TECHNICAL MANUAL
CD 1A™ EXCITER
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WARNING: Disconnect primary power prior to servicing.

Section I
Introduction and Overall Description

1.1 Introduction

This technical manual contains installation, operating and maintenance procedures for the HARRIS CD 1A™ 8VSB exciter. The manual is divided into these sections:

- Section I - Introduction and Overall Description, describes the CD 1A™ exciter and lists the sections of this technical manual.
- Section II - Installation, describes the mounting, environmental requirements and initial setup of the exciter.
- Section III - Operator's Guide, explains operation of the exciter.
- Section IV - CD 1A™ Exciter Theory, includes a discussion of the features of the 8VSB system.
- Section V - Maintenance, describes exciter adjustments available to the user.
- Section VI - Troubleshooting, describes checks and test which may be used to isolate a suspected problem in the exciter.
- Section VII - Frequency and Offset, provides instructions for users who must change the exciter to a different operating channel.
- Section VIII - Parts List, is an indexed listing of field-replaceable parts for the CD 1A™ exciter.

1.2 Overall Description

The CD 1A™ exciter is a TV transmitter signal source designed for the new 8VSB US terrestrial TV broadcast service.

The exciter consists of a rack-mountable unit 19" by 7", 25" deep. The assembly consists of 2 chassis, which mount together as a single unit. The main chassis houses the 8VSB modulator.

The upper chassis is the upconverter, which can be raised and locked to provide access to the 8VSB Modulator.

The lower section of the 8VSB Modulator chassis contains the power supplies. This section can be tilted downward to gain access to the power supplies.

All interconnections are via the rear panel.

The exciter accepts a DTV transport data stream, either in SMPTE 310M format with embedded clock, or in NRZ format, with a separate clock. It can be equipped to operate on any UHF or VHF television channel.

Output power from the exciter is variable and may be set to any output up to 250mW rms (1 Watt peak power).

The upconverter can accept a 10MHz external frequency standard input via a rear-panel connector. An external standard is used whenever the user requires either greater than standard precision, or a precise offset.

The CD 1A™ exciter can be installed in any Harris DTV television transmitter. For factory or test use, it can also be operated on any desktop or tabletop surface.

The exciter is easy to operate. Front panel power raise and lower controls allow the user to easily adjust power. A front panel LED power meter displays peak output power in milliwatts for easy tracking of power adjustments. Front panel LED's indicate fault conditions and correction bypass.

Specifications for the exciter are listed in the specification sheet HARRIS CD 1A™ 8-VSB DTV EXCITER, ATSC STANDARD, at the back of this technical manual.

Figure 1-1

WARNING: Disconnect primary power prior to servicing.

2.1 Introduction

Exciters sold as part of a transmitter will normally have been tested in the transmitter before shipment. The exciter is removed for shipment and must be installed after the transmitter is in place.

Exciters sold for use in test facilities can either be rackmounted or operated standing on a work surface.

2.2 Installing the Exciter

The physical mounting hardware and connecting harness should already be in place in the transmitter when it arrives at your location. Simply mount the exciter in its mounting slides, fastening the flexible cable retractor (if used) to the rear and connecting the cables to the rear panel as marked.

Two shipping screws must be removed before the Upconverter tray can be tilted upward to gain access to the 8VSB Modulator chassis. The screws may be found inside the Upconverter, fastening the right and left front corners of the Upconverter to the 8VSB Modulator. Remove these screws and keep them for use if the exciter must ever be removed for shipment.

2.3 Signal Connections

Input and output connections to the exciter are at the rear. Figure 2-1 shows the connections.

- DATA & CLK IN (Isolated BNC) is the input connection for the SMPTE-310M input signal. When this form of input is supplied, no separate transport clock input is required.
- DATA & CLK IN (9 pin D) is the transport input used for ECL or PECL transport data and clock signals.
- SERIAL DATA IN (BNC) is the transport input used for TTL, CMOS or Pseudo-SMPTE-259M ("Mitsubishi") signals. These signals do not carry the embedded clock, and must be accompanied by a separate 19.39 Clock cable.

NOTE

The Pseudo-SMPTE-259M signals are received from Mitsubishi MH1000E encoders.

- 19.39 CLK IN is the separate clock input when TTL/CMOS or SMPTE259M transport layer data streams are supplied.
- 10MHZ REF IN is the BNC reference frequency input used when precise control of the exciter's frequency requires an external reference.
- RF OUT is the SMA signal output from the exciter.
- SAMPLE IN is the SMA input signal connector for an RF sample of the transmitter output, to be used in the adaptive equalization system under development.
- EXC/CTRL UHF (25 Pin D) is the exciter control interface connector used to connect the UHF version of the exciter to the transmitter and the exciter switcher.
- EXC/CTRL VHF (37 Pin D) is the exciter control interface connector used to connect the VHF version of the exciter to the transmitter and the exciter switcher.
- RS232 DIAGNOSTIC (9 Pin D) is an interface connector which will be used to test the exciter. (This connection is also available on the front panel.)

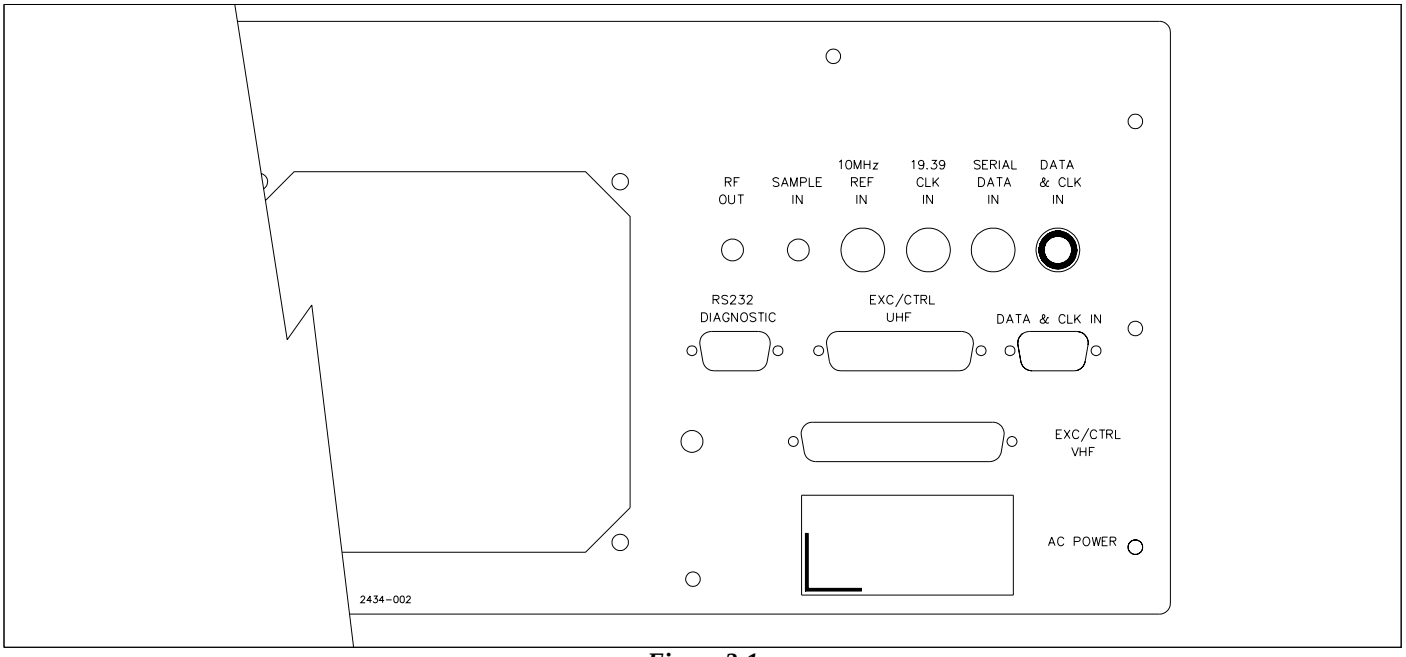

Figure 2-1
Exciter Inputs & Outputs

WARNING: Disconnect primary power prior to servicing.

2.4 Power

The power supplies used in the power supply section will accept AC input voltages from 90 VAC to 270 VAC without the need to adjust or tap for changing line voltage. Connect the power cord from the rear of the exciter assembly to the power source.

Turn ON the exciter by turning ON the AC POWER switch located at the lower right rear of the exciter (Figure 2-1).

2.5 Configuring the Exciter

Jumpers on the Transport to Transmission board (A2) and the Embedded Clock Recovery board (A1) are used to set up the exciter for your intended use.

NOTE

Use a grounded wrist strap when changing jumpers to avoid electrostatic damage to circuit board components

2.5.1 Internal Test Signal

The Transport to Transmission board includes an internal clock oscillator and data generator for use in testing the exciter. It is selected and enabled using three jumpers on the board. (Refer to DWG 843 5466 611.) The internal test signal is selected during factory testing of the exciter and it may be used for initial testing of a transmitter following installation.

When ready to supply an ATSC transport stream to the exciter input, the external clock and data input must be selected and the internal clock must be disabled using these jumpers.

Operating Mode:	JP5:	JP6:	JP7:
Internal Data & Clock:	1-2	1-2	1-2
ATSC Transport Input	2-3	2-3	2-3

NOTE

J4 and JP8 on the Transport to Transmission conversion board are correctly set during manufacture and should not be changed. Leave these in the factory -set position (2-3).

2.5.2 Selecting Input Format

Selection of input signal type and timing are done on A1, the Embedded Clock Recovery Board.

Several input signal formats can be accepted by the exciter. Most coders and source equipment now supply the SMPTE310M format, but you should identify the type of signal you need to supply to the exciter. Jumpers on A1 allow you to designate the input format and make needed adjustments.

Refer to Figure 2-2 for location of the jumpers.

SMPTE 310M DATA & CLK IN
(Isolated BNC)

SMPTE310M is now the most common transport signal format. Equipment conforming to the SMPTE 310M standard has the clock signal embedded in the data stream and requires no separate clock signal. The input impedance is 75 ohms. Belden 8281 or similar high-quality video cable can be used to deliver this signal to the exciter over a distance of up to 1000 feet.

Jumper Settings

JP4	2-3
JP6	2-3
JP11	1-4

The SMPTE 310M input can be connected either for optimum RFI rejection, or to provide common-mode rejection. Connect Embedded Clock Recovery Board JP3 to 1-2 for grounded operation, or to 2-3 for common mode rejection.

NOTE

The Isolated BNC connector for this input separates the sheild side of the input from ground. If common mode rejection at the input is selected, make certain the cable shield is grounded only in the signal source equipment.

ECL DATA & CLOCK INPUT
(DB9)

For ECL input signals, the DB9 CLK & DATA IN connector is used. The pin assignments in the DB9 connector permit use of flat ribbon cable with twisted pairs of wires.

The clock timing relative to the data must be adjusted as described in 2.6 - 19.39 MHz Clock Timing.

The ECL Connections to the 9-pin DB9 connector are:

Pin 1	ECL Data +
Pin 6	ECL Data -
Pin 2	ECL Clock +
Pin 7	ECL Clock -

Locate and set the following jumpers to select ECL input:

JP5	1-4
JP6	1-2
JP7	1-4

PECL DATA & CLOCK INPUT
(DB9)

For PECL inputs, the DB9 CLK & DATA IN connector is used. The pin assignments in the DB9 connector permit use of flat ribbon cable with twisted pairs of wires.

The clock timing relative to the data must be adjusted as described in 2.6 - 19.39 MHz Clock Timing.

The PECL Connections to the 9-pin DB9 connector are:

Pin 3	PECL Data +
Pin 8	PECL Data -
Pin 4	PECL Clock +
Pin 9	PECL Clock -

Locate and set the following jumpers to select PECL input:

JP5	1-5
JP6	1-2
JP7	1-5

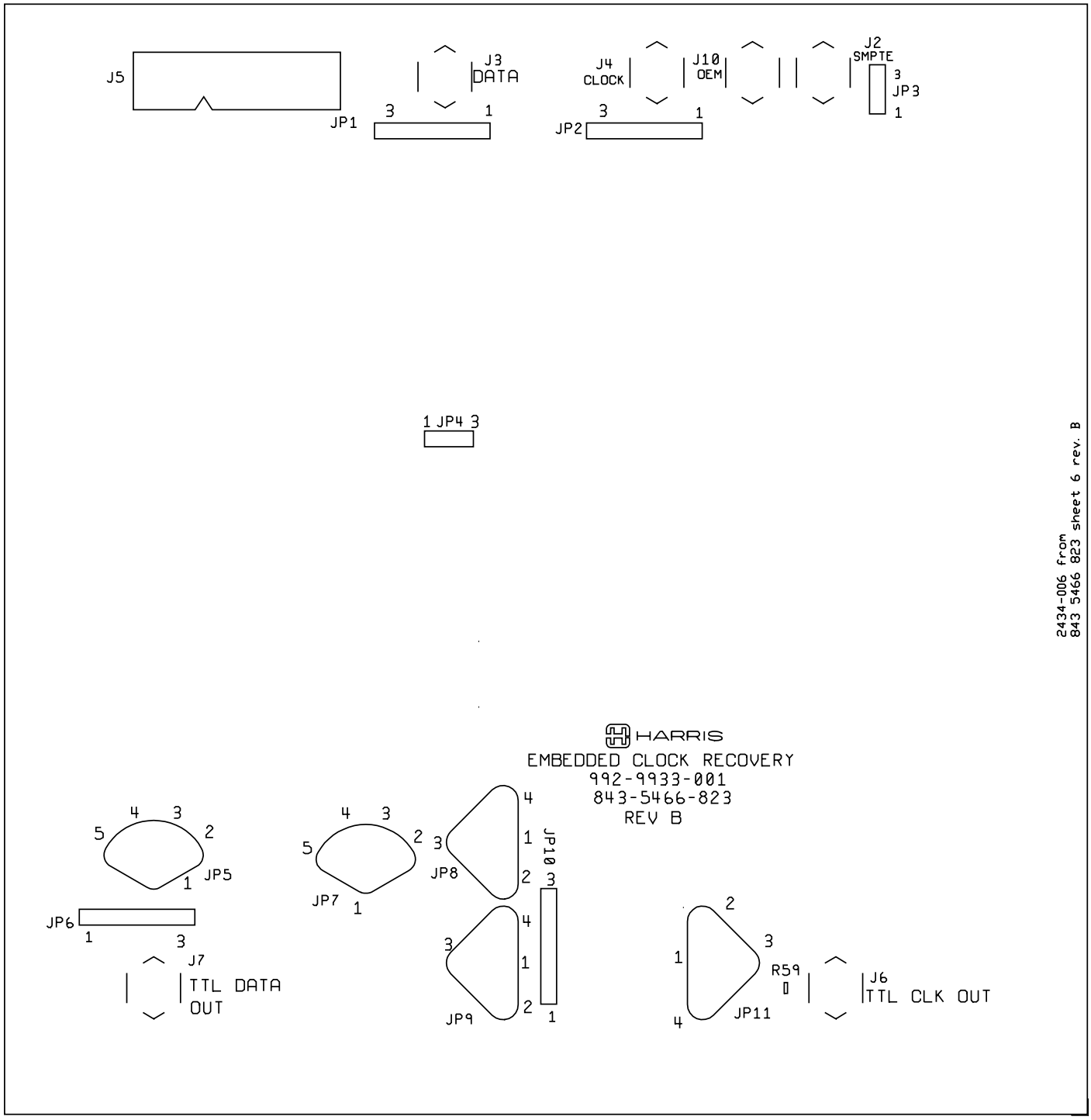

Figure 2-2 Input Selection and Timing Jumpers

WARNING: Disconnect primary power prior to servicing.

Pseudo-SMPTE 259M (Mitsubishi Mode)
SERIAL DATA IN (BNC)
19.39 CLK IN (BNC)

This input format requires two coaxial cables — a serial data signal cable and a clock signal cable. This type of input signal should be restricted to short cable runs (25 feet or less).

The clock timing relative to the data must be adjusted as described in 2.6 - 19.39 MHz Clock Timing.

Locate and set the following jumpers to select the Pseudo-SMPTE 259M input:

JP1	1-2
JP2	1-2
JP5	1-3
JP6	1-2
JP7	1-3

TTL/CMOS Input Signals
SERIAL DATA IN (BNC)
19.39 CLK IN (BNC)

This input format requires two coaxial cables — a serial data signal cable and a clock signal cable. TTL/CMOS signals should be limited to very short cable runs less than 10 feet.

The clock timing relative to the data must be adjusted as described in 2.6 - 19.39 MHz Clock Timing.

Locate and set the following jumpers to select the TTL/CMOS input:

JP1	2-3
JP2	2-3
JP5	1-2
JP6	1-2
JP7	1-2

2.6 19.39 MHz Clock Timing

The Embedded Clock Recovery Board contains additional jumpers used to adjust the timing of the input clock source. These timing jumpers are not used when the board is set to receive an SMPTE-310M signal.

Jumpers JP8, JP9, JP10 and JP11 are used to adjust the timing of the clock signal, in order to time it properly with the data signal.

To adjust the timing, observe the TTL clock output at J6 and the TTL data output at J7 on the Embedded Clock Recovery Board. Figure 2-2 shows the desired timing.

- One clock cycle has a period of approximately 52nS.
- t_{su} should be greater than 20nS.
- t_h should be greater than 10nS.

The timing of the clock can be adjusted in approximately 5nS increments: A 26nS delay is optimum for most equipment.

Delay (nS)	JP9	JP8	JP10	JP11
0	1-2	na	1-2	1-2
5	1-3	na	1-2	1-2
10	1-4	na	1-2	1-2
15	na	1-4	2-3	1-2
20	na	1-3	2-3	1-2
25	na	1-2	2-3	1-2
26	1-2	na	1-2	1-3
31	1-3	na	1-2	1-3
36	1-4	na	1-2	1-3
41	na	1-4	2-3	1-3
46	na	1-3	2-3	1-3
51	na	1-2	2-3	1-3

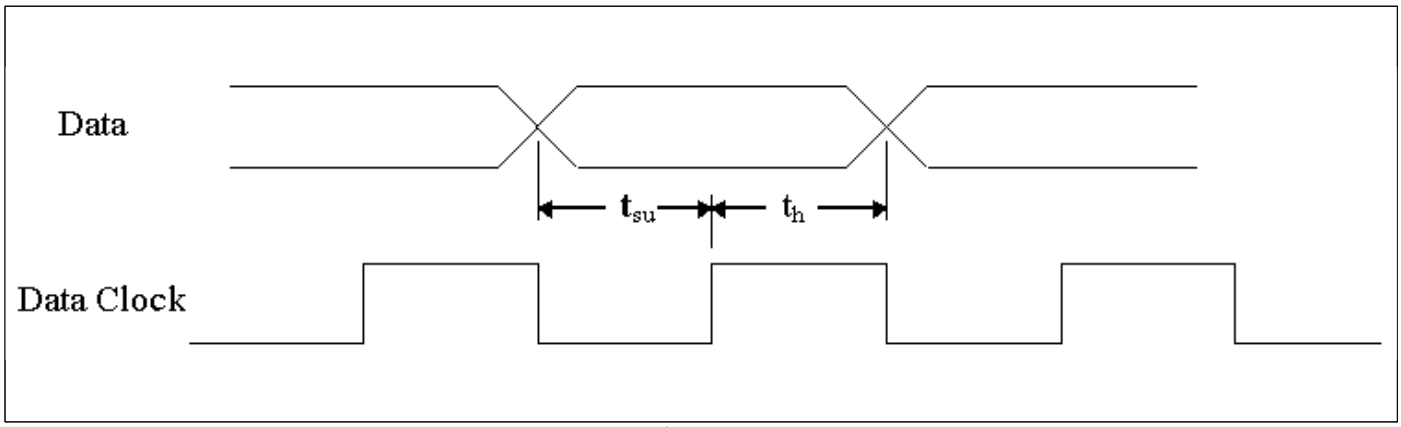

Figure 2-3
Transport Layer Input Signals

WARNING: Disconnect primary power prior to servicing.

3.1 Introduction

The front panel of the CD 1™ exciter consists of lamps (LED's) indicating status within the exciter, a front panel meter which indicates the output power level in mW peak and a momentary switch to raise or lower the exciter output level. The following table summarizes the LED functions:

8VSB Modulator Chassis:

LED:	Function:
Corrector Bypass	Not used at this time.
Corrector Fault	Not used at this time.
Input Fault	Unreliable Transport stream data or loss of input clock.

NOTE

The input fault indicator is normally dark. If illuminated or blinking, there may be a problem in the input data stream. If the problem persists when the exciter in in the internal test mode, the problem is with the PLL circuitry (see section 6.3).

Upconverter Chassis:

LED	Function
Phase	Phase corrector bypassed.
Linearity	Linearity corrector bypassed.
Response	Frequency response corrector bypassed.
PLL Fault	Internal Phase locked loop fault.
RF Mute	RF output disabled either by internal fault or external shut down.

3.2 Raising or Lowering Output Power

The exciter ouput power can be raised or lowered simply by pressing the momentary front panel switch. Pressing the switch upward raises output power and pressing the switch downward lowers power.

The front panel meter reads exciter output with a full scale reading of 1000 mW peak.

NOTE

The exciter is rated to operate with output power level up to 1W peak (250mW average). Normal and recommended practice is to adjust the internal power limit control so that the exciter output cannot be raised above the maximum desired value. This typically will be well below 1000mW.

The procedure to set the power limit is given in 5.3 - Power Limit Set.

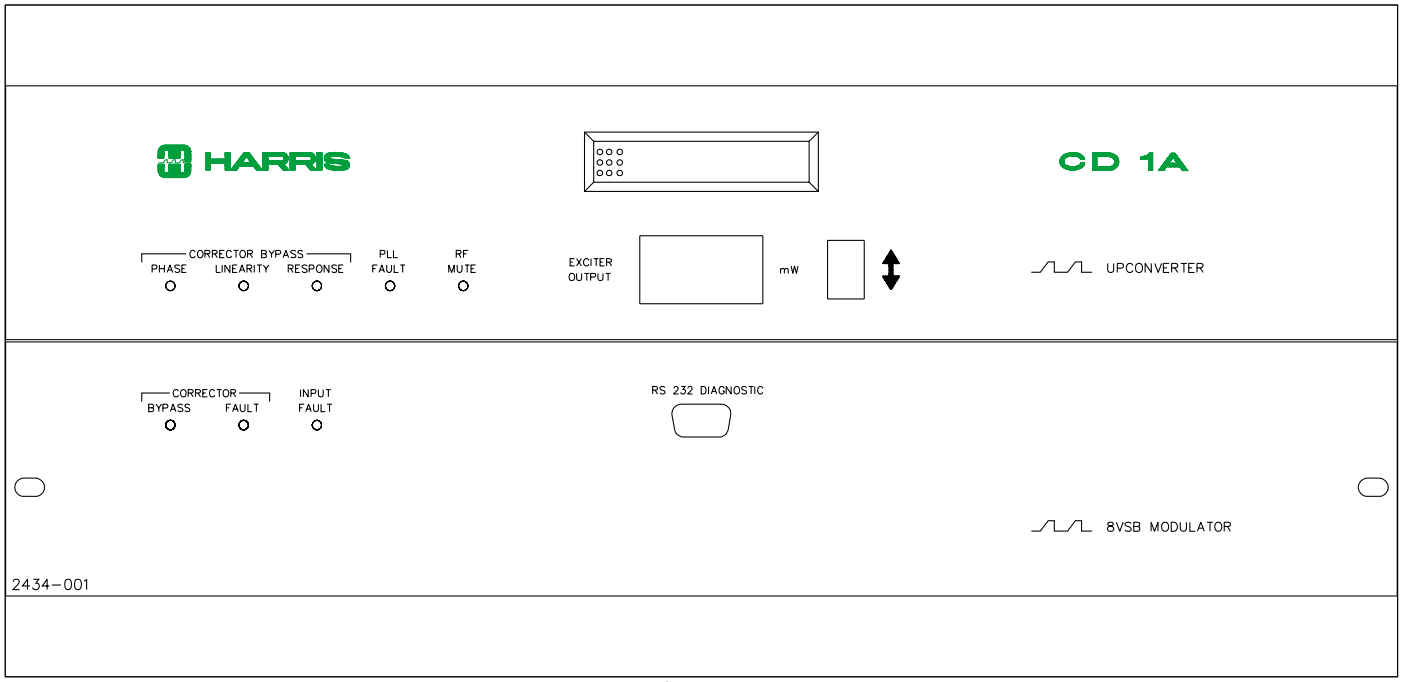

Figure 3-1

WARNING: Disconnect primary power prior to servicing.

4.1 General Description

The Harris CD 1A™ exciter converts the digital input signal received at the exciter input to an RF signal on the operating channel. The input transport signal may be from an encoder near the transmitter or from a studio located elsewhere, delivered by microwave or other means.

The CD 1A™ exciter can accept either a DTV transport layer signal with separate clock, or the SMPTE 310M signal with embedded clock.

The exciter processes this input into the on-channel 8VSB signal needed as drive for the transmitter amplifiers. Correction circuits in the exciter predistort linearity and phase (non-linear errors), and response and group delay (linear errors) to compensate for errors which occur in the amplifiers, resulting in a low-distortion output signal from the transmitter with very low intermodulation products.

4.2 Physical Description

The CD 1A™ exciter is constructed as a central tray with a tilt-up upper tray subassembly and a tilt-down lower power supply assembly. The exciter is normally mounted in the transmitter on slides, permitting it to be extended forward out of the cabinet for service. When pulled forward, either or both of the subassemblies may be tilted to gain full access to the circuits while operating.

The exciter is 7" high and 19" wide to allow mounting in a 4 rack unit space in a standard 19" rack. A minimum of 25" depth in the mounting rack is needed to allow space for the exciter and for its' connecting cables.

For installation outside a transmitter or rack cabinet, the exciter may be placed on a convenient desk or operating surface.

The exciter contains a cooling blower mounted in the rear. Cooling air is drawn into the assemblies from the rear and forced forward over the circuits.

4.3 Functional Description

The DTV transport signal is applied to connectors at the rear of the exciter. The signal may be in the form of the SMPTE 310M signal with embedded clock, supplied in a 75 ohm coaxial cable, or in a number of other formats with separate clock.

The CD 1A™ exciter performs the following general functions:

- Embedded clock recovery
- Data synchronization
- Channel encoding
- Sync and pilot insertion
- Nyquist filtering (spectral shaping)
- Pre-correction
- Upconversion

The on-channel RF signal, which is in full compliance with the ATSC 8VSB specification, is output through a 50-ohm SMAC connector at the rear of the CD 1A™. This output signal is suitable for amplification in subsequent high-power stages.

4.3.1 8VSB Modulator (Center Assembly)

Refer to Drawing 843 5466 240 - Diagram, 8VSB Modulator.

The 8VSB Modulator is main tray of the exciter, which accepts DC supply voltages from the power supply assembly and a DTV transport data stream as input. The 8VSB Modulator provides a fully modulated 8VSB First IF output centered at 10.76 MHz.

The 8VSB Modulator consists of 6 circuit boards:

- A1 - Embedded Clock Recovery
- A2 - Transport to Transmission Board
- A3 - Nyquist Filter Board
- A4 - Corrector
- A5 - D/A Converter
- A6 - DSP Controller
- A7 - A/D Converter Board

4.3.1.1 A1 - Embedded Clock Recovery

Refer to drawing 843 5466 821 - Clock & Data Interface.

