 200 Watts and for high band driver 500 Watts.

Apply DC (No RF) to module. Adjust R8 for proper voltage at U6-pin 4.

M/NTSC	B/PAL	U6-4 Voltage
2	E2, E3	.35 Volts
3	E4	.45 Volts
4		.62 Volts
5		.75 Volts
6		.85 Volts
7	E5	.45 Volts
8	E6	.55 Volts
9	E7	.62 Volts
10		.70 Volts
11	E8	.77 Volts
12	E9	.85 Volts
13	E10-E12	.95 Volts

Using a test load with low VSWR, measure the DC voltage of the forward sample at the feed through to the logic printed wiring or at junction of R5 and C4 for reference.

At the reflected sample feedthrough or at the anode of CR1 inject a DC voltage. Slowly increase the voltage until the module faults.

It should trip at a voltage 0.84 times the reference +/-10%.

To adjust the trip threshold set the injected voltage to 0.84 times the forward reference and adjust R101 until the module faults off.

This accounts for the 6 dB pad on the forward sample line and scales the trip point to be the equivalent of 2.5:1 VSWR.

WARNING: Disconnect primary power prior to servcing.

Table A-1. Summary of Module Specifications

BIAS CURRENTS Note: Quarter Module #1 is next to the module logic board, QM#4 is next to the front panel.

PART NUMBER	MODULE TYPE	BIAS CURRENT PER FET:
992-7182-002 thru 112	LB Driver (50-88 MHz)	All Modules Biased 1.0 A
	HB Driver (175-216 MHz)	All Modules Biased 1.0 A
	HB Driver (216-230 MHz)	All Modules Biased 1.0 A
992-7191-007 thru 012	HB Driver PA	Ranges from 500 to 900 ma.
		Marked on hold down spring
992-8969-002 thru 112	LB PA (50-88 MHz)	400mA unless marked differently
	HB PA (175-216 MHz)	300mA unless marked differently
	HB PA (216-230 MHz)	300mA unless marked differently

GAIN AND OUTPUT POWER

PART NUMBER	MODULE TYPE	Gain (dB)	Peak Power Out
992-7182-002 thru 112	LB Driver (50-88 MHz)	35 ± 0.5	200
	HB Driver (175-216 MHz)	35 ± 0.5	100
	HB Driver (216-230 MHz)	35 ± 0.5	100
992-7191-007 thru 012	HB Driver PA	13.7 ± 0.5	500
992-8969-002 thru 112	LB PA (50-88 MHz)	18.5 ± .05	1050
	HB PA (175-216 MHz)	13.7 ± 0.5	1050
	HB PA (216-230 MHz)	13.7 ± 0.5	1050

FAULT TRIP POINTS

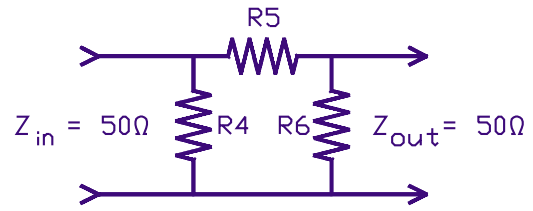
PART NUMBER	MODULE TYPE	Overdrive Fault	Reverse Power
992-7182-002 thru 112	LB Driver (50-88 MHz)	140 mW CW	45 – 55 W CW
	HB Driver (175-216 MHz)	350 mW CW	45 – 55 W CW
	HB Driver (216-230 MHz)	350 mW CW	45 – 55 W CW
992-7191-007 thru 012	HB Driver PA	60 ± 2 W CW	90 – 100 W CW
992-8969-002 thru 112	LB PA (50-88 MHz)	35 ± 1 W CW	90 – 100 W CW
	HB PA (175-216 MHz)	120 ± 2 W CW	90 – 100 W CW
	HB PA (216-230 MHz)	120 ± 2 W CW	90 – 100 W CW

WARNING: Disconnect primary power prior to servcing.

CURRENT REVISION	0		DWG. NO.	817-2100-639		
ZONE	LTR	DATE	REVISION	DFTM	ENG	ECN

Atten.	R4 and R6	R5
0.5	1740 Ω 548-1390-000	2.87Ω 548-2268-000
1.0	866Ω 548-2280-000	5.76Ω 548-2269-000
1.5	576Ω 548-2279-000	8.66Ω 548-2270-000
2.0	432Ω 548-0856-000	11.5 Ω 548-2193-000
2.5	348Ω 548-2267-000	14.7 Ω 548-2254-000
3.0	294Ω 548-1991-000	17.8 Ω 548-2194-000
3.5	249Ω 548-0712-000	20.5Ω 548-2256-000
4.0	221 Ω 548-0839-000	23.7Ω 548-2195-000
4.5	196 Ω 548-2266-000	26.7Ω 548-2271-000
5.0	178 Ω 548-2053-000	30.1 Ω 548-2196-000
5.5	162 Ω 548-0828-000	34.0 Ω 548-2258-000
6.0	150 Ω 548-2207-000	37.4Ω 548-2197-000
6.5	140 Ω 548-1047-000	41.2 Ω 548-2272-000
7.0	130 Ω 548-0227-000	45.3Ω 548-2198-000
7.5	124 Ω 548-0332-000	48.7Ω 548-2260-000
8.0	115 Ω 548-0581-000	52.3Ω 548-2199-000
8.5	110 Ω 548-0276-000	57.6Ω 548-2273-000
9.0	105 Ω 548-2203-000	61.9 Ω 548-0665-000
9.5	100 Ω 548-0363-000	66.5Ω 548-2261-000
10.0	95.3Ω 548-2202-000	71.5 Ω 548-2200-000
10.5	93.1 Ω 548-0814-000	76.8Ω 548-2263-000
11.0	88.7Ω 548-0754-000	82.5Ω 548-0703-000
11.5	86.6Ω 548-0813-000	86.6Ω 548-0813-000
12.0	82.5Ω 548-0703-000	93.1 Ω 548-0814-000
12.5	80.6Ω 548-0372-000	100 Ω 548-0363-000
13.0	78.7Ω 548-2201-000	107 Ω 548-2204-000
13.5	76.8Ω 548-2263-000	113 Ω 548-2264-000
14.0	75.0Ω 548-0576-000	121 Ω 548-2205-000
14.5	73.2Ω 548-2262-000	127 Ω 548-2265-000
15.0	71.5 Ω 548-2200-000	137 Ω 548-2206-000

Atten.	R4 and R6	R5
15.5	69.8Ω 548-0811-000	143 Ω 548-2276-000
16.0	68.1 Ω 548-0753-000	154 Ω 548-2074-000
16.5	68.1 Ω 548-0753-000	162 Ω 548-0828-000
17.0	66.5Ω 548-2261-000	174 Ω 548-2277-000
17.5	64.9Ω 548-2275-000	182 Ω 548-0756-000
18.0	64.9Ω 548-2275-000	196 Ω 548-2266-000
18.5	63.4Ω 548-2274-000	205Ω 548-2278-000
19.0	61.9 Ω 548-0665-000	221 Ω 548-0839-000
19.5	61.9 Ω 548-0665-000	232Ω 548-2054-000
20.0	61.9 Ω 548-0665-000	249Ω 548-0712-000



NOTE: Not all applications will use the same Resistor Reference Designators as shown above.

QTY.	HOLE	DESCRIPTION
UNLESS NOTED: DIMENSIONS ARE IN INCHES TOLERANCES: .X ± .030 .XX ± .015 .XXX ± .005 ANGLES ± 1 DEG.		HARRIS

DR. BY R.J. Crockett	TITLE Assembly Instruction Input Attenuator .	
ENG. CHK. R.J. Crockett		
PROJ. ENG. Mortimore		
MFG. ENG. R.J. Crockett		
MAT'L. . . .	SHEET 1 OF 1	DWG. NO. 817-2100-639

Table A-2. Input Attenuators/Driver

Table A-3. 30 Watt Attenuators

Attenuation - dB	Harris Part No.	KDI Part No.
0.75	556-0126-075	A3RH54-075
1.00	-100	-100
1.25	-125	-125
1.50	-150	-150
1.75	-175	-175
2.00	-200	-200
2.25	-225	-225
2.50	-250	-250
2.75	-275	-275
3.00	-300	-300
3.25	-325	-325
3.50	-350	-350
3.75	-375	-375
4.00	-400	-400
4.25	-425	-425
4.50	-450	-450
4.75	-475	-475
5.00	-500	-500

2.2 MECHANICAL SPECIFICATION

2.2.1 Substrate: Beryllium Oxide Ceramic

2.2.2 Resistive Element: Thin Film

2.2.3 Flange: Copper, Nickel Plated per QQ-N-290

2.2.4 Tabs: Beryllium copper, Gold Plated per MIL-G-45204

2.2.5 Cover: Alumina Ceramic

2.2.6 Outline Drawing: See Figure 1

2.2.7 Marking: Parts to be marked with Attenuation value and date code.

Title: SPEC, 30 WATT ATTENUATOR	Sh 2 of 3	Rev	Dwg: 817-2100-611

Appendix B
Module Parts List

MODULE PART NUMBERS

DRIVER Modules, Class A	992-7182-XXX where XXX for CH2 = 002
Driver PA, Modules, Class A	992-7191-XXX where XXX for CH2 = 002
PA Modules, Class AB	992-8969-XXX where XXX for CH2 = 002
1/4 MODULES	992-8960-XXX where XXX for CH2 = 002

NOTE: The DRIVER PA is a intermediate amplifier stage between the DRIVER and the PA Power Divider. The DRIVER PA and PA modules are identical except for the way they are aligned and tested.
The above numbers should be used for ordering complete tested modules, set for the correct bias currents.
In the following bills of material, use the 992-7191-XXX part lists for both DRIVER-PA and PA's.

Replaceable Parts List Index

WARNING: Disconnect primary power prior to servicing.

Table B-1. MODULE, DR,TUNED CLASS A - 992 7182 000

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
992 7182 002	MODULE, DR, CH-2 TUNED CLASS A	0.0 EA	
992 7182 003	MODULE, DR, CH-3 TUNED CLASS A	0.0 EA	
992 7182 004	MODULE, DR, CH-4 TUNED CLASS A	0.0 EA	
992 7182 005	MODULE, DR, CH-5 TUNED CLASS A	0.0 EA	
992 7182 006	MODULE, DR, CH-6 TUNED CLASS A	0.0 EA	
992 7182 007	MODULE, DR, CH-7 TUNED CLASS A	0.0 EA	
992 7182 008	MODULE, DR, CH-8 TUNED CLASS A	0.0 EA	
992 7182 009	MODULE, DR, CH-9 TUNED CLASS A	0.0 EA	
992 7182 010	MODULE, DR, CH10 TUNED CLASS A	0.0 EA	
992 7182 011	MODULE, DR, CH11 TUNED CLASS A	0.0 EA	
992 7182 012	MODULE, DR, CH12 TUNED CLASS A	0.0 EA	
992 7182 013	MODULE, DR, CH13 TUNED CLASS A	0.0 EA	

Table B-2. MODULE, DR, CH-2 TUNED CLASS A - 992 7182 002

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
992 8965 002	RF DRV/PA MOD 525W CH-2	1.0 EA	

Table B-3. RF DRV/PA MOD 525W CH-2 - 992 8965 002

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
817 2100 745	TEST REQUIREMENT, 525W,DR	0.0 EA	
992 8964 002	MOD, DR, CH-2, TUNED	1.0 EA	

Table B-4. MOD, DR, CH-2, TUNED - 992 8964 002

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (b)*
817 2100 743	TEST REQUIREMENTS, DRIVER	0.0 EA	
843 4999 638	SCH, LB DRIVER MODULE	0.0 EA	
917 2100 632	COAX TRIM, 22.5"	1.0 EA	TL3
917 2100 639	ATTENUATOR,UNBALANCED PIE	3.0 EA	#SELECT IN TEST #R4 R5 R6
992 8960 002	MOD,1/4,PA/DR,CH-2, TUNED	3.0 EA	A001 A002 A004
992 8961 001	MODULE, DRIVER BASIC LB1,	1.0 EA	

Table B-5. ATTENUATOR,UNBALANCED PIE - 917 2100 639

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (d)*
548 2400 045	RES 2.87 OHM 1/2W 1%	0.0 EA	
548 2400 074	RES 5.76 OHM 1/2W 1%	0.0 EA	
548 2400 091	RES 8.66 OHM 1/2W 1%	0.0 EA	
548 2400 107	RES 11.5 OHM 1/2W 1%	0.0 EA	
548 2400 117	RES 14.7 OHM 1/2W 1%	0.0 EA	
548 2400 125	RES 17.8 OHM 1/2W 1%	0.0 EA	
548 2400 131	RES 20.5 OHM 1/2W 1%	0.0 EA	
548 2400 137	RES 23.7 OHM 1/2W 1%	0.0 EA	
548 2400 142	RES 26.7 OHM 1/2W 1%	0.0 EA	
548 2400 147	RES 30.1 OHM 1/2W 1%	0.0 EA	
548 2400 152	RES 34 OHM 1/2W 1%	0.0 EA	
548 2400 156	RES 37.4 OHM 1/2W 1%	0.0 EA	
548 2400 160	RES 41.2 OHM 1/2W 1%	0.0 EA	
548 2400 164	RES 45.3 OHM 1/2W 1%	0.0 EA	

548 2400 167	RES 48.7 OHM 1/2W 1%	0.0 EA
548 2400 170	RES 52.3 OHM 1/2W 1%	0.0 EA
548 2400 174	RES 57.6 OHM 1/2W 1%	0.0 EA
548 2400 177	RES 61.9 OHM 1/2W 1%	0.0 EA
548 2400 178	RES 63.4 OHM 1/2W 1%	0.0 EA
548 2400 179	RES 64.9 OHM 1/2W 1%	0.0 EA
548 2400 180	RES 66.5 OHM 1/2W 1%	0.0 EA
548 2400 181	RES 68.1 OHM 1/2W 1%	0.0 EA
548 2400 182	RES 69.8 OHM 1/2W 1%	0.0 EA
548 2400 183	RES 71.5 OHM 1/2W 1%	0.0 EA
548 2400 184	RES 73.2 OHM 1/2W 1%	0.0 EA
548 2400 185	RES 75 OHM 1/2W 1%	0.0 EA
548 2400 186	RES 76.8 OHM 1/2W 1%	0.0 EA
548 2400 187	RES 78.7 OHM 1/2W 1%	0.0 EA
548 2400 188	RES 80.6 OHM 1/2W 1%	0.0 EA
548 2400 189	RES 82.5 OHM 1/2W 1%	0.0 EA
548 2400 191	RES 86.6 OHM 1/2W 1%	0.0 EA
548 2400 192	RES 88.7 OHM 1/2W 1%	0.0 EA
548 2400 194	RES 93.1 OHM 1/2W 1%	0.0 EA
548 2400 195	RES 95.3 OHM 1/2W 1%	0.0 EA
548 2400 201	RES 100 OHM 1/2W 1%	0.0 EA
548 2400 203	RES 105 OHM 1/2W 1%	0.0 EA
548 2400 204	RES 107 OHM 1/2W 1%	0.0 EA
548 2400 205	RES 110 OHM 1/2W 1%	0.0 EA
548 2400 206	RES 113 OHM 1/2W 1%	0.0 EA
548 2400 207	RES 115 OHM 1/2W 1%	0.0 EA
548 2400 209	RES 121 OHM 1/2W 1%	0.0 EA
548 2400 210	RES 124 OHM 1/2W 1%	0.0 EA
548 2400 211	RES 127 OHM 1/2W 1%	0.0 EA
548 2400 212	RES 130 OHM 1/2W 1%	0.0 EA
548 2400 214	RES 137 OHM 1/2W 1%	0.0 EA
548 2400 215	RES 140 OHM 1/2W 1%	0.0 EA
548 2400 216	RES 143 OHM 1/2W 1%	0.0 EA
548 2400 218	RES 150 OHM 1/2W 1%	0.0 EA
548 2400 219	RES 154 OHM 1/2W 1%	0.0 EA
548 2400 221	RES 162 OHM 1/2W 1%	0.0 EA
548 2400 224	RES 174 OHM 1/2W 1%	0.0 EA
548 2400 225	RES 178 OHM 1/2W 1%	0.0 EA
548 2400 226	RES 182 OHM 1/2W 1%	0.0 EA
548 2400 229	RES 196 OHM 1/2W 1%	0.0 EA
548 2400 231	RES 205 OHM 1/2W 1%	0.0 EA
548 2400 234	RES 221 OHM 1/2W 1%	0.0 EA
548 2400 236	RES 232 OHM 1/2W 1%	0.0 EA
548 2400 239	RES 249 OHM 1/2W 1%	0.0 EA
548 2400 246	RES 294 OHM 1/2W 1%	0.0 EA
548 2400 253	RES 348 OHM 1/2W 1%	0.0 EA
548 2400 262	RES 432 OHM 1/2W 1%	0.0 EA
548 2400 274	RES 576 OHM 1/2W 1%	0.0 EA
548 2400 291	RES 866 OHM 1/2W 1%	0.0 EA
548 2400 324	RES 1.74K OHM 1/2W 1%	0.0 EA
817 2100 639	ASSY INSTR, INPUT	0.0 EA

Table B-6. MOD,1/4,PA/DR,CH-2, TUNED - 992 8960 002

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (j)*
252 0420 000	WIRE, RIBBON 5 X 100 MIL	0.050 FT	#AT001
519 0036 000	CAP RF CHIP 27PF 5% 500V	2.0 EA	C023 C033
519 0060 000	CAP RF CHIP 270PF 5% 200V	10.0 EA	C008 C019 C005A C011A C016A C022A C005B C011B C016B C022B
548 2400 330	RES 2K OHM 1/2W 1%	4.0 EA	R021 R022 R023 R024
817 2100 741	TEST REQ, LB 1/4 MOD,	0.0 EA	
839 7900 701	SCH, LB 1/4 MODULE	0.0 EA	
917 2100 612	ATTENUATOR,SELECT IN TEST	1.0 EA	AT001
917 2100 644	INDUCTOR, OUTPUT LOOP	4.0 EA	L005 L006 L007 L008
917 2100 710	INDUCTOR, FEED BACK, 20T	4.0 EA	L001 L002 L003 L004
917 2442 001	COAX, INPUT, PHASE MATCH	1.0 EA	SELECT IN TEST
992 8958 001	MOD, 1/4, BASIC, LB,	1.0 EA	

Table B-7. ATTENUATOR,SELECT IN TEST - 917 2100 612

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (b)*
556 0126 075	ATTEN 0.75 DB 30W INPUT	0.0 EA	
556 0126 100	ATTEN 1.00 DB 30W INPUT	0.0 EA	
556 0126 125	ATTEN 1.25 DB 30W INPUT	0.0 EA	
556 0126 150	ATTEN 1.50 DB 30W INPUT	0.0 EA	
556 0126 175	ATTEN 1.75 DB 30W INPUT	0.0 EA	
556 0126 200	ATTEN 2.00 DB 30W INPUT	0.0 EA	
556 0126 225	ATTEN 2.25 DB 30W INPUT	0.0 EA	
556 0126 250	ATTEN 2.50 DB 30W INPUT	0.0 EA	
556 0126 275	ATTEN 2.75 DB 30W INPUT	0.0 EA	
556 0126 300	ATTEN 3.00 DB 30W INPUT	0.0 EA	
556 0126 325	ATTEN 3.25 DB 30W INPUT	0.0 EA	
556 0126 350	ATTEN 3.50 DB 30W INPUT	0.0 EA	
556 0126 375	ATTEN 3.75 DB 30W INPUT	0.0 EA	
556 0126 400	ATTEN 4.00 DB 30W INPUT	0.0 EA	
556 0126 425	ATTEN 4.25 DB 30W INPUT	0.0 EA	
556 0126 450	ATTEN 4.50 DB 30W INPUT	0.0 EA	
556 0126 475	ATTEN 4.75 DB 30W INPUT	0.0 EA	
556 0126 500	ATTEN 5.00 DB 30W INPUT	0.0 EA	
817 2100 611	SPEC, 30 WATT ATTENUATOR	0.0 EA	