The interface board is used to recover the embedded clock from the SMPTE 310M transport signal, or to convert ECL, PECL or Pseudo-SMPTE 259M transport data and clock to TTL/CMOS compatible signals. Selection of the conversion mode is accomplished via jumpers on the board.

The board also contains a variable clock delay which may be adjusted in 5 nS increments to properly time the clock to the data signal.

The jumper settings for all possible input signal choices and clock delays are given in Section II - Installation.

4.3.1.2 A2 - Transport to Transmission Conversion Board

Refer to Drawing 843 5466 611 - Transport to Transmission.

The Transport to Transmission Conversion PWB converts the incoming DTV transport layer data stream to the ATSC transmission format. Its primary functions include data synchronization and randomization, reed solomon encoding, interleaving, trellis coding, sync insertion, rate conversion and clock distribution.

The channel encoding functions are defined and described in the ATSC DTV standard. Please refer to this document for information regarding these functions.

Data acquisition time (lockup time when signal is applied) of the Transport to Transmission conversion board should normally be well under 1 millisecond.

A PLL circuit uses the 19.39...MHz clock to develop a 10.76...MHz system clock. This clock is distributed to other

boards in the system for clock and timing purposes, and becomes the transmitted symbol rate output from the exciter..

The output from the Transport to Transmission Conversion board is a 3 bit parallel signal at a data rate of 10.76 Ms/S (Mega-Symbols per second). This output is the unfiltered baseband 8VSB signal.

4.3.1.3 A3 - Nyquist Filter Board

The Nyquist Filter board receives the 10.76 Ms/S 8VSB data from A1 and performs pilot insertion, root-raised-cosine filtering and data interpolation.

These functions are all performed in high speed DSP circuitry which is synchronized to a 4x10.76 MHz clock. The Nyquist filter is a proprietary design which provides a close approximation to the theoretical filter specified by the ATSC standard. Filter performance is specified to be within the mask shown in Figure 4-1.

The output of the Nyquist filter board is a 32 bit, 10.76 Ms/S data word.

The Nyquist Filter board includes the LED display electronics for the front panel Corrector Bypass, Corrector Fault and Input Fault LED's.

4.3.1.4 A6 - DSP Controller

The DSP Controller is the digital processing heart of the 8VSB Modulator. This board will be used to control the future adaptive equalizer. The board also provides external diagnostic access via the RS232 diagnostic port.

4.3.1.5 A4 - Corrector

The corrector board passes the 32 bit Nyquist Filter output to the D/A Converter board to be converted and output as the 10.76 MHz First IF.

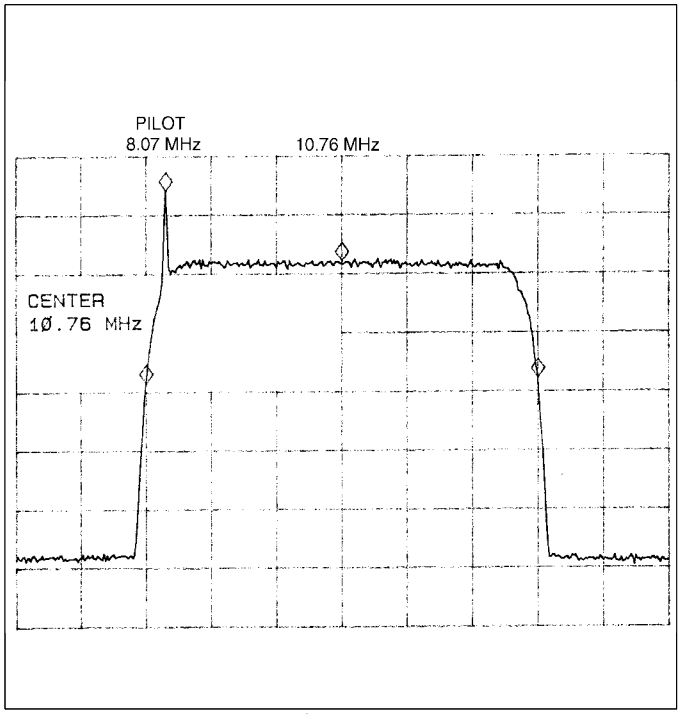

Figure 4-1

NOTE

When future versions of the exciter incorporate adaptive equalization, the corrector will add transmitter precorrection under the control of the DSP board. An A/D Converter board will receive the downconverted transmitter output sample from the Upconverter tray and will deliver the digital sample to the Corrector for comparison with the signal from the Nyquist Filter board.

4.3.1.6 A5 - D/A Converter Board

The D/A Converter board receives the 32bit output of the Nyquist filter board. It performs data interpolation, upconversion, digital to analog conversion, and analog alias filtering. The output is a -8dBm 8VSB signal centered at 10.76 MHz. The 3dB bandwidth is 5.38 MHz, and the pilot frequency is 8.07..MHz.

Figure 4-1 is a spectrum analyzer display of the converter board output.

4.3.1.7 A7 - A/D Converter

The A/D Converter Board will be used as part of the adaptive precorrection in later exciters. Refer to NOTE above.

4.3.2 Exciter Interface Connectors

The following connectors are included on the rear panel of the CD 1A™ exciter:

DATA & CLK IN	Isolated BNC
DATA & CLK IN	DB9
SERIAL DATA IN	BNC
19.39 CLK IN	BNC
10MHz REF IN	BNC
RF OUT	SMA
SAMPLE IN	SMA
EXC/CTRL UHF	DB25
EXC/CTRL VHF	DB37
RS232 DIAGNOSTIC	DB9

The RS232 DIAGNOSTIC 9-pin "D" connector on the 8VSB Modulator rear panel and the identical connector on the front panel are provided for future use.

4.3.3 Upconverter (Upper Tilt-Up Tray)

Refer to Drawing 843 5466 240, Diagram, Upconverter.

The up-converter accepts a 10.76 MHz IF from A5 - J4. The upconverter converts the signal in two stages to an on channel UHF output.

The upconverter may be configured to place the exciter output on any VHF or UHF channel.

Peak power capability of 1 Watt is provided (0.25 Watt Average). Pre-correction circuits are provided to compensate AM-AM and AM-PM distortions in the high power amplifier.

WARNING: Disconnect primary power prior to servicing.

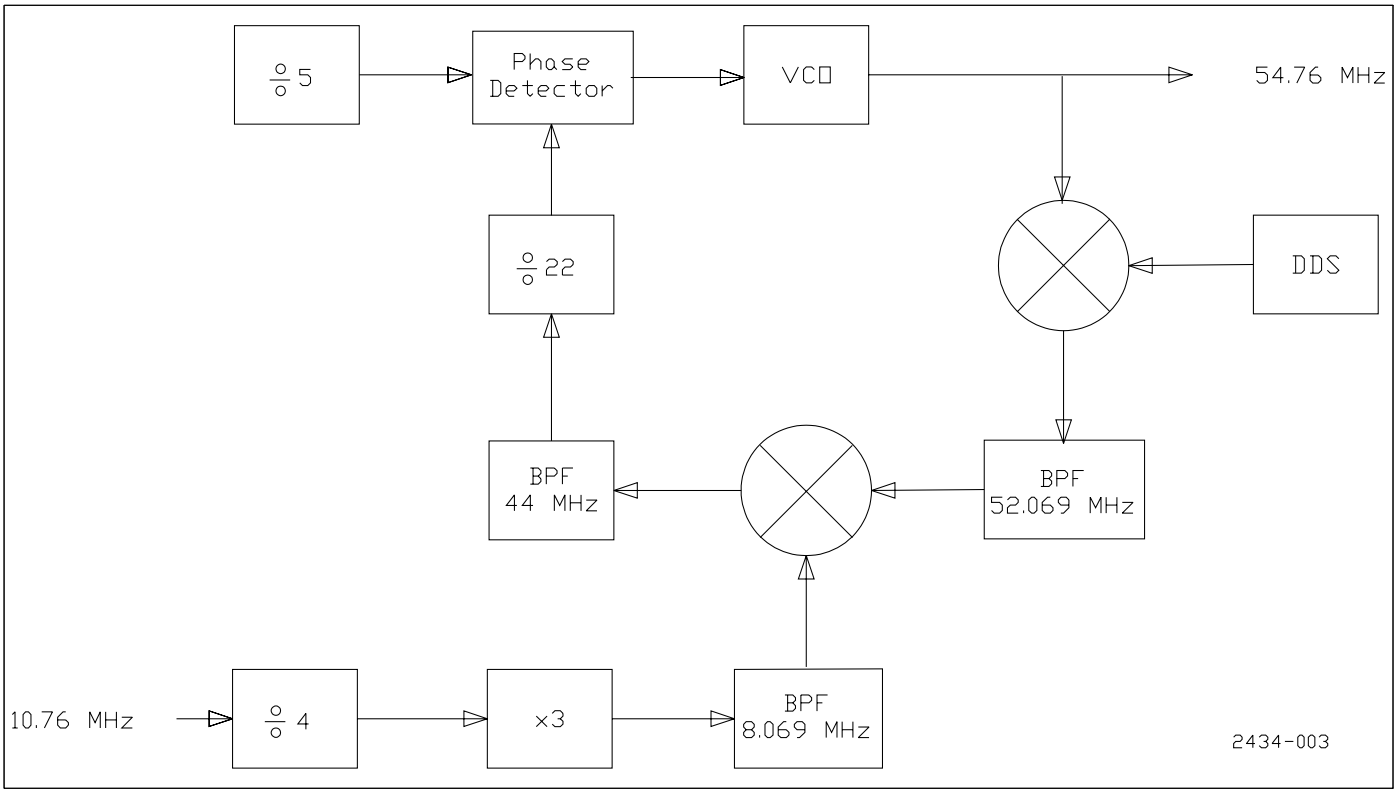

Figure 4-2
Block Diagram of IF PLL

Local oscillators used for up-conversion are generated via low noise phase locked loops. All frequencies are referenced to a common 10MHz standard.

For those users who need a more precise frequency standard, an external 10MHz reference input is provided.

4.3.3.1 A9 - 10MHz Reference

Refer to Drawing number 843 5466 221.

The 10 MHz reference assembly produces a precision low phase noise 10 MHz signal which is used by the up-converter phase lock loops. The phase-locked loops generate the frequencies required to convert the digital IF to the desired channel.

U4 is an oven controlled crystal oscillator (OCXO) operating at the fundamental frequency of 10 MHz. Provision for adjusting out crystal aging is provided.

The crystal oscillator is buffered by U5 and U6 and is supplied to the phase locked loops. Provision for an external 10 MHz is provided. If a sufficient level is present as detected by U2, the unit switches off the internal 10 MHz oscillator via U1 and routes the external 10 MHz to the outputs by U6. The internal oven is kept running to minimize frequency drift when switching between external and internal 10 MHz sources.

Upon power up, 3 minutes are required by the OCXO to stabilize in temperature.

4.3.3.2 A8 - IF PLL

Refer to Figure 4-2, block diagram of the IF PLL.

The IF PLL generates a 54.76 MHz carrier. It is used to convert the digital 10.76 MHz IF to 44MHz. A single loop PLL with a reference frequency of 2MHz is used to set the coarse frequency. A DDS based oscillator running at 2.69 MHz is used to offset the main loop to 54.76 MHz. The resolution of the DDS is 2.3 millihertz (mHz). This allows for very fine frequency offset capability. An 8.069. MHz pilot derived from the 10.76 MHz symbol clock from the digital modulator is used as a reference for the pilot and is tracked in the loop. This tracking removes any frequency drift from the digital modulator's IF and keeps the 44 MHz IF pilot at a constant frequency regardless of any drift in the incoming digital data stream. A lock detector function is provided to mute the RF output in the event of PLL failure.

Refer to 843 5466 231 Sheets 1-3, IF PLL, when reading the following.

Sheet 1

The 2.69 MHz is generated in numerically controlled oscillator (NCO) U3. U3 outputs a 12 bit digital signal which is converted to an analog signal in an A/D converter U10. A band pass filter ensures that the output of the 2.69 MHz signal will be free of spurious components.

The NCO requires 32 bit serial programming. DIP switches S1 thru S4 set the corresponding 32 bits and are loaded into the NCO via a serial to parallel conversion. U4, U15, U17 and U23 perform the serial conversion and are clocked by U12, U16 and U19.

WARNING: Disconnect primary power prior to servicing.

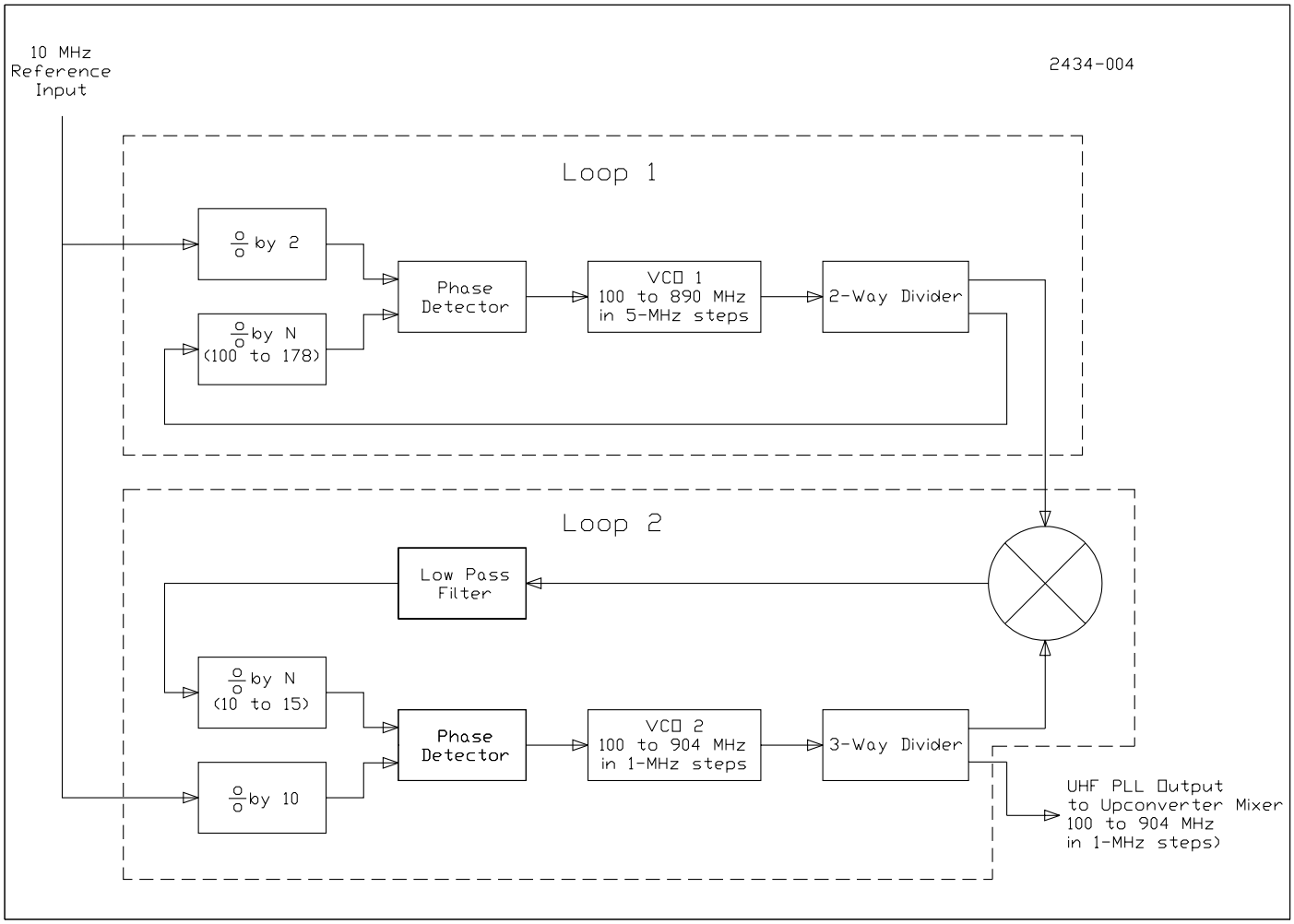

Figure 4-3
Block Diagram of MAIN PLL

Sheet 2

The main phase locked loop consists of a reference divider which divides the 10 MHz reference by 5 to obtain a 2 MHz reference for the phase detector, a high speed phase detector and a programmable feedback divider which is programmed to 44. U22 is a multifunction PLL IC which performs these functions. It is programmed via parallel input as set by dip switches S5 and S6. The phase error signals from U22 are filtered and applied to a VCO (voltage controlled oscillator) Q1, whose output is 54.76 MHz.

Sheet 3

The 54.76 MHz VCO output is offset to a 52.069 MHz intermediate IF by mixing with the 2.69 MHz DDS output in a single side band mixer. This mixer consists of U8, U9, HX1, and U18.

A 52 MHz band pass filter removes any mixer spurious products. A 10.76. MHz symbol clock from the digital modulator is divided by 4 in U26. This output is rich in harmonics. the third harmonic is equal to the pilot frequency of 8.069 MHz. This pilot frequency is subtracted from the 52.069 MHz intermediate IF in mixer U27 to produce a 44 MHz output.

Sheet 2

The 44 MHz output is divided by 22 to 2 MHz in U22 and is applied to the phase detector thus locking the original VCO frequency of 54.76. MHz to the 10 MHz reference. In this way the 54.76 MHz VCO is always locked to the pilot from the digital tray. When the digital IF is mixed with the 54.76 MHz LO the resultant 44 MHz IF will always be locked to the 10 MHz reference regardless of any drift in the digital IF output.

4.3.3.3 A 10 - MAIN PLL

Refer to Figure 4-3, MAIN PLL Block Diagram.

The MAIN PLL generates a carrier in the frequency range of 100MHz to 904MHz. It is used to convert the 44MHz IF to the desired output channel. A dual loop PLL is used to cover the frequency range and provide 1 MHz resolution. Loop 1 is a course tuning loop which tunes to within 10 to 15 MHz of the desired Local Oscillator frequency. The second loop is offset from the first in increments of 1 MHz to reach the desired frequency. A lock acquisition circuit is used to accelerate lock time. A lock detector function is provided to mute the RF output in the event of PLL failure.

Refer to schematic 843 5466 851 Sheets 1-2, UHF PLL.

WARNING: Disconnect primary power prior to servicing.

Both phase locked loops in the UHF PLL are based on a PLL integrated circuit. This IC contains a reference receiver, a 16 bit reference divider, a 10/11 dual modula prescaler, a 9 bit M and 4 bit A pulse swallow counter, a digital phase/frequency detector and an out-of-lock detector.

Sheet 1

Loop 1 operates from 500 to 890 MHz and increments in 5 MHz steps. 10 MHz from the reference oscillator is applied to U17 which divides the reference by 2 for a phase detection frequency of 5 MHz.. Output from the VCO is split in hybrid U6 and applied to the divide by N counter in U17. Phase detector outputs from U17 are filtered and integrated into by U10 into a dc voltage proportional to the phase difference between the reference and the divided VCO This dc voltage is applied to the VCO. Further filtering of the VCO control voltage is performed by a passive low pass filter.

Dip switch S1 and S2 determine the R, M, and A values for the counters in U17.

Sheet 2

Loop 2 operates from 514 to 904 MHz and increments in 1 MHz steps. 10 MHz from the reference oscillator is applied to U15 which divides the reference by 10 for a phase detection frequency of 1 MHz.. Output from the VCO is split in hybrid U8 and applied to a mixer along with the output from loop 1. The difference in frequency between the two loops is between 10 - 15 MHz and is applied to the divide by N counter in U15. A passive low pass filter removes any high frequency harmonics from the mixing process.

Sheet 3

Amplifier U14 compensates for the losses in the mixer and low pass filter.

Sheet 2

The phase detector outputs from U15 are filtered and integrated into by U9 into a dc voltage proportional to the phase difference between the reference and the divided difference frequency. This dc voltage is applied to the VCO. Further filtering of the VCO control voltage is performed by a passive low pass filter.

To prevent loop 2 from locking on a spurious mixer output U11 is configured as a window comparator and keeps the VCO control voltage centered about the desired frequency.

4.3.3.4 A22 - Mask filter Corrector

FCC Mask requirements have forced the inclusion of a bandpass filter at the output of the transmitter, adding substantial group delay error to the signal. The Mask Filter Corrector is provided to correct for errors caused by a practical filter meeting the FCC requirement.

Schematically, the Mask Filter Corrector and the Response Corrector are identical (see DWG. 843 5466 311). Since the Mask Filter Corrector operates on the signal at the 10.76MHz First IF frequency, certain components on the Mask Filter board differ from Response Corrector board A15. The differing component selections are shown in a table on the schematic drawing.

The Mask Filter Corrector provides for fine frequency response and group delay correction over the First IF bandwidth. A three section all pass circuit is used. The corrector can be bypassed via an on board switch. Front panel indication of corrector status is provided via an LED.

The Mask Filter corrector consists of three cascaded second order all-pass networks. Each all-pass network is based on a bridged T network with a single inductor.

The input signal is buffered by emitter follower Q1 which provides a low source impedance for the all pass network consisting of T1 and C15. The amount of delay is controlled by R90 and the Q (or response of the allpass is controlled by R89. In this way both amplitude and delay of the all pass can be controlled.

The following two all-pass networks perform in the same manner. By cascading the three networks and stagger tuning them across the 10.76 MHz IF band an over all response and delay corrector is created. Individual adjustment of any section can create a variety of precorrection shapes. Refer to Figure 4-5.

4.3.3.5 Mixer 1 - 10.76MHz to 44MHz

Refer to 843 5466 240, Diagram, Upconverter.

The 10.76 MHz IF from the digital modulator tray is converted to a 44MHz IF in a high level mixer with very low intermodulation products. The mixer produces two output products, the desired Second IF centered at 44MHz and the undesired product at 65.52 MHz. A small amount of the 54.76 MHz First LO signal from the IF PLL is also present at the output.

4.3.3.6 A11 - SAW Filter

Refer to schematic 843 5466 371, 44 MHz SAW.

SAW filter FL1 is used to remove the 65.52 MHz mixer image and the 54.76 MHz LO leakage. Low noise amplifiers U1 and U2 are included on the circuit board to compensate for the SAW filter loss.

4.3.3.7 A12 - Automatic Gain Control

The AGC board provides front-panel control of exciter output level and also holds the exciter output level constant at the level set from the front panel, eliminating any changes in level due to temperature changes or gain changes in the pre-correction circuits which follow. The AGC board receives and output sample from the 1Watt output amplifier and compares it with the control voltage controlled by the front panel switch.

In the event of a PLL failure, RF output is muted to prevent off-frequency operation. The power reference is generated in a digital potentiometer with memory and retains its memory even during a power outage.

Manual operation of the AGC for servicing or troubleshooting purposes is also possible and is selectable using a jumper on the board.

Refer to schematic 843 5466 861, AGC.

44 MHz from the mixer is applied to the input at J2. U4 buffers the input and provides a low impedance drive to a PIN diode attenuator. U7 buffers the attenuator and drives the output at J3.

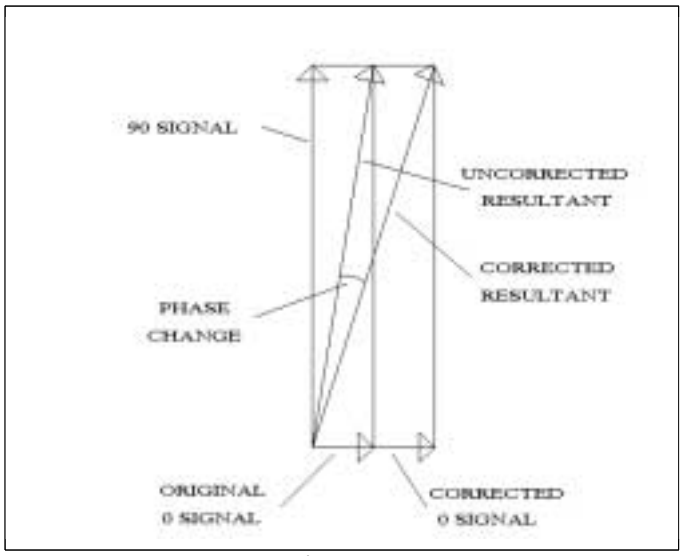

Figure 4-4
Phase Correction

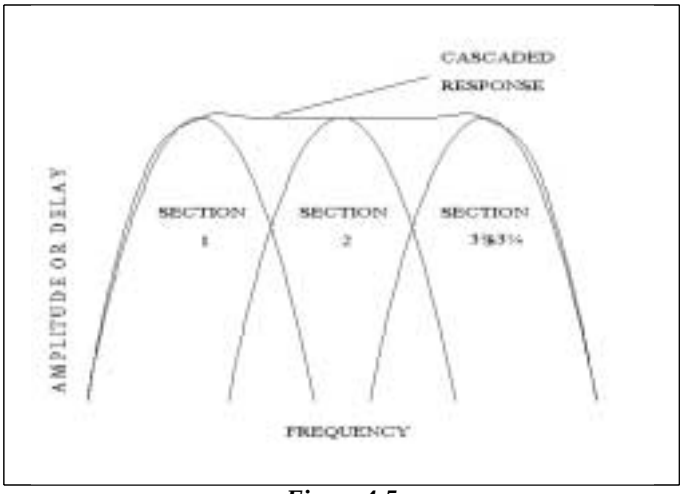

Figure 4-5
Response and Delay Correction

The maximum exciter output power is set by a variable dc reference voltage. This reference is generated by a temperature stable regulator U9 and divided by R49, POWER LIMIT. R49 sets the maximum voltage presented to a digital potentiometer U8. U8 is clocked either up or down by U6. The output of U8 is used as the exciter output power reference.

In the event of an internal PLL fault or an external mute command, Q1 switches the exciter reference to 0 volts, muting the output from the exciter to prevent off-frequency operation.

U2 compares the exciter reference with a detected rf sample of the actual exciter output power and drives the voltage controlled attenuator.

The detector in the exciter amplifier is a voltage detector and its output must be squared to display output power in watts. U1 performs this squaring function and R6, METER CAL determines the front panel meter drive voltage.

4.3.3.8 A13 - Phase Corrector

For proper cancellation of IP products generated in the high power amplifier the AM-PM distortions of the amplifier must be cancelled. The phase corrector in the CD 1A™ provides pre-correction of AM-PM with a three breakpoint corrector. Each break point can provide either positive or negative phase pre-correction with individual slope controls. The corrector can be bypassed via an on board switch. Front panel indication of corrector bypass is provided via an LED.

Refer to schematic 843 5466 351, Phase Corr.

RF input is applied to J1 and split in 90° hybrid HY1. One path flows through an amplitude corrector. The other path bypasses the corrector and travels through a short delay line to the output, where the corrected and the uncorrected signals are recombined in 0° hybrid U4.

As can be seen in Figure 4-4, the two signals combined in U4 are separated in phase by 90°. Combining the signals in this way produces a phase modulator. Linearity corrections generated in the corrector path of this board result in phase modulation of the signal. This corrector can be adjusted to precorrect for incidental carrier phase modulation in the transmitter.

The detailed circuit description of the corrector path of the phase corrector is the same as for the Linearity Corrector, described in the following section.

4.3.3.9 A14 - Linearity Corrector

For proper cancellation of IP products generated in the high power amplifier the AM-AM distortions of the amplifier must be cancelled. The linearity corrector in the CD 1A™ provides pre-correction of AM-AM with a three breakpoint corrector. Each break point can provide either positive or negative linearity pre-correction with individual slope controls. The corrector can be bypassed via an on board switch.

Front panel indication of corrector bypass is provided via an LED.

Refer to schematic 843 5466 341, SCH, Lin Corr.

RF input is applied to J1 and terminated in R26. Q5 amplifies the incoming rf by 4 (12 dB). Q7 is an emitter follower and provides a low impedance drive for corrector diodes CR6 and CR7. These diodes are reverse biased by op amp U1. The actual bias point being set by R58 and is called the threshold. As the bias point is lowered by R58 a point is reached were CR6 and CR7 begin to conduct. If JP3 is set to the 1-2 position, this conduction shunts that portion of the rf around R55 and increases the gain of the overall circuit, resulting in an increase in gain at the upper end of the power range. R61 sets the amount of signal that shunts R55 and is called the slope control.

If JP3 is set to the 2-3 position, CR6 and CR7 shunt R9, lowering gain and thus reversing the effect of the slope control.

This same circuit is repeated twice on the linearity corrector to provide three adjustable threshold/slope breakpoints.

S1, when in position 2 to 3, places the bottom of the threshold potentiometers at approximately -.3 volts, enabling the corrector. CR5 temperature compensates the turn on voltages of the corrector diodes.

WARNING: Disconnect primary power prior to servicing.

When S1 is switched to position 1 to 2 the threshold potentiometers pull to +15 volts to prevent the correction diodes from conducting, turning off the linearity correction.

The setup and adjustment of the Linearity corrector board is identical to that of the phase corrector, however the adjustments on this board are carried out to reduce linearity errors on the transmitter output.

4.3.3.10 A15 - Response Corrector

For proper cancellation of both AM-AM and AM-PM IP products created in the high power amplifier the frequency response and the group delay of the system must be essentially flat. The response corrector provides for fine frequency response and group delay correction over the IF bandwidth. It provides correction for the transmitter, while the Mask Filter Corrector is used to correct errors arising in the output Mask Filter.

A three section all pass circuit is used. The corrector can be bypassed via an on board switch. Front panel indication of corrector status is provided via an LED. Refer to schematic 843 5466 311, Response & Delay Corrector.

The response and delay corrector consists of three cascaded second order all-pass networks. Each all-pass network is based on a bridged T network with a single inductor.

The input signal is buffered by emitter follower Q1 which provides a low source impedance for the all pass network consisting of T1 and C15. The amount of delay is controlled by R90 and the Q (or response of the allpass is controlled by R89. In this way both amplitude and delay of the all pass can be controlled.

The following two all-pass networks perform in the same manner. By cascading the three networks and stagger tuning them across the 44 MHz IF band an over all response and delay corrector is created. Individual adjustment of any section can create a variety of precorrection shapes. Refer to Figure 4-5.

4.3.3.11 Mixer 2 - 44MHz to Output Frequency

Refer to 843 5466 422 - Diagram, UHF Upconverter.

The 44MHz IF is converted to the operating channel in a high level low intermodulation mixer.

The Second LO signal from the UHF PLL is 44MHz higher than the center of the desired output channel. The outputs from the second mixer are the desired channel signal and an undesired image at 88MHz above the desired channel. A small amount of the Second LO signal is also present due to slight mixer imbalance.

4.3.3.12 A16 - UHF/VHF Band Pass Filter

In UHF units, an interdigital combline band pass filter is used to filter out the mixer image and other unwanted signals.

The filter is implemented on a printed circuit board. A choice of three filter boards is used to cover the UHF band.

In VHF units, a purchased VHF bandpass filter is installed. The VHF filter is not adjustable.

4.3.3.13 A17 - 1 Watt Amplifier

The output of A16 is a low level signal. The 1 Watt amplifier provides approximately 50dB of gain to raise the signal level to 1 Watt peak. The unit is broad band and covers the VHF and UHF bands. An on board RF detector provides a DC voltage to the AGC board for power control and is routed by the AGC board to the front panel meter to indicate the output power from the amplifier.

Refer to schematic 843 5466 031, Sch, ATV 1 Watt Amp.

RF input is routed from J1 to broad band amplifiers U1, U2 and U3. A printed 0° splitter drives broadband amplifiers U4 and U5 who's outputs are combined in a printed 0° combiner.

A printed directional coupler samples the forward power of the amplifier and drives a detection diode CR1. The detection diode is temperature compensated by CR2 in a summing op amp U6. The output of U6 drives the AGC card and front panel meter.

4.3.3.14 A18 - Downconverter

The downconverter is part of adaptive equalization, currently under development. The Downconverter is not used in exciters not equipped with adaptive equalization.

4.3.3.15 A19 - Metering

The metering board is mounted to the front panel and contains the Power Raise/Lower toggle switch, the 3-digit LED Power Meter and the LED indicators.

Since each transmitter may require a different drive level, the upconverter front panel is equipped with an exciter output Raise/Lower toggle switch and a 3-digit LED display showing the current exciter output in milliwatts. This control gives the user the ability to adjust his transmitter drive level to optimum, and the 3-digit display lets the user know what drive level he is currently outputting to the transmitter.

Maximum output level from the exciter is 250 mW average power, corresponding to an 8VSB peak level of 1 Watt.

Also included in the upconverter front panel are these indicators:

- Phase Corrector Bypass
- Linearity Corrector Bypass
- Response Corrector Bypass
- PLL Fault
- RF Mute

WARNING: Disconnect primary power prior to servicing.

4.3.4 Power Supply (Lower Subassembly)

Refer to Drawing [ ].

The power supply assembly is the bottom of the main exciter tray. It may be tilted down to gain access when the exciter is pulled forward out of the transmitter. It contains two regulated power supplies and a Power Supply Interface which distributes the power supply outputs to other parts of the exciter. The power supply output voltages are:

- + 5 Volts
- - 5 Volts
- +15 Volts
- - 15 Volts

The power supplies are auto ranging and accept input voltages in the range of 90-270 VAC, 47 to 63 Hz.

The AC input is on the rear of the chassis and is EMI filtered by FL1. Transient protection from line to line, and line to ground is supplied by metal oxide varistors RV1, RV2, and RV3.

The input EMI filter, switch and fuse are an integrated assembly mounted on the rear face of the exciter, to the left as viewed from the front. The location of the AC Power switch may be seen in Figure 2-1.

Power Supply 1 is a dual 5 volt power supply with each supply rated for 10 amps output.

Power Supply 2 is a dual 15 volt unit. The positive 15 volt supply is rated for ten amps and the negative supply is rated for 3.3 amps.

The power supplies are cooled by the blower (B1) which is operated from the +15V supply. The blower is mounted in the rear face of the main tray and also cools the rest of the exciter's electronics.

The outputs of the power supplies are routed through A20, the power supply interface printed wiring board, to the rear panel. A1 provides green LED's to indicate the presence of each DC voltage and a means to trim the output voltage of each power supply.

WARNING: Disconnect primary power prior to servicing.

5.1 Introduction

This section is a maintenance guide to the CD 1A™ exciter, providing information about access to the exciter for maintenance, routine alignment procedures and a number of initial setup procedures.

5.2 Maintenance or Alignment Access

All CD 1A™ circuits can be accessed for maintenance while operating the exciter. The CD 1A™ is mounted in the transmitter on slides, permitting it to be pulled forward out of the cabinet. Once pulled forward, each subassembly is accessed as follows:

Upconverter Subassembly

The upconverter is the top assembly in the exciter. to access the circuits, use the holes in the front of the cover to gently pull the cover out, and set aside. All subassemblies and controls are clearly marked.

8VSB Modulator

The modulator is the central tray in the exciter. There are no operating adjustments in the modulator tray, which is fully digital. A number of jumpers are provided to allow the user to configure the modulator for his use. Section II -Installation describes the proper setting of the jumpers.

To access these circuits, tilt the Upconverter tray front upward and use the latching bar provided to hold it in the raised position. (See Figure 5-1.)

NOTE

Retaining screws are used to fasten the upconverter tray to the 8VSB tray during shipment. These must be removed to raise the upconverter tray. They are not needed when the exciter is installed in the transmitter and need not be reinstalled unless the exciter is to be shipped.

Power Supply Subassembly

The power supplies are mounted in a bottom assembly which forms the bottom of the exciter. They contain no adjustments. To access them simply release the spring-loaded latch plunger in the hole in the bottom plate and lower the subassembly. (See Figure 5-2)

5.3 Setting Frequency and Offset

If it becomes necessary to change the exciter frequency, Section VII -Frequency and Offset describes the procedure needed to set the IF PLL and the MAIN PLL. These two assemblies can be adjusted to place the exciter on any TV channel. A wide range of frequency offsets can be used.

Figure 5-1

Figure 5-2

WARNING: Disconnect primary power prior to servicing.

5.4 Transmitter Precorrection

The purpose of transmitter precorrectors in the Upconverter tray is to introduce distortions into the signal which cancel as fully as possible distortions introduced by the transmitter's amplifiers and filters. The precorrectors included in the CD 1A™ exciter are:

- A22 - Mask Filter Response and Delay Corrector, to precorrect for group delay and frequency response errors introduced by the transmitter output high-power mask filter.
- A13 - Phase Corrector, to predistort for unwanted phase modulation in the transmitter.
- A14 - Linearity Corrector, to predistort for transmitter amplifier nonlinearities.
- A15 - Response Corrector, a second response and delay corrector to predistort for response and group delay errors introduced by the exciter and transmitter.

Each corrector includes a bypass switch for use during servicing procedures.

The precorrectors are set up during initial manufacture and testing of the exciter, to minimize errors in the exciter output. When the exciter is installed and set up in the transmitter the correctors are adjusted again, to precorrect for the errors due to the transmitter circuits.

The 10.76MHz Mask Filter Delay Corrector is set up to compensate for the nominal expected output mask filter delay and bandpass response, and is then trimmed slightly upon final installation to compensate for the actual filter installed on the transmitter.

5.4.1 Adjusting Response and Delay

The following adjustment sequence is used in each exciter to bring the transmitter into compliance with standards and specifications. The correctors are assumed to have had preliminary setup adjustments done, or to be close to the proper settings.

NOTE

Sigma series transmitters use IOT output amplifier cabinet which contain RF Correctors and Feedforward Correctors. The amplifier(s) should have been tuned, and these correctors should have been adjusted, in each cabinet prior to commencing exciter precorrection adjustments.

a. Begin by bypassing the Phase (A13), Linearity (A14) and Response and Delay correctors (A15 and A22).

b. Set up the HP89441 or Tek RFA300 to monitor the transmitter output. Sample the transmitter output signal at a point before the transmitter RF Output Mask Filter.

c. operate the transmitter at full intended power for 15 - 30 minutes to ensure the equipment is at operating temperature.

d. Set the monitoring equipment to observe frequency response and group delay over an 18MHz bandwidth.

e. Turn ON A15, the 44MHz Response and Delay corrector. Make small adjustments in each of the 6 controls on A15, the 44MHz Response and Delay Corrector. Make the frequency response within the transmitted band as flat as possible, and the group delay as constant as possible across the band as well.

   1. R85 controls the delay, and R86 controls the gain, at the center of the channel.
   2. R88 controls the delay, and R87 controls the gain, at the low end of the channel.
   3. R90 controls the delay, and R89 controls the gain, at the low end of the channel.

f. Set the monitoring equipment to observe the transmitted spectrum, including the Lower and Upper Sidebands.

5.4.2 Adjusting Linearity and Phase Correctors

Linearity and Phase precorrectors are adjusted to create a linearity or phase error opposite and equal to the transmitter's errors, as shown in Figure 5-3.

The following process can usually produce a side band improvement of up to 10 dB:

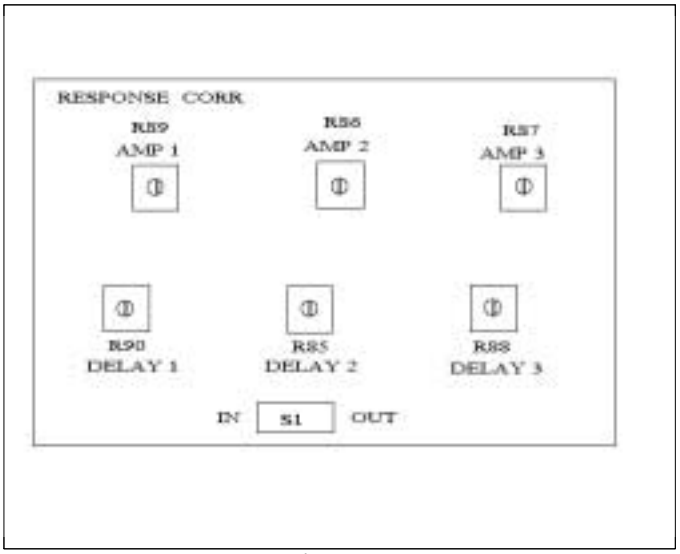

Figure 5-4

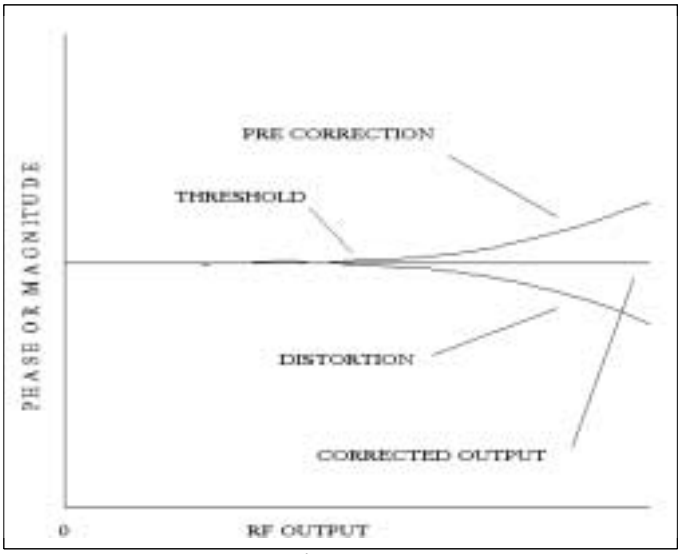

Figure 5-3
Linearity and Phase Correction

WARNING: Disconnect primary power prior to servicing.

a. Tune the transmitter for best overall linearity and maximum bandwidth. A sideband analyzer with RF tracking generator may be needed for initial tuning. Minor "touch-up" tuning can be carried out by observing the transmitted DTV signal with the spectrum analyzer.
b. Adjust Linearity Correction for lowest side band levels outside the 6 MHz channel..
c. Adjust Phase Correction for lowest side band levels outside the 6 MHz channel.
d. Repeat steps b and c until no further improvement is possible.

5.4.2.1 Corrector Adjustment

The following detailed procedures are those to be used with a new board or if it is necessary to completely readjust the board.

NOTE

It is not normally necessary to completely readjust these boards. It is usually best to use minor "trimming" adjustments. Unless you have reason to believe otherwise, it is best to assume the boards are approximately correct, and make only those adjustments which result in improvement.

Linearity Corrector

The linearity corrector of the CD 1A™ can be used to compensate a transmitter's linearity distortion vs output power. It consists of a three section corrector.

Each section has a threshold (the level on the power transfer curve where a change in linearity occurs) and a slope (the amount of change in linearity on the power transfer curve). Each section can provide either positive or negative linearity correction by setting a jumper (JP3, JP1 and JP2).

To make linearity adjustments, remove the cover to the upconverter tray and locate the linearity corrector printed wiring board. (See Figure 5-4.)

a. Locate bypass switch S1 and set to Bypass. The front panel Linearity Bypass indicator should light.
b. Locate the slope controls R61, R56, R57 and adjust fully CCW.
c. Locate the threshold controls R58, R59 and R60 and adjust fully CW. These are 4 turn pots.
d. Set JP1, 2 and 3 to positions 1 - 2.
e. Set S1 to IN.
f. Begin linearity adjustment by turning Slope 1 (R61) one turn CW. Next adjust Threshold 1 (R58) slowly CCW while observing the out of band sidebands.
   1. If the side bands decrease, adjust Threshold 1 for lowest overall sideband. Alternately adjust Slope 1 and Threshold 1 for best over all sidebands.
   2. If side bands increase as R58 is turned CCW, move JP3 to position 2 -3. and repeat the previous procedure.
g. Move to section 2 of the corrector and repeat above procedure with Slope and Threshold 2.
h. Move to section 3 of the corrector and repeat above procedure with Slope and Threshold 3.

Phase Corrector

The phase corrector of the CD 1A™ can be used to compensate a transmitter's phase distortion vs output power. It consists of a three section corrector.

The Phase Corrector is very similar in design to the Linearity Corrector described previously, and has the same controls.

To make phase adjustments remove the cover to the upconverter tray and locate the phase corrector printed wiring board. (See Figure 5-5.)

a. Locate bypass switch S1 and set to Bypass. The front panel Phase Corrector Bypass lamp should light.
b. Locate the slope controls R61, R56, R57 and adjust fully CCW.
c. Locate the threshold controls R58, R59 and R60 and adjust fully CW. These are 4 turn pots.

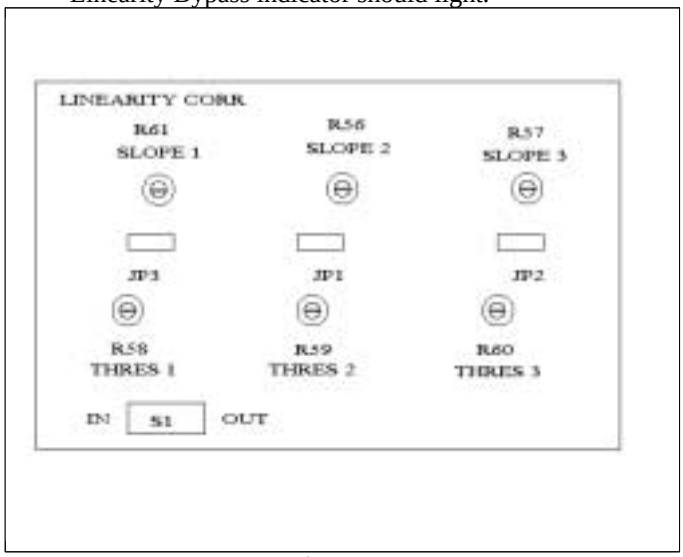

Figure 5-5
Linearity Corrector

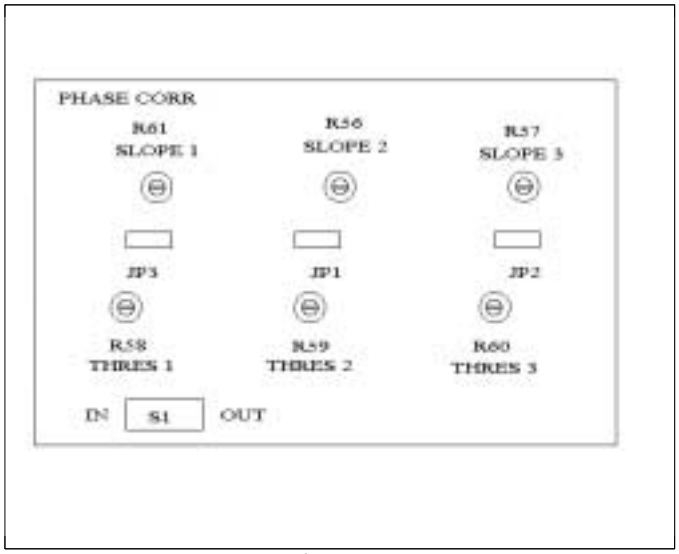

Figure 5-6
Phase Corrector

WARNING: Disconnect primary power prior to servicing.

d. Set JP1, 2 and 3 to positions 1 - 2.

e. Set S1 to IN.

f. Begin phase adjustment by turning Slope 1 (R61) CW 1 turn. Next adjust Threshold 1 (R58) slowly CCW while observing the out of band sidebands.

   1. If the side bands decrease, adjust Threshold 1 for lowest overall sidebands. Alternately adjust Slope 1 and Threshold 1 for best over all sidebands.
   2. If side bands increase as R58 is turned CCW, move JP3 to position 2 - 3. and repeat the previous procedure.

g. Move to section 2 of the corrector and repeat above procedure with Slope and Threshold 2.

h. Move to section 3 of the corrector and repeat above procedure with Slope and Threshold 3.

i. Turn ON the 10.76MHz Response and Delay Corrector.

j. Adjust the corrector Delay and Amplitude controls for flattest response and flattest delay. The procedure is similar to adjustment of the 44MHz corrector, but the controls on this board allow finer control over the response and delay within and at the edges of the band.

5.5 Setting the Power Limit

A Power Limit adjustment is provided in the AGC board to permit limiting maximum exciter output to a safe value. When the transmitter precorrectors have been adjusted it is desirable to recheck the power limit setting. Precorrector adjustments can alter the gain through these boards and result in changing the power limit.

To change the setting of the power limit, open the upconverter tray and locate the AGC printed wiring board.

a. Use S1 (Raise) and S2 (Lower) on the board, or use the front panel Raise/Lower switch, to adjust the exciter output in order to determine the maximum limit set in the exciter.

NOTE

When carrying out this adjustment, take care to avoid raising the transmitter output to an unsafe level or to a level which might result in damage!

b. If a different power limit is desired, locate R49 and adjust CCW for a decrease in maximum power or CW for an increase in maximum power, until the desired limit has been set.

NOTE

Do not set R35 for a maximum power exceeding 1000 mW peak power as indicated by the exciter front panel meter.

The exciter's maximum output is normally set to a value lower than 1000 mW peak power (250 mW average power). This is desirable in transmitter installations to prevent an operator from overdriving the transmitter.

JP1 on the AGC board is provided to allow the AGC to be disabled if necessary during maintenance. Set the jumper to ON (jumper 2-3) in normal operation to allow AGC to compensate for temperature drift. Set JP1 to the OFF position only if AGC action in the exciter is not desired.

WARNING

Exciter output may rise or drop sharply when JP1 is moved. Do not move JP1 when the exciter is supplying drive to an on-air transmitter! Severe overdrive might result!

Other AGC.Metering Adjustments

The four other controls on the AGC board are set during factory calibration and will not normally need to be changed therafter. They are:

- R6 - Meter Cal:
  Calibrates the exciter front-panel meter to read the peak exciter output power level in mW.
- R53 - Meter Zero:
  Adjusted to produce a zero output meter reading when there is no exciter RF output.
- R24 - RF Present Threshold:
  Set to turn ON the green RF Present LED on the board (DS5), and provide a LOW output to the UHF remote control connector.

NOTE

RF Present is used by the exciter switcher to detect an exciter failure and switch to the alternate exciter in some transmitters.

- R10 - VSWR GAIN:
  This controls the exciter foldback input gain. It is normally set to full CW (maximum sensitivity). If your transmitter uses foldback and requires a different setting, the correct setting for R10 can be found in the transmitter technical manual or in the factory test data.

5.5.1 RTAC™ Setup

RTAC™ can be used to regulate transmitter linear precorrection during operation.

An RF sample from the transmitter output must be connected to the exciter's SAMPLE IN connector before activating this feature. The control cabinet may have existing harness connecting a cabinet RF sample input to the exciter sample inputs.

(Use a high quality 50 ohm coax such as RG223 or better.)

5.5.1.1 Initial Setup

DIP switch S3 on DSP controller board A6 is used to configure the exciter. Set the 8 sections of S3 as follows before proceeding with the installation:

	Single Exciter or Exciter A	Exciter B
S3-1	Off	On
S3-2	Off	Off
S3-3	Off	Off
S3-4	Off	Off
S3-5	Off	Off
S3-6	Off	Off
S3-7	Off	Off
S3-8	On	On

NOTE

If the transmitter is a Sigma®CD transmitter, equipped with analog control cabinet meters rather than the Graphic User Interface control cabinet, dual-exciter versions are equipped with a separate exciter switcher assembly mounted between the exciters. In these transmitters only, set jumper JP4 on the circuit board inside the exciter switcher to the 2-3 position before proceeding.

a. Power up the exciter and bring the transmitter to rated power output.

NOTE

The upconverter IF response and delay, linearity and phase correctors should be left turned ON to center the RTAC™ corrector in its operating range.

b. Measure the power level at downconverter input J1. Use the HP power meter used for transmitter power calibration for this measurement.

c. The desired level is +5dBm +/- 1dB. Use attenuators as needed to set the input level at J1.

d. Confirm that JP1 and JP2 on the downconverter board are set to the 2-3 position.

e. Measure the dc voltage between JP1-1 and JP1-3. Adjust R58 if necessary to produce 0Vdc.

NOTE

JP1-1, 2 and 3 are a 3-pin inline row of jumper headers. JP1-1 and JP1-3 are the outer pins in the row. The jumper may be removed temporarily to make this adjustment.

f. Temporarily connect the transmitter RF sample at Upconverter J5 to a spectrum analyzer. Display the transmitter output spectrum. Check the response and note any deviation from flat response. Return the sample cable to J5.

g. Temporarily connect IF output J4 of the down converter to a spectrum analyzer. The signal should be an 8VSB IF signal centered on 10.76 MHz and should be slightly lower than 0dBm.

h. Adjust R32 (Response Equalizer) if necessary to produce a flat frequency response. If the transmitter sample response observed in step f above was not flat, adjust R32 to duplicate the response of the transmitter sample.

i. Connect the output from J4 to the power meter. Adjust R40 for –1.7dBm (+/- 0. 2dBm).

j. Remove the meter and reconnect W25 to down converter J4.

k. Enable RTAC™ by setting dipswitches S3-3 and S3-4 on the controller board (992 9810 001) to the On position.

l. Using Tektronix RFA300 or HP89440 verify that the transmitter performance does not exceed 4% for EVM (Error Vector Magnitude) and 27dB for S/N (Signal to Noise).

NOTE

To avoid erroneous results, this measurement should be made using a sample from the same point in the RF system used for the RTAC™ sample. This may be easily done by setting S3-4 to RTAC™ HOLD (see 2.8) to freeze the correction, then moving the sample from the exciter to the RFA300 or HP89440.

m. If your transmitter is equipped with two exciters, select the second exciter and perform steps a - l.

Technical Assistance

The procedure above should result in proper RTAC™ operation. If you encounter difficulty, we suggest you first retrace these steps to make sure each has been done correctly.

If a problem persists, contact Harris Customer Service for advice at 217 222 8200.

Controller Dip Switch Settings

S3, the 8-position configuration DIP switch on the DSP Controller board, controls the exciter as well as RTAC™ correction. The function of each switch section is listed below.

S3-1 Exciter ID used for Serial Communications
OFF = Exciter ID 1
ON = Exciter ID 3

S3-2 Exciter Mute when Input Fault occurs
(Customer Set-up; used by exciter switcher)
OFF = Ignores the loss of input SMPTE 310
ON = If customer wants the transmitter to switch exciters if SMPTE 310 is lost
(Provides the necessary signal to the transmitter's exciter switch)

S3-3 RTAC™ ON/OFF
OFF = No correction — RTAC™ correction does not modify the exciter signal.
ON = RTAC™ is applying precorrection to the signal. The correction may be continual, or fixed, depending on the setting of S4.

S3-4 RTAC™ RUN/HOLD
ON = RTAC™ precorrection is updating continually to optimize the transmitter output (RUN mode).
OFF = RTAC™ precorrection is fixed at the most recent setting (HOLD mode).