Table B-8. COAX, INPUT, PHASE MATCH - 917 2442 001

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (c)*
618 0705 000	COAX CABLE,RG316/U 50 OHM	1.0 FT	
817 2442 001	ASSY INSTR, COAX, INPUT,	0.0 EA	
917 2442 040	COAX TRIM 4.0"	0.0 EA	
917 2442 045	COAX TRIM 4.5"	0.0 EA	
917 2442 050	COAX TRIM, 5.0"	0.0 EA	
917 2442 055	COAX TRIM, 5.5"	0.0 EA	
917 2442 060	COAX TRIM, 6.0"	0.0 EA	
917 2442 065	COAX TRIM 6.5"	0.0 EA	
917 2442 070	COAX TRIM 7.0"	0.0 EA	
917 2442 075	COAX TRIM 7.5"	0.0 EA	
917 2442 080	COAX TRIM 8.0"	0.0 EA	
917 2442 085	COAX TRIM 8.5"	0.0 EA	

917 2442 090	COAX TRIM 9.0"	0.0 EA
917 2442 095	COAX TRIM 9.5"	0.0 EA
917 2442 100	COAX TRIM 10.0"	0.0 EA
917 2442 105	COAX TRIM 10.5"	0.0 EA
917 2442 110	COAX TRIM 11.0"	0.0 EA
917 2442 115	COAX TRIM 11.5"	0.0 EA
917 2442 120	COAX TRIM 12.0"	0.0 EA
917 2442 125	COAX TRIM 12.5"	0.0 EA
917 2442 130	COAX TRIM 13.0"	0.0 EA
917 2442 135	COAX TRIM 13.5"	0.0 EA
917 2442 140	COAX TRIM 14.0"	0.0 EA
917 2442 145	COAX TRIM 14.5"	0.0 EA
917 2442 150	COAX TRIM 15.0"	0.0 EA
917 2442 160	COAX TRIM 16.0"	0.0 EA
917 2442 170	COAX TRIM 17.0"	0.0 EA
917 2442 180	COAX TRIM 18.0"	0.0 EA
917 2442 190	COAX TRIM 19.0"	0.0 EA
917 2442 200	COAX TRIM 20.0"	0.0 EA

Table B-9. MOD, 1/4, BASIC, LB, - 992 8958 001

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (f)*
055 0190 009	* COATING 3140 RTV	0.0 EA	#T009
086 0001 010	*SEALANT GLYPTOL	0.0 QT	
086 0004 055	SOLDER, SN62/PB36/AG2	0.0 EA	#CHIP CAPS
302 0052 000	SCR, 4-40 X 1/4	8.0 EA	#MTG PWB
302 0053 000	SCR, 4-40 X 5/16	2.0 EA	#ANGLE MOUNTING
302 0132 000	SCR, 8-32 X 5/8	2.0 EA	#Q001/Q002 Q003/Q004
302 0401 000	SCR, 4-40 X 1/4	2.0 EA	#R015 #RT001
310 0006 000	WASHER FLAT 8	2.0 EA	#Q001/Q002 #Q003/Q004
310 0016 000	WASHER FLAT #4	1.0 EA	#RT001
310 0048 000	WASHER, FLAT #4 UNDERSIZE	8.0 EA	#MTG PWB
314 0003 000	WASHER, SPLIT-LOCK 4	10.0 EA	#MTG PWB #ANGLES
314 0006 000	WASHER, SPLIT-LOCK 8	2.0 EA	#Q001/Q002 #Q003/Q004
314 0037 000	WASHER, SPLIT-LOCK 4 SS	2.0 EA	#R015 #RT001
356 0235 000	CABLE TIE 0.75" DIA.	18.0 EA	
358 3435 000	LEVELER, RF FET	4.0 EA	#Q001 Q002 Q003 Q004
358 3436 000	SPACER, 0.305" LONG	2.0 EA	#Q001/Q002 Q003/Q004
358 3438 000	SPRING, LEAF	2.0 EA	#Q001/Q002 Q003/Q004
404 0818 000	HEATSINK, 1/4 MODULE	1.0 EA	
414 0286 000	TOROID FERRITE	10.0 EA	
414 0287 000	TOROID FERRITE	20.0 EA	
548 2332 000	RES 200 OHM 2W 5%	1.0 EA	R005
646 0665 000	INSPECTION LABEL	1.0 EA	
700 1252 000	RES 200 OHM 10W 5%	1.0 EA	R015
839 7900 701	SCH, LB 1/4 MODULE	0.0 EA	
843 4999 644	FAMILY TREE, LB, PA MOD,	0.0 EA	
843 4999 645	FAMILY TREE, LB DRIVER,	0.0 EA	
917 2100 331	TRIMMED COAX 5.9"	4.0 EA	
917 2100 332	TRIMMED COAX 2.9"	4.0 EA	
917 2100 334	TRIMMED COAX 3.85"	4.0 EA	
917 2100 619	TRIMMED COAX	4.0 EA	#T006 T007
917 2100 682	MOSFET RF PWR ON4402H ESD	4.0 EA	Q001 Q002 Q003 Q004
943 5140 013	BRACKET, MTG	2.0 EA	#CABLE CLAMPING
992 8608 001	THERMISTOR ASSEMBLY	1.0 EA	RT001 #SCREWED TO SINK

992 8956 001	PWA, 1/4 MOD LB RF,	1.0 EA

Table B-10. MOSFET RF PWR ON4402H ESD - 917 2100 682

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (c)*
380 0737 000	MOSFET RF PWR ESD	1.0 EA	NOTE: THE FOLLOWING NUMBERS HAVE BEEN ASSIGNED TO GAIN CODED ON4402H FET. THESE WILL BE STOCKED BY FIELD SERVICE WITH THESE NUMBERS FOR IN HOUSE PURPOSES ONLY.
380 0737 003	*FET ON4402H GAIN #3 ESD	0.0 EA	
380 0737 004	*FET ON4402H GAIN #4 ESD	0.0 EA	
380 0737 005	*FET ON4402H GAIN #5 ESD	0.0 EA	
380 0737 006	*FET ON4402H GAIN #6 ESD	0.0 EA	
380 0737 007	* FET ON4402H GAIN #7 ESD	0.0 EA	

Table B-11. THERMISTOR ASSEMBLY - 992 8608 001

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (b)*
051 0001 025	* ADHESIVE, LOCTITE 392	0.0 EA	
051 0001 026	* ACTIVATOR, LOCTITE 7387	0.0 EA	
354 0075 000	TERMINAL LUG RING 8	1.0 EA	
516 0935 000	CAP 0.012UF 10% 50V	1.0 EA	C001
559 0053 000	THERMISTOR,NTC,10K@25C,1%	1.0 EA	R001

Table B-12. PWA, 1/4 MOD LB RF, - 992 8956 001

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (j)*
254 0001 000	WIRE, BUS CU 22AWG	0.10 FT	#T009
296 0310 000	TUBING TEFLON 20 AWG	0.10 FT	#T009
358 3288 000	POWER TAP, PC MOUNT 25AMP	1.0 EA	TB001
384 0843 000	DIODE 1N4154 ESD	1.0 EA	CR001
516 0417 000	CAP 1000PF 10% 200V	12.0 EA	C001 C002 C003 C012 C013 C014 C035 C043 C044 C045 C046 C048
516 0484 000	CAP 0.1UF 100V 10%	4.0 EA	C024 C025 C032 C034
516 0831 000	CAP 0.010UF 10% 100V	9.0 EA	C006 C009 C017 C020 C029 C036 C047 C051 C052
516 0890 000	CAP 470PF 10% 200V C0G	12.0 EA	C004 C015 C026 C027 C028 C030 C031 C037 C038 C039 C040 C041
516 0891 000	CAP 0.100UF 10% 50V	4.0 EA	C007 C010 C018 C021
524 0375 000	CAP 100UF 63V	2.0 EA	C049 C050
540 1405 000	RES NETWORK 2700 OHM 2%	1.0 EA	R036
540 1600 117	RES 47 OHM 3W 5%	2.0 EA	R019 R020
540 1600 201	RES 100 OHM 3W 5%	8.0 EA	R001 R004 R006 R009 R010 R011 R012 R013
544 1667 000	RES 5.1 OHM 2W 5%	4.0 EA	R002 R003 R007 R008
548 2400 101	RES 10 OHM 1/2W 1%	2.0 EA	R014 R018
548 2400 166	RES 47.5 OHM 1/2W 1%	1.0 EA	R017
548 2400 201	RES 100 OHM 1/2W 1%	1.0 EA	R030
548 2400 283	RES 715 OHM 1/2W 1%	1.0 EA	R032
548 2400 318	RES 1.5K OHM 1/2W 1%	1.0 EA	R031
548 2400 322	RES 1.65K OHM 1/2W 1%	1.0 EA	R033
548 2400 330	RES 2K OHM 1/2W 1%	1.0 EA	R029

548 2400 468	RES 49.9K OHM 1/2W 1%	2.0 EA	R034 R035
550 0913 000	POT, 5K OHM, 1/2W	4.0 EA	R025 R026 R027 R028
550 0957 000	POT 500 OHM 1/2 W 10%	1.0 EA	R016
610 1223 000	HEADER 3 POSITION	1.0 EA	J001
843 4999 642	PWB, 1/4 MOD RF, LB,	1.0 EA	
917 2100 336	XMFR 150W SAMPLE	1.0 EA	T009
917 2100 640	AIR COIL, 8 TURN	4.0 EA	L009 L010 L011 L012

Table B-13. MODULE, DRIVER BASIC LB1, - 992 8961 001

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (j)*
007 4060 079	BRZ, FGR STK 0097-0606-02	0.3360 EA	* 0.313 OF 16" = 5" 2 PIECES 2.5" REQ FOR LOGIC COVER
054 0014 103	CARTON, SHIPPING	0.0 EA	
054 0014 107	INSERT, FOAM PACKAGING	0.0 ST	
086 0004 056	SOLDER, SN96/AG4	0.0 EA	#OUTPUT CABLES
252 0420 000	WIRE, RIBBON 5 X 100 MIL	0.40 FT	FT #TO/FROM 1/4 MODS
252 0423 000	TEFLON INSULATED HOOK-UP	2.0 FT	
254 0005 000	WIRE, BUS CU 14AWG	0.0330 FT	
302 0052 000	SCR, 4-40 X 1/4	8.0 EA	
302 0053 000	SCR, 4-40 X 5/16	3.0 EA	6#A2 3# LOAD RES
302 0054 000	SCR, 4-40 X 3/8	3.0 EA	3# CABLE CLAMPS
302 0106 000	SCR, 6-32 X 3/8	2.0 EA	2# OUTPUT COUPLER
302 0108 000	SCR, 6-32 X 1/2	10.0 EA	2#I/O CONNECTOR 8# COVER
302 0364 000	SCR, 4-40 X 3/16	6.0 EA	6# CHASSIS COVER
302 0378 000	SCR, 4-40 X 3/4	4.0 EA	2# PASS FETS 2# BUSS BARS
302 0380 000	SCR, 6-32 X 5/16	11.0 EA	#FRONT PANEL
302 0401 000	SCR, 4-40 X 1/4	1.0 EA	1# ATTEN
302 0661 000	SCR, 4-40 X 1/4	3.0 EA	#LOGIC CHASSIS
306 0003 000	NUT, HEX 4-40	9.0 EA	2# PASS FET 2# BUSS BAR 3# DC FEED CLAMPS 2# CLAMP PASS FETS
306 0004 000	NUT, HEX 6-32	4.0 EA	1# GRD WIRES 2# LOGIC CHASSIS 1# COUPLER
306 0071 000	NUT, HEX #6-32 UNDERSIZE	16.0 EA	16# QTR MOD MTG
306 0072 000	NUT, HEX #4-40 UNDERSIZE	3.0 EA	3# RF LOADS
310 0003 000	WASHER, FLAT NO. 4	17.0 EA	2# CLAMPS PASS FETS 4# PASS FETS 6# LOGIC 2# REG 3# CLAMPS STANDOFFS
310 0012 000	WASHER FLAT 6	30.0 EA	2# MAIN CONNECTOR 8# COVER 20# PWB
310 0017 000	WASHER FLAT #6	7.0 EA	2# LOGIC CHASSIS 5# COUPLER
312 0006 000	WASHER, INT LOCK 8	5.0 EA	#508-0560-000
314 0003 000	WASHER, SPLIT-LOCK 4	20.0 EA	
314 0005 000	WASHER, SPLIT-LOCK 6	44.0 EA	
314 0037 000	WASHER, SPLIT-LOCK 4 SS	4.0 EA	3# RF LOADS 1# ATTEN
336 1239 000	SCREW 6-32 X 3/8	12.0 EA	5# 2 X 2 DIVIDER 5# 2 X 2 COMBINER 2# COUPLER
344 0009 000	SCREW, SET 8-32 X 3/16	2.0 EA	
350 0105 000	RIVET 3/16 ALUM .126/.25	4.0 EA	4# FRONT PANEL
350 0155 000	RIVET POP .156 X .392	10.0 EA	5# DIVIDER PWB 5# COMBINER PWB
354 0386 000	TERM, LOCKING #10 RING	1.0 EA	
356 0235 000	CABLE TIE 0.75" DIA.	15.0 EA	
356 0237 000	CLAMP CABLE 1/4" DIA	1.0 EA	
356 0241 000	CABLE CLAMP TIE	5.0 EA	

358 1214 000	SCREWLOCK, FEMALE	1.0 EA	* FILTERED D
358 3322 000	PLUG BUTTON, 0.50" HOLE	1.0 EA	
380 0715 000	XSTR MOSFET IXTH67N10 ESD	2.0 EA	Q001 Q002
384 0831 000	LED LIGHT BAR MOUNT ESD	2.0 EA	
386 0438 000	ZENER, 1N5243, 13V 0.5W ESD	1.0 EA	#BUSS BAR CR001
410 0335 000	INSULATOR SCREW	1.0 EA	#A2U011
410 0413 000	INSULATOR PAD FOR TO-247	3.0 EA	#A2U011 2# PASS FETS
410 0414 000	THERMAL PAD 1.000 X .800	2.0 EA	
414 0292 000	CORE, BALUN 2500 PERM	4.0 EA	L014 L015 L016 L017
424 0013 000	GROMMET .381 MTG DIA	1.0 EA	
424 0598 000	BUSHING, SPLIT, GUIDE PIN	1.0 EA	
508 0560 000	CAP, FEEDTHRU 1000PF	5.0 EA	C001 C002 C003 C004 C005
508 0561 000	EMI FILTER FEEDTHRU	2.0 EA	FL001 FL002
516 0417 000	CAP 1000PF 10% 200V	2.0 EA	2# BUSS BAR C023 C028
516 0831 000	CAP 0.010UF 10% 100V	4.0 EA	4# BUSS BAR C024 C025 C026 C027
519 0011 000	CAP RF CHIP 2.4PF 500V	1.0 EA	A5A1C003
544 1654 000	RES 100 OHM 250W 5%	1.0 EA	A5R001
544 1660 000	RES 100 OHM 20W 5%	1.0 EA	A3R001
548 2400 073	RES 5.62 OHM 1/2W 1%	2.0 EA	#PASS FET R001 R002
556 0126 200	ATTEN 2.00 DB 30W INPUT	1.0 EA	AT001
610 1222 000	PLUG/RECP, D, 25 PIN	1.0 EA	
646 0665 000	INSPECTION LABEL	1.0 EA	
646 1519 000	LABEL, WARNING RF RADIATION	1.0 EA	
843 4999 528	PWB, PASS FET GATE BIAS	1.0 EA	
843 4999 645	FAMILY TREE, LB DRIVER,	0.0 EA	
917 2100 146	TAPE SWITCH ASSY	1.0 EA	
917 2100 386	CABLE, LED BOARD	1.0 EA	
917 2100 627	CABLE ASSEMBLY, DC FEED	1.0 EA	
917 2100 631	COAX TRIM, 12.5"	1.0 EA	TL004
917 2100 633	COAX TRIM, 3.5"	1.0 EA	TL007
917 2100 635	COAX TRIM, 48.5"	1.0 EA	TL005
917 2100 637	COAX TRIM, 39"	1.0 EA	TL006
917 2100 747	MAIN I/O CONN ASSY	1.0 EA	
939 7900 054	EXTRUSION, FLAPPER	1.0 EA	
943 4999 084	MODULE FACE EXTRUSION	1.0 EA	
943 4999 454	MODULE FRONT PANEL	1.0 EA	
943 4999 456	MODULE COVER	1.0 EA	
943 4999 518	BUSS BAR, DC (VERTICAL)	2.0 EA	
943 4999 526	INSULATOR, BUSS BAR	3.0 EA	
943 4999 585	ANGLE, HEATSINK MOUNTING	2.0 EA	
943 4999 650	CHASSIS, MODULE	1.0 EA	
943 4999 651	LOGIC CHASSIS	1.0 EA	
943 4999 652	LOGIC COVER	1.0 EA	
943 4999 653	CABLE, MODULE, MAIN	1.0 EA	
943 5140 015	SPACER, INSULATOR	2.0 EA	#BUSS BAR
943 5140 022	COVER, 1/4 MODULE, DRIVER	1.0 EA	
992 8023 001	PWA, LED BOARD	1.0 EA	A007
992 8127 002	PWA, LOGIC/CONTROL BD	1.0 EA	A002
992 8557 102	DIVIDER, 2-WAY, LB1	1.0 EA	A003
992 8559 102	COMB, LB1, 2-WAY	1.0 EA	A005
992 8568 001	DIVIDER, LB, RF INTRA-	1.0 EA	A004
992 8568 002	COMB, LB, RF INTRACONNECT	1.0 EA	A006
992 8976 001	COUPLER ASSY, LB MODULE	1.0 EA	A001

WARNING: Disconnect primary power prior to servicing.