S3-5 ESN Default (Used by CDEYE™ option)

S3-6 ESN WRITABLE (Used by the CDEYE™ option)

S3-7 NOT USED

S3-8 TEST MODE (Factory or Service use only)
OFF = Runs test code
ON = Bypasses the test code

WARNING: Disconnect primary power prior to servicing.

5.6 Response and Delay Corrector - Initial Setup

These procedures should be used only if a delay corrector is replaced or seriously disturbed.

A15, the 44MHz Response Corrector, is used to correct transmitter response and group delay at the Second IF frequency.

A22, the 10MHz Response Corrector, is used to correct at the first IF frequency for large group delay errors inherent in the transmitter output mask filter dictated by FCC out-of-band attenuation requirements. Correcting at the first IF with this second board allows the mask filter precorrection to accurately mirror the errors due to the filter.

Although the two correctors are schematically identical, they use different values for certain components. A table in Drawing 843-5466-311 lists the components used for each version.

Full alignment of one of these boards is normally required only if it has been serviced or replaced, or if the adjustments have been disturbed and initial setup must be reestablished. Initial setup of either board requires a network analyzer, in order to establish initial group delay and response.

5.6.1 44MHz Response and Delay Corrector

a. Set the network analyzer as follows:
   1. Center Frequency at 44MHz
   2. Span at 30MHz
   3. Dual (split) displays
   4. Display 1 to measure TRANS FWD(S21, B/R), format to LOG MAG, SCALE REFERENCE to 1dB/div
   5. Display 2 to measure TRANS FWD(S21, B/R), format to DELAY, SCALE REFERENCE to 10nS/div
   6. Markers at 35, 44, and 53MHz.

b. Calibrate the analyzer

c. Connect the RF OUT of the network analyzer to Response Corrector input (J1), and the output connector (J2) to the analyzer RF IN.

d. Switch the corrector to “In”.

e. Check the response and delay of the corrector board.
   1. Response should be flat within 0.2dB from 35 to 53 MHz.
   2. Delay should be flat within 5nS from 35 to 53 MHz.

NOTE

It should be possible to align any 44MHz Response Corrector board to meet these limits. It is critically important that the response and delay are as flat as possible from 41 to 47 MHz. However, if the board has previously been aligned to correct the transmitter it may deviate significantly from these limits. It is best to avoid disturbing previously-made adjustments until you are convinced you need to start over with the initial setup.

f. If it appears necessary to fully align the board, proceed as follows:

g. There are 7 potentiometers on the board. 6 of these controls are shown in Figure 5-6. Set all 6 of these controls to midrange:
   1. Amplitude controls R89, R86 and R87.
   2. Delay (Q) controls R90, R85 and R88.

h. Control R8, not shown in Figure 5-6, is an overall gain control for the board.

NOTE

Each section of the corrector is tuned to a different frequency. Turning an amplitude control clockwise raises the gain at the section’s frequency. Turning a Delay (Q) control clockwise lowers the delay at the section’s frequency.

i. Set R85 fully CCW and adjust T2 to set the peak in delay to 44MHz (Turning the coil CW lowers the frequency). Then return R90 to midrange.

NOTE

Be careful when adjusting T2, T1 or T3, to avoid turning the adjustment all the way CW. The slug may jam at the CW end, causing you to replace the coil.

j. Set R90 fully CCW and adjust T1 to set the peak in delay to 35MHz. Then return R90 to midrange.

k. Set R88 fully CCW and adjust T3 to set the peak in delay at 53MHz. Then return R88 to midrange.

l. Adjust R90, R85 and R88 to produce flattest delay.

m. Adjust R89, R86 and R87 to produce flattest frequency response.
   1. Turning R89 CW lowers the gain at 35 MHz.
   2. Turning R86 CW lowers the gain at 44 MHz.
   3. Turning R87 CW lowers the gain to 53 MHz.

n. When response is flat, recheck delay. You will need to repeat delay and then response adjustments until response is within 0.2dB and group delay is within 5nS.

o. Some versions of this board have a seventh potentiometer, R8, located toward the right edge of the board. In other units this resistor is fixed. If present, R8 should now be adjusted to produce unity gain — the output level should be the same as the input level.

This places the 44MHz Response Corrector at its initial settings. Subsequent adjustment is made to correct for transmitter errors and is described elsewhere.

5.6.2 10.76 MHz Response & Delay Corrector

a. Set the network analyzer as follows:
   1. Center Frequency at 10.76 MHz
   2. Span at 10MHz
   3. Dual (split) displays
   4. Display 1 to measure TRANS FWD(S21, B/R), format to LOG MAG, SCALE REFERENCE to 1dB/div
   5. Display 2 to measure TRANS FWD(S21, B/R), format to DELAY, SCALE REFERENCE to 50nS/div
   6. Markers at 7.76, 10.76, and 13.76MHz.
   7. Calibrate the analyzer

b. Connect the RF OUT of the network analyzer to 10MHz Response Corrector input (J1), and the output connector (J2) to the analyzer RF IN.

c. Switch the corrector to “In”.

d. Check the response and delay of the corrector board. It should be very close to Figure [ ]. If it differs substantially and the full transmitter alignment procedure cannot achieve proper response and group delay, it is possible a full alignment of this board is needed. If it appears necessary to fully align the board, proceed as follows:

e. There are 7 potentiometers on the board. 6 of these controls are shown in Figure 5-6:

   1. Amplitude controls R89, R86 and R87.
   2. Delay (Q) controls R90, R85 and R88.

f. The seventh control, R8, is an overall gain control for the board, located toward the right edge of the board.

g. Set all 7 of these controls to midrange.

NOTE

Each section of the corrector is tuned to a different frequency. Turning an amplitude control clockwise raises the gain at the section's frequency. Turning a Delay (Q) control clockwise lowers the delay at the section's frequency.

h. Set R85 fully CCW and adjust T2 to set the peak in delay to 10.76MHz. Then, return R85 to midrange.

i. Set R90 fully CCW and adjust T1 to set the peak in delay 2 to 2.25MHz below 10.76. Then return R90 to midrange.

NOTE

If this section will not tune low enough, it may be necessary to change C15, 150pf, to a larger value. 180pf may be a suitable value.

j. Set R88 fully CCW and adjust T3 to set the peak in delay 1.75Mhzabove 10.76. Then return R88 to midrange.

k. Adjust R90, and R88 to produce the delay curve shown in figure 5-7.

l. Adjust R89, R86 and R87 to produce flattest frequency response.

m. When response is flat, recheck delay. You will need to repeat delay and then response adjustments until the response and group delay are as shown in Figure 5-7.

n. R8 should now be adjusted to produce unity gain — the output level should be the same as the input level.

This places the 10.76 MHz Response Corrector at its initial settings. Subsequent adjustment is made to correct for transmitter errors and is described elsewhere.

WARNING: Disconnect primary power prior to servicing.

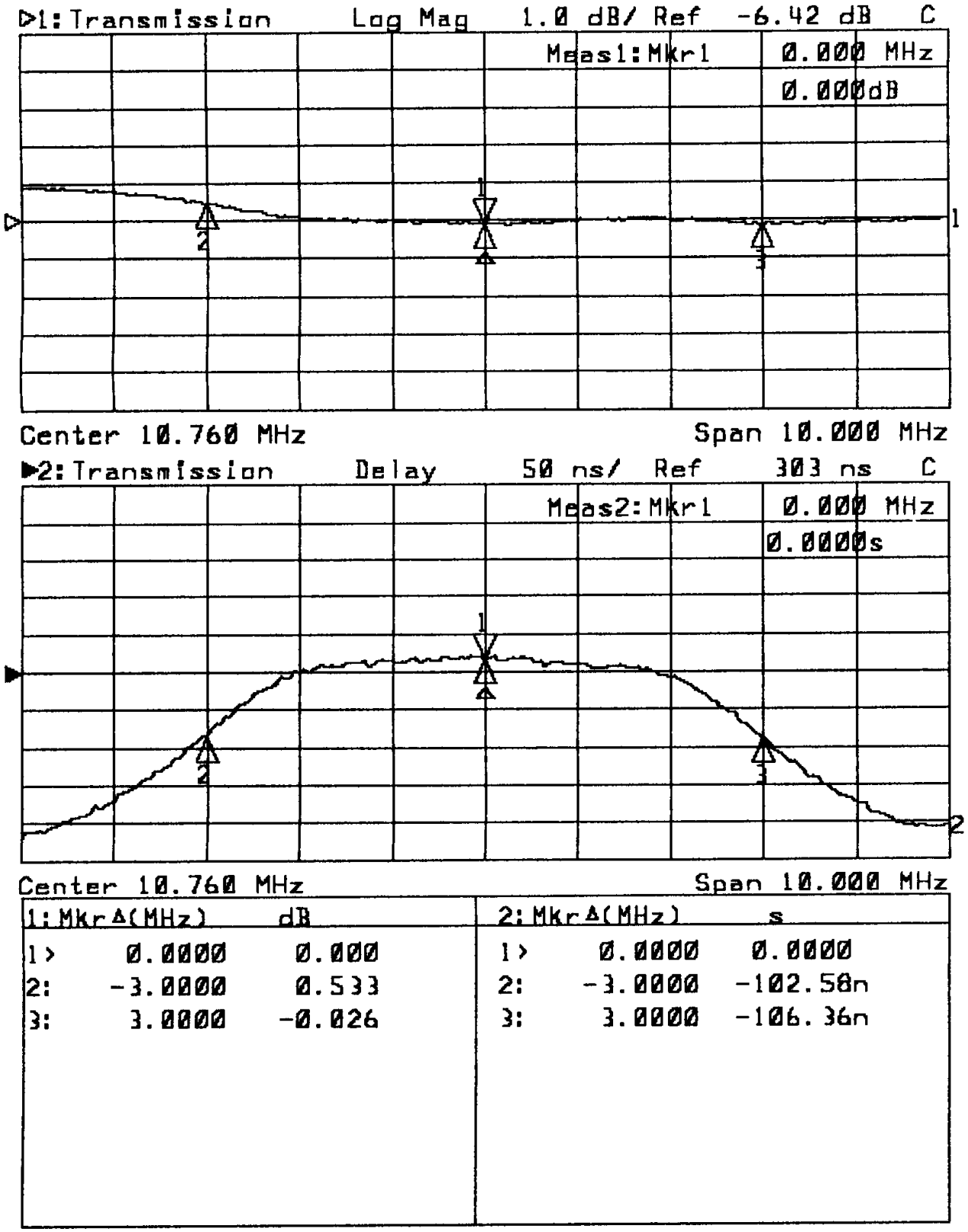

Figure 5-7 10.76 MHz Corrector Initial Settings

WARNING: Disconnect primary power prior to servicing.

6.1 Introduction

This section is a troubleshooting guide to the CD 1A™ exciter.

The following paragraphs describe the levels and indicators which may be used to verify proper operation of a CD 1A™ exciter or to isolate a possible problem in the unit to a subassembly. Some of the assemblies in the CD 1A™ exciter may not be field-repairable due to the surface-mount technology used. Once a faulty unit is located, the technician should consider whether a direct repair on site or a factory repair or exchange is preferable.

6.2 Power Supply

The power supply tray must be operating correctly if the 8VSB Modulator and the Upconverter are to operate. The presence of power supply output voltages from the power supply tray can be checked quickly by tilting down the bottom power supply section of the exciter and observing the LED indicators for the four output voltages on the Power Supply Interface. The power supply voltages used in the 8VSB Modulator and the upconverter are:

Voltage:	Modulator:	Upconverter:
+5 Volts.	Yes	Yes
-5 Volts.	No	Yes
+15 Volts.	Yes	Yes
-15 Volts.	Yes	Yes

If all 4 lamps are illuminated yet a power supply problem is still suspected, the four voltages may be checked with a meter or with an oscilloscope on the Power Supply Interface board. All power supply voltages as measured on the power supply interface board should be within +/- 0.2 Volts of these values:

Nominal Voltage:	Required Voltage:
+5 Volts.	+5.1
-5 Volts.	-5.0
+15 Volts.	+15.2
-15 Volts.	-15.0

A voltage adjusting pot is located next to each voltage LED on the power supply interface board.

NOTE

If the exciter does not operate and none of the power supply interface LED's is lit, one of the fuses in the power input connector has failed or primary voltage is not reaching the exciter.

6.3 8VSB Modulator Tray

The boards in the modulator tray contain advanced digital circuitry and are highly reliable. If one of these boards is thought to be defective, it in most cases should be repaired by the Harris factory or replaced.

Checking the Modulator Tray

With the power supply operating and the normal input data stream connected to the modulator, three lights on the front panel of the 8VSB Modulator signal the following:

- Input Fault - the input data stream has failed or there is a PLL failure on the Transport to Transmission board in the unit. The PLL Sync LED on A2, the Transport to Transmission board, also signals input fault.
  1. Check for the presence of the input signal. If the input is not SMPTE 310M, check also for the presence of the data clock signal.
  2. If both data and clock are present, check relative timing as shown in Figure 2-2 at J3 and J2 of A1.
  3. If signals are not present then investigate the signal source.
  4. If signals appear to meet requirements, then switch to internal data clock to verify that the tray is working correctly with the internal test signal. Jumpers JP5, JP6 and JP7 are used to make this selection.

Operating Mode:	JP5:	JP6:	JP7:
Internal Data & Clock:	1-2	1-2	1-2
External Data & Clock:	2-3	2-3	2-3

NOTE

Switch power OFF before changing these jumper settings.

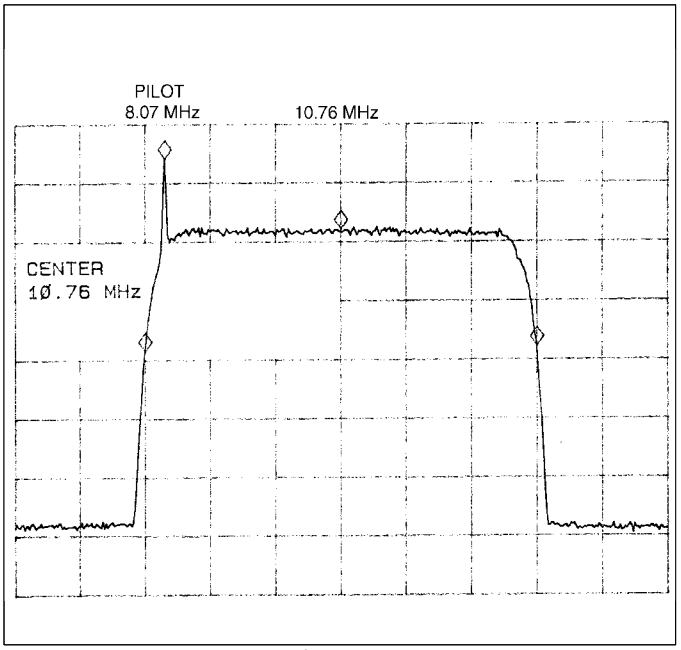

Figure 6-1
8VSB Modulator Output

WARNING: Disconnect primary power prior to servicing.

5. If the PLL light is still on when using the internal test signal, PLL operation has failed.

- Corrector Fault - this indicator is for future use and should be dark.
- Corrector Bypass - this indicator is for future use and should be dark.

In normal operation, none of these 8VSB front panel lights is ON.

6.3.1 8VSB Modulator Output

The 8VSB modulator output is the First IF at A5, J4. The modulated signal should be centered on 10.76 MHz. The 8VSB Modulator Tray output level is checked with a spectrum analyzer.

- Set the Resolution Bandwidth to 30 kHz.
- Use averaging to minimize the random character of the broadband trace.

The display should appear approximately as shown in Figure 6-1.

a. The output level at 10.76 MHz should be greater than -8dBm and the output should consist of a broadband signal as shown, centered on 10.76 MHz. The bandwidth at the -3dB points should be 5.38 MHz.

b. The pilot at 8.07 MHz (the lower -3dB point) should be 9 to 10dB higher than the average level of the signal in the envelope as shown in Figure 6-1.

c. The signal level on the out of band skirts below the pilot frequency and above 13.45 MHz should be at least 45 dB below the average signal level.

6.3.2 8VSB Circuit Boards

Inside the tray, seven circuit boards process the signal:

- A1 - Embedded Clock Recovery
- A2 - Transport to Transmission
- A3 - Nyquist Filter
- A4 - Corrector
- A5 - D/A Converter
- A6 - DSP Controller
- A7 - Converter (To be used in adaptive precorrection)

6.3.2.1 A1 - Embedded Clock Recovery Board

This board conditions various types of input signal to the form of the TTL/CMOS signal levels required by the Transport to Transmission Conversion board. There are two indicators on the board, to signal the status of the SMPTE 310M input processing circuits:

- Carrier Detect, DS1, is a green LED which lights to indicate the board is receiving SMPTE 310M and is locked to the signal.
- PLL UNLOCK is a red LED which lights if the circuit is not locked. The LED will flicker at times during normal operation, even though locked. This typically occurs when a long string of Null packets is received.

The output cables from the interface board sending signals to the Transport to Transmission board are J3 (TTL Clock Out) and J5 (TTL Data out). These signals may be observed using an oscilloscope to confirm proper data is being output. Figure 2-2 in Section II is a sketch of the two signals showing the proper timing between them.

The clock timing is adjustable using jumpers on the board. (See Section 2.6.)

6.3.2.2 A2 - Transport To Transmission

There are 3 indicator lights on the transport to transmission board:

- DS1, DS2 - Configuration Complete - Normally illuminated. If one of these lights is not illuminated, configuration did not complete and the board will not function correctly.
- DS3 - PLL Fault - PLL Fault—Illuminates to signal a PLL fault or input data fault.

The Transport to Transmission board is a highly integrated design. Because of this, its accurate operation is difficult to assess. Several data test points exist which give some level of confidence that the board is working properly.

8VSB Data Output (J7)

The transport to transmission board 8VSB output consists of 3 signals, comprising a 3-bit parallel data stream. The signals appear on J7 as follows:

Bit	Pin
Q0	2
Q1	4
Q2	6

The bitstream data rate of is 10.76..Mbits/S, and the levels are CMOS compatible. Investigation by an oscilloscope should reveal random-type data transitions on each output. The data should transition with a stable timing relative to the 10.76 MHz clock (J10, J11, etc) or the FS Trigger or SS Trigger (J4, J5).

Segment Sync (SS) and Field Sync (FS) are added in the Transport to Transmission Conversion board and can be seen in these output lines using an oscilloscope triggered from the appropriate sync trigger source. The segment sync and field sync differ from the rest of the symbol stream. They are a pre-defined sequence made up of only two symbol levels; binary “6" (110) and binary ”1" (001).

Segment Sync

- J4, SS Trig, is the segment sync trigger, coincident with the start of each data segment.

Data segment sync is a 4-symbol sequence, which will appear at a 77.3µS in the 3 data outputs lines as:

Binary State:	1	0	0	1
Symbol Level:	6	1	1	6
Q0	0	1	1	0
Q1	1	0	0	1
Q2	1	0	0	1

A 3- or 4-trace oscilloscope is preferred for this check, as it allows viewing of all 3 outputs simultaneously.

Field Sync

- J5, FS Trig, is the Field Rate trigger, occurring coincident with the beginning of each field sync segment.

Data Field Sync is a full data segment at a rate of 48.6mS, at the start of each field. All of the data field sync symbols except the last 12 are binary 6 or binary 1.

A fixed "pseudo-random" data sequence is transmitted in the first 511 symbols after the segment sync in the data field sync segment.

A 3- or 4-trace oscilloscope can be connected to view all 3 data output lines simultaneously. The data field sync segment, if correct, will have a fixed bit pattern for the first 511 symbols of the segment. It is the only segment which will have this characteristic.

PLL Circuitry

In addition to the PLL fault LED (DS3), the PLL can be further tested by probing the following easy test points:

- J9 - J14 These connectors should all output a 43.04 MHz square wave.
- R3 This should be a DC voltage of about 2.5Volts. Voltages at 0V, 5V, or a fluctuating voltage indicate a PLL fault.

6.3.2.3 A3 - Nyquist Filter

The Nyquist Filter board is a highly integrated design. Because of this, its accurate operation may be difficult to determine.

On the board are 2 PLD configuration LED indicators, DS1 and DS2. These are normally illuminated. If not the board will not function properly because either the PLD was not programmed or the five volt power supply is not present.

NOTE

The Configuration Complete lights indicate proper initialization of parts of the circuit. They should light immediately upon power-up. If one of the indicators is dark, the Nyquist Filter board will not function properly.

a. A 43MHz clock signal is applied at coaxial connector J2 and is easily monitored at R8.
   1. TP1 should be a 10.76MHz clock signal.
   2. U1-17 should be a 21.52MHz (clk*2) square wave clock signal.

b. Next check the output of the Nyquist board. An easy test to determine a minimal level of operation is to disconnect the data by unplugging connector J3, thus removing the three bits of input data.
   1. Check the I MSB at J5-15, and the Q MSB at J5-36. These signal lines should both be a 2.69MHz square wave.

6.3.2.4 A4 - Corrector
A6 - DSP Controller
A7 - A/D Converter

These three boards are included for use in the adaptive precorrection circuitry. Adaptive precorrection is not active in this exciter presently.

6.3.2.5 A5 - D/A Converter Board

If a problem is suspected in this board:

a. Check the board clock at R15. You should find a 43.04 MHz square wave.

b. Check the DAC output at J4. This should have the 10.76 MHz IF signal along with other wideband alias products. Continue down the signal chain to J5, J7, J9, and J11 making sure 10.76 MHz IF is present.

6.4 Upconverter Tray

The upconverter output level is displayed on the front panel meter. Several indicator lights on the front signal the following:

- Phase Corrector Bypass
- Linearity Corrector Bypass
- Response Corrector Bypass
- PLL Fault, indicating a loss of lock in a phase-locked loop in either the IF Phase Locked Loop or the UHF PLL board.
- RF Mute, indicating the exciter output is shut down due to loss of proper input or a PLL fault.

Within the upconverter, some circuit boards have indicator lights.

6.4.0.1 10 MHz Reference Oscillator

The 10 MHz Reference Oscillator has one on-board indicator:

- DS1 - External Reference Input Present

The oscillator output may be observed on output connectors J3, J4, J5 or J6, with an oscilloscope terminated in 50 ohms.

a. The output level should be 500mV (p-p) minimum.

b. After a 5-minute warm-up, the frequency should be 10 MHz +/- 1 Hz.

c. If an external frequency 10 MHz reference is to be used with the exciter, the 10 MHz input to 10 MHz Reference input J2 should be 0 dBm. When the input to J2 is lowered, DS1 should remain lit until the input is below -10 dBm.

6.4.0.2 IF Phase Locked Loop

There is one indicator on the IF PLL board:

- DS1 - Phase Locked Loop unlocked.

On the circuit board, jumper JP1 should be set to the 2-3 position for normal operation. The correct connections of the coaxial jumpers on the board are:

J6	to	J2	(DDS)
J1	to	J5	(54.76MHz)
J9	to	J8	(44MHz)
J3	to	Chassis	
J4	to	Chassis	(Mixer 1 LO In)

The following levels can be checked to attempt to isolate a suspected problem:

WARNING: Disconnect primary power prior to servicing.

a. Remove the jumper from J6. Connect J6 to a spectrum analyzer. The signal here should be 2.69 MHz at a level of -2dBm. Restore the jumper from J2 to J6.
b. Connect J4 (LO Out) to a spectrum analyzer. You should measure 54.76 MHz at a minimum of 7dBm. Measure the phase noise as follows:
    1. Set the center frequency to 54.76 MHz
    2. Set the span to 200 kHz.
    3. Set the Resolution Bandwidth to 1 kHz.
    4. Set the Video Bandwidth to 1 kHz.
    5. Set Trace Averaging to 50.
    6. Set the peak of the display to a reference level.
    7. Measure the level at a 20 kHz offset from 54.76..MHz.
    8. Subtract 30 dB from the measured noise level to find the actual noise level in dBc/Hz.
    9. Verify the level (phase noise) in dBc/Hz is lower than -65 dB from the 54.76..MHz signal.

NOTE

The phase noise in dBc/Hz is 30dB lower than it appears to be when measured with the spectrum analyzer set to 1 kHz resolution bandwidth.

6.4.0.3 MAIN PLL

There are two on-board indicators on the MAIN PLL:

- DS1 - PLL unlock in U15 (Loop 2).
- DS2 - PLL unlock in U17 (Loop 1).

The on-board coaxial jumpers should be connected as follows for normal operation:

J1	to	J2	(Loop 1 Out)
J3	to	J4	(Loop 2 Out)
J7	to	J8	(U15 Input)
J5	to	Chassis	(LO Output)
J6	to	Chassis	(LO Output)

Observe an output from the MAIN PLL with a spectrum analyzer.

a. The output level should be approximately +8dBm.
b. Use the following procedure to check the phase noise from the board:
    1. Set the center frequency to the desired LO frequency.
    2. Set the span to 100 kHz.
    3. Set the Resolution Bandwidth to 1 kHz.
    4. Set the Video Bandwidth to 1 kHz.
    5. Set Trace Averaging to 100.
    6. Set the peak of the display to a reference level.
    7. Measure the level at a 20 kHz offset from the LO.
    8. Subtract 30 dB from the measured noise level to find the actual noise level in dBc/Hz.
    9. Verify the level (phase noise) is lower than -65 dB from the LO.

NOTE

The phase noise in dBc/Hz is 30dB lower than it appears to be when measured with the spectrum analyzer set to 1 kHz resolution bandwidth.

WARNING: Disconnect primary power prior to servicing.

7.1 Introduction

The operating frequency of the Harris CD 1A™ exciter is set in the factory before the unit is shipped to a customer.

If it becomes necessary to change an exciter's operating channel or to shift the frequency due to an offset requirement, this section of the technical manual describes the method to be used.

NOTE

A9, the 10 MHz Reference Oscillator, is the frequency source for both PLL modules and sets the frequency for the exciter. A9 may also be locked to an external frequency source. Section 5.5, Transmitter Frequency Measurement, in this technical manual describes the procedure used to measure the exciter's frequency and to adjust A9.

The exciter's operating frequency is established by adjusting A8, the IF PLL, to place the exciter Second IF at 44 MHz. A10, the UHF/VHF PLL is then set to shift this IF signal to the desired channel. Refer to Drawing 843 5466 891 for the locations of these modules.

Any offset to the transmitter's frequency is accomplished by setting A8 to shift the Second IF frequency by the required amount. A8's output can be offset by as little as a millihertz. This makes possible extremely precise setting of the offset.

7.2 IF Phase Locked Loop Adjustment

The standard (no offset) IF Local Oscillator frequency is approximately 54.76 MHz. The exact frequency is 44 MHz higher than the 10.76 MHz center frequency of the First IF, offsetting and canceling any frequency error which might result from drift in the frequency of the incoming transport stream.

There is no measurable frequency component at the center of the ATSC 8VSB channel. The ATSC pilot is the only measurable frequency reference in an ATSC signal.

The pilot is located 2.69055944058 MHz below the channel center frequency and 0.3094405594 MHz above the lower channel edge if no offset is applied. In some cases the pilot may be shifted (offset) a precise amount away from this frequency to reduce potential interference.

S5 and S6 control the main PLL loop and provide coarse frequency setting for the board. They are set to produce a nominal 54.76 MHz output from A8. Set S5 and S6 (Figure 7-1) as follows:

Switch S5	1	2	3	4	5	6	7	8
Number:	0	0	1	0	1	0	1	0
Set to:	on	on	off	on	off	on	off	on

Switch S6	1	2	3	4	5	6	7	8
Number:	1	0	0	1	0	0	0	0
Set to:	off	on	on	off	on	on	on	on

NOTE

When setting any of the DIP switches on either PLL board, an OFF produces a "1", and an ON produces a "0".

S1, S2, S3 and S4 control the DDS (Direct Digital Synthesis) circuit which sets the frequency to mHz (millihertz) accuracy.

7.2.1 DDS Setting for No-Offset operation

The DDS frequency is equal to the difference between the channel center frequency and the pilot frequency. If no offset is required, the DDS frequency should be 2.69055944058 MHz. Set the switches as follows:

Switch S1	1	2	3	4	5	6	7	8
Number:	0	1	0	0	0	1	0	0
Set to:	on	off	on	on	on	off	on	on

Switch S2	1	2	3	4	5	6	7	8
Number:	1	1	1	0	0	0	0	0
Set to:	off	off	off	on	on	on	on	on

Switch S3	1	2	3	4	5	6	7	8
Number:	1	1	0	1	1	0	0	1
Set to:	off	off	on	off	off	on	on	off

Switch S4	1	2	3	4	5	6	7	8
Number:	1	0	1	1	0	0	0	0
Set to:	off	on	off	off	on	on	on	on

A CD-1A™ exciter which has the IF PLL switches set as shown above should center the second IF at exactly 44 MHz.

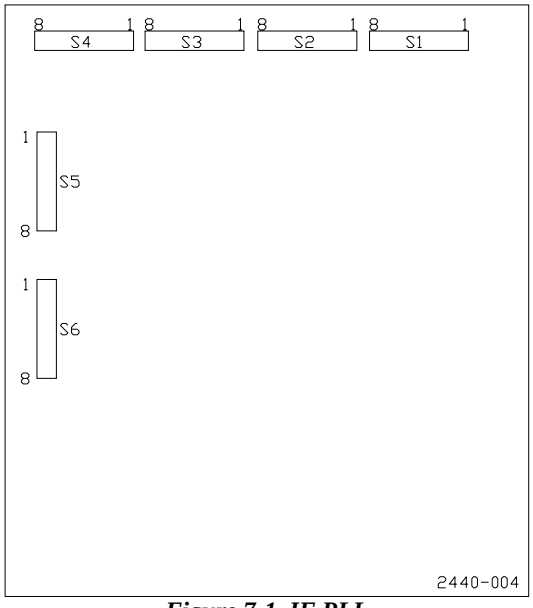

Figure 7-1 IF PLL

WARNING: Disconnect primary power prior to servicing.

NOTE

In the 44 MHz Second IF of the exciter, the frequencies are inverted, with the pilot at the upper edge of the bandpass. The pilot frequency in the Second IF should be 46.69055944 MHz.

Using the procedure and settings described in 7.4, UHF/VHF PLL, the exciter output can then be placed on the desired TV channel.

7.2.2 Offset Operation

Many DTV stations will need to use an offset frequency to minimize interference from or to another TV station, on the same channel or on an adjacent channel. Examples of channel assignments which can call for use of an offset are:

- A Co-Channel DTV transmitter with an area of signal overlap.
- A Co-Channel NTSC transmitter with signal area overlap.
- An NTSC transmitter on the Lower Adjacent channel (the channel below and adjacent to the DTV channel) with signal area overlap.

NOTE

Frequency offsetting is used to place an interfering signal at a frequency where the interference will be less visible, or where it will have a lessened effect. Many NTSC stations are assigned +10 or -10 kHz offsets for this purpose.

Frequency Offset in the CD 1A™ exciter is accomplished by changing the settings of IF PLL S1, S2, S3 and S4 to shift the Second IF frequency the required amount. Changing the DDS frequency shifts the IF PLL output by the same amount, and this in turn shifts the exciter output frequency by the same amount.

- The DDS frequency is raised to raise the exciter output frequency
- The DDS frequency is lowered to lower the exciter output frequency.

The general method to calculate the new switch settings is:

a. Determine the pilot frequency offset required. Examples are given below.

b. Calculate the new DDS frequency as follows:

Fdds = 2.69055944058 MHz + [Offset in MHz]

c. Calculate a decimal offset number, Nd, as follows:

$Nd = (Fdds\ [in\ MHz]\ / 10) \times 2^{32}$

d. Convert the decimal offset number to a 32 bit binary number, Nb, separated into four 8-bit binary words.

1. S1 is set using the high-order (first) 8-bit word.
2. S2 is set using the next 8-bit word.
3. S3 is set using the next 8-bit word.
4. S4 is set using the low order (last) 8-bit word.

NOTE

These calculations require greater precision than can be found in most pocket calculators. Use a Windows® calculator or a spreadsheet such as Excel or 123.

A very useful way to verify that your calculations are precise enough and that they are correct is to perform the calculation with no offset.

Fdds = 2.69055944058 MHz

$Nd = (2.69055944058\ MHz\ / 10) \times 2^{32}$

$= 1155586480$

Nd is then converted to binary number Nb:

Nb = 01000100 11100000 11011001 10110000

This result becomes the settings of S1, S2, S3 and S4 as shown on the previous page.

To find the pilot frequency produced by these switch settings, simply subtract the Fdds frequency from the center frequency of the channel. Example:

Channel 38 Center = 617 MHz

Pilot Frequency = 617 - 2.69055944058 MHz

= 614.30944055942 MHz

7.2.2.1 Co-Channel DTV Transmitters

When Co-Channel DTV transmitters need to improve reception in a signal overlap area, interference rejection in receivers might be improved if one transmitter were offset in frequency by 1.5 times the DTV segment frequency, which equals 19.403 kHz.

Frequency Tolerance

Both transmitters must be held to within +/- 10 Hz.

NOTE

This offset, although specified by the ATSC, has not currently been specifically authorized by the FCC. Since it offsets the DTV pilot more than 1 kHz, special FCC permission may be required before proceeding.

This offset will also require special tuning of the high-power mask filter used at the transmitter output. It is important to specify the intended offset - precisely - when the transmitter and the mask filter are ordered, to avoid mask filter rework costs.

Offset Calculation

If one transmitter is to be raised in frequency by 19.403 kHz

Fdds = 2.69055944058 MHz - 0.019403 MHz

Fdds = 2.67115644058 MHz.

$Nd = (2.67115644058\ MHz\ / 10) \times 2^{32}$

Nd = 1147252955

Nd, converted to a binary number, produces the following IF PLL switch settings:

Switch S1	1	2	3	4	5	6	7	8
Number:	0	1	0	0	0	1	0	0
Switch S2	1	2	3	4	5	6	7	8
Number:	0	1	1	0	0	0	0	1
Switch S3	1	2	3	4	5	6	7	8
Number:	1	0	1	1	0	0	0	0
Switch S4	1	2	3	4	5	6	7	8
Number:	1	1	0	1	1	0	1	1

To find the pilot frequency:

DTV-DTV Offset Pilot = 617 - 2.67115644058 MHz

= 614.32884355942 MHz

7.2.2.2 Co-Channel DTV and NTSC Transmitters

When there is signal overlap between an NTSC and a DTV transmitter on the same channel, any interference to the NTSC signal by the DTV signal would appear as noise, or snow, and would in most cases not be the major problem caused by signal overlap. The NTSC signal however, if strong enough, could disrupt DTV reception.

DTV receivers contain a switchable comb filter designed to reduce the strength of both NTSC carriers and the NTSC color subcarrier. To optimize the effect of the filter when it is required, the DTV pilot frequency should be shifted to place the NTSC visual carrier near the null in the filter. The ATSC - recommended choice is place the DTV pilot 911.944 kHz below the NTSC visual carrier.

Frequency Tolerance

Both transmitters need only adhere to the standard frequency tolerance of +/- 1 kHz.

Offset Calculation

The NTSC Visual carrier, in NTSC stations which use no frequency offset, is 1.25 MHz above the lower channel edge. Thus, the ATSC pilot would be offset to:

Fpilot = [Lower Channel Edge] + 1.25 - 0.911944 MHz

= [Lower Channel Edge] + 0.338056 MHz

= [Channel Center Frequency] - 3 + 0.338056 MHz

Fdds = [Channel Center Frequency] - 2.6619444 MHz

= 2.6619444 MHz

Nd = (2.6619444 MHz / 10) x 2^{32}

Nd = 1143296414

NOTE

This offset would place the DTV pilot well beyond the 1 kHz tolerance for the channel frequency. FCC approval may be needed in order to use this offset technique.

This offset will also require special tuning of the high-power mask filter used at the transmitter output. It is important to specify the intended offset -precisely - when the transmitter and the mask filter are ordered to avoid mask filter rework costs.

For DTV transmitters offsetting from a co-channel NTSC signal where the NTSC station uses no offset, this calculation produces the following switch settings:

Switch S1	1	2	3	4	5	6	7	8
Number:	0	1	0	0	0	1	0	0
Switch S2	1	2	3	4	5	6	7	8
Number:	0	0	1	0	0	1	0	1
Switch S3	1	2	3	4	5	6	7	8
Number:	0	1	0	1	0	0	0	1
Switch S4	1	2	3	4	5	6	7	8
Number:	1	0	0	1	1	1	1	0

To find the pilot frequency:

DTV-NTSC Offset Pilot = 617 - 2.6619444 MHz

= 614.3380556 MHz

This offset would be suitable **only** where the NTSC transmitter used no offset

The table of assignments for NTSC transmitters calls for a frequency offset of +10 kHz or -10 kHz in many locations, to help reduce co-channel interference between NTSC transmitters in signal overlap areas.

7.2.2.3 Co-Channel DTV and NTSC, With NTSC Offset

When offsetting the frequency of a DTV transmitter in co-channel overlap areas with an NTSC transmitter, if the NTSC transmitter frequency uses an offset, the NTSC transmitter's offset must be included in the calculation of the DTV offset.

- If the NTSC station uses a -10 kHz offset, the DTV pilot frequency with offset should be 2.6519444 MHz

- If the NTSC station uses a +10 kHz offset, the DTV pilot frequency with offset should be 2.6719444 MHz

NOTE

Although NTSC stations assigned offset channels may use precise offset frequencies of +/-10.01 kHz instead of +/- 10 kHz, this small difference is well within the required +/- 1 kHz frequency tolerance for an ATSC transmitter. Use of NTSC precise offset does not affect the co-channel offset frequency.

7.2.2.4 DTV transmitters with Lower-Adjacent NTSC

This case can be particularly troublesome. If an NTSC station receives a strong enough DTV signal from the channel above it in part of its coverage area, the pilot from the DTV transmitter can mix with the NTSC aural and produce a product near the color subcarrier frequency. Color banding interference can result.

The FCC has provided for this difficulty by coding a number of DTV channels in the Table of Assignments with the letter "c". (73.662, Paragraph b)

Any DTV station on a channel marked "c" in the Table of assignments, with an NTSC transmitter within 88 km operating on the lower adjacent channel to the DTV transmitter, must use a specified offset frequency for its pilot. (In some cases, DTV stations may also need to provide this protection for LPTV stations.)

The frequency offset must place the DTV pilot frequency 5.082138 MHz higher than the NTSC Visual Carrier frequency.

Frequency Tolerance

The frequency tolerance of the offset is +/- 3 Hz, which calls for both stations to use precise frequency control.

NOTE

Check current FCC Rules and your authorization before applying this offset.

This offset will also require special tuning of the high-power mask filter used at the transmitter output. It is important to specify the intended offset - precisely -when the transmitter and the mask filter are ordered to avoid mask filter rework costs.

Offset Calculation

If the NTSC transmitter uses a non-offset visual carrier frequency, its visual carrier is 4.75 MHz below the NTSC upper channel edge, which is also the adjacent DTV lower channel edge.

Fpilot = [DTV Lower Edge] + (5.082138 - 4.75) MHz

= [DTV Lower Edge + 0.3321380 MHz

Fdds = [DTV Channel Center] - 3 MHz + 0.3321380 MHz

Fdds = 2.6678620 MHz

Nd = 1145838004

Converting Nd to Nb, these are the settings for S1 - S4::

Switch S1	1	2	3	4	5	6	7	8
Number:	0	1	0	0	0	1	0	0
Switch S2	1	2	3	4	5	6	7	8
Number:	0	1	0	0	1	1	0	0
Switch S3	1	2	3	4	5	6	7	8
Number:	0	0	0	1	1	0	0	1
Switch S4	1	2	3	4	5	6	7	8
Number:	1	0	1	1	0	1	0	0

To find the pilot frequency for a DTV transmitter offset by a lower-adjacent NTSC transmitter (no NTSC Offset):

Offset Pilot = 617 - 2.6678620 MHz

= 614.3321380 MHz

7.2.2.5 Lower-Adjacent NTSC with NTSC Offset

Any offset of the NTSC transmitter must be used to offset the ATSC pilot frequency as well, but we must be very precise in this case as the frequency tolerance is +/- 3 Hz.

NTSC stations frequently use precise offset for improved performance, setting a +10 kHz transmitter to +10.01 kHz, or a -10 kHz transmitter to -10.01 kHz. The offset pilot frequency must use the exact offset used by the NTSC transmitter to stay within the +/- 3 Hz tolerance.

To offset from a lower-adjacent NTSC transmitter which uses NTSC offset, the procedure to calculate the switch settings is modified as follows:

a. Determine the **exact** NTSC offset in use.
b. Offset the new pilot frequency from 2.6678620 MHz by the amount of the NTSC offset.

Fdds = 2.6678620 - [NTSC Offset] MHz

NOTE

Fdds is the amount (in MHz) by which the pilot is **lower** *than the channel center. Therefore, the NTSC Offset must be* **subtracted** *from Fdds to find the new Fdds offset value.*

c. Calculate a decimal offset number, Nd.
d. Convert the decimal offset number to a 32 bit binary number, separated into four 8-bit binary words.
   1. S1 is set using the high-order (first) 8-bit word.
   2. S2 is set using the next 8-bit word.
   3. S3 is set using the next 8-bit word.
   4. S4 is set using the low-order (last) 8-bit word.

7.3 UHF/VHF PLL

The UHF/VHF PLL produces the second LO signal used to shift the 44MHz Second IF to the output channel frequency. S1, S2, S3 and S4 on the UHF/VHF PLL board (Figure 7-2) are used to select the frequency.

Refer to Table 7-1 to find the binary number for each switch. When setting these switches to select the proper channel output, setting a switch section ON sends a binary “0"; setting the switch to OFF sends a binary ”1". Thus, for channel 14, S1 on the UHF/VHF PLL would be set as follows:

Switch S1	1	2	3	4	5	6	7	8
Number:	1	0	0	0	1	0	0	1
Set to:	off	on	on	on	off	on	on	off

S2, S3 and S4 would be set in similar manner, to the values given in Table 7-1

If the channel selection is changed, the High and Low frequency limits must be reset using the following procedure.

7.3.1 Setting the High and Low Frequency Limits

If the output channel is changed, R37 (High Frequency Limit) and R51 (Low Frequency Limit) should be reset. Use this procedure:

a. Turn R37 full CW (Clockwise). Turn R51 fully CCW (Counter clockwise).

b. Connect a spectrum analyzer to J5 (LO Out) and set the analyzer to a center frequency of 680 MHz and a span of 500MHz.

c. If DS2 is dark, indicating U17 is locked, proceed to step d. If DS2 is illuminated, check the frequency of the PLL output. When U17 is unlocked, the frequency is either above or below the frequency you have selected with S1 - S4.

   1. If the frequency is low, adjust R51 slowly CW until lock is acquired (DS2 is dark).
   2. If the frequency is high, slowly adjust R37 CCW until lock is acquired (DS2 is dark).

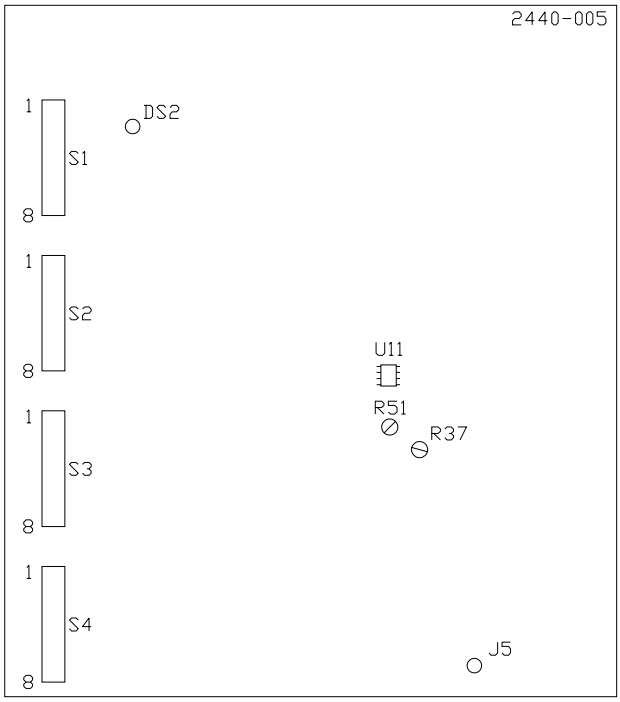

Figure 7-2 UHF/VHF PLL

d. With U17 locked (DS2 should be dark), perform the following two steps to ensure reliable lockup over the full operating temperature range:

   1. Observe pin 2 of U11 with an accurate VOM. Adjust R37 (upper limit) for -0.25V.
   2. Observe pin 6 of U11. Adjust R51 (lower limit) for +0.25V.

e. Turn exciter power off briefly and then on to verify the VHF/UHF PLL locks.

NOTE

If the exciter is moved to another UHF channel, the UHF Band Pass Filter must be retuned (UHF channels only). Refer to Section 5.6.4, UHF Band Pass Filter for instructions. If moved to a VHF channel, a new filter for the desired channel must be installed.

WARNING: Disconnect primary power prior to servicing.

Table 7-1

Channel	LO	Loop1	S1	S2	Loop2	S3	S4
			12345678	12345678		12345678	12345678
2	101	90	10001000	10010000	11	10010101	00010000
3	107	95	10000100	10010000	12	10011101	00010000
4	113	100	10001100	10010000	13	10010011	00010000
5	123	110	10001010	10010000	13	10010011	00010000
6	129	115	10000110	10010000	14	10011011	00010000
7	221	210	10001001	01010000	11	10010101	00010000
8	227	215	10000101	01010000	12	10011101	00010000
9	233	220	10001101	01010000	13	10010011	00010000
10	239	225	10000011	01010000	14	10011011	00010000
11	245	230	10001011	01010000	15	10010111	00010000
12	251	240	10001111	01010000	11	10010101	00010000
13	257	245	10000000	11010000	12	10011101	00010000
14	517	505	10001001	00001000	12	10011101	00010000
15	523	510	10001001	00000100	13	10010011	00010000
16	529	515	10001001	00001100	14	10011011	00010000
17	535	525	10001001	00001010	10	10011001	00010000
18	541	530	10001001	00000110	11	10010101	00010000
19	547	535	10001001	00001110	12	10011101	00010000
20	553	540	10001001	00000001	13	10010011	00010000
21	559	545	10001001	00001001	14	10011011	00010000
22	565	555	10000101	00001000	10	10011001	00010000
23	571	560	10000101	00000100	11	10010101	00010000
24	577	565	10000101	00001100	12	10011101	00010000
25	583	570	10000101	00000010	13	10010011	00010000
26	589	575	10000101	00001010	14	10011011	00010000
27	595	585	10000101	00001110	10	10011001	00010000
28	601	590	10000101	00000001	11	10010101	00010000
29	607	595	10000101	00001001	12	10011101	00010000
30	613	600	10001101	00000000	13	10010011	00010000
31	619	605	10001101	00001000	14	10011011	00010000
32	625	615	10001101	00001100	10	10011001	00010000
33	631	620	10001101	00000010	11	10010101	00010000
34	637	625	10001101	00001010	12	10011101	00010000
35	643	630	10001101	00000110	13	10010011	00010000
36	649	635	10001101	00001110	14	10011011	00010000
37	655	645	10001101	00001001	10	10011001	00010000
38	661	650	10000011	00000000	11	10010101	00010000
39	667	655	10000011	00001000	12	10011101	00010000
40	673	660	10000011	00000100	13	10010011	00010000
41	679	665	10000011	00001100	14	10011011	00010000
42	685	675	10000011	00001010	10	10011001	00010000
43	691	680	10000011	00000110	11	10010101	00010000
44	697	685	10000011	00001110	12	10011101	00010000
45	703	690	10000011	00000001	13	10010011	00010000
46	709	695	10000011	00001001	14	10011011	00010000
47	715	705	10001011	00001000	10	10011001	00010000
48	721	710	10001011	00000100	11	10010101	00010000
49	727	715	10001011	00001100	12	10011101	00010000
50	733	720	10001011	00000010	13	10010011	00010000
51	739	725	10001011	00001010	14	10011011	00010000
52	745	735	10001011	00001110	10	10011001	00010000
53	751	740	10001011	00000001	11	10010101	00010000
54	757	745	10001011	00001001	12	10011101	00010000
55	763	750	10000111	00000000	13	10010011	00010000
56	769	755	10000111	00001000	14	10011011	00010000
57	775	765	10000111	00001100	10	10011001	00010000
58	781	770	10000111	00000010	11	10010101	00010000
59	787	775	10000111	00001010	12	10011101	00010000
60	793	780	10000111	00000101	13	10010011	00010000
61	799	785	10000111	00001110	14	10011011	00010000
62	805	795	10000111	00001001	10	10011001	00010000
63	811	800	10001111	00000000	11	10010101	00010000
64	817	805	10001111	00001000	12	10011101	00010000
65	823	810	10001111	00000100	12	10010011	00010000
66	829	815	10001111	00001100	14	10011011	00010000
67	835	825	10001111	00001010	10	10011001	00010000
68	841	830	10001111	00000110	11	10010101	00010000
69	847	835	10001111	00001110	12	10011101	00010000

WARNING: Disconnect primary power prior to servicing.

Section VIII
Parts List

Replaceable Parts List Index

Table 8-1. EXCITER,CD-1A UHF OR VHF TUNED - 994 9785 001

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (b)*
250 0274 000	CORD, POWER 3C 7-1/2 FT	0.0 EA	*SELECT QTY 1 FOR TABLETOP*
358 3579 000	SLIDES, DRAWER	0.0 EA	*SELECT QTY 1 FOR CABINET INSTALLATION*
817 2462 200	RUNNING LIST, CD-1A	0.0 EA	
828 5886 001	SPEC, CHART, BP FILTER	0.0 EA	
843 5466 240	DIAG, CD-1 EXCITER	0.0 EA	
917 2462 175	KIT, UHF CH 14-34	0.0 EA	*SELECT QTY 1 FOR CH-14 TO CH-34*
917 2462 176	KIT, UHF CH 35-69	0.0 EA	*SELECT QTY 1 FOR CH-35 TO CH-69*
917 2462 177	KIT, VHF CH2	0.0 EA	*SELECT QTY 1 FOR CH-2*
917 2462 178	KIT, VHF CH3	0.0 EA	*SELECT QTY 1 FOR CH-3*
917 2462 179	KIT, VHF CH4	0.0 EA	*SELECT QTY 1 FOR CH-4*
917 2462 180	KIT, VHF CH5	0.0 EA	*SELECT QTY 1 FOR CH-5*
917 2462 181	KIT, VHF CH6	0.0 EA	*SELECT QTY 1 FOR CH-6*
917 2462 182	KIT, VHF CH7	0.0 EA	*SELECT QTY 1 FOR CH-7*
917 2462 183	KIT, VHF CH8	0.0 EA	*SELECT QTY 1 FOR CH-8*
917 2462 184	KIT, VHF CH9	0.0 EA	*SELECT QTY 1 FOR CH-9*
917 2462 185	KIT, VHF CH10	0.0 EA	*SELECT QTY 1 FOR CH-10*
917 2462 186	KIT, VHF CH11	0.0 EA	*SELECT QTY 1 FOR CH-11*
917 2462 187	KIT, VHF CH12	0.0 EA	*SELECT QTY 1 FOR CH-12*
917 2462 188	KIT, VHF CH13	0.0 EA	*SELECT QTY 1 FOR CH-13*
988 2434 001	DP, EXCITER CD-1A	0.0 EA	
992 9940 021	PWA, MAIN L.O.PLL UHF CH 14-42	0.0 EA	*SELECT QTY 1 FOR CH-14 TO CH-42*
992 9940 031	PWA, MAIN L.O.PLL UHF CH 43-69	0.0 EA	*SELECT QTY 1 FOR CH-43 TO CH-69*
992 9943 001	EXCITER, CD-1A BASIC	1.0 EA	
992 9943 002	KIT, SPARE BOARDS, CH2-CH6	0.0 EA	
992 9943 003	KIT, SPARE BOARDS CH7-CH13	0.0 EA	
992 9943 004	KIT, SPARE BOARDS CH14-CH42	0.0 EA	
992 9943 005	KIT, SPARE BOARDS CH43-CH69	0.0 EA	

Table 8-2. KIT, UHF CH 14-34 - 917 2462 175

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (b)*
917 2462 189	CABLE, W46, SMA-SMA	1.0 EA	W046
917 2462 190	CABLE, W47, SMA-SMA	1.0 EA	W047
917 2462 214	CABLE, W48, SMA-SMA	1.0 EA	W048
992 9769 002	FILTER UHF BANDPASS CH 14-34	1.0 EA	

Table 8-3. FILTER UHF BANDPASS CH 14-34 - 992 9769 002

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (c)*
517 0055 000	CAP VARIABLE .6 TO 4.5 PF	6.0 EA	C001 C002 C003 C004 C005 C006
612 1507 000	CONN SMA FEMALE BULKHEAD	2.0 EA	J001 J002
843 5466 161	SCH, BAND PASS FILTER	0.0 EA	
843 5466 503	PWB, UHF BANDPASS FILTER LB	1.0 EA	
917 2462 034	BOX, BAND PASS FILTER	1.0 EA	
917 2462 035	COVER, BAND PASS FILTER	1.0 EA	
917 2462 036	DIVIDER, BAND PASS FILTER	1.0 EA	
999 2893 001	HARDWARE LIST, BANDPASS FILTER	1.0 EA	

Table 8-4. KIT, UHF CH 35-69 - 917 2462 176

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (b)*
917 2462 189	CABLE, W46, SMA-SMA	1.0 EA	W046
917 2462 190	CABLE, W47, SMA-SMA	1.0 EA	W047
917 2462 214	CABLE, W48, SMA-SMA	1.0 EA	W048
992 9769 003	FILTER UHF BANDPASS CH 35-69	1.0 EA	

Table 8-5. FILTER UHF BANDPASS CH 35-69 - 992 9769 003

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (c)*
517 0055 000	CAP VARIABLE .6 TO 4.5 PF	6.0 EA	C001 C002 C003 C004 C005 C006
612 1507 000	CONN SMA FEMALE BULKHEAD	2.0 EA	J001 J002
843 5466 161	SCH, BAND PASS FILTER	0.0 EA	
843 5466 443	PWB, UHF BANDPASS FILTER MB	1.0 EA	
917 2462 034	BOX, BAND PASS FILTER	1.0 EA	
917 2462 035	COVER, BAND PASS FILTER	1.0 EA	
917 2462 036	DIVIDER, BAND PASS FILTER	1.0 EA	
999 2893 001	HARDWARE LIST, BANDPASS FILTER	1.0 EA	