992 9018 001	RF PLUG ASSY	1.0 EA	J001

Table B-14. TAPE SWITCH ASSY - 917 2100 146

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (e)*
296 0262 000	TUBING, SHRINK 1/4 WHITE	0.060 FT	
354 0711 000	CONTACT, 24/20 RECEPTACLE	2.0 EA	
604 1102 000	SWITCH, PRESS SENSING,8OZ	1.0 EA	
612 1312 000	HOUSING CONTACT 2 PIN	1.0 EA	
817 2100 146	ASSY INSTR, TAPE SWITCH	0.0 EA	

Table B-15. MAIN I/O CONN ASSY - 917 2100 747

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
252 0241 000	WIRE, STRD 12AWG BLK	0.920 FT	
252 0422 000	WIRE, STRD 12AWG RED	1.0 FT	
354 0023 000	LUG #6 RING YEL 12-10AWG	2.0 EA	
354 0779 000	CONTACT, PIN SIZE 8	4.0 EA	
620 2537 001	RECPT HSG, 12 PIN, MODULE	1.0 EA	
817 2100 747	ASSY INSTR, MAIN I/O CONN	0.0 EA	
822 0900 180	SPACER, CONN	4.0 EA	
917 2100 371	RF IN CABLE, TV AMP	1.0 EA	

Table B-16. MODULE COVER - 943 4999 456

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
001 5010 060	AL, SH .063 THK	2.4070 LB	
843 4999 456	ASSY INSTR, COVER, MODULE	0.0 EA	

Table B-17. BUSS BAR, DC (VERTICAL) - 943 4999 518

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (b)*
003 5010 020	CU, SH .064 X 48 X 96	0.1480 LB	
843 4999 518	ASSY INSTR, BUS BAR, DC	0.0 EA	

Table B-18. INSULATOR, BUSS BAR - 943 4999 526

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
027 5010 055	GL, .062 THK	0.0250 LB	
843 4999 526	ASSY INSTR, INSULATOR,	0.0 EA	

Table B-19. LOGIC COVER - 943 4999 652

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
001 5010 060	AL, SH .063 THK	0.290 LB	
358 2911 000	PLUNGER ASSY	1.0 EA	
843 4999 652	ASSY INSTR, LOGIC COVER	0.0 EA	

Table B-20. COVER, 1/4 MODULE, DRIVER - 943 5140 022

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
001 5010 060	AL, SH .063 THK	0.4060 LB	
843 5140 022	ASSY INSTR, COVER, DRIVER	0.0 EA	

Table B-21. PWA, LED BOARD - 992 8023 001

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (d)*
384 0826 000	LED LIGHT BAR, RED ESD	1.0 EA	CR001
384 0827 000	LED LIGHT BAR, GREEN ESD	1.0 EA	CR002
610 0852 000	HEADER 8 PIN SINGLE ROW	0.0 EA	J001
610 0877 000	HDR, STR, 2 PIN, SQ	1.0 EA	J003
610 0902 000	HDR 10 PIN STRAIGHT	1.0 EA	J002
839 7900 047	SCHEM, LED BOARD	0.0 EA	
843 4999 094	PWB LED BOARD	1.0 EA	

Table B-22. PWA, LOGIC/CONTROL BD - 992 8127 002

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (m)*
380 0219 000	*XSTR, 2N2222 ESD	1.0 EA	Q002
380 0591 000	*XSTR, NPN, 2N5681	1.0 EA	Q001
380 0726 000	XSTR, 2N7000 ESD	4.0 EA	Q003 Q004 Q005 Q006
382 0184 000	IC, 340T-5/7805 +5V REG ESD	1.0 EA	U012
382 0428 000	IC, LM358 ESD	1.0 EA	U004
382 0648 000	IC, LM339A ESD	3.0 EA	U006 U007 U013
382 1127 000	IC ADJ VOLT REG ESD	1.0 EA	U011
382 1192 000	IC, MC14584BCP ESD	1.0 EA	U005
382 1426 000	IC, LM317LZ ESD	1.0 EA	U010
384 0205 000	DIODE SILICON 1N914/4148 ESD	2.0 EA	CR009 CR010
384 0802 000	TRANSZORB, BIPOLAR 18V 5% ESD	1.0 EA	CR005
384 0843 000	DIODE 1N4154 ESD	6.0 EA	CR001 CR003 CR004 CR006 CR007 CR008
386 0394 000	ZENER, 1N5231A(B) 5.1V.5W ESD	1.0 EA	CR002
398 0015 000	FUSE,FAST CART .500A 250V	1.0 EA	F001
402 0129 000	CLIP, 1/4 DIA FUSE	2.0 EA	#F001
404 0198 000	SPACER TO-5, TO-9, TO-11	1.0 EA	#Q001
404 0704 000	SOCKET IC 20 PIN	3.0 EA	#U001 #U002 #U003
516 0453 000	CAP .1UF 100V 20% X7R	8.0 EA	C002 C008 C009 C014 C031 C032 C033 C034
516 0530 000	CAP .01UF 10% 100V X7R	18.0 EA	C001 C003 C006 C007 C010 C011 C012 C013 C021 C022 C023 C024 C025 C026 C027 C028 C029 C030
522 0548 000	CAP 10UF 50V 20%	1.0 EA	C036
522 0573 000	CAP 47UF 63V 20%	1.0 EA	C016
526 0048 000	CAP 10UF 20V 20%	3.0 EA	C004 C019 C020
526 0378 000	CAP 1UF 50V 20%	5.0 EA	C005 C015 C017 C018 C035
540 0332 000	* RES 1K OHM 1W 5%	1.0 EA	R039
540 1386 000	RES NETWORK 10K OHM 2%	1.0 EA	R004
540 1416 000	RES NETWORK 10K OHM 2%	1.0 EA	R006
540 1493 000	RES NETWORK 100K OHM	1.0 EA	R015
544 1649 000	RES 33 OHM 2W 5%	1.0 EA	R080
548 2400 151	RES 33.2 OHM 1/2W 1%	1.0 EA	R076
548 2400 201	RES 100 OHM 1/2W 1%	2.0 EA	R033 R079
548 2400 251	RES 332 OHM 1/2W 1%	4.0 EA	R012 R030 R032 R058
548 2400 262	RES 432 OHM 1/2W 1%	1.0 EA	R072
548 2400 266	RES 475 OHM 1/2W 1%	3.0 EA	R021 R049 R050
548 2400 281	RES 681 OHM 1/2W 1%	1.0 EA	R075
548 2400 289	RES 825 OHM 1/2W 1%	1.0 EA	R081
548 2400 301	RES 1K OHM 1/2W 1%	4.0 EA	R036 R037 R059 R061
548 2400 309	RES 1.21K OHM 1/2W 1%	2.0 EA	R073 R074

548 2400 321	RES 1.62K OHM 1/2W 1%	1.0 EA	R045
548 2400 334	RES 2.21K OHM 1/2W 1%	3.0 EA	R043 R070 R071
548 2400 351	RES 3.32K OHM 1/2W 1%	2.0 EA	R044 R052
548 2400 366	RES 4.75K OHM 1/2W 1%	6.0 EA	R002 R028 R046 R056 R066 R068
548 2400 373	RES 5.62K OHM 1/2W 1%	3.0 EA	R053
			R060 R062
548 2400 378	RES 6.34K OHM 1/2W 1%	1.0 EA	R031
548 2400 391	RES 8.66K OHM 1/2W 1%	4.0 EA	R005 R010 R016 R022
548 2400 401	RES 10K OHM 1/2W 1%	14.0 EA	R007 R011 R013 R017 R019 R023 R025 R026
			R034 R042 R047 R064 R069 R100
548 2400 409	RES 12.1K OHM 1/2W 1%	1.0 EA	R038
548 2400 434	RES 22.1K OHM 1/2W 1%	1.0 EA	R001
548 2400 458	RES 39.2K OHM 1/2W 1%	1.0 EA	R048
548 2400 466	RES 47.5K OHM 1/2W 1%	2.0 EA	R020 R054
548 2400 481	RES 68.1K OHM 1/2W 1%	1.0 EA	R040
548 2400 501	RES 100K OHM 1/2W 1%	4.0 EA	R024
			R027 R063 R082
548 2400 551	RES 332K OHM 1/2W 1%	1.0 EA	R055
548 2400 566	RES 475K OHM 1/2W 1%	3.0 EA	R009 R035 R057
548 2400 601	RES 1MEG OHM 1/2W 1%	4.0 EA	R003 R014 R018 R041
550 0812 000	POT 100 OHM 1/2W 10%	2.0 EA	R051 R102
550 0922 000	POT 10K OHM 1/2W	2.0 EA	R008 R101
610 0900 000	HEADER 3 CKT STRAIGHT	1.0 EA	P005
612 1184 000	SHUNT JUMPER 0.1" CENTERS	1.0 EA	J005
612 1418 000	RECP, D, 25C STRAIGHT	1.0 EA	J001
839 7900 700	SCH, MODULE CONTROL BOARD	0.0 EA	
843 4999 640	PWB, LOGIC/CONTROL BD	1.0 EA	
917 2236 002	FIRMWARE, FAULT LATCH U1	1.0 EA	U001
917 2236 003	FIRMWARE, LED INDICATION U2	1.0 EA	U002
917 2236 004	FIRMWARE, MODULE CONTROL U3	1.0 EA	U003
917 2256 052	KIT, REPLACEMENT FIRMWARE	0.0 EA	FIELD SERVICE REPLACEMENT KIT

Table B-23. KIT, REPLACEMENT FIRMWARE - 917 2256 052

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
817 2256 052	REPLACEMENT INSTR, FIRMWARE	0.0 EA	
917 2236 002	FIRMWARE, FAULT LATCH U1	1.0 EA	U001
917 2236 003	FIRMWARE, LED INDICATION U2	1.0 EA	U002
917 2236 004	FIRMWARE, MODULE CONTROL U3	1.0 EA	U003

Table B-24. DIVIDER, 2-WAY, LB1 - 992 8557 102

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (b)*
000 0000 010	B/M NOTE:	0.0 EA	THIS ITEM USED AT HIGHERLEVEL RES 100 OHM 20W R001 544-1660-000
384 0321 000	*DIODE 5082-2800 ESD	1.0 EA	CR001
515 0038 000	*CAP 22PF 50V 5% 1206 COG	1.0 EA	C001
515 0041 000	*CAP 39PF 50V 5% 1206 COG	1.0 EA	C002
516 0417 000	CAP 1000PF 10% 200V	1.0 EA	C003
548 0049 000	RES 100 OHM 3/4W 1%	1.0 EA	R002
548 2400 301	RES 1K OHM 1/2W 1%	1.0 EA	R003
843 4999 492	PWB, DIVIDER 2-WAY	1.0 EA	

Table B-25. COMB, LB1, 2-WAY - 992 8559 102

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
000 0000 010	B/M NOTE:	0.0 EA	THIS ITEM USED AT HIGHERLEVEL RES 100 OHM 250W R1 544-1654-000
500 1337 000	CAP 18PF 5% 250V	1.0 EA	C001
519 0041 000	CAP RF CHIP 43PF 5% 500V	1.0 EA	C002
843 4999 485	PWB, LB COMB 2-WAY	1.0 EA	

Table B-26. DIVIDER, LB, RF INTRA- - 992 8568 001

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (c)*
843 4999 523	PWB, DRVR RF INTRACONNECT	1.0 EA	

Table B-27. COMB, LB, RF INTRACONNECT - 992 8568 002

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (c)*
843 4999 523	PWB, DRVR RF INTRACONNECT	1.0 EA	

Table B-28. COUPLER ASSY, LB MODULE - 992 8976 001

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
252 0420 000	WIRE, RIBBON 5 X 100 MIL	0.10 FT	
350 0114 000	RIVET, POP 1/8 DIA	4.0 EA	
350 0127 000	RIVET, BLIND RETAINED	6.0 EA	
424 0012 000	GROMMET 1/4 MTG DIA	1.0 EA	
839 7900 641	SCHEM, OUTPUT COUPLER LB	0.0 EA	
843 4999 477	PWB, LB COUPLER TOP BD	1.0 EA	
843 4999 478	PWB, LB COUPLER BOTTOM BD	1.0 EA	
843 4999 480	PWB, LB COUPLER MID BD	1.0 EA	
922 0900 448	PLATE, DIRECT COUPLER	1.0 EA	
943 4999 586	ANGLE DIRECT COUPLER	1.0 EA	
992 8843 001	DC PWA, LB COUPLER	1.0 EA	

Table B-29. DC PWA, LB COUPLER - 992 8843 001

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (b)*
384 0321 000	*DIODE 5082-2800 ESD	1.0 EA	CR001
516 0831 000	CAP 0.010UF 10% 100V	1.0 EA	C001
544 1651 000	*RES 51 OHM 2W 5%	1.0 EA	R001
548 2192 000	RES, 49.9 OHM, 2W, 1%	1.0 EA	R002
843 4999 479	PWB, LB COUPLER DC BD	1.0 EA	

Table B-30. RF PLUG ASSY - 992 9018 001

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
354 0835 000	SOLDER LUG, M18 HOLE	1.0 EA	
358 3450 000	NUT, HEX M18X1	1.0 EA	
358 3451 000	WASHER, INT LOCK M18	1.0 EA	
620 2826 000	PLUG, PANEL COAXIAL	1.0 EA	

Table B-31. MODULE, DR, CH-3 TUNED CLASS A - 992 7182 003

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
992 8965 003	RF DRV/PA MOD 525W CH-3	1.0 EA	

Table B-32. RF DRV/PA MOD 525W CH-3 - 992 8965 003

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
817 2100 745	TEST REQUIREMENT, 525W,DR	0.0 EA	
992 8964 003	MOD, DR, CH-3, TUNED	1.0 EA	

Table B-33. MOD, DR, CH-3, TUNED - 992 8964 003

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (b)*
508 0557 000	CAP TRIMMER 10 - 90 PF	2.0 EA	A5A6C4 A5A3C14
817 2100 743	TEST REQUIREMENTS, DRIVER	0.0 EA	
843 4999 638	SCH, LB DRIVER MODULE	0.0 EA	
917 2100 639	ATTENUATOR,UNBALANCED PIE	3.0 EA	#SELECT IN TEST #R4 R5 R6
917 2100 750	AIR COIL, 4 TURN	1.0 EA	A5A6L1
917 2100 814	COAX TRIM, 32.8"	1.0 EA	TL003
992 8960 003	MOD,1/4,PA/DR,CH3, TUNED	3.0 EA	A001 A002 A004
992 8961 001	MODULE, DRIVER BASIC LB1,	1.0 EA	

Table B-34. MOD,1/4,PA/DR,CH3, TUNED - 992 8960 003

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (h)*
252 0420 000	WIRE, RIBBON 5 X 100 MIL	0.050 FT	#AT001
519 0038 000	CAP RF CHIP 33PF 5% 500V	2.0 EA	C023 C033
519 0052 000	CAP RF CHIP 120PF 5% 300V	2.0 EA	C008 C019
519 0060 000	CAP RF CHIP 270PF 5% 200V	8.0 EA	C005A C011A C016A C022A C005B C011B C016B C022B
548 2400 277	RES 619 OHM 1/2W 1%	4.0 EA	R021 R022 R023 R024
817 2100 741	TEST REQ, LB 1/4 MOD,	0.0 EA	
839 7900 701	SCH, LB 1/4 MODULE	0.0 EA	
917 2100 612	ATTENUATOR,SELECT IN TEST	1.0 EA	AT001
917 2100 646	OUTPUT INDUCT. LOOP 1.8"	4.0 EA	L005 L006 L007 L008
917 2100 711	INDUCTOR, FEEDBACK, 13T	4.0 EA	L001 L002 L003 L004
917 2442 001	COAX, INPUT, PHASE MATCH	1.0 EA	SELECT IN TEST
992 8958 001	MOD, 1/4, BASIC, LB,	1.0 EA	

Table B-35. MODULE, DR, CH-4 TUNED CLASS A - 992 7182 004

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
992 8965 004	RF DRV/PA MOD 525W CH-4	1.0 EA	

Table B-36. RF DRV/PA MOD 525W CH-4 - 992 8965 004

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
817 2100 745	TEST REQUIREMENT, 525W,DR	0.0 EA	
992 8964 004	MOD, DR, CH-4, TUNED	1.0 EA	

Table B-37. MOD, DR, CH-4, TUNED - 992 8964 004

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (c)*
500 1368 000	CAP, VAR 25-115PF 175V	1.0 EA	A5A4C1
508 0557 000	CAP TRIMMER 10 - 90 PF	2.0 EA	A5A6C4 A5A3C14
817 2100 743	TEST REQUIREMENTS, DRIVER	0.0 EA	
843 4999 638	SCH, LB DRIVER MODULE	0.0 EA	
917 2100 639	ATTENUATOR,UNBALANCED PIE	3.0 EA	#SELECT IN TEST #R4 R5 R6
917 2100 739	COAX, TRIM 39"	1.0 EA	A5A4TL8
917 2100 750	AIR COIL, 4 TURN	1.0 EA	A5A6L1
917 2100 813	COAX TRIM, 29.9"	1.0 EA	TL003
992 8960 004	MOD,1/4,PA/DR,CH4, TUNED	3.0 EA	A001 A002 A004
992 8962 001	MODULE, DRIVER, BASIC LB2	1.0 EA	

Table B-38. MOD,1/4,PA/DR,CH4, TUNED - 992 8960 004

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (g)*
252 0420 000	WIRE, RIBBON 5 X 100 MIL	0.050 FT	#AT001
519 0041 000	CAP RF CHIP 43PF 5% 500V	2.0 EA	C023 C033
519 0052 000	CAP RF CHIP 120PF 5% 300V	2.0 EA	C008 C019
519 0060 000	CAP RF CHIP 270PF 5% 200V	8.0 EA	C005A C011A C016A C022A C005B C011B C016B C022B
548 2400 277	RES 619 OHM 1/2W 1%	4.0 EA	R021 R022 R023 R024
817 2100 741	TEST REQ, LB 1/4 MOD,	0.0 EA	
839 7900 701	SCH, LB 1/4 MODULE	0.0 EA	
917 2100 612	ATTENUATOR,SELECT IN TEST	1.0 EA	AT001
917 2100 648	OUTPUT INDUCTOR,LOOP 1.7"	4.0 EA	L005 L006 L007 L008
917 2100 711	INDUCTOR, FEEDBACK, 13T	4.0 EA	L001 L002 L003 L004
917 2442 001	COAX, INPUT, PHASE MATCH	1.0 EA	SELECT IN TEST
992 8958 001	MOD, 1/4, BASIC, LB,	1.0 EA	

Table B-39. MODULE, DRIVER, BASIC LB2 - 992 8962 001

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (j)*
007 4060 079	BRZ, FGR STK 0097-0606-02	0.3360 EA	* 0.313 OF 16" = 5" 2 PIECES 2.5" REQ FOR LOGIC COVER
054 0014 103	CARTON, SHIPPING	0.0 EA	
054 0014 107	INSERT, FOAM PACKAGING	0.0 ST	
086 0004 056	SOLDER, SN96/AG4	0.0 EA	#OUTPUT CABLES
252 0420 000	WIRE, RIBBON 5 X 100 MIL	0.40 FT	FT #TO/FROM 1/4 MODS
252 0423 000	TEFLON INSULATED HOOK-UP	2.0 FT	
254 0005 000	WIRE, BUS CU 14AWG	0.0330 FT	
296 0260 000	TUBING, SHRINK 3/32 WHITE	0.10 FT	
302 0052 000	SCR, 4-40 X 1/4	8.0 EA	6# LOGIC 2# LOGIC REG
302 0053 000	SCR, 4-40 X 5/16	3.0 EA	3# LOAD RES
302 0054 000	SCR, 4-40 X 3/8	3.0 EA	3# CABLE CLAMPS
302 0106 000	SCR, 6-32 X 3/8	2.0 EA	2# COUPLER
302 0108 000	SCR, 6-32 X 1/2	10.0 EA	2#I/O CONNECTOR 8# COVER
302 0364 000	SCR, 4-40 X 3/16	6.0 EA	6# CHASSIS COVER
302 0378 000	SCR, 4-40 X 3/4	4.0 EA	2# PASS FETS 2# BUSS BARS
302 0380 000	SCR, 6-32 X 5/16	11.0 EA	#FRONT PANEL
302 0401 000	SCR, 4-40 X 1/4	1.0 EA	1# ATTEN
302 0661 000	SCR, 4-40 X 1/4	3.0 EA	#LOGIC CHASSIS
306 0003 000	NUT, HEX 4-40	9.0 EA	2# PASS FET 2# BUSS BAR 2# CLAMP PASS FET 3# DC FEED CLAMPS