Table 8-6. KIT, VHF CH2 - 917 2462 177

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (b)*
358 3434 000	TY-RAP MTG BASE .316" TIE	4.0 EA	
484 0098 000	FLTR BANDPASS CH-2,E3,A1	2.0 EA	
917 2462 191	CABLE, W19, SMA RT-BNC RT	1.0 EA	W019
917 2462 192	CABLE, W20, SMA RT-BNC RT	1.0 EA	W020
917 2462 215	CABLE, W57, SMA RT-BNC RT	1.0 EA	W057
917 2462 216	CABLE, W58, SMA RT-BNC RT	1.0 EA	W058
992 9940 001	PWA, MAIN L.O. PLL VHF CH 2-6	1.0 EA	

Table 8-7. PWA, MAIN L.O. PLL VHF CH 2-6 - 992 9940 001

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (c)*
384 0780 000	LED, RED ESD	2.0 EA	DS001 DS002
492 0839 000	IND 330 UH 10% 500MA	3.0 EA	L012 L013 L014
522 0590 000	CAP 470UF 25V 20%	3.0 EA	C074 C075 C076
550 0928 000	POT 20K OHM 1/2W	2.0 EA	R037 R051
610 0900 000	HEADER 3 CKT STRAIGHT	2.0 EA	JP001 JP002
610 1288 000	PLUG 9 PIN	1.0 EA	J009
612 1184 000	SHUNT JUMPER 0.1" CENTERS	2.0 EA	JP001 JP002
620 0700 000	*RECPT, MALE SMB,PC MOUNT	8.0 EA	J001 J002 J003 J004 J005 J006 J007 J008
620 2952 000	JACK RECEPTACLE BULKHEAD SMC	1.0 EA	
843 5466 851	SCH, SECOND LO PLL	0.0 EA	
992 9940 002	*PWA, MAIN LO CH 2-6, SMT	1.0 EA	

Table 8-8. *PWA, MAIN LO CH 2-6, SMT - 992 9940 002

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (g)*
000 0000 010	B/M NOTE:	0.0 EA	CR007 CR008 CR009 ARE SKIPS FOR REF ONLY DRAFTING SHAPE
381 0017 000	XSTR BC847 NPN ESD	2.0 EA	Q001 Q002
382 1341 000	IC LRPS-2-4 ESD	1.0 EA	U006
382 1618 000	IC LRPS-3-850 ESD	1.0 EA	U008

383 0029 000	IC, 78L05 ESD	2.0 EA	U019 U020
383 0030 000	IC, 79L05 ESD	1.0 EA	U021
383 0104 000	IC LRMS-2 ESD	1.0 EA	U004
383 0125 000	IC Q3236I SMT ESD	2.0 EA	U015 U017
383 0171 000	IC MAR-3SM ESD	5.0 EA	U002 U005 U007 U013 U014
383 0173 000	IC MC10216 ESD	2.0 EA	U016 U018
383 0201 000	IC, 1007 SMT ESD	2.0 EA	U009 U010
383 0256 000	IC, TL072 OP AMP SMT ESD	2.0 EA	U011 U012
383 0341 000	IC, JTOS-150 ESD	2.0 EA	U001 U003
385 0001 000	DIODE, RECT 4148 / 914 ESD	11.0 EA	CR001 CR002 CR003 CR004 CR005 CR006 CR010 CR011 CR012 CR013 CR014
496 0026 000	IND CHIP .820 UH 10%	2.0 EA	L006 L009
496 0028 000	IND CHIP 1 UH 10%	4.0 EA	L001 L005 L008 L011
496 0043 000	IND CHIP 18 UH 10%	2.0 EA	L003 L007
496 0044 000	IND CHIP 22 UH 10%	1.0 EA	L002
496 0046 000	IND CHIP 33 UH 10%	1.0 EA	L004
496 0061 000	IND, CHIP 3.3UH	1.0 EA	L010
496 0077 000	IND CHIP, 100UH 10%	2.0 EA	L015 L016
515 0035 000	*CAP 12PF 50V 5% 1206 COG	1.0 EA	C032
515 0040 000	*CAP 33PF 50V 5% 1206 COG	5.0 EA	C024 C031 C033 C050 C057
515 0046 000	*CAP 100PF 50V 5% 1206 COG	4.0 EA	C055 C062 C079 C088
515 0049 000	*CAP 180PF 50V 5% 1206 COG	1.0 EA	C021
515 0054 000	*CAP 470PF 50V 5% 1206 COG	4.0 EA	C019 C023 C025 C044
515 0056 000	CAP CHIP 680PF 5% 50V	1.0 EA	C012
515 0078 000	*CAP CHIP 1000PF 10% 50V	6.0 EA	C027 C035 C042 C047 C049 C060
515 0081 000	*CAP 3300PF 50V 10% 1206 X7R	2.0 EA	C010 C028
515 0082 000	*CAP 4700PF 50V 10% 1206 X7R	1.0 EA	C018
515 0083 000	*CAP 6800PF 50V 10% 1206 X7R	2.0 EA	C008 C020
515 0084 000	*CAP .01UF 50V 10% 1206 X7R	39.0 EA	C001 C002 C003 C004 C007 C009 C011 C014 C017 C022 C029 C036 C041 C051 C061 C064 C065 C068 C069 C070 C071 C072 C073 C077 C078 C080 C081 C082 C083 C084 C085 C086 C087 C089 C090 C091 C092 C093 C094
515 0137 501	CAP 0.1UF 50V 10% 1206 X7R	21.0 EA	C026 C030 C034 C038 C039 C040 C045 C046 C048 C052 C059 C066 C067 C095 C096 C097 C098 C099 C100 C101 C102
515 0137 517	CAP 0.47UF 25V 10% 1206 X7R	2.0 EA	C037 C056
515 0158 000	CAP 0.22 UF 50V 20% 1206 Z5U	2.0 EA	C013 C054
522 0634 000	CAP 10UF 25V	8.0 EA	C005 C006 C015 C016 C043 C053 C058 C063
545 0309 103	RES 12.1 OHM 1% 1/4W 1206	5.0 EA	R010 R029 R035 R048 R064
545 0309 107	RES 18.2 OHM 1% 1/4W 1206	4.0 EA	R008 R009 R016 R026
545 0309 115	RES 39.2 OHM 1% 1/4W 1206	4.0 EA	R052 R059 R067 R074
545 0309 118	RES 51.1 OHM 1% 1/4W 1206	2.0 EA	R098 R099
545 0309 122	RES 75 OHM 1% 1/4W 1206	2.0 EA	R019 R021
545 0309 201	RES 100 OHM 1% 1/4W 1206	6.0 EA	R014 R018 R032 R034 R094 R095
545 0309 202	RES 110 OHM 1% 1/4W 1206	1.0 EA	R020
545 0309 208	RES 200 OHM 1% 1/4W 1206	6.0 EA	R002 R003 R056 R058 R070 R082
545 0309 212	RES 301 OHM 1% 1/4W 1206	8.0 EA	R006 R007 R012 R013 R015 R017 R023 R027
545 0309 213	RES 332 OHM 1% 1/4W 1206	4.0 EA	R033 R061 R092 R093
545 0309 216	RES 432 OHM 1% 1/4W 1206	10.0 EA	R004 R011 R025 R030 R031 R036 R038 R049 R065 R073
545 0309 218	RES 511 OHM 1% 1/4W 1206	9.0 EA	

			R076 R077 R083 R084 R087 R088 R091 R096 R097
545 0309 220	RES 619 OHM 1% 1/4W 1206	10.0 EA	R022 R024 R039 R042 R045 R047 R050 R054 R080 R086
545 0309 221	RES 681 OHM 1% 1/4W 1206	4.0 EA	R057 R062 R066 R071
545 0309 222	RES 750 OHM 1% 1/4W 1206	2.0 EA	R028 R060
545 0309 301	RES 1K OHM 1% 1/4W 1206	4.0 EA	R001 R005 R040 R046
545 0309 308	RES 2K OHM 1% 1/4W 1206	4.0 EA	R055 R068 R072 R075
545 0309 401	RES 10K OHM 1% 1/4W 1206	4.0 EA	R081 R085 R089 R090
545 0309 408	RES 20K OHM 1% 1/4W 1206	2.0 EA	R041 R044
545 0309 409	RES 22.1K OHM 1% 1/4W 1206	1.0 EA	R043
545 0309 413	RES 33.2K OHM 1% 1/4W 1206	2.0 EA	R078 R079
545 0309 508	RES 200K OHM 1% 1/4W 1206	1.0 EA	R053
604 1162 000	DIPSWITCH, 8 SPST SMT	4.0 EA	S001 S002 S003 S004
843 5466 851	SCH, SECOND LO PLL	0.0 EA	
843 5466 853	PWB, SECOND LO PLL	1.0 EA	

Table 8-9. KIT, VHF CH3 - 917 2462 178

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (b)*
358 3434 000	TY-RAP MTG BASE .316" TIE	4.0 EA	
484 0099 000	FLTR BANDPASS CH-3, R2	2.0 EA	
917 2462 191	CABLE, W19, SMA RT-BNC RT	1.0 EA	W019
917 2462 192	CABLE, W20, SMA RT-BNC RT	1.0 EA	W020
917 2462 215	CABLE, W57, SMA RT-BNC RT	1.0 EA	W057
917 2462 216	CABLE, W58, SMA RT-BNC RT	1.0 EA	W058
992 9940 001	PWA, MAIN L.O. PLL VHF CH 2-6	1.0 EA	

Table 8-10. KIT, VHF CH4 - 917 2462 179

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (b)*
358 3434 000	TY-RAP MTG BASE .316" TIE	4.0 EA	
484 0100 000	FILTER BANDPASS CH-4	2.0 EA	
917 2462 191	CABLE, W19, SMA RT-BNC RT	1.0 EA	W019
917 2462 192	CABLE, W20, SMA RT-BNC RT	1.0 EA	W020
917 2462 215	CABLE, W57, SMA RT-BNC RT	1.0 EA	W057
917 2462 216	CABLE, W58, SMA RT-BNC RT	1.0 EA	W058
992 9940 001	PWA, MAIN L.O. PLL VHF CH 2-6	1.0 EA	

Table 8-11. KIT, VHF CH5 - 917 2462 180

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (b)*
358 3434 000	TY-RAP MTG BASE .316" TIE	4.0 EA	
484 0101 000	FLTR BANDPASS CH-5, R3	2.0 EA	
917 2462 191	CABLE, W19, SMA RT-BNC RT	1.0 EA	W019
917 2462 192	CABLE, W20, SMA RT-BNC RT	1.0 EA	W020
917 2462 215	CABLE, W57, SMA RT-BNC RT	1.0 EA	W057
917 2462 216	CABLE, W58, SMA RT-BNC RT	1.0 EA	W058
992 9940 001	PWA, MAIN L.O. PLL VHF CH 2-6	1.0 EA	

Table 8-12. KIT, VHF CH6 - 917 2462 181

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (b)*
358 3434 000	TY-RAP MTG BASE .316" TIE	4.0 EA	
484 0102 000	FLTR BANDPASS CH-6, R4	2.0 EA	
917 2462 191	CABLE, W19, SMA RT-BNC RT	1.0 EA	W019
917 2462 192	CABLE, W20, SMA RT-BNC RT	1.0 EA	W020
917 2462 215	CABLE, W57, SMA RT-BNC RT	1.0 EA	W057
917 2462 216	CABLE, W58, SMA RT-BNC RT	1.0 EA	W058
992 9940 001	PWA, MAIN L.O. PLL VHF CH 2-6	1.0 EA	

Table 8-13. KIT, VHF CH7 - 917 2462 182

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (b)*
358 3434 000	TY-RAP MTG BASE .316" TIE	4.0 EA	
484 0072 000	FLTR BANDPASS CH-7,E5,A6,R6	2.0 EA	
917 2462 191	CABLE, W19, SMA RT-BNC RT	1.0 EA	W019
917 2462 192	CABLE, W20, SMA RT-BNC RT	1.0 EA	W020
917 2462 215	CABLE, W57, SMA RT-BNC RT	1.0 EA	W057
917 2462 216	CABLE, W58, SMA RT-BNC RT	1.0 EA	W058
992 9940 011	PWA, MAIN L.O. PLL VHF CH 7-13	1.0 EA	

Table 8-14. PWA, MAIN L.O. PLL VHF CH 7-13 - 992 9940 011

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (c)*
384 0780 000	LED, RED ESD	2.0 EA	DS001 DS002
492 0839 000	IND 330 UH 10% 500MA	3.0 EA	L012 L013 L014
522 0590 000	CAP 470UF 25V 20%	3.0 EA	C074 C075 C076
550 0928 000	POT 20K OHM 1/2W	2.0 EA	R037 R051
610 0900 000	HEADER 3 CKT STRAIGHT	2.0 EA	JP001 JP002
610 1288 000	PLUG 9 PIN	1.0 EA	J009
612 1184 000	SHUNT JUMPER 0.1" CENTERS	2.0 EA	JP001 JP002
620 0700 000	*RECPT, MALE SMB,PC MOUNT	8.0 EA	J001 J002 J003 J004 J005 J006 J007 J008
620 2952 000	JACK RECEPTACLE BULKHEAD SMC	1.0 EA	
843 5466 851	SCH, SECOND LO PLL	0.0 EA	
992 9940 012	*PWA, MAIN LO CH 7-13, SMT	1.0 EA	

Table 8-15. *PWA, MAIN LO CH 7-13, SMT - 992 9940 012

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (g)*
000 0000 010	B/M NOTE:	0.0 EA	CR007 CR008 CR009 ARE SKIPS FOR REF ONLY DRAFTING SHAPE
381 0017 000	XSTR BC847 NPN ESD	2.0 EA	Q001 Q002
382 1341 000	IC LRPS-2-4 ESD	1.0 EA	U006
382 1618 000	IC LRPS-3-850 ESD	1.0 EA	U008
383 0029 000	IC, 78L05 ESD	2.0 EA	U019 U020
383 0030 000	IC, 79L05 ESD	1.0 EA	U021
383 0104 000	IC LRMS-2 ESD	1.0 EA	U004
383 0125 000	IC Q3236I SMT ESD	2.0 EA	U015 U017
383 0171 000	IC MAR-3SM ESD	5.0 EA	U002 U005 U007 U013 U014
383 0173 000	IC MC10216 ESD	2.0 EA	U016 U018
383 0201 000	IC, 1007 SMT ESD	2.0 EA	U009 U010
383 0256 000	IC, TL072 OP AMP SMT ESD	2.0 EA	U011 U012
383 0342 000	IC, JTOS-300 ESD	2.0 EA	U001 U003
385 0001 000	DIODE, RECT 4148 / 914 ESD	11.0 EA	

			CR001 CR002 CR003 CR004 CR005 CR006 CR010 CR011 CR012 CR013 CR014
496 0026 000	IND CHIP .820 UH 10%	2.0 EA	L006 L009
496 0028 000	IND CHIP 1 UH 10%	4.0 EA	L001 L005 L008 L011
496 0043 000	IND CHIP 18 UH 10%	2.0 EA	L003 L007
496 0044 000	IND CHIP 22 UH 10%	1.0 EA	L002
496 0046 000	IND CHIP 33 UH 10%	1.0 EA	L004
496 0061 000	IND, CHIP 3.3UH	1.0 EA	L010
496 0077 000	IND CHIP, 100UH 10%	2.0 EA	L015 L016
515 0035 000	*CAP 12PF 50V 5% 1206 COG	1.0 EA	C032
515 0040 000	*CAP 33PF 50V 5% 1206 COG	5.0 EA	C024 C031 C033 C050 C057
515 0046 000	*CAP 100PF 50V 5% 1206 COG	4.0 EA	C055 C062 C079 C088
515 0049 000	*CAP 180PF 50V 5% 1206 COG	1.0 EA	C021
515 0054 000	*CAP 470PF 50V 5% 1206 COG	4.0 EA	C019 C023 C025 C044
515 0056 000	CAP CHIP 680PF 5% 50V	1.0 EA	C012
515 0078 000	*CAP CHIP 1000PF 10% 50V	6.0 EA	C027 C035 C042 C047 C049 C060
515 0081 000	*CAP 3300PF 50V 10% 1206 X7R	2.0 EA	C010 C028
515 0082 000	*CAP 4700PF 50V 10% 1206 X7R	1.0 EA	C018
515 0083 000	*CAP 6800PF 50V 10% 1206 X7R	2.0 EA	C008 C020
515 0084 000	*CAP .01UF 50V 10% 1206 X7R	39.0 EA	C001 C002 C003 C004 C007 C009 C011 C014 C017 C022 C029 C036 C041 C051 C061 C064 C065 C068 C069 C070 C071 C072 C073 C077 C078 C080 C081 C082 C083 C084 C085 C086 C087 C089 C090 C091 C092 C093 C094
515 0137 501	CAP 0.1UF 50V 10% 1206 X7R	21.0 EA	C026 C030 C034 C038 C039 C040 C045 C046 C048 C052 C059 C066 C067 C095 C096 C097 C098 C099 C100 C101 C102
515 0137 517	CAP 0.47UF 25V 10% 1206 X7R	2.0 EA	C037 C056
515 0158 000	CAP 0.22 UF 50V 20% 1206 Z5U	2.0 EA	C013 C054
522 0634 000	CAP 10UF 25V	8.0 EA	C005 C006 C015 C016 C043 C053 C058 C063
545 0309 103	RES 12.1 OHM 1% 1/4W 1206	5.0 EA	R010 R029 R035 R048 R064
545 0309 107	RES 18.2 OHM 1% 1/4W 1206	4.0 EA	R008 R009 R016 R026
545 0309 115	RES 39.2 OHM 1% 1/4W 1206	4.0 EA	R052 R059 R067 R074
545 0309 118	RES 51.1 OHM 1% 1/4W 1206	2.0 EA	R098 R099
545 0309 122	RES 75 OHM 1% 1/4W 1206	2.0 EA	R019 R021
545 0309 201	RES 100 OHM 1% 1/4W 1206	6.0 EA	R014 R018 R032 R034 R094 R095
545 0309 202	RES 110 OHM 1% 1/4W 1206	1.0 EA	R020
545 0309 208	RES 200 OHM 1% 1/4W 1206	6.0 EA	R002 R003 R056 R058 R070 R082
545 0309 212	RES 301 OHM 1% 1/4W 1206	8.0 EA	R006 R007 R012 R013 R015 R017 R023 R027
545 0309 213	RES 332 OHM 1% 1/4W 1206	4.0 EA	R033 R061 R092 R093
545 0309 216	RES 432 OHM 1% 1/4W 1206	10.0 EA	R004 R011 R025 R030 R031 R036 R038 R049 R065 R073
545 0309 218	RES 511 OHM 1% 1/4W 1206	9.0 EA	R076 R077 R083 R084 R087 R088 R091 R096 R097
545 0309 220	RES 619 OHM 1% 1/4W 1206	10.0 EA	R022 R024 R039 R042 R045 R047 R050 R054 R080 R086
545 0309 221	RES 681 OHM 1% 1/4W 1206	4.0 EA	R057 R062 R066 R071
545 0309 222	RES 750 OHM 1% 1/4W 1206	2.0 EA	R028 R060
545 0309 301	RES 1K OHM 1% 1/4W 1206	4.0 EA	R001 R005 R040 R046
545 0309 308	RES 2K OHM 1% 1/4W 1206	4.0 EA	R055 R068 R072 R075
545 0309 401	RES 10K OHM 1% 1/4W 1206	4.0 EA	R081 R085 R089 R090

545 0309 408	RES 20K OHM 1% 1/4W 1206	2.0 EA	R041 R044
545 0309 409	RES 22.1K OHM 1% 1/4W 1206	1.0 EA	R043
545 0309 413	RES 33.2K OHM 1% 1/4W 1206	2.0 EA	R078 R079
545 0309 508	RES 200K OHM 1% 1/4W 1206	1.0 EA	R053
604 1162 000	DIPSWITCH, 8 SPST SMT	4.0 EA	S001 S002 S003 S004
843 5466 851	SCH, SECOND LO PLL	0.0 EA	
843 5466 853	PWB, SECOND LO PLL	1.0 EA	

Table 8-16. KIT, VHF CH8 - 917 2462 183

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (b)*
358 3434 000	TY-RAP MTG BASE .316" TIE	4.0 EA	
484 0073 000	FLTR BANDPASS CH-8,E6, A7,R7	2.0 EA	
917 2462 191	CABLE, W19, SMA RT-BNC RT	1.0 EA	W019
917 2462 192	CABLE, W20, SMA RT-BNC RT	1.0 EA	W020
917 2462 215	CABLE, W57, SMA RT-BNC RT	1.0 EA	W057
917 2462 216	CABLE, W58, SMA RT-BNC RT	1.0 EA	W058
992 9940 011	PWA, MAIN L.O. PLL VHF CH 7-13	1.0 EA	

Table 8-17. KIT, VHF CH9 - 917 2462 184

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (b)*
358 3434 000	TY-RAP MTG BASE .316" TIE	4.0 EA	
484 0074 000	FILTER BANDPASS CH-9	2.0 EA	
917 2462 191	CABLE, W19, SMA RT-BNC RT	1.0 EA	W019
917 2462 192	CABLE, W20, SMA RT-BNC RT	1.0 EA	W020
917 2462 215	CABLE, W57, SMA RT-BNC RT	1.0 EA	W057
917 2462 216	CABLE, W58, SMA RT-BNC RT	1.0 EA	W058
992 9940 011	PWA, MAIN L.O. PLL VHF CH 7-13	1.0 EA	

Table 8-18. KIT, VHF CH10 - 917 2462 185

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (b)*
358 3434 000	TY-RAP MTG BASE .316" TIE	4.0 EA	
484 0075 000	FLTR BANDPASS CH-10,E7,A8,R8	2.0 EA	
917 2462 191	CABLE, W19, SMA RT-BNC RT	1.0 EA	W019
917 2462 192	CABLE, W20, SMA RT-BNC RT	1.0 EA	W020
917 2462 215	CABLE, W57, SMA RT-BNC RT	1.0 EA	W057
917 2462 216	CABLE, W58, SMA RT-BNC RT	1.0 EA	W058
992 9940 011	PWA, MAIN L.O. PLL VHF CH 7-13	1.0 EA	

Table 8-19. KIT, VHF CH11 - 917 2462 186

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (b)*
358 3434 000	TY-RAP MTG BASE .316" TIE	4.0 EA	
484 0076 000	FLTR BANDPASS CH-11,E8,A9,R9	2.0 EA	
917 2462 191	CABLE, W19, SMA RT-BNC RT	1.0 EA	W019
917 2462 192	CABLE, W20, SMA RT-BNC RT	1.0 EA	W020
917 2462 215	CABLE, W57, SMA RT-BNC RT	1.0 EA	W057
917 2462 216	CABLE, W58, SMA RT-BNC RT	1.0 EA	W058
992 9940 011	PWA, MAIN L.O. PLL VHF CH 7-13	1.0 EA	

Table 8-20. KIT, VHF CH12 - 917 2462 187

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (b)*
358 3434 000	TY-RAP MTG BASE .316" TIE	4.0 EA	
484 0077 000	FLTR BANDPASS CH-12,E9,R10	2.0 EA	
917 2462 191	CABLE, W19, SMA RT-BNC RT	1.0 EA	W019
917 2462 192	CABLE, W20, SMA RT-BNC RT	1.0 EA	W020
917 2462 215	CABLE, W57, SMA RT-BNC RT	1.0 EA	W057
917 2462 216	CABLE, W58, SMA RT-BNC RT	1.0 EA	W058
992 9940 011	PWA, MAIN L.O. PLL VHF CH 7-13	1.0 EA	

Table 8-21. KIT, VHF CH13 - 917 2462 188

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (b)*
358 3434 000	TY-RAP MTG BASE .316" TIE	4.0 EA	
484 0078 000	FLTR BANDPASS CH-13,E10,A10	2.0 EA	
917 2462 191	CABLE, W19, SMA RT-BNC RT	1.0 EA	W019
917 2462 192	CABLE, W20, SMA RT-BNC RT	1.0 EA	W020
917 2462 215	CABLE, W57, SMA RT-BNC RT	1.0 EA	W057
917 2462 216	CABLE, W58, SMA RT-BNC RT	1.0 EA	W058
992 9940 011	PWA, MAIN L.O. PLL VHF CH 7-13	1.0 EA	

Table 8-22. PWA, MAIN L.O.PLL UHF CH 14-42 - 992 9940 021

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (d)*
384 0780 000	LED, RED ESD	2.0 EA	DS001 DS002
492 0839 000	IND 330 UH 10% 500MA	3.0 EA	L012 L013 L014
522 0590 000	CAP 470UF 25V 20%	3.0 EA	C074 C075 C076
550 0928 000	POT 20K OHM 1/2W	2.0 EA	R037 R051
610 0900 000	HEADER 3 CKT STRAIGHT	2.0 EA	JP001 JP002
610 1288 000	PLUG 9 PIN	1.0 EA	J009
612 1184 000	SHUNT JUMPER 0.1" CENTERS	2.0 EA	JP001 JP002
620 0700 000	*RECPT, MALE SMB,PC MOUNT	8.0 EA	J001 J002 J003 J004 J005 J006 J007 J008
620 2952 000	JACK RECEPTACLE BULKHEAD SMC	1.0 EA	J010
843 5466 851	SCH, SECOND LO PLL	0.0 EA	
992 9940 022	*PWA, MAIN PLL CH 14-42, SMT	1.0 EA	

Table 8-23. *PWA, MAIN PLL CH 14-42, SMT - 992 9940 022

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (g)*
000 0000 010	B/M NOTE:	0.0 EA	CR007 CR008 CR009 ARE SKIPS FOR REF ONLY DRAFTING SHAPE
381 0017 000	XSTR BC847 NPN ESD	2.0 EA	Q001 Q002
382 1341 000	IC LRPS-2-4 ESD	1.0 EA	U006
382 1618 000	IC LRPS-3-850 ESD	1.0 EA	U008
383 0029 000	IC, 78L05 ESD	2.0 EA	U019 U020
383 0030 000	IC, 79L05 ESD	1.0 EA	U021
383 0104 000	IC LRMS-2 ESD	1.0 EA	U004
383 0125 000	IC Q3236I SMT ESD	2.0 EA	U015 U017
383 0171 000	IC MAR-3SM ESD	5.0 EA	U002 U005 U007 U013 U014
383 0173 000	IC MC10216 ESD	2.0 EA	U016 U018
383 0201 000	IC, 1007 SMT ESD	2.0 EA	U009 U010
383 0256 000	IC, TL072 OP AMP SMT ESD	2.0 EA	U011 U012
383 0300 000	VCO 485-765 MHZ SMT ESD	2.0 EA	U001 U003
385 0001 000	DIODE, RECT 4148 / 914 ESD	11.0 EA	