306 0004 000	NUT, HEX 6-32	4.0 EA	1# GRD WIRES 2# LOGIC CHASSIS 1# COUPLER
306 0071 000	NUT, HEX #6-32 UNDERSIZE	16.0 EA	16# QTR MOD MTG
306 0072 000	NUT, HEX #4-40 UNDERSIZE	3.0 EA	3# DUMP LOADS
310 0003 000	WASHER, FLAT NO. 4	17.0 EA	2# CLAMP PASS FETS 4# PASS FETS 6# LOGIC 2# REG 3# CLAMP STANDOFFS
310 0012 000	WASHER FLAT 6	30.0 EA	2# MAIN CONNECTOR 8# COVER 20# PWB
310 0017 000	WASHER FLAT #6	7.0 EA	2# LOGIC CHASSIS 5# COUPLER
312 0006 000	WASHER, INT LOCK 8	5.0 EA	#508-0560-000
314 0003 000	WASHER, SPLIT-LOCK 4	20.0 EA	
314 0005 000	WASHER, SPLIT-LOCK 6	44.0 EA	
314 0037 000	WASHER, SPLIT-LOCK 4 SS	4.0 EA	3# RF LOADS 1# ATTEN
336 1239 000	SCREW 6-32 X 3/8	12.0 EA	5# 2 X 2 DIVIDER 5# 2 X 2 COMBINER 2# COUPLER
344 0009 000	SCREW, SET 8-32 X 3/16	2.0 EA	
350 0105 000	RIVET 3/16 ALUM .126/.25	4.0 EA	4# FRONT PANEL
350 0155 000	RIVET POP .156 X .392	10.0 EA	5# DIVIDER PWB 5# COMBINER PWB
354 0386 000	TERM, LOCKING #10 RING	1.0 EA	
356 0235 000	CABLE TIE 0.75" DIA.	15.0 EA	
356 0237 000	CLAMP CABLE 1/4" DIA	1.0 EA	
356 0241 000	CABLE CLAMP TIE	5.0 EA	
358 1214 000	SCREWLOCK, FEMALE	1.0 EA	* FILTERED D
358 3322 000	PLUG BUTTON, 0.50" HOLE	1.0 EA	
380 0715 000	XSTR MOSFET IXTH67N10 ESD	2.0 EA	Q001 Q002
384 0831 000	LED LIGHT BAR MOUNT ESD	2.0 EA	
386 0438 000	ZENER, 1N5243, 13V 0.5W ESD	1.0 EA	#BUSS BAR CR001
410 0335 000	INSULATOR SCREW	1.0 EA	#A2U011
410 0413 000	INSULATOR PAD FOR TO-247	3.0 EA	#A2U011 2# PASS FETS
410 0414 000	THERMAL PAD 1.000 X .800	2.0 EA	
414 0292 000	CORE, BALUN 2500 PERM	4.0 EA	L014 L015 L016 L017
424 0013 000	GROMMET .381 MTG DIA	1.0 EA	
424 0598 000	BUSHING, SPLIT, GUIDE PIN	1.0 EA	
508 0560 000	CAP, FEEDTHRU 1000PF	5.0 EA	C001 C002 C003 C004 C005
508 0561 000	EMI FILTER FEEDTHRU	2.0 EA	FL001 FL002
516 0417 000	CAP 1000PF 10% 200V	2.0 EA	2# BUSS BAR C023 C028
516 0831 000	CAP 0.010UF 10% 100V	4.0 EA	4# BUSS BAR C024 C025 C026 C027
519 0011 000	CAP RF CHIP 2.4PF 500V	1.0 EA	A5A1C003
544 1654 000	RES 100 OHM 250W 5%	1.0 EA	A5R001
544 1660 000	RES 100 OHM 20W 5%	1.0 EA	A3R001
548 2400 073	RES 5.62 OHM 1/2W 1%	2.0 EA	#PASS FET R001 R002
556 0126 200	ATTEN 2.00 DB 30W INPUT	1.0 EA	AT001
610 1222 000	PLUG/RECP, D, 25 PIN	1.0 EA	
646 0665 000	INSPECTION LABEL	1.0 EA	
646 1519 000	LABEL, WARNING RF RADIATION	1.0 EA	
843 4999 528	PWB, PASS FET GATE BIAS	1.0 EA	
843 4999 645	FAMILY TREE, LB DRIVER,	0.0 EA	
917 2100 146	TAPE SWITCH ASSY	1.0 EA	
917 2100 386	CABLE, LED BOARD	1.0 EA	
917 2100 627	CABLE ASSEMBLY, DC FEED	1.0 EA	
917 2100 631	COAX TRIM, 12.5"	1.0 EA	TL004
917 2100 633	COAX TRIM, 3.5"	1.0 EA	TL007
917 2100 636	COAX TRIM, 39.9"	1.0 EA	TL005
917 2100 638	COAX TRIM, 30.4"	1.0 EA	TL006

917 2100 747	MAIN I/O CONN ASSY	1.0 EA	
939 7900 054	EXTRUSION, FLAPPER	1.0 EA	
943 4999 084	MODULE FACE EXTRUSION	1.0 EA	
943 4999 454	MODULE FRONT PANEL	1.0 EA	
943 4999 456	MODULE COVER	1.0 EA	
943 4999 518	BUSS BAR, DC (VERTICAL)	2.0 EA	
943 4999 526	INSULATOR, BUSS BAR	3.0 EA	
943 4999 585	ANGLE, HEATSINK MOUNTING	2.0 EA	
943 4999 650	CHASSIS, MODULE	1.0 EA	
943 4999 651	LOGIC CHASSIS	1.0 EA	
943 4999 652	LOGIC COVER	1.0 EA	
943 4999 653	CABLE, MODULE, MAIN	1.0 EA	
943 5140 015	SPACER, INSULATOR	2.0 EA	#BUSS BAR
943 5140 022	COVER, 1/4 MODULE, DRIVER	1.0 EA	
992 8023 001	PWA, LED BOARD	1.0 EA	A007
992 8127 002	PWA, LOGIC/CONTROL BD	1.0 EA	A002
992 8557 104	DIVIDER, LB2, 2-WAY, SSTV	1.0 EA	A003
992 8559 104	COMB, LB2, 2-WAY, SSTV	1.0 EA	A005
992 8568 001	DIVIDER, LB, RF INTRA-	1.0 EA	A004
992 8568 002	COMB, LB, RF INTRACONNECT	1.0 EA	A006
992 8976 001	COUPLER ASSY, LB MODULE	1.0 EA	A001
992 9018 001	RF PLUG ASSY	1.0 EA	J001

Table B-40. DIVIDER, LB2, 2-WAY, SSTV - 992 8557 104

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (d)*
000 0000 010	B/M NOTE:	0.0 EA	THIS ITEM USED AT HIGHERLEVEL RES 100 OHM 20W R1 544-1660-000
384 0321 000	*DIODE 5082-2800 ESD	1.0 EA	CR001
515 0037 000	*CAP 18PF 50V 5% 1206 COG	2.0 EA	C002A C002B
515 0147 000	CAP 15PF 200V 5% 1206 COG	1.0 EA	C001
516 0417 000	CAP 1000PF 10% 200V	1.0 EA	C003
548 0049 000	RES 100 OHM 3/4W 1%	1.0 EA	R002
548 2400 301	RES 1K OHM 1/2W 1%	1.0 EA	R003
843 4999 493	PWB, DIVIDER 2-WAY	1.0 EA	

Table B-41. COMB, LB2, 2-WAY, SSTV - 992 8559 104

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (c)*
000 0000 010	B/M NOTE:	0.0 EA	THIS ITEM USED AT HIGHERLEVEL. RES 100 OHM 250W R1 544-1654-000
500 1335 000	CAP 15PF 5% 250V	1.0 EA	C001
519 0037 000	CAP RF CHIP 30PF 5% 500V	1.0 EA	C002
843 4999 487	PWB, LB COMB 2-WAY	1.0 EA	

Table B-42. MODULE, DR, CH-5 TUNED CLASS A - 992 7182 005

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
992 8965 005	RF DRV/PA MOD 525W CH-5	1.0 EA	

Table B-43. RF DRV/PA MOD 525W CH-5 - 992 8965 005

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
817 2100 745	TEST REQUIREMENT, 525W,DR	0.0 EA	

992 8964 005	MOD, DR, CH-5, TUNED	1.0 EA

Table B-44. MOD, DR, CH-5, TUNED - 992 8964 005

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (b)*
508 0557 000	CAP TRIMMER 10 - 90 PF	2.0 EA	A5A6C4 A5A3C14
817 2100 743	TEST REQUIREMENTS, DRIVER	0.0 EA	
843 4999 638	SCH, LB DRIVER MODULE	0.0 EA	
917 2100 630	COAX TRIM, 26"	1.0 EA	TL003
917 2100 639	ATTENUATOR,UNBALANCED PIE	3.0 EA	#SELECT IN TEST #R4 R5 R6
917 2100 750	AIR COIL, 4 TURN	1.0 EA	A5A6L1
992 8960 005	MOD,1/4,PA/DR,CH5, TUNED	3.0 EA	A001 A002 A004
992 8962 001	MODULE, DRIVER, BASIC LB2	1.0 EA	

Table B-45. MOD,1/4,PA/DR,CH5, TUNED - 992 8960 005

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (f)*
252 0420 000	WIRE, RIBBON 5 X 100 MIL	0.050 FT	#AT001
519 0041 000	CAP RF CHIP 43PF 5% 500V	2.0 EA	C023 C033
519 0052 000	CAP RF CHIP 120PF 5% 300V	2.0 EA	C008 C019
519 0066 000	CAP RF CHIP 470PF 5% 200V	4.0 EA	C005A C011A C016A C022A
817 2100 741	TEST REQ, LB 1/4 MOD,	0.0 EA	
839 7900 701	SCH, LB 1/4 MODULE	0.0 EA	
917 2100 612	ATTENUATOR,SELECT IN TEST	1.0 EA	AT001
917 2100 649	OUTPUT INDUC. LOOP 1.25"	4.0 EA	L005 L006 L007 L008
917 2100 711	INDUCTOR, FEEDBACK, 13T	4.0 EA	L001 L002 L003 L004
917 2442 001	COAX, INPUT, PHASE MATCH	1.0 EA	SELECT IN TEST
992 8958 001	MOD, 1/4, BASIC, LB,	1.0 EA	

Table B-46. MODULE, DR, CH-6 TUNED CLASS A - 992 7182 006

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
992 8965 006	RF DRV/PA MOD 525W CH-6	1.0 EA	

Table B-47. RF DRV/PA MOD 525W CH-6 - 992 8965 006

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
817 2100 745	TEST REQUIREMENT, 525W,DR	0.0 EA	
992 8964 006	MOD, DR, CH-6, TUNED	1.0 EA	

Table B-48. MOD, DR, CH-6, TUNED - 992 8964 006

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (d)*
508 0557 000	CAP TRIMMER 10 - 90 PF	2.0 EA	A5A3C14 A5A6C4
817 2100 743	TEST REQUIREMENTS, DRIVER	0.0 EA	
843 4999 638	SCH, LB DRIVER MODULE	0.0 EA	
917 2100 639	ATTENUATOR,UNBALANCED PIE	3.0 EA	#SELECT IN TEST #R4 R5 R6
917 2100 738	COAX, TRIM 34"	1.0 EA	TL003
917 2100 750	AIR COIL, 4 TURN	1.0 EA	A5A6L1
992 8960 006	MOD, 1/4, PA/DR,CH6,TUNED	3.0 EA	A001 A002 A004
992 8962 001	MODULE, DRIVER, BASIC LB2	1.0 EA	

Table B-49. MOD, 1/4, PA/DR,CH6,TUNED - 992 8960 006

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (g)*
252 0420 000	WIRE, RIBBON 5 X 100 MIL	0.050 FT	#AT001
519 0041 000	CAP RF CHIP 43PF 5% 500V	2.0 EA	C023 C033
519 0052 000	CAP RF CHIP 120PF 5% 300V	2.0 EA	C008 C019
519 0060 000	CAP RF CHIP 270PF 5% 200V	8.0 EA	C005A&B C011A&B C016A&B C022A&B
548 2400 277	RES 619 OHM 1/2W 1%	4.0 EA	R021 R022 R023 R024
817 2100 741	TEST REQ, LB 1/4 MOD,	0.0 EA	
839 7900 701	SCH, LB 1/4 MODULE	0.0 EA	
917 2100 612	ATTENUATOR,SELECT IN TEST	1.0 EA	AT001
917 2100 650	OUTPUT INDUCTOR LOOP 1.1"	4.0 EA	L005 L006 L007 L008
917 2100 711	INDUCTOR, FEEDBACK, 13T	4.0 EA	L001 L002 L003 L004
992 8958 001	MOD, 1/4, BASIC, LB,	1.0 EA	

Table B-50. MODULE, DR, CH-7 TUNED CLASS A - 992 7182 007

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
992 8964 007	MODULE, DR, CH-7, TUNED	1.0 EA	

Table B-51. MODULE, DR, CH-7, TUNED - 992 8964 007

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
500 1200 000	CAP VAR 1.5-20PF	2.0 EA	C004 C014
817 2100 743	TEST REQUIREMENTS, DRIVER	0.0 EA	
843 4999 639	SCH, HB DRIVER MODULE	0.0 EA	
917 2100 639	ATTENUATOR,UNBALANCED PIE	3.0 EA	#SELECT IN TEST #R4 R5 R6
917 2100 676	COAX TRIM, 17.0"	1.0 EA	TL002
917 2100 683	COAX TRIM, 27.9"	1.0 EA	TL003
992 8960 007	MOD 1/4,PA/DR CH-7, TUNED	4.0 EA	
992 8963 001	MODULE, DRIVER, BASIC HB,	1.0 EA	

Table B-52. MOD 1/4,PA/DR CH-7, TUNED - 992 8960 007

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (c)*
252 0420 000	WIRE, RIBBON 5 X 100 MIL	0.050 FT	L007
519 0021 000	CAP RF CHIP 6.2PF 500V	2.0 EA	C037 C038
519 0028 000	CAP RF CHIP 12PF 5% 500V	1.0 EA	C008
519 0042 000	CAP RF CHIP 47PF 5% 500V	4.0 EA	C004 C005 C006 C007
519 0049 000	CAP	2.0 EA	C002 C003
817 2100 742	TEST REQ, HB 1/4 MOD	0.0 EA	
839 7900 702	SCH, HB 1/4 MODULE	0.0 EA	
917 2100 542	LOOP INDUCTOR 2T	1.0 EA	L008
917 2100 544	BALUN, SEMI-RIGID 11.00"	2.0 EA	T003 T004
917 2100 545	COAX TRIM 11.00"	4.0 EA	2-T001 2-T002
917 2100 612	ATTENUATOR,SELECT IN TEST	1.0 EA	AT1 SELECT IN TEST
917 2442 001	COAX, INPUT, PHASE MATCH	1.0 EA	SELECT IN TEST TL1
992 8959 001	MOD, 1/4, BASIC, HB,	1.0 EA	

Table B-53. MOD, 1/4, BASIC, HB, - 992 8959 001

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (g)*
055 0190 009	* COATING 3140 RTV	0.0 EA	
086 0001 010	*SEALANT GLYPTOL	0.0 QT	

086 0004 055	SOLDER, SN62/PB36/AG2	0.0 EA	#CHIP CAPS
252 0420 000	WIRE, RIBBON 5 X 100 MIL	0.20 FT	
254 0055 000	WIRE, 16AWG, SOLID, 600V	1.0 FT	L001 L002 L003 L004 CUT TO 2.80" +/- 0.050" STRIP BOTH ENDS 0.15" +/-0.050"
302 0052 000	SCR, 4-40 X 1/4	8.0 EA	#MTG PWB
302 0053 000	SCR, 4-40 X 5/16	2.0 EA	#ANGLE MOUNTING
302 0132 000	SCR, 8-32 X 5/8	2.0 EA	#Q001/Q002 #Q003/Q004
302 0401 000	SCR, 4-40 X 1/4	2.0 EA	#R011 #RT001
310 0006 000	WASHER FLAT 8	2.0 EA	#Q001/Q002 #Q003/Q005
310 0016 000	WASHER FLAT #4	1.0 EA	#RT001
310 0048 000	WASHER, FLAT #4 UNDERSIZE	8.0 EA	#MTG PWB
314 0003 000	WASHER, SPLIT-LOCK 4	10.0 EA	#MTG PWB
314 0006 000	WASHER, SPLIT-LOCK 8	2.0 EA	#Q001/Q002 #Q003/Q004
314 0037 000	WASHER, SPLIT-LOCK 4 SS	2.0 EA	#R011 #RT001
356 0235 000	CABLE TIE 0.75" DIA.	4.0 EA	
358 3435 000	LEVELER, RF FET	4.0 EA	#Q001 Q002 Q003 Q004
358 3436 000	SPACER, 0.305" LONG	2.0 EA	#Q001/Q002 Q003/Q004
358 3438 000	SPRING, LEAF	2.0 EA	#Q001/Q002 Q003/Q004
404 0818 000	HEATSINK, 1/4 MODULE	1.0 EA	
519 0080 000	CAP RF CHIP 220PF 10%	4.0 EA	C013 C015 C017 C019
540 1600 101	RES 10 OHM 3W 5%	4.0 EA	R003 R004 R005 R006
544 1661 000	RES 100 OHM 10W 5%	1.0 EA	R011
548 2332 000	RES 200 OHM 2W 5%	2.0 EA	R001A R001B
646 0665 000	INSPECTION LABEL	1.0 EA	
839 7900 702	SCH, HB 1/4 MODULE	0.0 EA	
843 4999 643	FAMILY TREE, HB, PA MOD,	0.0 EA	
843 4999 646	FAMILY TREE, HB, DRIVER,	0.0 EA	
917 2100 682	MOSFET RF PWR ON4402H ESD	4.0 EA	Q001 Q002 Q003 Q004
943 5140 013	BRACKET, MTG	2.0 EA	#CABLE CLAMPING
992 8608 001	THERMISTOR ASSEMBLY	1.0 EA	RT001 #SCREWED TO SINK
992 8957 001	PWA, 1/4 MOD, HB RF,	1.0 EA	