			CR001 CR002 CR003 CR004 CR005 CR006 CR010 CR011 CR012 CR013 CR014
496 0026 000	IND CHIP .820 UH 10%	2.0 EA	L006 L009
496 0028 000	IND CHIP 1 UH 10%	4.0 EA	L001 L005 L008 L011
496 0043 000	IND CHIP 18 UH 10%	2.0 EA	L003 L007
496 0044 000	IND CHIP 22 UH 10%	1.0 EA	L002
496 0046 000	IND CHIP 33 UH 10%	1.0 EA	L004
496 0061 000	IND, CHIP 3.3UH	1.0 EA	L010
496 0077 000	IND CHIP, 100UH 10%	2.0 EA	L015 L016
515 0035 000	*CAP 12PF 50V 5% 1206 COG	1.0 EA	C032
515 0040 000	*CAP 33PF 50V 5% 1206 COG	5.0 EA	C024 C031 C033 C050 C057
515 0046 000	*CAP 100PF 50V 5% 1206 COG	4.0 EA	C055 C062 C079 C088
515 0049 000	*CAP 180PF 50V 5% 1206 COG	1.0 EA	C021
515 0054 000	*CAP 470PF 50V 5% 1206 COG	4.0 EA	C019 C023 C025 C044
515 0056 000	CAP CHIP 680PF 5% 50V	1.0 EA	C012
515 0078 000	*CAP CHIP 1000PF 10% 50V	6.0 EA	C027 C035 C042 C047 C049 C060
515 0081 000	*CAP 3300PF 50V 10% 1206 X7R	2.0 EA	C010 C028
515 0082 000	*CAP 4700PF 50V 10% 1206 X7R	1.0 EA	C018
515 0083 000	*CAP 6800PF 50V 10% 1206 X7R	2.0 EA	C008 C020
515 0084 000	*CAP .01UF 50V 10% 1206 X7R	39.0 EA	C001 C002 C003 C004 C007 C009 C011 C014 C017 C022 C029 C036 C041 C051 C061 C064 C065 C068 C069 C070 C071 C072 C073 C077 C078 C080 C081 C082 C083 C084 C085 C086 C087 C089 C090 C091 C092 C093 C094
515 0137 501	CAP 0.1UF 50V 10% 1206 X7R	21.0 EA	C026 C030 C034 C038 C039 C040 C045 C046 C048 C052 C059 C066 C067 C095 C096 C097 C098 C099 C100 C101 C102
515 0137 517	CAP 0.47UF 25V 10% 1206 X7R	2.0 EA	C037 C056
515 0158 000	CAP 0.22 UF 50V 20% 1206 Z5U	2.0 EA	C013 C054
522 0634 000	CAP 10UF 25V	8.0 EA	C005 C006 C015 C016 C043 C053 C058 C063
545 0309 103	RES 12.1 OHM 1% 1/4W 1206	5.0 EA	R010 R029 R035 R048 R064
545 0309 107	RES 18.2 OHM 1% 1/4W 1206	4.0 EA	R008 R009 R016 R026
545 0309 115	RES 39.2 OHM 1% 1/4W 1206	4.0 EA	R052 R059 R067 R074
545 0309 118	RES 51.1 OHM 1% 1/4W 1206	2.0 EA	R098 R099
545 0309 122	RES 75 OHM 1% 1/4W 1206	2.0 EA	R019 R021
545 0309 201	RES 100 OHM 1% 1/4W 1206	6.0 EA	R014 R018 R032 R034 R094 R095
545 0309 202	RES 110 OHM 1% 1/4W 1206	1.0 EA	R020
545 0309 208	RES 200 OHM 1% 1/4W 1206	6.0 EA	R002 R003 R056 R058 R070 R082
545 0309 212	RES 301 OHM 1% 1/4W 1206	8.0 EA	R006 R007 R012 R013 R015 R017 R023 R027
545 0309 213	RES 332 OHM 1% 1/4W 1206	4.0 EA	R033 R061 R092 R093
545 0309 216	RES 432 OHM 1% 1/4W 1206	10.0 EA	R004 R011 R025 R030 R031 R036 R038 R049 R065 R073
545 0309 218	RES 511 OHM 1% 1/4W 1206	9.0 EA	R076 R077 R083 R084 R087 R088 R091 R096 R097
545 0309 220	RES 619 OHM 1% 1/4W 1206	10.0 EA	R022 R024 R039 R042 R045 R047 R050 R054 R080 R086
545 0309 221	RES 681 OHM 1% 1/4W 1206	4.0 EA	R057 R062 R066 R071
545 0309 222	RES 750 OHM 1% 1/4W 1206	2.0 EA	R028 R060
545 0309 301	RES 1K OHM 1% 1/4W 1206	4.0 EA	R001 R005 R040 R046
545 0309 308	RES 2K OHM 1% 1/4W 1206	4.0 EA	R055 R068 R072 R075
545 0309 401	RES 10K OHM 1% 1/4W 1206	4.0 EA	R081 R085 R089 R090

545 0309 408	RES 20K OHM 1% 1/4W 1206	2.0 EA	R041 R044
545 0309 409	RES 22.1K OHM 1% 1/4W 1206	1.0 EA	R043
545 0309 413	RES 33.2K OHM 1% 1/4W 1206	2.0 EA	R078 R079
545 0309 508	RES 200K OHM 1% 1/4W 1206	1.0 EA	R053
604 1162 000	DIPSWITCH, 8 SPST SMT	4.0 EA	S001 S002 S003 S004
843 5466 851	SCH, SECOND LO PLL	0.0 EA	
843 5466 853	PWB, SECOND LO PLL	1.0 EA	

Table 8-24. PWA, MAIN L.O.PLL UHF CH 43-69 - 992 9940 031

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (c)*
384 0780 000	LED, RED ESD	2.0 EA	DS001 DS002
492 0839 000	IND 330 UH 10% 500MA	3.0 EA	L012 L013 L014
522 0590 000	CAP 470UF 25V 20%	3.0 EA	C074 C075 C076
550 0928 000	POT 20K OHM 1/2W	2.0 EA	R037 R051
610 0900 000	HEADER 3 CKT STRAIGHT	2.0 EA	JP001 JP002
610 1288 000	PLUG 9 PIN	1.0 EA	J009
612 1184 000	SHUNT JUMPER 0.1" CENTERS	2.0 EA	JP001 JP002
620 0700 000	*RECPT, MALE SMB,PC MOUNT	8.0 EA	J001 J002 J003 J004 J005 J006 J007 J008
620 2952 000	JACK RECEPTACLE BULKHEAD SMC	1.0 EA	
843 5466 851	SCH, SECOND LO PLL	0.0 EA	
992 9940 032	*PWA, MAIN PLL CH 43-69, SMT	1.0 EA	

Table 8-25. *PWA, MAIN PLL CH 43-69, SMT - 992 9940 032

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (g)*
000 0000 010	B/M NOTE:	0.0 EA	CR007 CR008 CR009 ARE SKIPS FOR REF ONLY DRAFTING SHAPE
381 0017 000	XSTR BC847 NPN ESD	2.0 EA	Q001 Q002
382 1341 000	IC LRPS-2-4 ESD	1.0 EA	U006
382 1618 000	IC LRPS-3-850 ESD	1.0 EA	U008
383 0029 000	IC, 78L05 ESD	2.0 EA	U019 U020
383 0030 000	IC, 79L05 ESD	1.0 EA	U021
383 0104 000	IC LRMS-2 ESD	1.0 EA	U004
383 0125 000	IC Q3236I SMT ESD	2.0 EA	U015 U017
383 0171 000	IC MAR-3SM ESD	5.0 EA	U002 U005 U007 U013 U014
383 0173 000	IC MC10216 ESD	2.0 EA	U016 U018
383 0201 000	IC, 1007 SMT ESD	2.0 EA	U009 U010
383 0256 000	IC, TL072 OP AMP SMT ESD	2.0 EA	U011 U012
383 0343 000	IC, JTOS-1025 ESD	2.0 EA	U001 U003
385 0001 000	DIODE, RECT 4148 / 914 ESD	11.0 EA	CR001 CR002 CR003 CR004 CR005 CR006 CR010 CR011 CR012 CR013 CR014
496 0026 000	IND CHIP .820 UH 10%	2.0 EA	L006 L009
496 0028 000	IND CHIP 1 UH 10%	4.0 EA	L001 L005 L008 L011
496 0043 000	IND CHIP 18 UH 10%	2.0 EA	L003 L007
496 0044 000	IND CHIP 22 UH 10%	1.0 EA	L002
496 0046 000	IND CHIP 33 UH 10%	1.0 EA	L004
496 0061 000	IND, CHIP 3.3UH	1.0 EA	L010
496 0077 000	IND CHIP, 100UH 10%	2.0 EA	L015 L016
515 0035 000	*CAP 12PF 50V 5% 1206 COG	1.0 EA	C032
515 0040 000	*CAP 33PF 50V 5% 1206 COG	5.0 EA	C024 C031 C033 C050 C057
515 0046 000	*CAP 100PF 50V 5% 1206 COG	4.0 EA	C055 C062 C079 C088
515 0049 000	*CAP 180PF 50V 5% 1206 COG	1.0 EA	C021

515 0054 000	*CAP 470PF 50V 5% 1206 COG	4.0 EA	C019 C023 C025 C044
515 0056 000	CAP CHIP 680PF 5% 50V	1.0 EA	C012
515 0078 000	*CAP CHIP 1000PF 10% 50V	6.0 EA	C027 C035 C042 C047 C049 C060
515 0081 000	*CAP 3300PF 50V 10% 1206 X7R	2.0 EA	C010 C028
515 0082 000	*CAP 4700PF 50V 10% 1206 X7R	1.0 EA	C018
515 0083 000	*CAP 6800PF 50V 10% 1206 X7R	2.0 EA	C008 C020
515 0084 000	*CAP .01UF 50V 10% 1206 X7R	39.0 EA	C001 C002 C003 C004 C007 C009 C011 C014 C017 C022 C029 C036 C041 C051 C061 C064 C065 C068 C069 C070 C071 C072 C073 C077 C078 C080 C081 C082 C083 C084 C085 C086 C087 C089 C090 C091 C092 C093 C094
515 0137 501	CAP 0.1UF 50V 10% 1206 X7R	21.0 EA	C026 C030 C034 C038 C039 C040 C045 C046 C048 C052 C059 C066 C067 C095 C096 C097 C098 C099 C100 C101 C102
515 0137 517	CAP 0.47UF 25V 10% 1206 X7R	2.0 EA	C037 C056
515 0158 000	CAP 0.22 UF 50V 20% 1206 Z5U	2.0 EA	C013 C054
522 0634 000	CAP 10UF 25V	8.0 EA	C005 C006 C015 C016 C043 C053 C058 C063
545 0309 103	RES 12.1 OHM 1% 1/4W 1206	5.0 EA	R010 R029 R035 R048 R064
545 0309 107	RES 18.2 OHM 1% 1/4W 1206	4.0 EA	R008 R009 R016 R026
545 0309 115	RES 39.2 OHM 1% 1/4W 1206	4.0 EA	R052 R059 R067 R074
545 0309 118	RES 51.1 OHM 1% 1/4W 1206	2.0 EA	R098 R099
545 0309 122	RES 75 OHM 1% 1/4W 1206	2.0 EA	R019 R021
545 0309 201	RES 100 OHM 1% 1/4W 1206	6.0 EA	R014 R018 R032 R034 R094 R095
545 0309 202	RES 110 OHM 1% 1/4W 1206	1.0 EA	R020
545 0309 208	RES 200 OHM 1% 1/4W 1206	6.0 EA	R002 R003 R056 R058 R070 R082
545 0309 212	RES 301 OHM 1% 1/4W 1206	8.0 EA	R006 R007 R012 R013 R015 R017 R023 R027
545 0309 213	RES 332 OHM 1% 1/4W 1206	4.0 EA	R033 R061 R092 R093
545 0309 216	RES 432 OHM 1% 1/4W 1206	10.0 EA	R004 R011 R025 R030 R031 R036 R038 R049 R065 R073
545 0309 218	RES 511 OHM 1% 1/4W 1206	9.0 EA	R076 R077 R083 R084 R087 R088 R091 R096 R097
545 0309 220	RES 619 OHM 1% 1/4W 1206	10.0 EA	R022 R024 R039 R042 R045 R047 R050 R054 R080 R086
545 0309 221	RES 681 OHM 1% 1/4W 1206	4.0 EA	R057 R062 R066 R071
545 0309 222	RES 750 OHM 1% 1/4W 1206	2.0 EA	R028 R060
545 0309 301	RES 1K OHM 1% 1/4W 1206	4.0 EA	R001 R005 R040 R046
545 0309 308	RES 2K OHM 1% 1/4W 1206	4.0 EA	R055 R068 R072 R075
545 0309 401	RES 10K OHM 1% 1/4W 1206	4.0 EA	R081 R085 R089 R090
545 0309 408	RES 20K OHM 1% 1/4W 1206	2.0 EA	R041 R044
545 0309 409	RES 22.1K OHM 1% 1/4W 1206	1.0 EA	R043
545 0309 413	RES 33.2K OHM 1% 1/4W 1206	2.0 EA	R078 R079
545 0309 508	RES 200K OHM 1% 1/4W 1206	1.0 EA	R053
604 1162 000	DIPSWITCH, 8 SPST SMT	4.0 EA	S001 S002 S003 S004
843 5466 851	SCH, SECOND LO PLL	0.0 EA	
843 5466 853	PWB, SECOND LO PLL	1.0 EA	

Table 8-26. EXCITER, CD-1A BASIC - 992 9943 001

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (g)*
007 4020 022	FINGERSTOCK CLIP-ON	1.0 EA	
007 4060 077	BRZ,PH FGR STK 97-0621-02	6.0 EA	
335 0010 000	WASHER NYLON .195 ID	6.0 EA	
356 0003 000	CABLE CLAMP 3/16 D	1.0 EA	
356 0004 000	CABLE CLAMP 1/4 D	1.0 EA	
356 0007 000	CABLE CLAMP 7/16 D	1.0 EA	
356 0214 000	CLAMP, FLAT CABLE 1 IN.	3.0 EA	
358 1214 000	SCREWLOCK, FEMALE	3.0 EA	
358 2635 000	CABLE TIE, PUSH MOUNT SNAP IN	2.0 EA	
358 2995 000	END PLATE, 261 TERM BD	1.0 EA	TB001
358 3223 000	FEMALE SCREWLOCK .56"4-40	3.0 EA	
358 3582 000	STANDOFF MALE/FEMALE 6-32X 5/8	14.0 EA	
358 3734 000	KIT, SCREWLOCK, FEMALE	1.0 EA	
382 1617 000	MIXER ZFM-2 1-1000MHZ ESD	2.0 EA	MX001, MX002
398 0552 000	FUSE, SLOW CARTRIDGE, 10A 250V	2.0 EA	
424 0012 000	GROMMET 1/4 MTG DIA	1.0 EA	
424 0502 000	BUMPER 5/8 DIA X 1/4 THK	2.0 EA	
430 0192 000	FINGER GUARD, 119MM FAN	2.0 EA	
430 0268 000	FAN TUBEAXIAL 12V 110CFM 119MM	1.0 EA	B001
448 1105 000	HANDLE, CONCEALED PULL	1.0 EA	
484 0446 000	FILTER, RFI POWER LINE ENTRY	1.0 EA	FL-1
560 0055 000	MOV 4500A 70J 250VAC	3.0 EA	RV001 RV002 RV003
604 1197 000	SWITCH, ROCKER, SPDT	1.0 EA	
610 1136 000	ADAPTOR, EMI FILTERED	1.0 EA	FL002
614 0787 000	TERM BD, 4C MODULAR 261	4.0 EA	TB001
620 2109 000	JACK, BNC 75 OHM BULKHEAD	1.0 EA	J001 (CLK & DATA IN)
632 1201 000	PNL MTG, DIGITAL VOLTMETER	1.0 EA	
646 0665 000	INSPECTION LABEL	1.0 EA	
646 1487 000	NAMEPLATE PATENT, GENERIC	1.0 EA	
736 0299 000	POWER SUPPLY,DUAL 15V,3.3 &10A	1.0 EA	PS002
736 0300 000	POWER SUPPLY, DUAL 5V, 10AEA	1.0 EA	PS001
813 4999 027	STDOFF 6-32X5/8 1/4 HEX	4.0 EA	
817 2462 200	RUNNING LIST, CD-1A	0.0 EA	
843 5466 240	DIAG, CD-1 EXCITER	0.0 EA	
917 2462 008	COVER, 10MHZ REFERENCE	1.0 EA	
917 2462 009	BOX, 10MHZ REFERENCE	1.0 EA	
917 2462 015	BOX, UHF PLL	1.0 EA	
917 2462 020	COVER, MAIN PLL	1.0 EA	
917 2462 048	BOX, IF PLL	1.0 EA	
917 2462 049	COVER, IF PLL	1.0 EA	
917 2462 174	CABLE PACKAGE, CD-1A EXCITER	1.0 EA	
917 2462 211	SHIELD, AMP	1.0 EA	200
922 1296 006	UPPER SHIELD, CORRECTOR BOARD	1.0 EA	A021
922 1296 007	LOWER SHIELD, CORRECTOR BOARD	1.0 EA	A021
952 9202 186	CHASSIS, LOWER	1.0 EA	
952 9202 187	CHASSIS, UPPER	1.0 EA	
952 9202 188	PLATE, MODULATOR	1.0 EA	
952 9202 189	PLATE, P/S	1.0 EA	
952 9202 190	HINGE, UPPER	1.0 EA	
952 9202 191	HINGE, LOWER	1.0 EA	
952 9202 192	FRONT, LOWER	1.0 EA	
952 9202 193	FRONT, UPPER	1.0 EA	
952 9202 194	REAR, I/O	1.0 EA	

952 9202 195	BRACKET, HINGE MTG	1.0 EA	
952 9202 196	BRACKET, DOOR CATCH	1.0 EA	
952 9202 202	COVER, SAFETY	1.0 EA	
952 9202 203	ANGLE, P/S SUPPORT	2.0 EA	
952 9202 204	LINK, OUTSIDE	1.0 EA	
952 9202 205	LINK, INSIDE	1.0 EA	
952 9202 206	COVER, CHASSIS UPPER	1.0 EA	
952 9202 213	SPACER	1.0 EA	
952 9202 214	ANGLE, BUMPER, LEFT	1.0 EA	
952 9202 215	ANGLE, BUMPER, RIGHT	1.0 EA	
952 9202 216	PROP ROD	1.0 EA	
992 9556 002	PWA, D/A CONVERTER	1.0 EA	A005
992 9556 003	PWA, A/D CONVERTER	1.0 EA	A007
992 9711 003	PWA, NYQUIST FILTER	1.0 EA	A003
992 9723 001	PWA, 10MHZ REFERENCE	1.0 EA	A009
992 9728 001	PWA, IF PLL	1.0 EA	A008
992 9731 001	PWA, RESPONSE CORRECTOR	1.0 EA	A015
992 9732 001	PWA, METER BOARD	1.0 EA	A019
992 9748 001	PWA, LINNEARITY CORRECTOR	1.0 EA	A014
992 9748 002	PWA, PHASE CORRECTOR	1.0 EA	A013
992 9752 001	PWA, 44 MHZ SAW	1.0 EA	A011
992 9787 001	PWA, DOWNCONVERTER,EXCITER,DTV	1.0 EA	
992 9808 001	PWA, TRANSPORT/TRANSMISSION	1.0 EA	A002
992 9809 001	PWA, CORRECTOR	1.0 EA	A004
992 9810 001	PWA, DSP CONTROLLER	1.0 EA	A006
992 9933 001	PWA, EMBEDDED CLOCK RECOVERY	1.0 EA	A001
992 9939 001	PWA, P/S & CTLR INTERFACE	1.0 EA	A020
992 9941 001	PWA, 1W AMP	1.0 EA	A017
992 9942 001	PWA, AGC	1.0 EA	A012
992 9968 001	PWA,RESPONSE & DELAY CORRECTOR	1.0 EA	A021

Table 8-27. PWA, D/A CONVERTER - 992 9556 002

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (c)*
000 0000 010	B/M NOTE:	0.0 EA	“JP001 IS NOT INSTALLED”
492 0765 000	FIXED RF INDUCTOR 345NH	3.0 EA	L002 L003 L007
492 0768 000	FIXED RF INDUCTOR 720NH	1.0 EA	L005
492 0867 000	INDUCTOR, FIXED RF, 410HH	1.0 EA	L006
492 0868 000	INDUCTOR, FIXED RF, 260NH	1.0 EA	L004
492 0869 000	INDUCTOR, FIXED RF, 550NH	1.0 EA	L001
540 1600 118	RES 51 OHM 3W 5%	1.0 EA	R024
620 2883 000	JACK, OSX PWB MTG	2.0 EA	J002 J004
843 5466 381	SCH, D/A CONVERTER	0.0 EA	
992 9556 005	*PWA, D/A, SMT	1.0 EA	

Table 8-28. *PWA, D/A, SMT - 992 9556 005

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (l)*
382 1549 000	IC, MC79M05CDT, NEG 5V REG ESD	1.0 EA	U004
383 0062 000	IC, HI5741 ESD	1.0 EA	U001
383 0239 000	IC 74AC04 ESD	1.0 EA	U002
387 0010 006	DIODE, TVS 5.0V 1500W ESD	1.0 EA	CR002
387 0010 017	DIODE, TVS 15V 1500W ESD	1.0 EA	CR001
478 0428 000	XFMR, RF, 0.05-200MHZ	1.0 EA	T001

484 0434 000	PI FILTER 2000PF	2.0 EA	FL001 FL002
515 0034 000	*CAP 10PF 50V 5% 1206 COG	1.0 EA	C012
515 0038 000	*CAP 22PF 50V 5% 1206 COG	1.0 EA	C014
515 0040 000	*CAP 33PF 50V 5% 1206 COG	1.0 EA	C007
515 0041 000	*CAP 39PF 50V 5% 1206 COG	1.0 EA	C010
515 0042 000	*CAP 47PF 50V 5% 1206 COG	1.0 EA	C006
515 0044 000	*CAP 68PF 50V 5% 1206 COG	1.0 EA	C008
515 0045 000	*CAP 82PF 50V 5% 1206 COG	1.0 EA	C009
515 0046 000	*CAP 100PF 50V 5% 1206 COG	1.0 EA	C015
515 0049 000	*CAP 180PF 50V 5% 1206 COG	2.0 EA	C011 C013
515 0084 000	*CAP .01UF 50V 10% 1206 X7R	2.0 EA	C020 C021
515 0135 301	CAP 1000PF 100V 5% 1206 C0G	5.0 EA	C001 C003 C016 C034 C035
515 0137 501	CAP 0.1UF 50V 10% 1206 X7R	6.0 EA	C002 C004 C005 C017 C033 C036
526 0384 000	CAP 10UF 16V 10% 6032	2.0 EA	C024 C026
526 0385 000	CAP, 22UF 16V 10%	3.0 EA	C030 C031 C032
545 0309 107	RES 18.2 OHM 1% 1/4W 1206	1.0 EA	R019
545 0309 201	RES 100 OHM 1% 1/4W 1206	15.0 EA	R001 R002 R003 R004 R005 R006 R007 R008 R009 R010 R011 R012 R013 R014 R018
545 0309 204	RES 130 OHM 1% 1/4W 1206	1.0 EA	R015
545 0309 212	RES 301 OHM 1% 1/4W 1206	2.0 EA	R020 R021
545 0309 217	RES 475 OHM 1% 1/4W 1206	1.0 EA	R017
545 0309 218	RES 511 OHM 1% 1/4W 1206	1.0 EA	R016
545 0309 301	RES 1K OHM 1% 1/4W 1206	1.0 EA	R025
545 0309 401	RES 10K OHM 1% 1/4W 1206	2.0 EA	R028 R029
545 0309 999	RES ZERO OHM JUMPER 1206	4.0 EA	R022 R023 R026 R027
611 0001 000	HEADER 20 PIN SMT	1.0 EA	J001
611 0002 000	HEADER, 40 PIN, SMT	1.0 EA	J003
843 5466 381	SCH, D/A CONVERTER	0.0 EA	
843 5466 383	PWB, D/A CONVERTER	1.0 EA	

Table 8-29. PWA, A/D CONVERTER - 992 9556 003

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
000 0000 010	B/M NOTE:	0.0 EA	J5 & R6 ARE NOT NORMALLY INSTALLED. OPTIONAL TEST ONLY.
492 0765 000	FIXED RF INDUCTOR 345NH	2.0 EA	L001 L002
540 1600 111	RES 27 OHM 3W 5%	1.0 EA	R013
620 2883 000	JACK, OSX PWB MTG	2.0 EA	J002 J003
843 5466 401	SCH, A/D CONVERTER	0.0 EA	
992 9556 004	*PWA, A/D, SMT	1.0 EA	

Table 8-30. *PWA, A/D, SMT - 992 9556 004

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (k)*
000 0000 010	B/M NOTE:	0.0 EA	J5 & R6 ARE NOT NORMALLY INSTALLED. OPTIONAL TEST ONLY.
382 1441 000	IC, LT1117 5V REG SMT ESD	1.0 EA	U005
383 0109 000	IC AD9042AST ESD	1.0 EA	U002
383 0176 000	IC, 74FCT574T, 8 BIT REG, ESD	2.0 EA	U003 U004
387 0010 006	DIODE, TVS 5.0V 1500W ESD	1.0 EA	CR002
387 0010 017	DIODE, TVS 15V 1500W ESD	1.0 EA	CR001
478 0428 000	XFMR, RF, 0.05-200MHZ	1.0 EA	T001
494 0485 000	INDUCTOR, 10UH, POWER, 20%	1.0 EA	L003

515 0034 000	*CAP 10PF 50V 5% 1206 COG	1.0 EA	C003
515 0040 000	*CAP 33PF 50V 5% 1206 COG	1.0 EA	C005
515 0044 000	*CAP 68PF 50V 5% 1206 COG	2.0 EA	C002 C006
515 0049 000	*CAP 180PF 50V 5% 1206 COG	1.0 EA	C004
515 0084 000	*CAP .01UF 50V 10% 1206 X7R	2.0 EA	C009 C010
515 0135 301	CAP 1000PF 100V 5% 1206 C0G	6.0 EA	C011
			C015 C018 C019 C031 C033
515 0137 501	CAP 0.1UF 50V 10% 1206 X7R	10.0 EA	C001 C007 C008 C012 C016 C017 C020 C026
			C032 C034
526 0384 000	CAP 10UF 16V 10% 6032	1.0 EA	C028
526 0385 000	CAP, 22UF 16V 10%	4.0 EA	C022 C023 C024 C025
545 0309 019	RES 5.62 OHM 1% 1/4W 1206	2.0 EA	R001 R007
545 0309 120	RES 61.9 OHM 1% 1/4W 1206	1.0 EA	R010
545 0309 201	RES 100 OHM 1% 1/4W 1206	2.0 EA	R011 R012
545 0309 224	RES 909 OHM 1% 1/4W 1206	4.0 EA	R002 R003 R008 R009
545 0309 999	RES ZERO OHM JUMPER 1206	2.0 EA	R004
			R005
611 0001 000	HEADER 20 PIN SMT	1.0 EA	J001
611 0002 000	HEADER, 40 PIN, SMT	1.0 EA	J004
843 5466 401	SCH, A/D CONVERTER	0.0 EA	
843 5466 403	PWB, A/D CONVERTER	1.0 EA	