Table B-54. PWA, 1/4 MOD, HB RF, - 992 8957 001

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (f)*
254 0001 000	WIRE, BUS CU 22AWG	0.10 FT	#L010
296 0310 000	TUBING TEFLON 20 AWG	0.10 FT	#L010
358 3288 000	POWER TAP, PC MOUNT 25AMP	1.0 EA	TB001
384 0843 000	DIODE 1N4154 ESD	1.0 EA	CR001
516 0417 000	CAP 1000PF 10% 200V	6.0 EA	C025 C026 C027 C028 C033 C043
516 0484 000	CAP 0.1UF 100V 10%	2.0 EA	C029 C030
516 0831 000	CAP 0.010UF 10% 100V	7.0 EA	C021 C022 C023 C024 C042 C044 C045
516 0890 000	CAP 470PF 10% 200V C0G	4.0 EA	C009 C011 C034 C035
524 0375 000	CAP 100UF 63V	2.0 EA	C031 C032
548 2400 166	RES 47.5 OHM 1/2W 1%	1.0 EA	R012
548 2400 201	RES 100 OHM 1/2W 1%	1.0 EA	R013
548 2400 283	RES 715 OHM 1/2W 1%	1.0 EA	R015
548 2400 309	RES 1.21K OHM 1/2W 1%	4.0 EA	R007 R008 R009 R010
548 2400 318	RES 1.5K OHM 1/2W 1%	1.0 EA	R014
548 2400 322	RES 1.65K OHM 1/2W 1%	1.0 EA	R016
548 2400 330	RES 2K OHM 1/2W 1%	1.0 EA	R017
548 2400 343	RES 2.74K OHM 1/2W 1%	4.0 EA	R024 R025 R026 R027
548 2400 468	RES 49.9K OHM 1/2W 1%	2.0 EA	R022 R023
550 0913 000	POT, 5K OHM, 1/2W	4.0 EA	R018 R019 R020 R021

550 0957 000	POT 500 OHM 1/2 W 10%	1.0 EA	R002
610 1223 000	HEADER 3 POSITION	1.0 EA	J001
839 7900 702	SCH, HB 1/4 MODULE	0.0 EA	
843 4999 641	PWB, TEFLON RF 1/4 MOD HB	1.0 EA	
917 2100 536	WIRE ASSY, 14 TURN TOROID	1.0 EA	L009

Table B-55. MODULE, DRIVER, BASIC HB, - 992 8963 001

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (k)*
007 4060 079	BRZ, FGR STK 0097-0606-02	1.050 EA	2 PIECES 2.0" REQUIRED FOR LOGIC COVER 2 PIECES 6.0" REQUIRED FOR SHIELDS.
007 4060 083	BRZ, FINGER STOCK	0.50 EA	#FRONT PANEL
054 0014 103	CARTON, SHIPPING	0.0 EA	
054 0014 107	INSERT, FOAM PACKAGING	0.0 ST	
086 0004 056	SOLDER, SN96/AG4	0.0 EA	#OUTPUT CABLES
252 0420 000	WIRE, RIBBON 5 X 100 MIL	0.40 FT	FT #TO/FROM 1/4 MODS
252 0423 000	TEFLON INSULATED HOOK-UP	2.0 FT	
302 0052 000	SCR, 4-40 X 1/4	8.0 EA	6 LOGIC BD 2# LOGIC REG
302 0053 000	SCR, 4-40 X 5/16	3.0 EA	6#A2 3# LOAD RES
302 0054 000	SCR, 4-40 X 3/8	4.0 EA	4# CABLE CLAMPS
302 0106 000	SCR, 6-32 X 3/8	2.0 EA	2# OUTPUT COUPLER
302 0108 000	SCR, 6-32 X 1/2	10.0 EA	2#I/O CONNECTOR 8# COVER
302 0364 000	SCR, 4-40 X 3/16	6.0 EA	6# CHASSIS COVER
302 0378 000	SCR, 4-40 X 3/4	4.0 EA	2# PASS FETS 2# BUSS BARS
302 0380 000	SCR, 6-32 X 5/16	11.0 EA	#FRONT PANEL
302 0401 000	SCR, 4-40 X 1/4	1.0 EA	1# ATTEN
302 0661 000	SCR, 4-40 X 1/4	3.0 EA	#LOGIC CHASSIS
306 0003 000	NUT, HEX 4-40	10.0 EA	2# PASS FET 2# BUSS BAR 2# CLAMP PASS FETS 4# DC FEED CLAMPS
306 0004 000	NUT, HEX 6-32	4.0 EA	1# GRD WIRES 2# LOGIC CHASSIS 1# COUPLER
306 0071 000	NUT, HEX #6-32 UNDERSIZE	16.0 EA	16# QTR MOD MTG
306 0072 000	NUT, HEX #4-40 UNDERSIZE	3.0 EA	3# RF LOADS
310 0003 000	WASHER, FLAT NO. 4	18.0 EA	4 PASS FET 6 LOGIC 2 REG. 2# CLAMP PASS FETS 4# CLAMPS STANDOFFS
310 0012 000	WASHER FLAT 6	30.0 EA	2# MAIN CONNECTOR 8# COVER 20# PWB
310 0017 000	WASHER FLAT #6	7.0 EA	5# DIR COUPLER 2# LOGIC CHASSIS
312 0006 000	WASHER, INT LOCK 8	5.0 EA	#508-0560-000
314 0003 000	WASHER, SPLIT-LOCK 4	21.0 EA	2# PASS FETS 2# BUSS BARS 2# TRANS U11 & U12 6# LOGIC BD 3# LOGIC CHASSIS 4# DC WIRE CLAMPS
314 0005 000	WASHER, SPLIT-LOCK 6	44.0 EA	
314 0037 000	WASHER, SPLIT-LOCK 4 SS	4.0 EA	
336 1239 000	SCREW 6-32 X 3/8	12.0 EA	5# 2 X 2 DIVIDER 2# COUPLER 5# 2 X 2 COMBINER
344 0009 000	SCREW, SET 8-32 X 3/16	2.0 EA	#EXT/FLAPPER
350 0105 000	RIVET 3/16 ALUM .126/.25	4.0 EA	4# FRONT PANEL
350 0155 000	RIVET POP .156 X .392	10.0 EA	5# DIVIDER PWB 5# COMBINER PWB
354 0386 000	TERM, LOCKING #10 RING	1.0 EA	#FRONT PANEL GND
356 0235 000	CABLE TIE 0.75" DIA.	20.0 EA	
356 0237 000	CLAMP CABLE 1/4" DIA	1.0 EA	# TAPE SWITCH

356 0241 000	CABLE CLAMP TIE	6.0 EA	
358 1214 000	SCREWLOCK, FEMALE	1.0 EA	* FILTERED D
358 3322 000	PLUG BUTTON, 0.50" HOLE	1.0 EA	
380 0715 000	XSTR MOSFET IXTH67N10 ESD	2.0 EA	Q001 Q002
384 0831 000	LED LIGHT BAR MOUNT ESD	2.0 EA	
386 0438 000	ZENER, 1N5243, 13V 0.5W ESD	1.0 EA	#BUSS BAR CR001
410 0335 000	INSULATOR SCREW	1.0 EA	#A2U011
410 0413 000	INSULATOR PAD FOR TO-247	3.0 EA	#A2U011 2# PASS FETS
410 0414 000	THERMAL PAD 1.000 X .800	2.0 EA	
414 0292 000	CORE, BALUN 2500 PERM	4.0 EA	L014 L015 L016 L017
424 0013 000	GROMMET .381 MTG DIA	1.0 EA	
424 0598 000	BUSHING, SPLIT, GUIDE PIN	1.0 EA	
508 0560 000	CAP, FEEDTHRU 1000PF	5.0 EA	C001 C002 C003 C004 C005
508 0561 000	EMI FILTER FEEDTHRU	2.0 EA	FL001 FL002
516 0417 000	CAP 1000PF 10% 200V	2.0 EA	2# BUSS BARS C023 C028
516 0831 000	CAP 0.010UF 10% 100V	4.0 EA	4# BUSS BAR C024 C025 C026 C027
544 1654 000	RES 100 OHM 250W 5%	1.0 EA	A5R001
544 1660 000	RES 100 OHM 20W 5%	1.0 EA	A3R001
548 2400 073	RES 5.62 OHM 1/2W 1%	2.0 EA	#PASS FET R001 R002
556 0126 200	ATTEN 2.00 DB 30W INPUT	1.0 EA	AT001
610 1222 000	PLUG/RECP, D, 25 PIN	1.0 EA	
646 0665 000	INSPECTION LABEL	1.0 EA	
646 1519 000	LABEL, WARNING RF RADIATION	1.0 EA	
843 4999 528	PWB, PASS FET GATE BIAS	1.0 EA	
843 4999 639	SCH, HB DRIVER MODULE	0.0 EA	
843 4999 646	FAMILY TREE, HB, DRIVER,	0.0 EA	
917 2100 146	TAPE SWITCH ASSY	1.0 EA	
917 2100 386	CABLE, LED BOARD	1.0 EA	
917 2100 627	CABLE ASSEMBLY, DC FEED	1.0 EA	
917 2100 631	COAX TRIM, 12.5"	1.0 EA	TL004
917 2100 632	COAX TRIM, 22.5"	1.0 EA	TL005
917 2100 633	COAX TRIM, 3.5"	1.0 EA	TL007
917 2100 634	COAX TRIM, 13.5"	1.0 EA	TL006
917 2100 747	MAIN I/O CONN ASSY	1.0 EA	
939 7900 054	EXTRUSION, FLAPPER	1.0 EA	
943 4999 084	MODULE FACE EXTRUSION	1.0 EA	
943 4999 454	MODULE FRONT PANEL	1.0 EA	
943 4999 456	MODULE COVER	1.0 EA	
943 4999 518	BUSS BAR, DC (VERTICAL)	2.0 EA	
943 4999 526	INSULATOR, BUSS BAR	3.0 EA	
943 4999 585	ANGLE, HEATSINK MOUNTING	2.0 EA	
943 4999 647	BRACKET, MODULE SHIELD	2.0 EA	
943 4999 650	CHASSIS, MODULE	1.0 EA	
943 4999 651	LOGIC CHASSIS	1.0 EA	
943 4999 652	LOGIC COVER	1.0 EA	
943 4999 653	CABLE, MODULE, MAIN	1.0 EA	
943 5140 015	SPACER, INSULATOR	2.0 EA	#BUSS BAR
992 8023 001	PWA, LED BOARD	1.0 EA	A007
992 8127 002	PWA, LOGIC/CONTROL BD	1.0 EA	A002
992 8557 007	DIVIDER, HB, 2-WAY	1.0 EA	A003
992 8559 007	COMB, HB, 2-WAY	1.0 EA	A005
992 8568 003	DIV, HB, RF INTRACONNECT	1.0 EA	A004
992 8568 004	COMB, HB, RF INTRACONNECT	1.0 EA	A006
992 8975 001	COUPLER ASSY, HB MODULE	1.0 EA	A001

992 9018 001	RF PLUG ASSY	1.0 EA	J001

Table B-56. DIVIDER, HB, 2-WAY - 992 8557 007

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (b)*
000 0000 010	B/M NOTE:	0.0 EA	THIS ITEM USED AT HIGHER LEVEL RES 100 OHM 20W R1 544-1660-000
384 0321 000	*DIODE 5082-2800 ESD	1.0 EA	CR001
516 0929 000	CAP 470PF 10% 200V	1.0 EA	C001
548 0049 000	RES 100 OHM 3/4W 1%	1.0 EA	R002
548 2400 301	RES 1K OHM 1/2W 1%	1.0 EA	R003
843 4999 494	PWB, DIVIDER 2-WAY	1.0 EA	

Table B-57. COMB, HB, 2-WAY - 992 8559 007

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
000 0000 010	B/M NOTE:	0.0 EA	THIS ITEM USED AT HIGHER LEVEL RES 100 OHM 250W R1 544-1654-000
843 4999 489	PWB, HB COMB 2-WAY	1.0 EA	

Table B-58. DIV, HB, RF INTRACONNECT - 992 8568 003

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
843 4999 523	PWB, DRVR RF INTRACONNECT	1.0 EA	

Table B-59. COMB, HB, RF INTRACONNECT - 992 8568 004

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
843 4999 523	PWB, DRVR RF INTRACONNECT	1.0 EA	

Table B-60. COUPLER ASSY, HB MODULE - 992 8975 001

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
252 0420 000	WIRE, RIBBON 5 X 100 MIL	0.10 FT	
350 0114 000	RIVET, POP 1/8 DIA	2.0 EA	
350 0126 000	RIVET, BLIND RETAINED	6.0 EA	
350 0127 000	RIVET, BLIND RETAINED	2.0 EA	
424 0012 000	GROMMET 1/4 MTG DIA	1.0 EA	
839 7900 642	SCHEM, OUTPUT COUPLER HB	0.0 EA	
843 4999 514	PWB, HB COUPLER TOP BD	1.0 EA	
843 4999 515	PWB, HB COUPLER BTM BD	1.0 EA	
922 0900 457	PLATE, DIRECT COUPLER HB	1.0 EA	
943 4999 586	ANGLE DIRECT COUPLER	1.0 EA	
992 8844 001	DC PWA, HB COUPLER	1.0 EA	

Table B-61. DC PWA, HB COUPLER - 992 8844 001

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (b)*
384 0321 000	*DIODE 5082-2800 ESD	1.0 EA	CR001
516 0831 000	CAP 0.010UF 10% 100V	1.0 EA	C001
544 1651 000	*RES 51 OHM 2W 5%	1.0 EA	R004
548 2192 000	RES, 49.9 OHM, 2W, 1%	1.0 EA	R001
843 4999 516	PWB, HB COUPLER DC BD	1.0 EA	

Table B-62. MODULE, DR, CH-8 TUNED CLASS A - 992 7182 008

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
992 8964 008	MODULE, DR, CH-8, TUNED	1.0 EA	

Table B-63. MODULE, DR, CH-8, TUNED - 992 8964 008

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
500 1200 000	CAP VAR 1.5-20PF	2.0 EA	C004 C014
817 2100 743	TEST REQUIREMENTS, DRIVER	0.0 EA	
843 4999 639	SCH, HB DRIVER MODULE	0.0 EA	
917 2100 639	ATTENUATOR,UNBALANCED PIE	3.0 EA	#SELECT IN TEST #R4 R5 R6
917 2100 675	COAX TRIM, 16.0"	1.0 EA	TL002
917 2100 684	COAX TRIM, 24.5"	1.0 EA	TL003
992 8960 008	MOD 1/4, PA/DR,CH8, TUNED	4.0 EA	
992 8963 001	MODULE, DRIVER, BASIC HB,	1.0 EA	

Table B-64. MOD 1/4, PA/DR,CH8, TUNED - 992 8960 008

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (c)*
252 0420 000	WIRE, RIBBON 5 X 100 MIL	0.050 FT	L007
519 0028 000	CAP RF CHIP 12PF 5% 500V	1.0 EA	C008
519 0032 000	CAP RF CHIP 18PF 5% 500V	2.0 EA	C037 C038
519 0049 000	CAP	2.0 EA	C002 C003
519 0050 000	CAP RF CHIP 100PF 5% 500V	4.0 EA	C004 C005 C006 C007
817 2100 742	TEST REQ, HB 1/4 MOD	0.0 EA	
839 7900 702	SCH, HB 1/4 MODULE	0.0 EA	
917 2100 542	LOOP INDUCTOR 2T	1.0 EA	L008
917 2100 544	BALUN, SEMI-RIGID 11.00"	2.0 EA	T003 T004
917 2100 545	COAX TRIM 11.00"	4.0 EA	2-T001 2-T002
917 2100 612	ATTENUATOR,SELECT IN TEST	1.0 EA	AT1 SELECT IN TEST
917 2442 001	COAX, INPUT, PHASE MATCH	1.0 EA	SELECT IN TEST TL1
992 8959 001	MOD, 1/4, BASIC, HB,	1.0 EA	

Table B-65. MODULE, DR, CH-9 TUNED CLASS A - 992 7182 009

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
992 8964 009	MODULE, DR, CH-9, TUNED	1.0 EA	

Table B-66. MODULE, DR, CH-9, TUNED - 992 8964 009

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
500 1200 000	CAP VAR 1.5-20PF	2.0 EA	C004 C014
817 2100 743	TEST REQUIREMENTS, DRIVER	0.0 EA	
843 4999 639	SCH, HB DRIVER MODULE	0.0 EA	
917 2100 639	ATTENUATOR,UNBALANCED PIE	3.0 EA	#SELECT IN TEST #R4 R5 R6
917 2100 685	COAX TRIM, 14.75"	1.0 EA	TL002
917 2100 686	COAX TRIM, 21.3"	1.0 EA	TL003
992 8960 009	MOD 1/4, PA/DR, CH9,TUNED	4.0 EA	
992 8963 001	MODULE, DRIVER, BASIC HB,	1.0 EA	

Table B-67. MOD 1/4, PA/DR, CH9,TUNED - 992 8960 009

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (c)*
252 0420 000	WIRE, RIBBON 5 X 100 MIL	0.050 FT	L007
519 0028 000	CAP RF CHIP 12PF 5% 500V	1.0 EA	C008
519 0032 000	CAP RF CHIP 18PF 5% 500V	2.0 EA	C037 C038
519 0049 000	CAP	2.0 EA	C002 C003
519 0050 000	CAP RF CHIP 100PF 5% 500V	4.0 EA	C004 C005 C006 C007
817 2100 742	TEST REQ, HB 1/4 MOD	0.0 EA	
839 7900 702	SCH, HB 1/4 MODULE	0.0 EA	
917 2100 542	LOOP INDUCTOR 2T	1.0 EA	L008
917 2100 544	BALUN, SEMI-RIGID 11.00"	2.0 EA	T003 T004
917 2100 545	COAX TRIM 11.00"	4.0 EA	2-T002 2-T002
917 2100 612	ATTENUATOR,SELECT IN TEST	1.0 EA	AT1 SELECT IN TEST
917 2442 001	COAX, INPUT, PHASE MATCH	1.0 EA	SELECT IN TEST TL1
992 8959 001	MOD, 1/4, BASIC, HB,	1.0 EA	

Table B-68. MODULE, DR, CH10 TUNED CLASS A - 992 7182 010

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
992 8964 010	MODULE, DR, CH-10, TUNED	1.0 EA	

Table B-69. MODULE, DR, CH-10, TUNED - 992 8964 010

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
500 1200 000	CAP VAR 1.5-20PF	2.0 EA	C004 C014
817 2100 743	TEST REQUIREMENTS, DRIVER	0.0 EA	
843 4999 639	SCH, HB DRIVER MODULE	0.0 EA	
917 2100 639	ATTENUATOR,UNBALANCED PIE	3.0 EA	#SELECT IN TEST #R4 R5 R6
917 2100 673	COAX TRIM, 13.0"	1.0 EA	TL002
917 2100 687	COAX TRIM, 37.2"	1.0 EA	TL003
992 8960 010	MOD 1/4, PA/DR,CH10,TUNED	4.0 EA	
992 8963 001	MODULE, DRIVER, BASIC HB,	1.0 EA	

Table B-70. MOD 1/4, PA/DR,CH10,TUNED - 992 8960 010

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (c)*
252 0420 000	WIRE, RIBBON 5 X 100 MIL	0.050 FT	L007
519 0028 000	CAP RF CHIP 12PF 5% 500V	1.0 EA	C008
519 0036 000	CAP RF CHIP 27PF 5% 500V	2.0 EA	C037 C038
519 0049 000	CAP	2.0 EA	C002 C003
519 0050 000	CAP RF CHIP 100PF 5% 500V	4.0 EA	C004 C005 C006 C007
817 2100 742	TEST REQ, HB 1/4 MOD	0.0 EA	
839 7900 702	SCH, HB 1/4 MODULE	0.0 EA	
917 2100 542	LOOP INDUCTOR 2T	1.0 EA	L008
917 2100 544	BALUN, SEMI-RIGID 11.00"	2.0 EA	T003 T004
917 2100 545	COAX TRIM 11.00"	4.0 EA	2-T001 2-T002
917 2100 612	ATTENUATOR,SELECT IN TEST	1.0 EA	AT1 SELECT IN TEST
917 2442 001	COAX, INPUT, PHASE MATCH	1.0 EA	SELECT IN TEST TL1
992 8959 001	MOD, 1/4, BASIC, HB,	1.0 EA	

Table B-71. MODULE, DR, CH11 TUNED CLASS A - 992 7182 011

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
992 8964 011	MODULE, DR, CH-11, TUNED	1.0 EA	

Table B-72. MODULE, DR, CH-11, TUNED - 992 8964 011

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
500 1200 000	CAP VAR 1.5-20PF	2.0 EA	C004 C012
817 2100 743	TEST REQUIREMENTS, DRIVER	0.0 EA	
843 4999 639	SCH, HB DRIVER MODULE	0.0 EA	
917 2100 629	COAX TRIM, 14"	1.0 EA	TL002
917 2100 639	ATTENUATOR,UNBALANCED PIE	3.0 EA	#SELECT IN TEST #R4 R5 R6
917 2100 651	COAX TRIM, 40.5"	1.0 EA	TL003
992 8960 011	MOD 1/4, PA/DR,CH11,TUNED	4.0 EA	
992 8963 001	MODULE, DRIVER, BASIC HB,	1.0 EA	

Table B-73. MOD 1/4, PA/DR,CH11,TUNED - 992 8960 011

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (c)*
519 0026 000	CAP RF CHIP 10PF 5% 500V	1.0 EA	C001
519 0028 000	CAP RF CHIP 12PF 5% 500V	2.0 EA	C037 C038
519 0047 000	*CAP RF CHIP 75PF 5% 500V	2.0 EA	C002 C003
519 0050 000	CAP RF CHIP 100PF 5% 500V	4.0 EA	C004 C005 C006 C007
817 2100 742	TEST REQ, HB 1/4 MOD	0.0 EA	
839 7900 702	SCH, HB 1/4 MODULE	0.0 EA	
917 2100 539	OUTPUT LOOP, 1/2 TURN	2.0 EA	L007 L008
917 2100 540	BALUN, SEMI-RIGID 9.97"	2.0 EA	T003 T004
917 2100 541	COAX TRIM 9.97"	2.0 EA	T001 T002
917 2100 612	ATTENUATOR,SELECT IN TEST	1.0 EA	AT1 SELECT IN TEST
917 2442 001	COAX, INPUT, PHASE MATCH	1.0 EA	SELECT IN TEST TL1
992 8959 001	MOD, 1/4, BASIC, HB,	1.0 EA	

Table B-74. MODULE, DR, CH12 TUNED CLASS A - 992 7182 012

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
992 8964 012	MODULE, DR, CH-12, TUNED	1.0 EA	

Table B-75. MODULE, DR, CH-12, TUNED - 992 8964 012

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
500 1200 000	CAP VAR 1.5-20PF	2.0 EA	C004 C012
817 2100 743	TEST REQUIREMENTS, DRIVER	0.0 EA	
843 4999 639	SCH, HB DRIVER MODULE	0.0 EA	
917 2100 629	COAX TRIM, 14"	1.0 EA	TL002
917 2100 639	ATTENUATOR,UNBALANCED PIE	3.0 EA	#SELECT IN TEST #R4 R5 R6
917 2100 652	COAX TRIM, 39.5"	1.0 EA	TL003
992 8960 012	MOD 1/4, PA/DR,CH12,TUNED	4.0 EA	
992 8963 001	MODULE, DRIVER, BASIC HB,	1.0 EA	

Table B-76. MOD 1/4, PA/DR,CH12,TUNED - 992 8960 012

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (d)*
519 0026 000	CAP RF CHIP 10PF 5% 500V	1.0 EA	C001
519 0028 000	CAP RF CHIP 12PF 5% 500V	2.0 EA	C037 C038
519 0047 000	*CAP RF CHIP 75PF 5% 500V	2.0 EA	C002 C003
519 0050 000	CAP RF CHIP 100PF 5% 500V	4.0 EA	C004 C005 C006 C007
817 2100 742	TEST REQ, HB 1/4 MOD	0.0 EA	
839 7900 702	SCH, HB 1/4 MODULE	0.0 EA	
917 2100 539	OUTPUT LOOP, 1/2 TURN	2.0 EA	L007 L008
917 2100 540	BALUN, SEMI-RIGID 9.97"	2.0 EA	T003 T004
917 2100 541	COAX TRIM 9.97"	2.0 EA	T001 T002
917 2100 612	ATTENUATOR,SELECT IN TEST	1.0 EA	AT1 SELECT IN TEST
917 2442 001	COAX, INPUT, PHASE MATCH	1.0 EA	SELECT IN TEST TL1
992 8959 001	MOD, 1/4, BASIC, HB,	1.0 EA	

Table B-77. MODULE, DR, CH13 TUNED CLASS A - 992 7182 013

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (b)*
992 8964 013	MODULE, DR, CH-13, TUNED	1.0 EA	

Table B-78. MODULE, DR, CH-13, TUNED - 992 8964 013

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (b)*
500 1200 000	CAP VAR 1.5-20PF	2.0 EA	C004 C012
817 2100 743	TEST REQUIREMENTS, DRIVER	0.0 EA	
843 4999 639	SCH, HB DRIVER MODULE	0.0 EA	
917 2100 639	ATTENUATOR,UNBALANCED PIE	3.0 EA	#SELECT IN TEST #R4 R5 R6
917 2100 675	COAX TRIM, 16.0"	1.0 EA	
917 2100 687	COAX TRIM, 37.2"	1.0 EA	
992 8960 013	MOD 1/4, PA/DR,CH13,TUNED	4.0 EA	
992 8963 001	MODULE, DRIVER, BASIC HB,	1.0 EA	

Table B-79. MOD 1/4, PA/DR,CH13,TUNED - 992 8960 013

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (e)*
519 0019 000	CAP RF CHIP 5.1PF 500V	1.0 EA	C001
519 0028 000	CAP RF CHIP 12PF 5% 500V	2.0 EA	C037 C038
519 0046 000	*CAP RF CHIP 68PF 5% 500V	2.0 EA	C002 C003
519 0050 000	CAP RF CHIP 100PF 5% 500V	4.0 EA	C004 C005 C006 C007
817 2100 742	TEST REQ, HB 1/4 MOD	0.0 EA	
839 7900 702	SCH, HB 1/4 MODULE	0.0 EA	
917 2100 539	OUTPUT LOOP, 1/2 TURN	2.0 EA	L007 L008
917 2100 540	BALUN, SEMI-RIGID 9.97"	2.0 EA	T003 T004
917 2100 541	COAX TRIM 9.97"	2.0 EA	T001 T002
917 2100 612	ATTENUATOR,SELECT IN TEST	1.0 EA	AT1 SELECT IN TEST
917 2442 001	COAX, INPUT, PHASE MATCH	1.0 EA	SELECT IN TEST TL1
992 8959 001	MOD, 1/4, BASIC, HB,	1.0 EA	

Table B-80. MODULE, DR-PA, CLASS A - 992 7191 000

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
992 7191 002	MODULE, IPA, CH-2 CLASS A	0.0 EA	
992 7191 003	MODULE, IPA, CH-3 CLASS A	0.0 EA	

992 7191 004	MODULE, IPA, CH-4 CLASS A	0.0 EA
992 7191 005	MODULE, IPA, CH-5 CLASS A	0.0 EA
992 7191 006	MODULE, IPA, CH-6 CLASS A	0.0 EA
992 7191 007	MODULE, DR-PA, CH-7 CLASS A	0.0 EA
992 7191 008	MODULE, DR-PA, CH-8 CLASS A	0.0 EA
992 7191 009	MODULE, DR-PA, CH-9 CLASS A	0.0 EA
992 7191 010	MODULE, DR-PA, CH10 CLASS A	0.0 EA
992 7191 011	MODULE, DR-PA, CH11 CLASS A	0.0 EA
992 7191 012	MODULE, DR-PA, CH12 CLASS A	0.0 EA
992 7191 013	MODULE, DR-PA, CH13 CLASS A	0.0 EA

Table B-81. MODULE, IPA, CH-2 CLASS A - 992 7191 002

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
992 8969 002	MOD, PA, CH-2, TUNED	1.0 EA	

Table B-82. MOD, PA, CH-2, TUNED - 992 8969 002

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
817 2100 744	TEST REQUIREMENTS, MODULE	0.0 EA	
992 8960 002	MOD,1/4,PA/DR,CH-2, TUNED	4.0 EA	A001 A002 A003 A004
992 8966 001	MODULE, RF, BASIC PA, LB1	1.0 EA	

Table B-83. MODULE, RF, BASIC PA, LB1 - 992 8966 001

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (g)*
007 4060 079	BRZ, FGR STK 0097-0606-02	0.3360 EA	* 0.313 OF 16" = 5" 2 PIECES 2.5" REQ FOR LOGIC COVER
054 0014 103	CARTON, SHIPPING	0.0 EA	
054 0014 107	INSERT, FOAM PACKAGING	0.0 ST	
252 0420 000	WIRE, RIBBON 5 X 100 MIL	0.40 FT	FT #TO/FROM 1/4 MODS
252 0423 000	TEFLON INSULATED HOOK-UP	2.0 FT	
302 0052 000	SCR, 4-40 X 1/4	8.0 EA	6#LOGIC PWB 2# LOGIC REG
302 0053 000	SCR, 4-40 X 5/16	3.0 EA	3# DUMP LOADS
302 0054 000	SCR, 4-40 X 3/8	4.0 EA	4# CABLE CLAMPS
302 0106 000	SCR, 6-32 X 3/8	2.0 EA	2# OUTPUT COUPLER
302 0108 000	SCR, 6-32 X 1/2	10.0 EA	2#I/O CONNECTOR 8# COVER
302 0364 000	SCR, 4-40 X 3/16	6.0 EA	6# CHASSIS COVER
302 0378 000	SCR, 4-40 X 3/4	4.0 EA	2# PASS FETS 2# BUSS BARS
302 0380 000	SCR, 6-32 X 5/16	11.0 EA	#FRONT PANEL
302 0401 000	SCR, 4-40 X 1/4	6.0 EA	6# DUMP LOADS
302 0661 000	SCR, 4-40 X 1/4	3.0 EA	#LOGIC CHASSIS
306 0003 000	NUT, HEX 4-40	10.0 EA	2 PASS FET 2 BUSS BAR 2# CLAMP PASS FETS 4# DC FEED CLAMPS
306 0004 000	NUT, HEX 6-32	4.0 EA	1# GRD WIRES 1# COUPLER 2# LOGIC CHASSIS
306 0071 000	NUT, HEX #6-32 UNDERSIZE	16.0 EA	16# QTR MOD MTG
306 0072 000	NUT, HEX #4-40 UNDERSIZE	3.0 EA	3# RF LOADS
310 0003 000	WASHER, FLAT NO. 4	18.0 EA	2# CLAMP PASS FETS 4# PASS FETS 6# LOGIC 2# REG 4 CLAMP STANDOFFS
310 0012 000	WASHER FLAT 6	30.0 EA	2# MAIN CONNECTOR

			#5 - 2 X 2 COMBINER #5 - 2 X 2 DIVIDER #5 - 2-WAY COMBINER #5 -2-WAY DIVIDER 8# COVER
310 0017 000	WASHER FLAT #6	7.0 EA	2# LOGIC CHASSIS 5# COUPLER
312 0006 000	WASHER, INT LOCK 8	5.0 EA	#508-0560-000
314 0003 000	WASHER, SPLIT-LOCK 4	21.0 EA	
314 0005 000	WASHER, SPLIT-LOCK 6	44.0 EA	
314 0037 000	WASHER, SPLIT-LOCK 4 SS	9.0 EA	#9 LOAD RESISTORS
336 1239 000	SCREW 6-32 X 3/8	12.0 EA	5# 2 X
			2 DIVIDER 5# 2 X 2 COMBINER 2# COUPLER
344 0009 000	SCREW, SET 8-32 X 3/16	2.0 EA	#EXT/FLAPPER
350 0105 000	RIVET 3/16 ALUM .126/.25	4.0 EA	4# FRONT PANEL
350 0155 000	RIVET POP .156 X .392	10.0 EA	5# DIVIDER PWB 5# COMBINER PWB
354 0386 000	TERM, LOCKING #10 RING	1.0 EA	#FRONT PANEL GND
356 0235 000	CABLE TIE 0.75" DIA.	20.0 EA	
356 0237 000	CLAMP CABLE 1/4" DIA	1.0 EA	#TAPE SWITCH
356 0241 000	CABLE CLAMP TIE	6.0 EA	
358 1214 000	SCREWLOCK, FEMALE	1.0 EA	* FILTERED D
380 0715 000	XSTR MOSFET IXTH67N10 ESD	2.0 EA	Q001
			Q002
384 0831 000	LED LIGHT BAR MOUNT ESD	2.0 EA	
386 0438 000	ZENER, 1N5243, 13V 0.5W ESD	1.0 EA	#BUSS BAR CR001
410 0335 000	INSULATOR SCREW	1.0 EA	#A2U011
410 0413 000	INSULATOR PAD FOR TO-247	3.0 EA	#A2U011 2# PASS FETS
410 0414 000	THERMAL PAD 1.000 X .800	2.0 EA	
414 0292 000	CORE, BALUN 2500 PERM	4.0 EA	L014 L015 L016 L017
424 0013 000	GROMMET .381 MTG DIA	1.0 EA	
424 0598 000	BUSHING, SPLIT, GUIDE PIN	2.0 EA	
508 0560 000	CAP, FEEDTHRU 1000PF	5.0 EA	C001 C002 C003 C004 C005
508 0561 000	EMI FILTER FEEDTHRU	2.0 EA	FL001 FL002
516 0417 000	CAP 1000PF 10% 200V	2.0 EA	2# BUSS BAR C023
			C028
516 0831 000	CAP 0.010UF 10% 100V	4.0 EA	4# BUSS BAR C024 C025 C026 C027
519 0011 000	CAP RF CHIP 2.4PF 500V	1.0 EA	A5A1C003
544 1654 000	RES 100 OHM 250W 5%	3.0 EA	A5R001 A6R001 A6R002
544 1660 000	RES 100 OHM 20W 5%	3.0 EA	A4R001 A4R002 A3R001
548 2400 073	RES 5.62 OHM 1/2W 1%	2.0 EA	#PASS FET R001 R002
610 1222 000	PLUG/RECP, D, 25 PIN	1.0 EA	
646 0665 000	INSPECTION LABEL	1.0 EA	
646 1519 000	LABEL, WARNING RF RADIATION	1.0 EA	
843 4999 528	PWB, PASS FET GATE BIAS	1.0 EA	
843 4999 637	SCH, PA MODULE	0.0 EA	
843 4999 644	FAMILY TREE, LB, PA MOD,	0.0 EA	
917 2100 146	TAPE SWITCH ASSY	1.0 EA	
917 2100 386	CABLE, LED BOARD	1.0 EA	
917 2100 627	CABLE ASSEMBLY, DC FEED	1.0 EA	
917 2100 747	MAIN I/O CONN ASSY	1.0 EA	
939 7900 054	EXTRUSION, FLAPPER	1.0 EA	
943 4999 084	MODULE FACE EXTRUSION	1.0 EA	
943 4999 454	MODULE FRONT PANEL	1.0 EA	
943 4999 456	MODULE COVER	1.0 EA	
943 4999 518	BUSS BAR, DC (VERTICAL)	2.0 EA	
943 4999 526	INSULATOR, BUSS BAR	3.0 EA	
943 4999 585	ANGLE, HEATSINK MOUNTING	2.0 EA	
943 4999 650	CHASSIS, MODULE	1.0 EA	

943 4999 651	LOGIC CHASSIS	1.0 EA	
943 4999 652	LOGIC COVER	1.0 EA	
943 4999 653	CABLE, MODULE, MAIN	1.0 EA	
943 5140 015	SPACER, INSULATOR	2.0 EA	#BUSS BAR
992 8023 001	PWA, LED BOARD	1.0 EA	A007
992 8127 002	PWA, LOGIC/CONTROL BD	1.0 EA	A002
992 8557 102	DIVIDER, 2-WAY, LB1	1.0 EA	A003
992 8558 102	COMB, LB1, 2 X 2 WAY	1.0 EA	A006
992 8559 102	COMB, LB1, 2-WAY	1.0 EA	A005
992 8560 102	DIVIDER, LB1, 2 X 2 WAY	1.0 EA	A004
992 8976 001	COUPLER ASSY, LB MODULE	1.0 EA	A001 NEED NEW NO. L.W.
992 9018 001	RF PLUG ASSY	1.0 EA	J001

Table B-84. COMB, LB1, 2 X 2 WAY - 992 8558 102

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
000 0000 010	B/M NOTE:	0.0 EA	THIS ITEM USED AT HIGHERLEVEL RES 100 OHM 250W R1 R2 544-1654-000
500 1337 000	CAP 18PF 5% 250V	2.0 EA	C001 C004
519 0041 000	CAP RF CHIP 43PF 5% 500V	2.0 EA	C002 C003
843 4999 495	PWB, LB COMB/DIV 2X2,	1.0 EA	

Table B-85. DIVIDER, LB1, 2 X 2 WAY - 992 8560 102

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (c)*
000 0000 010	B/M NOTE:	0.0 EA	THIS ITEM USED AT HIGHERLEVEL RES 100 OHM 20W R1 R2 544-1660-000
515 0038 000	*CAP 22PF 50V 5% 1206 COG	2.0 EA	C001 C004
515 0041 000	*CAP 39PF 50V 5% 1206 COG	2.0 EA	C002 C003
843 4999 495	PWB, LB COMB/DIV 2X2,	1.0 EA	

Table B-86. MODULE, IPA, CH-3 CLASS A - 992 7191 003

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
992 8969 003	MOD, PA, CH-3, TUNED	1.0 EA	

Table B-87. MOD, PA, CH-3, TUNED - 992 8969 003

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
817 2100 744	TEST REQUIREMENTS, MODULE	0.0 EA	
992 8960 003	MOD,1/4,PA/DR,CH3, TUNED	4.0 EA	A001 A002 A003 A004
992 8966 001	MODULE, RF, BASIC PA, LB1	1.0 EA	

Table B-88. MODULE, IPA, CH-4 CLASS A - 992 7191 004

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
992 8969 004	MOD, PA, CH-4, TUNED	1.0 EA	

Table B-89. MOD, PA, CH-4, TUNED - 992 8969 004

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
817 2100 744	TEST REQUIREMENTS, MODULE	0.0 EA	
992 8960 004	MOD,1/4,PA/DR,CH4, TUNED	4.0 EA	A001 A002 A003 A004

992 8967 001	MODULE, RF, BASIC PA, LB2	1.0 EA

Table B-90. MODULE, RF, BASIC PA, LB2 - 992 8967 001

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (g)*
007 4060 079	BRZ, FGR STK 0097-0606-02	0.3360 EA	0.313 OF 16" = 5 2 PIECES 2.5" REQ FOR LOGIC COVER
054 0014 103	CARTON, SHIPPING	0.0 EA	
054 0014 107	INSERT, FOAM PACKAGING	0.0 ST	
252 0420 000	WIRE, RIBBON 5 X 100 MIL	0.40 FT	FT #TO/FROM 1/4 MODS
252 0423 000	TEFLON INSULATED HOOK-UP	2.0 FT	
302 0052 000	SCR, 4-40 X 1/4	8.0 EA	6# LOGIC PWB 2# LOGIC REG
302 0053 000	SCR, 4-40 X 5/16	3.0 EA	3# DUMP LOADS
302 0054 000	SCR, 4-40 X 3/8	4.0 EA	4# CABLE CLAMPS
302 0106 000	SCR, 6-32 X 3/8	5.0 EA	2# OUTPUT COUPLER
302 0108 000	SCR, 6-32 X 1/2	10.0 EA	2#I/O CONNECTOR 8# COVER
302 0364 000	SCR, 4-40 X 3/16	6.0 EA	6# CHASSIS COVER
302 0378 000	SCR, 4-40 X 3/4	4.0 EA	2# PASS FETS 2# BUSS BARS
302 0380 000	SCR, 6-32 X 5/16	11.0 EA	#FRONT PANEL
302 0401 000	SCR, 4-40 X 1/4	6.0 EA	6# DUMP LOADS
302 0661 000	SCR, 4-40 X 1/4	3.0 EA	#LOGIC CHASSIS
306 0003 000	NUT, HEX 4-40	10.0 EA	#2 PASS FET #2 BUSS BAR 2# CLAMP PASS FETS 4# DC FEED CLAMPS
306 0004 000	NUT, HEX 6-32	4.0 EA	1# GRD WIRES 2# LOGIC CHASSIS 1# COUPLER
306 0071 000	NUT, HEX #6-32 UNDERSIZE	16.0 EA	16# QTR MOD MTG
306 0072 000	NUT, HEX #4-40 UNDERSIZE	3.0 EA	3# RF LOADS
310 0003 000	WASHER, FLAT NO. 4	18.0 EA	2# CLAMP PASS FETS 4# PASS FETS 6# LOGIC 2# REG 4# CLAMPS STANDOFFS
310 0012 000	WASHER FLAT 6	30.0 EA	2# MAIN CONNECTOR #5 2 X 2 COMBINER #5 2 X 2 DIVIDER #5 2-WAY COMBINER #5 2-WAY DIVIDER 8# COVER
310 0017 000	WASHER FLAT #6	7.0 EA	2# LOGIC CHASSIS 5# COUPLER
312 0006 000	WASHER, INT LOCK 8	5.0 EA	#508-0560-000
314 0003 000	WASHER, SPLIT-LOCK 4	21.0 EA	
314 0005 000	WASHER, SPLIT-LOCK 6	44.0 EA	
314 0037 000	WASHER, SPLIT-LOCK 4 SS	9.0 EA	#9 LOAD RESISTORS
336 1239 000	SCREW 6-32 X 3/8	12.0 EA	5# 2 X 2 DIVIDER 5# 2 X 2 COMBINER 2# COUPLER
344 0009 000	SCREW, SET 8-32 X 3/16	2.0 EA	#EXT/FLAPPER
350 0105 000	RIVET 3/16 ALUM .126/.25	4.0 EA	4# FRONT PANEL
350 0155 000	RIVET POP .156 X .392	10.0 EA	5# DIVIDER PWB 5# COMBINER PWB
354 0386 000	TERM, LOCKING #10 RING	1.0 EA	#FRONT PANEL GND
356 0235 000	CABLE TIE 0.75" DIA.	20.0 EA	
356 0237 000	CLAMP CABLE 1/4" DIA	1.0 EA	#TAPE SWITCH
356 0241 000	CABLE CLAMP TIE	6.0 EA	
358 1214 000	SCREWLOCK, FEMALE	1.0 EA	#FILTERED D
380 0715 000	XSTR MOSFET IXTH67N10 ESD	2.0 EA	Q001 Q002
384 0831 000	LED LIGHT BAR MOUNT ESD	2.0 EA	
386 0438 000	ZENER, 1N5243, 13V 0.5W ESD	1.0 EA	#BUSS BAR CR001
410 0335 000	INSULATOR SCREW	1.0 EA	#A2U011
410 0413 000	INSULATOR PAD FOR TO-247	3.0 EA	#A2U011 2# PASS FETS

410 0414 000	THERMAL PAD 1.000 X .800	2.0 EA	
414 0292 000	CORE, BALUN 2500 PERM	4.0 EA	L014 L015 L016 L017
424 0013 000	GROMMET .381 MTG DIA	1.0 EA	
424 0598 000	BUSHING, SPLIT, GUIDE PIN	2.0 EA	
508 0560 000	CAP, FEEDTHRU 1000PF	5.0 EA	C001 C002 C003 C004 C005
508 0561 000	EMI FILTER FEEDTHRU	2.0 EA	FL001 FL002
516 0417 000	CAP 1000PF 10% 200V	2.0 EA	2# BUSS BAR C023 C028
516 0831 000	CAP 0.010UF 10% 100V	4.0 EA	4# BUSS BAR C024 C025 C026 C027
519 0011 000	CAP RF CHIP 2.4PF 500V	1.0 EA	A5A1C003
544 1654 000	RES 100 OHM 250W 5%	3.0 EA	A5R001 A6R001 A6R002
544 1660 000	RES 100 OHM 20W 5%	3.0 EA	A4R001 A4R002 A3R001
548 2400 073	RES 5.62 OHM 1/2W 1%	2.0 EA	#PASS FET R001 R002
610 1222 000	PLUG/RECP, D, 25 PIN	1.0 EA	
646 0665 000	INSPECTION LABEL	1.0 EA	
646 1519 000	LABEL, WARNING RF RADIATION	1.0 EA	
843 4999 528	PWB, PASS FET GATE BIAS	1.0 EA	
843 4999 637	SCH, PA MODULE	0.0 EA	
843 4999 644	FAMILY TREE, LB, PA MOD,	0.0 EA	
917 2100 146	TAPE SWITCH ASSY	1.0 EA	
917 2100 386	CABLE, LED BOARD	1.0 EA	
917 2100 627	CABLE ASSEMBLY, DC FEED	1.0 EA	
917 2100 747	MAIN I/O CONN ASSY	1.0 EA	
939 7900 054	EXTRUSION, FLAPPER	1.0 EA	
943 4999 084	MODULE FACE EXTRUSION	1.0 EA	
943 4999 454	MODULE FRONT PANEL	1.0 EA	
943 4999 456	MODULE COVER	1.0 EA	
943 4999 518	BUSS BAR, DC (VERTICAL)	2.0 EA	
943 4999 526	INSULATOR, BUSS BAR	3.0 EA	
943 4999 585	ANGLE, HEATSINK MOUNTING	2.0 EA	
943 4999 650	CHASSIS, MODULE	1.0 EA	
943 4999 651	LOGIC CHASSIS	1.0 EA	
943 4999 652	LOGIC COVER	1.0 EA	
943 4999 653	CABLE, MODULE, MAIN	1.0 EA	
943 5140 015	SPACER, INSULATOR	2.0 EA	#BUSS BAR
992 8023 001	PWA, LED BOARD	1.0 EA	A007
992 8127 002	PWA, LOGIC/CONTROL BD	1.0 EA	A002
992 8557 104	DIVIDER, LB2, 2-WAY, SSTV	1.0 EA	A003
992 8558 104	COMB, LB2, 2X2 WAY, SSTV	1.0 EA	A006
992 8559 104	COMB, LB2, 2-WAY, SSTV	1.0 EA	A005
992 8560 104	DIVIDER, LB2, 2X2 WAY	1.0 EA	A004
992 8976 001	COUPLER ASSY, LB MODULE	1.0 EA	A001 NEED NEW NO. L.W.
992 9018 001	RF PLUG ASSY	1.0 EA	J001

Table B-91. COMB, LB2, 2X2 WAY, SSTV - 992 8558 104

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (b)*
000 0000 010	B/M NOTE:	0.0 EA	THIS ITEM USED AT HIGHERLEVEL. RES 100 OHM 250W R1 R2 544-1654-000
500 1335 000	CAP 15PF 5% 250V	2.0 EA	C001 C004
519 0037 000	CAP RF CHIP 30PF 5% 500V	2.0 EA	C002 C003
843 4999 488	PWB, COMB/DIV 2 X 2	1.0 EA	

Table B-92. DIVIDER, LB2, 2X2 WAY - 992 8560 104

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (c)*
000 0000 010	B/M NOTE:	0.0 EA	THIS ITEM USED AT HIGHERLEVEL. RES 100 OHM 20W R1 R2 544-1660-000
515 0040 000	*CAP 33PF 50V 5% 1206 COG	2.0 EA	C002 C003
515 0147 000	CAP 15PF 200V 5% 1206 COG	2.0 EA	C001 C004
843 4999 488	PWB, COMB/DIV 2 X 2	1.0 EA	

Table B-93. MODULE, IPA, CH-5 CLASS A - 992 7191 005

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
992 8969 005	MOD, PA, CH-5, TUNED	1.0 EA	

Table B-94. MOD, PA, CH-5, TUNED - 992 8969 005

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
817 2100 744	TEST REQUIREMENTS, MODULE	0.0 EA	
992 8960 005	MOD,1/4,PA/DR,CH5, TUNED	4.0 EA	A001 A002 A003 A004
992 8967 001	MODULE, RF, BASIC PA, LB2	1.0 EA	

Table B-95. MODULE, IPA, CH-6 CLASS A - 992 7191 006

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
992 8969 006	MOD, PA, CH-6, TUNED	1.0 EA	

Table B-96. MOD, PA, CH-6, TUNED - 992 8969 006

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
817 2100 744	TEST REQUIREMENTS, MODULE	0.0 EA	
992 8960 006	MOD, 1/4, PA/DR,CH6,TUNED	4.0 EA	A001 A002 A003 A004
992 8967 001	MODULE, RF, BASIC PA, LB2	1.0 EA	

Table B-97. MODULE, DR-PA, CH-7 CLASS A - 992 7191 007

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
992 8969 007	MODULE, PA, CH-7, TUNED	1.0 EA	

Table B-98. MODULE, PA, CH-7, TUNED - 992 8969 007

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
817 2100 744	TEST REQUIREMENTS, MODULE	0.0 EA	
992 8960 007	MOD 1/4,PA/DR CH-7, TUNED	4.0 EA	
992 8968 001	MODULE, RF, BASIC PA HB,	1.0 EA	

Table B-99. MODULE, RF, BASIC PA HB, - 992 8968 001

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (h)*
007 4060 079	BRZ, FGR STK 0097-0606-02	0.3360 EA	0.313 OF 16" = 5" 5"* 2 PIECES 2.5" REQ FOR LOGIC COVER
054 0014 103	CARTON, SHIPPING	0.0 EA	
054 0014 107	INSERT, FOAM PACKAGING	0.0 ST	
252 0420 000	WIRE, RIBBON 5 X 100 MIL	0.40 FT	FT #TO/FROM 1/4 MODS

252 0423 000	TEFLON INSULATED HOOK-UP	2.0 FT	
302 0052 000	SCR, 4-40 X 1/4	8.0 EA	6# LOGIC PWB 2# LOGIC REG
302 0053 000	SCR, 4-40 X 5/16	3.0 EA	3# DUMP LOADS
302 0054 000	SCR, 4-40 X 3/8	4.0 EA	4# CABLE CLAMPS
302 0106 000	SCR, 6-32 X 3/8	2.0 EA	2# OUTPUT COUPLER
302 0108 000	SCR, 6-32 X 1/2	10.0 EA	2#I/O CONNECTOR 8# COVER
302 0364 000	SCR, 4-40 X 3/16	6.0 EA	6# CHASSIS COVER
302 0378 000	SCR, 4-40 X 3/4	4.0 EA	2# PASS FETS 2# BUSS BARS
302 0380 000	SCR, 6-32 X 5/16	11.0 EA	#FRONT PANEL
302 0401 000	SCR, 4-40 X 1/4	6.0 EA	6# DUMP LOADS
302 0661 000	SCR, 4-40 X 1/4	3.0 EA	#LOGIC CHASSIS
306 0003 000	NUT, HEX 4-40	10.0 EA	2#PASS FET 2#BUSS BAR 2# CLAMP PASS FETS 4# DC FEED CLAMPS
306 0004 000	NUT, HEX 6-32	4.0 EA	1# GRD WIRE 2# LOGIC CHASSIS #1 COUPLER
306 0071 000	NUT, HEX #6-32 UNDERSIZE	16.0 EA	16# QTR MOD MTG
306 0072 000	NUT, HEX #4-40 UNDERSIZE	3.0 EA	3# RF LOADS
310 0003 000	WASHER, FLAT NO. 4	18.0 EA	2# CLAMP PASS FETS 4# PASS FET 6# LOGIC 2#REG. 4# CLAMPS STANDOFFS
310 0012 000	WASHER FLAT 6	30.0 EA	2# MAIN CONNECTOR 8# COVER 20# PWB
310 0017 000	WASHER FLAT #6	7.0 EA	2# LOGIC CHASSIS 5# COUPLER
314 0003 000	WASHER, SPLIT-LOCK 4	21.0 EA	
314 0005 000	WASHER, SPLIT-LOCK 6	44.0 EA	
314 0037 000	WASHER, SPLIT-LOCK 4 SS	9.0 EA	9# DUMP LOADS
336 1239 000	SCREW 6-32 X 3/8	12.0 EA	5# 2 X 2 DIVIDER 5# 2 X 2 COMBINER 2# COUPLER
344 0009 000	SCREW, SET 8-32 X 3/16	2.0 EA	#EXT/FLAPPER
350 0105 000	RIVET 3/16 ALUM .126/.25	4.0 EA	4# FRONT PANEL
350 0155 000	RIVET POP .156 X .392	10.0 EA	5# DIVIDER PWB 5# COMBINER PWB
354 0386 000	TERM, LOCKING #10 RING	1.0 EA	#FRONT PANEL GND.
356 0235 000	CABLE TIE 0.75" DIA.	20.0 EA	
356 0237 000	CLAMP CABLE 1/4" DIA	1.0 EA	#TAPE SWITCH
356 0241 000	CABLE CLAMP TIE	6.0 EA	
358 1214 000	SCREWLOCK, FEMALE	1.0 EA	* FILTERED D
380 0715 000	XSTR MOSFET IXTH67N10 ESD	2.0 EA	Q001 Q002
384 0831 000	LED LIGHT BAR MOUNT ESD	2.0 EA	
386 0438 000	ZENER, 1N5243, 13V 0.5W ESD	1.0 EA	#BUSS BAR CR001
410 0335 000	INSULATOR SCREW	1.0 EA	#A2U011
410 0413 000	INSULATOR PAD FOR TO-247	3.0 EA	#A2U011 2# PASS FETS
410 0414 000	THERMAL PAD 1.000 X .800	2.0 EA	
414 0292 000	CORE, BALUN 2500 PERM	4.0 EA	L014 L015 L016 L017
424 0013 000	GROMMET .381 MTG DIA	1.0 EA	
424 0598 000	BUSHING, SPLIT, GUIDE PIN	2.0 EA	
508 0560 000	CAP, FEEDTHRU 1000PF	5.0 EA	C001 C002 C003 C004 C005
508 0561 000	EMI FILTER FEEDTHRU	2.0 EA	FL001 FL002
516 0417 000	CAP 1000PF 10% 200V	2.0 EA	2# BUSS BAR C023 C028
516 0831 000	CAP 0.010UF 10% 100V	4.0 EA	4# BUSS BAR C024 C025 C026 C027
544 1654 000	RES 100 OHM 250W 5%	3.0 EA	A5R001 A6R001 A6R002
544 1660 000	RES 100 OHM 20W 5%	3.0 EA	A4R001 A4R002 A3R001
548 2400 073	RES 5.62 OHM 1/2W 1%	2.0 EA	#PASS FET R001 R002

610 1222 000	PLUG/RECP, D, 25 PIN	1.0 EA	
646 0665 000	INSPECTION LABEL	1.0 EA	
646 1519 000	LABEL, WARNING RF RADIATION	1.0 EA	
843 4999 528	PWB, PASS FET GATE BIAS	1.0 EA	
843 4999 637	SCH, PA MODULE	0.0 EA	
843 4999 643	FAMILY TREE, HB, PA MOD,	0.0 EA	
917 2100 146	TAPE SWITCH ASSY	1.0 EA	
917 2100 386	CABLE, LED BOARD	1.0 EA	
917 2100 627	CABLE ASSEMBLY, DC FEED	1.0 EA	
917 2100 747	MAIN I/O CONN ASSY	1.0 EA	
939 7900 054	EXTRUSION, FLAPPER	1.0 EA	
943 4999 084	MODULE FACE EXTRUSION	1.0 EA	
943 4999 454	MODULE FRONT PANEL	1.0 EA	
943 4999 456	MODULE COVER	1.0 EA	
943 4999 518	BUSS BAR, DC (VERTICAL)	2.0 EA	
943 4999 526	INSULATOR, BUSS BAR	3.0 EA	
943 4999 585	ANGLE, HEATSINK MOUNTING	2.0 EA	
943 4999 650	CHASSIS, MODULE	1.0 EA	
943 4999 651	LOGIC CHASSIS	1.0 EA	
943 4999 652	LOGIC COVER	1.0 EA	
943 4999 653	CABLE, MODULE, MAIN	1.0 EA	
943 5140 015	SPACER, INSULATOR	2.0 EA	#BUSS BAR
992 8023 001	PWA, LED BOARD	1.0 EA	A007
992 8127 002	PWA, LOGIC/CONTROL BD	1.0 EA	A002
992 8557 007	DIVIDER, HB, 2-WAY	1.0 EA	A003
992 8558 007	COMBINER, HB 2 X 2 WAY	1.0 EA	A006
992 8559 007	COMB, HB, 2-WAY	1.0 EA	A005
992 8560 007	DIVIDER, HB, 2 X 2 WAY	1.0 EA	A004
992 8975 001	COUPLER ASSY, HB MODULE	1.0 EA	A001
992 9018 001	RF PLUG ASSY	1.0 EA	J001

Table B-100. COMBINER, HB 2 X 2 WAY - 992 8558 007

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
000 0000 010	B/M NOTE:	0.0 EA	THIS ITEM USED AT HIGHER LEVEL RES 100 OHM 250W R1 R2544-1654-000
843 4999 490	PWB, HB COMB/DIV 2X2	1.0 EA	

Table B-101. DIVIDER, HB, 2 X 2 WAY - 992 8560 007

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
000 0000 010	B/M NOTE:	0.0 EA	THIS ITEM USED AT HIGHER LEVEL RES 100 OHM 20W R1 R2544-1660-000
843 4999 490	PWB, HB COMB/DIV 2X2	1.0 EA	

Table B-102. MODULE, DR-PA, CH-8 CLASS A - 992 7191 008

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
992 8969 008	MODULE, PA, CH-8, TUNED	1.0 EA	

Table B-103. MODULE, PA, CH-8, TUNED - 992 8969 008

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
817 2100 744	TEST REQUIREMENTS, MODULE	0.0 EA	
992 8960 008	MOD 1/4, PA/DR,CH8, TUNED	4.0 EA	
992 8968 001	MODULE, RF, BASIC PA HB,	1.0 EA	

Table B-104. MODULE, DR-PA, CH-9 CLASS A - 992 7191 009

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
992 8969 009	MODULE, PA, CH-9, TUNED	1.0 EA	

Table B-105. MODULE, PA, CH-9, TUNED - 992 8969 009

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
817 2100 744	TEST REQUIREMENTS, MODULE	0.0 EA	
992 8960 009	MOD 1/4, PA/DR, CH9,TUNED	4.0 EA	
992 8968 001	MODULE, RF, BASIC PA HB,	1.0 EA	

Table B-106. MODULE, DR-PA, CH10 CLASS A - 992 7191 010

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
992 8969 010	MODULE, PA, CH-10, TUNED	1.0 EA	

Table B-107. MODULE, PA, CH-10, TUNED - 992 8969 010

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
817 2100 744	TEST REQUIREMENTS, MODULE	0.0 EA	
992 8960 010	MOD 1/4, PA/DR,CH10,TUNED	4.0 EA	
992 8968 001	MODULE, RF, BASIC PA HB,	1.0 EA	

Table B-108. MODULE, DR-PA, CH11 CLASS A - 992 7191 011

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
992 8969 011	MODULE, PA, CH-11 TUNED	1.0 EA	

Table B-109. MODULE, PA, CH-11 TUNED - 992 8969 011

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
817 2100 744	TEST REQUIREMENTS, MODULE	0.0 EA	
992 8960 011	MOD 1/4, PA/DR,CH11,TUNED	4.0 EA	
992 8968 001	MODULE, RF, BASIC PA HB,	1.0 EA	

Table B-110. MODULE, DR-PA, CH12 CLASS A - 992 7191 012

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
992 8969 012	MODULE, PA, CH-12 TUNED	1.0 EA	

Table B-111. MODULE, PA, CH-12 TUNED - 992 8969 012

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
817 2100 744	TEST REQUIREMENTS, MODULE	0.0 EA	
992 8960 012	MOD 1/4, PA/DR,CH12,TUNED	4.0 EA	

992 8968 001	MODULE, RF, BASIC PA HB,	1.0 EA

Table B-112. MODULE, DR-PA, CH13 CLASS A - 992 7191 013

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
992 8969 013	MODULE, PA, CH-13 TUNED	1.0 EA	

Table B-113. MODULE, PA, CH-13 TUNED - 992 8969 013

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
817 2100 744	TEST REQUIREMENTS, MODULE	0.0 EA	
992 8960 013	MOD 1/4, PA/DR,CH13,TUNED	4.0 EA	
992 8968 001	MODULE, RF, BASIC PA HB,	1.0 EA	

Appendix C
Transmitter Parts List

Replaceable Parts List

Table C-1. HTEL CD & RF SYS - 994 9822 XXX

Harris PN	*Description*	*QTY UM*	*Reference Designators (B)*
484 0384 XXX	LOW PASS FLTR CH 7 1-5/8	1.0 EA	
620 0276 000	ADAPTER 1-5/8 IN.	2.0 EA	FLANGED TO UNFLANGED, DTV FILTER IN & OUT
620 2570 000	LINE SECT, 1-5/8" SINGLE	1.0 EA	DTV FILTER INPUT, MAINTENANCE SAMPLE.
620 2570 204	ELEMENT, 40DB, HB, 1-5/8"	5.0 EA	QTY 2 CAB OUT. QTY 1 DTV FILTER IN. QTY 2 DTV FILTER OUT.
620 2600 000	REDUCER,1-5/8 UF TO N FEM	1.0 EA	CABINET OUTPUT COUPLER.
620 2618 000	LINE SECT, 1-5/8" DUAL	2.0 EA	CABINET OUTPUT COUPLER. DTV FILTER OUTPUT COUPLER.
843 5275 417	WIRING DIAG, HTEL CD	0.0 EA	
917 2315 011	BLANK MODULE ASSY	XX EA	
922 1195 036	PANEL, BLANK	1.0 EA	
922 1195 039	BRACKET, SPLITTER MTG.	0.0 EA	
939 7900 061	PLATE ASSY, 1-5/8" COVER	1.0 EA	
943 5275 444	AIR DAM, HEATPIPE	1.0 EA	
992 7182 XXX	MODULE, DR, TUNED TO CHAN CLASS A	1.0 EA	
992 8556 002	EXTENDER, TV PA MODULE	0.0 EA	*OPTIONAL ORDER TRAINING VIDEO 732-0510-000 FOR PAL (INTERNATIONAL) OR 732-0511-000 FOR NTSC (DOMESTIC)
992 8950 002	EXTENDER, POWER MODULE	0.0 EA	* OPTIONAL
992 8969 XXX	MODULE, PA, TUNED TO CHANNEL	1.0 EA	
992 9511 420	CABINET, HTEL CD150	1.0 EA	

Table C-2. CABINET, HTEL CD150 - 992 9511 420

Harris PN	*Description*	*QTY UM*	*Reference Designators (A)*
041 1310 001	GASKET, RUBBER	1 FT	CUT 19.0"
041 1310 030	GASKET, RUBBER	1 FT	CUT 141.0"
055 0120 120	CONN, 1/2 CONDUIT	1.0 EA	
302 0721 000	SCR, 6-32 X 2-1/2"	22.0 EA	#BLOWERS
320 3229 000	LEVELER, 1/2"-13 X 3" LG	4.0 EA	
336 1240 000	COTTER, HAIRPIN/HITCHPIN	1.0 EA	
357 0089 000	GUIDE, MODULE	12.0 EA	
358 2635 000	CABLE TIE, PUSH MOUNT SNAP IN	30.0 EA	
358 3186 000	PLUG, WHT 1.375" HOLE	1.0 EA	
358 3372 000	CABLE CARRIER	1.0 EA	
404 0837 000	SOCKET FOR SAF 1005 SW	0.0 EA	1A15XU1 (SUPPLIED WITH CABLE 952-9193-005)
424 0018 000	GROMMET 1-1/2 MTG DI	2.0 EA	
430 0226 000	SCREEN GUARD,WIRE FORM 6"	15.0 EA	
430 0233 000	FAN 235CFM 48VDC	10.0 EA	ISOLATE UNUSED WIRING TO HEAT PIPE FAN AS REQ'D.
448 0941 001	HINGE, FREE SWINGING TYPE	2.0 EA	
448 0974 000	FILTER,14X30X1 DISPOSABLE	1.0 EA	
448 1124 000	LATCH, RAISED, ADJ LEVER	2.0 EA	
448 1126 000	ADJ LEVER LATCH W/KEYLOCK	1.0 EA	
516 0530 000	CAP .01UF 10% 100V X7R	0.0 EA	1A15C1 (SUPPLIED WITH CABLE)
604 1138 000	SWITCH AIR FLOW 50FPM	0.0 EA	1A15U1 (SUPPLIED WITH CABLE)
606 0905 000	CB, 2 POLE, 20 AMP 277VAC	2.0 EA	1A1CB1 1A1CB2
606 0907 000	CB, 2 POLE, 2 AMP 277VAC	1.0 EA	1A1CB4
606 0908 000	CB, 2 POLE, 5 AMP 277VAC	1.0 EA	1A1CB3
614 0046 000	TERM BD 2 TERM	1.0 EA	1A18TB1

614 0050 000	TERM BD 6 TERM	1.0 EA	1A18TB3
614 0872 000	BARRIER BLOCK, 3 POLE 1X4	1.0 EA	1A14TB1
646 1353 000	NAMEPLATE, XMTR EQUIPMENT	1.0 EA	
646 1483 000	HARRIS NAMEPLATE	1.0 EA	
822 0900 016	PIN, ALIGNMENT	9.0 EA	
843 5275 417	WIRING DIAG, HTEL CD	0.0 EA	
843 5275 418	ASSY DIAG, EXCITER SLIDE MTG	0.0 EA	
922 1195 032	PLATE, SLIDE MTG.	4.0 EA	
922 1195 033	SHIM, SLIDE MTG. PLATE	8.0 EA	
922 1195 034	ANGLE, LT EXCITER STOP	1.0 EA	
922 1195 035	ANGLE, RIGHT EXCITER STOP	1.0 EA	
922 1195 036	PANEL, BLANK	0.0 EA	EXC B/EXC SWITCHER BLANK PANEL, POSITIVE QTY ON TOP LEVEL BOM.
922 1297 014	BRACKET, CABLE SUPPORT	1.0 EA	
922 1300 031	RAIL, SUPPORT	1.0 EA	
943 5275 420	SHIELD, REAR DOOR	1.0 EA	
943 5285 038	LEVIC CONN BRKT	5.0 EA	
943 5285 066	MODULE SHELF	4.0 EA	
943 5285 067	MODULE BOTTOM SHELF	1.0 EA	
943 5285 081	STRAP, CABINET GROUND	1.0 EA	
943 5285 098	RETAINER, FILTER	1.0 EA	
943 5285 111	CABINET WELDMENT,	1.0 EA	
943 5285 117	INLET DUCT LEFT	1.0 EA	
943 5285 118	LINER, LEFT	1.0 EA	
943 5285 119	LINER, RIGHT	1.0 EA	
943 5285 130	DOOR, REAR	1.0 EA	
943 5285 133	COVER, TB/CB SAFETY	2.0 EA	
943 5285 143	BRACKET, EXHAUST FANS MTG	1.0 EA	
943 5285 144	SHIELD, EXHAUST FAN	1.0 EA	
943 5285 152	COVER, TB SAFETY	1.0 EA	
943 5285 156	BRACKET, C.B. DOUBLE	4.0 EA	
943 5285 158	BRACKET, MODULE TOP	1.0 EA	
943 5285 174	BRACKET, “MOV” PCB MTG	1.0 EA	
943 5285 178	BRACKET, P.M. CONNECTOR	1.0 EA	
943 5285 439	PANEL, LEFT SLIDE MTG.	1.0 EA	
943 5285 440	PANEL, RIGHT SLIDE MTG.	1.0 EA	
952 9188 122	CABLES, CABINET, HTEL150CD	1.0 EA	
992 8553 001	PWA, MOV-AC 198-250 VAC	1.0 EA	
992 8612 010	POWER MODULE, HTEL-2000	1.0 EA	A11
992 9511 396	ASSY, INTERFACE LOGIC	1.0 EA	A7
992 9511 397	I/O PNL, HTEL CD, 1 EXCITER	1.0 EA	A12
999 2793 001	HARDWARE LIST, CABINET,	1.0 EA	

Table C-3. KIT, DUAL APEX, HTELCD - 999 2940 001 (B)

Harris PN	*Description*	*QTY UM*	*Reference Designators*
358 0420 000	SPACER, ROLLED 1/4 L	4 EA	
358 3372 000	CABLE CARRIER	1 EA	
606 0906 000	CB, 2 POLE, 10 AMP 277VAC	1 EA	A1CB3
620 0455 000	ADPT BNC UG492A/U	1 EA	1A12J15
620 0547 000	ADAPTER BNC TO N UG201A/U	2 EA	1A9D3,1A9D4
620 1563 000	POWER SPLITTER	2 EA	
620 2109 000	JACK, BNC 75 OHM BULKHEAD	1 EA	1A12J11
736 0247 000	POWER SUPPLY 12V @ 1.7ADC	1 EA	

917 1335 261	WIRE / TUBING LIST	1 EA
922 1195 039	BRACKET, SPLITTER MTG.	1 EA
922 1297 014	BRACKET, CABLE SUPPORT	1 EA
922 1300 031	RAIL, SUPPORT	1 EA
939 8106 072	PLATE MTG PWR SUPPLY	1 EA
939 8106 073	COVER SAFETY PWR SUPPLY	1 EA
939 8210 176	PANEL, BLANK	1 EA
999 2941 001	KIT, DUAL APEX CBLS, HTELCD	1 EA

Table C-4. KIT, DUAL APEX CBLS, HTELCD - 999 2941 001 (A)

Harris PN	*Description*	*QTY UM*	*Reference Designators*
839 8106 944	ASSY INSTR, RIBBON CABLES	0 DWG	
917 2416 596	COAX CBL, EXC A RF OUT / A9D3	1 EA	
917 2416 597	COAX CBL, EXC B RF OUT / A9D4	1 EA	
917 2416 598	COAX CBL, A12P11 / SMPTE EXC B	1 EA	
917 2416 599	COAX CBL,A12P15 / 10M REF EXC B	1 EA	
917 2416 600	RIBBON CBL,EXC B RS232 / A12P18	1 EA	
917 2416 601	COAX CBL, HPF SAMPLE / EXC B	1 EA	
917 2416 602	COAX CBL, PA SAMPLE / EXC B	1 EA	
917 2416 603	COAX CBL, PA SAMPLE, SPL1	1 EA	
917 2416 604	COAX CBL, HPF SAMPLE, SPL2	1 EA	
917 2416 605	COAX CBL, A9K2J3 / A7P11	1 EA	
917 2416 606	RIBBON CBL,EXC A CTLR / A9P2	1 EA	
917 2416 607	RIBBON CBL,EXC B CTLR / A9P1	1 EA	
917 2416 608	RIBBON CBL, A9P3 / A7P1	1 EA	
917 2416 609	CABLE, RIBBON, A7P2 / A9P5	1 EA	

Table C-5. TRAY, EXCITER SWITCHER - 971 0004 006 (A)

Harris PN	*Description*	*QTY UM*	*Reference Designators*
354 0625 000	TERMINAL, FEMALE	6 EA	
358 3283 000	SLIDE, FULL EXT DRAWER	1 PR	
358 3372 000	CABLE CARRIER	1 EA	
610 0762 000	PLUG 37 PIN	1 EA	
610 0836 000	HOUSING, PLUG 6 POS	1 EA	
620 0547 000	ADAPTER BNC TO N UG201A/U	2 EA	
620 2546 000	RF TRANSFER SWITCH	1 EA	K002
700 0116 000	RES, LOAD 50 OHM 2W	1 EA	RL002
843 5275 417	WIRING DIAG, HTEL CD	0 DWG	
917 2100 081	CABLE, RF JUMPER	2 EA	
917 2506 128	CABLE, WIRE	1 EA	
939 1250 003	R.F. DETECTOR ASSY	2 EA	D003,D004
952 9188 124	CHASSIS, EXCITER SWITCHER	1 EA	
971 0004 007	PWA, EXCITER SWITCHER LOGIC, MODIFIED	1 EA	

Table C-6. PWA, EXCITER SWITCHER LOGIC, MODIFIED - 971 0004 007(A)

Harris PN	*Description*	*QTY UM*	*Reference Designators*
817 2416 598	INSTR, EXCITER SWITCHER MOD	0 DWG	
992 9272 001	EXCITER SWITCHER,HTEL2000	1 EA	

Table C-7. EXCITER SWITCHER,HTEL2000 - 992 9272 001 (J)

Harris PN	*Description*	*QTY UM*	*Reference Designators*
354 0685 000	TERMINAL, MALE	6 EA	
358 1214 000	SCREWLOCK, FEMALE	3 EA	
358 1726 000	SPRING, HOLD DOWN	9 EA	#K004,#K005,#K006,#K007,#K008,#K009,#K012,#K013,#K016
358 1928 000	JUMPER 1/4 LG 1/8H	3 EA	JP001,JP002,JP003
382 0381 000	IC, 556 TIMER ESD	1 EA	U009
382 0522 000	IC, LM393N ESD	2 EA	U003,U004
382 1070 000	IC, ILQ-1 OPTO-ISOLATOR ESD	2 EA	U007,U010
382 1236 000	*IC 22V10Z ESD	2 EA	U005,U008
382 1278 000	IC UDN2596 ESD	1 EA	U006
384 0431 000	RECT. 1N4001 ESD	13 EA	CR009,CR010,CR012,CR013,CR015,CR019,CR020,CR021,CR022,CR023,CR024,CR025,CR029
384 0689 000	LED, RED RECTANGULAR ESD	7 EA	DS003,DS004,DS005,DS006,DS007,DS008,DS010
384 0719 000	TRANSZORB 1N6373 5V 5W ESD	1 EA	CR017
384 0837 000	TRANSZORB 1N6376 12V 5W ESD	2 EA	CR016,CR018
384 0854 000	DIODE ARRAY, 8 ISOLATED ESD	1 EA	CR031
384 0869 000	LED GREEN RECTANGULAR ESD	3 EA	DS001,DS002,DS009
386 0085 000	ZENER, 1N4740A 10V ESD	5 EA	CR005,CR007,CR008,CR011,CR014
404 0161 000	SOCKET RELAY 9KH2	9 EA	#K004,#K005,#K006,#K007,#K008,#K009,#K012,#K013,#K016
404 0673 000	SOCKET, DIP, 8 PIN (DL)	2 EA	XU003,XU004
404 0674 000	SOCKET, DIP, 14 PIN (DL)	1 EA	XU009
404 0675 000	SOCKET, DIP, 16 PIN (DL)	2 EA	XU007,XU010
404 0767 000	SOCKET, DIP, 20 PIN (DL)	1 EA	XU006
404 0797 000	SOCKET, DIP, 24 PIN (DL)	2 EA	XU005,XU008
516 0530 000	CAP .01UF 10% 100V X7R	17 EA	C008,C015,C016,C017,C022,C025,C030,C031,C032,C033,C038,C039,C040,C050,C051,C052,C053
516 0736 000	CAP .001UF 10% 100V X7R	4 EA	C010,C011,C027,C028
522 0548 000	CAP 10UF 50V 20%	4 EA	C034,C035,C036,C037
526 0311 000	CAP 2.2UF 35V 10%	5 EA	C009,C012,C026,C029,C048
526 0358 000	CAP 22UF 35V 10%	1 EA	C046
540 1383 000	RES NETWORK 100K OHM 2%	2 EA	R010,R023
540 1386 000	RES NETWORK 10K OHM 2%	2 EA	R021,R045
540 1417 000	RES NETWORK 1500 OHM 2%	3 EA	R011,R022,R032
540 1494 000	RES NETWORK 1.8K 8 DIP	1 EA	R046
548 2400 169	RES 51.1 OHM 1/2W 1%	1 EA	R029
548 2400 401	RES 10K OHM 1/2W 1%	8 EA	R013,R019,R025,R027,R039,R040,R041,R042
548 2400 701	RES 10MEG OHM 1/2W 1%	4 EA	R007,R012,R020,R024
550 1035 000	TRIMPOT 5K OHM 1/2W 10%	4 EA	R026,R028,R030,R031
574 0156 000	RELAY 12VDC 4PDT	9 EA	K004,K005,K006,K007,K008,K009,K012,K013,K016
574 0487 000	RELAY 4PDT 12VDC	2 EA	K010,K011
604 1103 000	SW, TGL SPDT MOM-OFF-MOM	2 EA	S001,S002
612 0993 000	HOUSING, RECPT 6 POS	1 EA	J004
612 1124 000	RECPT 37 PIN D RT ANGLE	3 EA	J001,J002,J003
612 1163 000	RECEPTACLE 37 POS D	1 EA	J006
612 1341 000	*RECP, D, 15 PIN, STRAIGHT	1 EA	J005
843 5460 101	SCH, EXCITER SWITCHER	0 DWG	
843 5460 103	PWB, EXCITER SWITCHER	1 EA	