Table 8-31. PWA, NYQUIST FILTER - 992 9711 003

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (d)*
384 0881 000	LED, YELLOW, RT ANGLE MTG ESD	1.0 EA	DS005
384 0882 000	LED, RED, RT ANGLE MTG ESD	2.0 EA	DS003 DS004
384 0904 000	LED, GRN, T-1 ESD	2.0 EA	DS001 DS002
404 0673 000	SOCKET 8 PIN DIP (DL)	2.0 EA	XU003 XU015
604 1089 000	SW, TGL SPDT PC MOUNT	1.0 EA	S001
620 2883 000	JACK, OSX PWB MTG	1.0 EA	J002
817 2462 045	SOFTWARE INSTR, NYQUIST	0.0 EA	
817 2462 115	SOFTWARE INSTR, NYQUIST U015	0.0 EA	
817 2462 205	SOFTWARE INSTR, NYQUIST, U003	0.0 EA	
843 5466 391	SCH, NYQUIST FILTER	0.0 EA	
917 2462 131	FIRMWARE PKG NYQUIST FILTER	1.0 EA	
992 9711 004	*PWA, NYQUIST, SMT	1.0 EA	

Table 8-32. *PWA, NYQUIST, SMT - 992 9711 004

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (f)*
382 1607 000	IC, EPF8820A ESD	1.0 EA	U001
387 0010 006	DIODE, TVS 5.0V 1500W ESD	1.0 EA	CR001
393 0031 000	IC, EPF8820A ESD	1.0 EA	U014
404 0869 000	SOCKET, PLCC-32 SMT	10.0 EA	XU004 XU005 XU006 XU007 XU008 XU009
			XU010 XU011 XU012 XU013
515 0084 000	*CAP .01UF 50V 10% 1206 X7R	40.0 EA	C001 C002 C003 C004 C005 C006 C007 C008
			C009 C010 C011 C012 C013 C014 C015 C016
			C017 C018 C019 C020 C021 C022 C023 C024
			C025 C031 C033 C034 C035 C036 C037 C038
			C039 C040 C041 C042 C043 C044 C046 C048
523 0001 201	CAP 100UF 6.3V 20% SMT	5.0 EA	C026 C027 C028 C029 C047
545 0309 201	RES 100 OHM 1% 1/4W 1206	3.0 EA	R001 R002 R003
545 0309 207	RES 182 OHM 1% 1/4W 1206	1.0 EA	R008

545 0309 218	RES 511 OHM 1% 1/4W 1206	3.0 EA	R014 R015 R016
545 0309 301	RES 1K OHM 1% 1/4W 1206	8.0 EA	R004 R005 R006 R007 R009 R010 R011 R012
545 0309 401	RES 10K OHM 1% 1/4W 1206	1.0 EA	R013
611 0001 000	HEADER 20 PIN SMT	2.0 EA	J001 J003
611 0002 000	HEADER, 40 PIN, SMT	1.0 EA	J005
843 5466 391	SCH, NYQUIST FILTER	0.0 EA	
843 5466 393	PWB, NYQUIST FILTER	1.0 EA	

Table 8-33. PWA, 10MHZ REFERENCE - 992 9723 001

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (k)*
000 0000 010	B/M NOTE:	0.0 EA	COMPONENTS NOT USED AT THIS TIME: J003 J005
382 1609 000	IC LT1036 ESD	1.0 EA	U001
404 0513 000	HEAT SINK PA1-1CB	1.0 EA	XU001
610 1288 000	PLUG 9 PIN	1.0 EA	J001
620 2952 000	JACK RECEPTACLE BULKHEAD SMC	5.0 EA	J002 J003 J004 J005 J006
700 1271 000	OCXO 10 MHZ	1.0 EA	U004
992 9723 002	*PWA, 10MHZ REFERENCE, SMT	1.0 EA	

Table 8-34. *PWA, 10MHZ REFERENCE, SMT - 992 9723 002

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (g)*
381 0003 001	XSTR, NPN, 3904 (SMT) ESD	1.0 EA	Q002
381 0003 002	XSTR, PNP MMBT3906 ESD	1.0 EA	Q001
383 0173 000	IC MC10216 ESD	3.0 EA	U003 U005 U006
383 0253 000	IC, LM358 ESD	1.0 EA	U002
385 0001 000	DIODE, RECT 4148 / 914 ESD	1.0 EA	CR002
385 0027 000	DIODE, 2800 SCHOTTKY SMT ESD	1.0 EA	CR001
389 0013 000	LED RED SURFACE MOUNT ESD	1.0 EA	DS001
494 0485 000	INDUCTOR, 10UH, POWER, 20%	3.0 EA	L001 L002 L003
496 0044 000	IND CHIP 22 UH 10%	2.0 EA	L004 L005
515 0084 000	*CAP .01UF 50V 10% 1206 X7R	9.0 EA	C008 C011 C012 C013 C016 C017 C018 C019 C020
515 0137 501	CAP 0.1UF 50V 10% 1206 X7R	11.0 EA	C002 C004 C005 C007 C009 C010 C014 C015 C021 C022 C023
522 0634 000	CAP 10UF 25V	1.0 EA	C003
522 0635 000	CAP 100UF 25V	2.0 EA	C001 C006
545 0309 113	RES 33.2 OHM 1% 1/4W 1206	4.0 EA	R014 R023 R025 R026
545 0309 118	RES 51.1 OHM 1% 1/4W 1206	3.0 EA	R012 R016 R020
545 0309 201	RES 100 OHM 1% 1/4W 1206	2.0 EA	R018 R019
545 0309 217	RES 475 OHM 1% 1/4W 1206	1.0 EA	R017
545 0309 219	RES 562 OHM 1% 1/4W 1206	4.0 EA	R008 R009 R021 R022
545 0309 221	RES 681 OHM 1% 1/4W 1206	5.0 EA	R011 R015 R024 R027 R028
545 0309 305	RES 1.5K OHM 1% 1/4W 1206	1.0 EA	R005
545 0309 317	RES 4.75K OHM 1% 1/4W 1206	1.0 EA	R013
545 0309 401	RES 10K OHM 1% 1/4W 1206	5.0 EA	R002 R003 R004 R006 R010
545 0309 421	RES 68.1K OHM 1% 1/4W 1206	1.0 EA	R001
545 0309 501	RES 100K OHM 1% 1/4W 1206	1.0 EA	R007
551 0017 402	TRIMPOT 20K OHM 1/4W 4MM SQ	1.0 EA	R029
843 5466 221	SCH, 10MHZ REFERENCE	0.0 EA	
843 5466 223	PWB, 10MHZ REFERENCE	1.0 EA	

Table 8-35. PWA, IF PLL - 992 9728 001

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (k)*
382 1534 000	IC POS-75 ESD	1.0 EA	U001
384 0780 000	LED, RED ESD	1.0 EA	DS001
492 0778 000	IND VAR .288UH NOM	9.0 EA	L016 L021 L022 L023 L024 L025 L028 L029 L030
522 0591 000	CAP 47UF 25V 20%	8.0 EA	C010 C053 C062 C063 C064 C068 C069 C119
540 1538 000	RES NETWORK 10K OHM 2%	4.0 EA	R005 R024 R050 R069
550 0397 000	POT 50 OHM 1/2W 10%	1.0 EA	R048
550 0934 000	POT 500 OHM 1/2W 10%	1.0 EA	R046
610 0900 000	HEADER 3 CKT STRAIGHT	1.0 EA	JP001
610 1288 000	PLUG 9 PIN	1.0 EA	J007
612 1184 000	SHUNT JUMPER 0.1" CENTERS	1.0 EA	JP001
620 0700 000	*RECPT, MALE SMB,PC MOUNT	9.0 EA	J001 J002 J003 J004 J005 J006 J008 J009 J011
620 2952 000	JACK RECEPTACLE BULKHEAD SMC	2.0 EA	J010 J012
843 5466 231	SCHEMATIC, IF PLL	0.0 EA	
992 9728 002	*PWA, IF PLL, SMT	1.0 EA	

Table 8-36. *PWA, IF PLL, SMT - 992 9728 002

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (s)*
000 0000 010	B/M NOTE:	0.0 EA	NOT USED: CR004 CR005 CR006 CR007 R014
381 0017 000	XSTR BC847 NPN ESD	1.0 EA	Q001
383 0057 000	IC 74AC20 ESD	1.0 EA	U005
383 0058 000	IC, HSP45102 33 MHZ ESD	1.0 EA	U003
383 0059 000	IC 74AC163 ESD	2.0 EA	U016 U019
383 0060 000	IC 74AC138 ESD	1.0 EA	U012
383 0062 000	IC, HI5741 ESD	1.0 EA	U010
383 0114 000	IC 75107 ESD	1.0 EA	U024
383 0125 000	IC Q3236I SMT ESD	1.0 EA	U022
383 0138 000	IC, 74AC74 DUAL D F-F ESD	1.0 EA	U026
383 0139 000	IC 74AC151 ESD	4.0 EA	U004 U015 U017 U023
383 0168 000	IC SLQ-KH1 ESD	1.0 EA	HY001
383 0169 000	IC LRMS-1 ESD	3.0 EA	U008 U009 U027
383 0170 000	IC LRPS-2-1 ESD	1.0 EA	U018
383 0171 000	IC MAR-3SM ESD	4.0 EA	U002 U006 U011 U025
383 0172 000	IC LRPS-3-1 ESD	1.0 EA	U007
383 0173 000	IC MC10216 ESD	2.0 EA	U020 U021
383 0201 000	IC, 1007 SMT ESD	1.0 EA	U014
383 0256 000	IC, TL072 OP AMP SMT ESD	1.0 EA	U013
385 0001 000	DIODE, RECT 4148 / 914 ESD	4.0 EA	CR001 CR002 CR003 CR008
478 0428 000	XFMR, RF, 0.05-200MHZ	1.0 EA	T001
494 0485 000	INDUCTOR, 10UH, POWER, 20%	5.0 EA	L017 L018 L019 L020 L034
496 0013 000	IND CHIP .100 UH 10%	2.0 EA	L012 L013
496 0028 000	IND CHIP 1 UH 10%	4.0 EA	L001 L006 L011 L033
496 0032 000	IND CHIP 2.2 UH 10%	3.0 EA	L002 L003 L004
496 0036 000	IND CHIP 4.7 UH 10%	5.0 EA	L007 L010 L015 L026 L027
496 0038 000	IND CHIP 6.8 UH 10%	2.0 EA	L031 L032
496 0044 000	IND CHIP 22 UH 10%	3.0 EA	L005 L009 L014
496 0046 000	IND CHIP 33 UH 10%	1.0 EA	L008

515 0034 000	*CAP 10PF 50V 5% 1206 COG	2.0 EA	C101 C105
515 0040 000	*CAP 33PF 50V 5% 1206 COG	7.0 EA	C027 C050 C079 C088 C093 C102 C104
515 0042 000	*CAP 47PF 50V 5% 1206 COG	6.0 EA	C020 C035 C036 C049 C054 C103
515 0046 000	*CAP 100PF 50V 5% 1206 COG	1.0 EA	C082
515 0048 000	*CAP 150PF 50V 5% 1206 COG	2.0 EA	C096 C100
515 0049 000	*CAP 180PF 50V 5% 1206 COG	2.0 EA	C075 C090
515 0051 000	*CAP 270PF 50V 5% 1206 COG	1.0 EA	C023
515 0052 000	*CAP 330PF 50V 5% 1206 COG	2.0 EA	C017 C060
515 0054 000	*CAP 470PF 50V 5% 1206 COG	4.0 EA	C003 C004 C015 C016
515 0055 000	CAP CHIP 560PF 5% 50V	4.0 EA	C025 C058 C080 C089
515 0081 000	*CAP 3300PF 50V 10% 1206 X7R	2.0 EA	C014 C019
515 0084 000	*CAP .01UF 50V 10% 1206 X7R	29.0 EA	C001 C007 C008 C012 C018 C021 C024 C031 C034 C045 C055 C066 C070 C071 C072 C073 C074 C077 C078 C081 C083 C085 C086 C087 C091 C094 C106 C107 C108
515 0088 000	CAP CHIP .047UF 10% 50V	2.0 EA	C032 C048
515 0135 301	CAP 1000PF 100V 5% 1206 C0G	8.0 EA	C011 C022 C029 C037 C046 C052 C061 C092
515 0135 303	CAP 1200PF 100V 5% 1206 C0G	4.0 EA	C009 C013 C097 C099
515 0135 305	CAP 1500PF 100V 5% 1206 C0G	1.0 EA	C098
515 0137 501	CAP 0.1UF 50V 10% 1206 X7R	21.0 EA	C002 C005 C006 C026 C028 C030 C033 C038 C039 C040 C041 C042 C047 C051 C056 C059 C065 C067 C076 C084 C095
515 0147 000	CAP 15PF 200V 5% 1206 COG	1.0 EA	C044
518 0111 000	CAP, TRIM 4.5-20PF 50V	1.0 EA	C043
545 0309 103	RES 12.1 OHM 1% 1/4W 1206	3.0 EA	R007 R019 R031
545 0309 107	RES 18.2 OHM 1% 1/4W 1206	2.0 EA	R011 R062
545 0309 109	RES 22.1 OHM 1% 1/4W 1206	1.0 EA	R045
545 0309 115	RES 39.2 OHM 1% 1/4W 1206	2.0 EA	R038 R047
545 0309 118	RES 51.1 OHM 1% 1/4W 1206	4.0 EA	R002 R044 R070 R071
545 0309 201	RES 100 OHM 1% 1/4W 1206	4.0 EA	R017 R028 R029 R063
545 0309 208	RES 200 OHM 1% 1/4W 1206	5.0 EA	R001 R034 R043 R052 R053
545 0309 209	RES 221 OHM 1% 1/4W 1206	2.0 EA	R051 R073
545 0309 211	RES 267 OHM 1% 1/4W 1206	2.0 EA	R054 R055
545 0309 212	RES 301 OHM 1% 1/4W 1206	4.0 EA	R010 R012 R056 R065
545 0309 213	RES 332 OHM 1% 1/4W 1206	1.0 EA	R066
545 0309 216	RES 432 OHM 1% 1/4W 1206	6.0 EA	R004 R008 R015 R020 R027 R032
545 0309 217	RES 475 OHM 1% 1/4W 1206	4.0 EA	R040 R042 R049 R059
545 0309 218	RES 511 OHM 1% 1/4W 1206	6.0 EA	R041 R060 R061 R064 R067 R072
545 0309 220	RES 619 OHM 1% 1/4W 1206	10.0 EA	R009 R013 R016 R018 R021 R033 R036 R037 R074 R075
545 0309 221	RES 681 OHM 1% 1/4W 1206	2.0 EA	R035 R039
545 0309 224	RES 909 OHM 1% 1/4W 1206	1.0 EA	R030
545 0309 301	RES 1K OHM 1% 1/4W 1206	1.0 EA	R003
545 0309 309	RES 2.21K OHM 1% 1/4W 1206	1.0 EA	R068
545 0309 318	RES 5.11K OHM 1% 1/4W 1206	1.0 EA	R006
545 0309 407	RES 18.2K OHM 1% 1/4W 1206	1.0 EA	R057
545 0309 408	RES 20K OHM 1% 1/4W 1206	2.0 EA	R023 R026
545 0309 413	RES 33.2K OHM 1% 1/4W 1206	1.0 EA	R058
545 0309 414	RES 35.7K OHM 1% 1/4W 1206	1.0 EA	R022
545 0309 416	RES 43.2K OHM 1% 1/4W 1206	1.0 EA	R025
604 1162 000	DIPSWITCH, 8 SPST SMT	6.0 EA	S001 S002 S003 S004 S005 S006
843 5466 232	COMPONENT LOCATOR, IF PLL	0.0 EA	
843 5466 233	PWB, IF PLL	1.0 EA	

WARNING: Disconnect primary power prior to servicing.

Table 8-37. PWA, RESPONSE CORRECTOR - 992 9731 001

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (f)*
604 1192 000	SWITCH TGL SPDT	1.0 EA	S001
610 0979 000	HDR 10C 2ROW VERTICAL	1.0 EA	J003
620 0700 000	*RECPT, MALE SMB,PC MOUNT	2.0 EA	J001 J002
843 5466 311	SCHEMATIC, RESPONSE CORRECTOR	0.0 EA	
917 2462 023	XFMR 7-TURN	1.0 EA	T001
917 2462 024	XFMR 6-TURN	1.0 EA	T002
917 2462 025	XFMR 5-TURN	1.0 EA	T003
992 9731 002	*PWA, RESPONSE CORRECTOR, SMT	1.0 EA	

Table 8-38. *PWA, RESPONSE CORRECTOR, SMT - 992 9731 002

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (l)*
000 0000 010	B/M NOTE:	0.0 EA	THESE PARTS NOT USED AT THIS LEVEL: R028 R029 R030
381 0008 000	XSTR, MMBTH10 SOT-23 NPN ESD	4.0 EA	Q001 Q002 Q003 Q004
383 0063 000	IC MAV-11SM SMT ESD	1.0 EA	U001
496 0058 000	IND CHIP 10UH 10%	1.0 EA	L001
515 0035 000	*CAP 12PF 50V 5% 1206 COG	1.0 EA	C003
515 0039 000	*CAP 27PF 50V 5% 1206 COG	1.0 EA	C015
515 0084 000	*CAP .01UF 50V 10% 1206 X7R	15.0 EA	C002 C004 C005 C006 C007 C008 C009 C010 C011 C012 C013 C014 C016 C017 C018
515 0147 000	CAP 15PF 200V 5% 1206 COG	1.0 EA	C001
545 0309 017	RES 4.75 OHM 1% 1/4W 1206	2.0 EA	R019 R022
545 0309 101	RES 10 OHM 1% 1/4W 1206	4.0 EA	R005 R006 R015 R020
545 0309 110	RES 23.7 OHM 1% 1/4W 1206	1.0 EA	R001
545 0309 113	RES 33.2 OHM 1% 1/4W 1206	2.0 EA	R002 R018
545 0309 114	RES 35.7 OHM 1% 1/4W 1206	1.0 EA	R024
545 0309 117	RES 47.5 OHM 1% 1/4W 1206	1.0 EA	R003
545 0309 118	RES 51.1 OHM 1% 1/4W 1206	1.0 EA	R016
545 0309 201	RES 100 OHM 1% 1/4W 1206	2.0 EA	R026 R027
545 0309 205	RES 150 OHM 1% 1/4W 1206	2.0 EA	R023 R025
545 0309 209	RES 221 OHM 1% 1/4W 1206	1.0 EA	R007
545 0309 211	RES 267 OHM 1% 1/4W 1206	1.0 EA	R004
545 0309 212	RES 301 OHM 1% 1/4W 1206	1.0 EA	R021
545 0309 213	RES 332 OHM 1% 1/4W 1206	1.0 EA	R017
545 0309 220	RES 619 OHM 1% 1/4W 1206	4.0 EA	R009 R010 R011 R012
545 0309 401	RES 10K OHM 1% 1/4W 1206	2.0 EA	R013 R014
551 0024 000	TRIMPOT 100 OHM 1/4W 4MM SQ	7.0 EA	R8 R85 R86 R87 R88 R89 R90
579 0001 000	RELAY, 12VDC DPDT	2.0 EA	K001 K002
843 5466 311	SCHEMATIC, RESPONSE CORRECTOR	0.0 EA	
843 5466 313	PWB, RESPONSE CORRECTOR	1.0 EA	

Table 8-39. PWA, METER BOARD - 992 9732 001

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (d)*
384 0780 000	LED, RED ESD	2.0 EA	DS004 DS005
384 0961 000	LED, YELLOW ESD	3.0 EA	DS001 DS002 DS003
404 0851 000	SOCKET, 18 PIN SIP	1.0 EA	J002
548 2400 268	RES 499 OHM 1/2W 1%	5.0 EA	R001 R002 R003 R004 R005
610 0979 000	HDR 10C 2ROW VERTICAL	1.0 EA	J001

843 5466 301	SCH, METERING	0.0 EA
843 5466 303	PWB, METERING	1.0 EA

Table 8-40. PWA, LINNEARITY CORRECTOR - 992 9748 001

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (g)*
522 0548 000	CAP 10UF 50V 20%	5.0 EA	C037 C038 C039 C040 C041
550 0858 000	POT 5K OHM .5W 10%	3.0 EA	R056 R057 R061
550 0958 000	POT 10K OHM 1/2 W 10%	3.0 EA	R058 R059 R060
604 1192 000	SWITCH TGL SPDT	1.0 EA	S001
610 0900 000	HEADER 3 CKT STRAIGHT	3.0 EA	JP001 JP002 JP003
610 0979 000	HDR 10C 2ROW VERTICAL	1.0 EA	J003
612 1184 000	SHUNT JUMPER 0.1" CENTERS	3.0 EA	
620 0700 000	*RECPT, MALE SMB,PC MOUNT	2.0 EA	J001 J002
843 5466 341	SCHEMATIC, LINEARITY CORRECTOR	0.0 EA	
992 9789 001	*PWA, LINNEARITY CORRECTOR,SMT	1.0 EA	

Table 8-41. *PWA, LINNEARITY CORRECTOR,SMT - 992 9789 001

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (h)*
381 0008 000	XSTR, MMBTH10 SOT-23 NPN ESD	7.0 EA	Q001 Q002 Q003 Q004 Q005 Q006 Q007
383 0256 000	IC, TL072 OP AMP SMT ESD	3.0 EA	U001 U002 U003
385 0027 000	DIODE, 2800 SCHOTTKY SMT ESD	7.0 EA	CR001 CR002 CR003 CR004 CR005 CR006 CR007
496 0022 000	IND CHIP .560 UH 10%	3.0 EA	L003 L008 L011
496 0040 000	IND CHIP 10 UH 10%	8.0 EA	L001 L002 L004 L005 L006 L007 L009 L010
515 0042 000	*CAP 47PF 50V 5% 1206 COG	3.0 EA	C005 C010 C032
515 0084 000	*CAP .01UF 50V 10% 1206 X7R	23.0 EA	C001 C002 C006 C007 C008 C009 C013 C014 C017 C018 C019 C020 C023 C024 C030 C031 C033 C034 C035 C036 C042 C043 C044
515 0137 501	CAP 0.1UF 50V 10% 1206 X7R	13.0 EA	C003 C004 C011 C012 C015 C016 C021 C022 C025 C026 C027 C028 C029
545 0309 018	RES 5.11 OHM 1% 1/4W 1206	1.0 EA	R031
545 0309 101	RES 10 OHM 1% 1/4W 1206	6.0 EA	R036 R039 R042 R043 R050 R051
545 0309 118	RES 51.1 OHM 1% 1/4W 1206	1.0 EA	R026
545 0309 119	RES 56.2 OHM 1% 1/4W 1206	3.0 EA	R012 R017 R040
545 0309 120	RES 61.9 OHM 1% 1/4W 1206	3.0 EA	R005 R022 R054
545 0309 201	RES 100 OHM 1% 1/4W 1206	1.0 EA	R035
545 0309 210	RES 237 OHM 1% 1/4W 1206	3.0 EA	R009 R019 R029
545 0309 213	RES 332 OHM 1% 1/4W 1206	1.0 EA	R030
545 0309 217	RES 475 OHM 1% 1/4W 1206	3.0 EA	R011 R018 R025
545 0309 218	RES 511 OHM 1% 1/4W 1206	3.0 EA	R013 R016 R055
545 0309 219	RES 562 OHM 1% 1/4W 1206	3.0 EA	R004 R023 R052
545 0309 301	RES 1K OHM 1% 1/4W 1206	4.0 EA	R033 R034 R044 R049
545 0309 308	RES 2K OHM 1% 1/4W 1206	6.0 EA	R001 R002 R003 R014 R015 R024
545 0309 309	RES 2.21K OHM 1% 1/4W 1206	3.0 EA	R007 R010 R021
545 0309 315	RES 3.92K OHM 1% 1/4W 1206	2.0 EA	R027 R028
545 0309 401	RES 10K OHM 1% 1/4W 1206	9.0 EA	R032 R037 R038 R041 R045 R046 R047 R048 R053
545 0309 403	RES 12.1K OHM 1% 1/4W 1206	3.0 EA	R006 R008 R020
843 5466 341	SCHEMATIC, LINEARITY CORRECTOR	0.0 EA	
843 5466 343	PWB, LINEARITY CORRECTOR	1.0 EA	

Table 8-42. PWA, PHASE CORRECTOR - 992 9748 002

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (I)*
383 0170 000	IC LRPS-2-1 ESD	1.0 EA	
492 0839 000	IND 330 UH 10% 500MA	1.0 EA	L010
494 0479 000	IND 3,300 UH 10%	1.0 EA	L009
522 0548 000	CAP 10UF 50V 20%	3.0 EA	C042 C043 C044
522 0591 000	CAP 47UF 25V 20%	2.0 EA	C037 C038
550 0858 000	POT 5K OHM .5W 10%	3.0 EA	R056 R057 R061
550 0958 000	POT 10K OHM 1/2 W 10%	3.0 EA	R058 R059 R060
604 1192 000	SWITCH TGL SPDT	1.0 EA	S001
610 0900 000	HEADER 3 CKT STRAIGHT	3.0 EA	JP001 JP002 JP003
610 0979 000	HDR 10C 2ROW VERTICAL	1.0 EA	J003
612 1184 000	SHUNT JUMPER 0.1" CENTERS	3.0 EA	JP001 JP002 JP003
620 0700 000	*RECPT, MALE SMB,PC MOUNT	2.0 EA	J001 J002
843 5466 351	SCHEMATIC, PHASE CORRECTOR	0.0 EA	
992 9748 003	*PWA, PHASE CORRECTOR, SMT	1.0 EA	

Table 8-43. *PWA, PHASE CORRECTOR, SMT - 992 9748 003

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (I)*
381 0008 000	XSTR, MMBTH10 SOT-23 NPN ESD	7.0 EA	Q001 Q002 Q003 Q004 Q005 Q006 Q007
383 0063 000	IC MAV-11SM SMT ESD	1.0 EA	U005
383 0168 000	IC SLQ-KH1 ESD	1.0 EA	HY001
383 0170 000	IC LRPS-2-1 ESD	2.0 EA	U004 U006
383 0256 000	IC, TL072 OP AMP SMT ESD	3.0 EA	U001 U002 U003
385 0027 000	DIODE, 2800 SCHOTTKY SMT ESD	7.0 EA	CR001 CR002 CR003 CR004 CR005 CR006 CR007
496 0013 000	IND CHIP .100 UH 10%	4.0 EA	L013 L014 L015 L016
496 0022 000	IND CHIP .560 UH 10%	3.0 EA	L003 L008 L011
496 0036 000	IND CHIP 4.7 UH 10%	1.0 EA	L012
496 0062 000	IND CHIP 10 UH 10%	6.0 EA	L001 L002 L004 L005 L006 L007
515 0037 000	*CAP 18PF 50V 5% 1206 COG	2.0 EA	C048 C051
515 0042 000	*CAP 47PF 50V 5% 1206 COG	3.0 EA	C005 C010 C032
515 0044 000	*CAP 68PF 50V 5% 1206 COG	1.0 EA	C049
515 0045 000	*CAP 82PF 50V 5% 1206 COG	1.0 EA	C050
515 0084 000	*CAP .01UF 50V 10% 1206 X7R	27.0 EA	C001 C002 C006 C007 C008 C009 C013 C014 C017 C018 C019 C020 C023 C024 C030 C031 C033 C034 C035 C036 C039 C040 C041 C045 C046 C047 C053
515 0137 501	CAP 0.1UF 50V 10% 1206 X7R	13.0 EA	C003 C004 C011 C012 C015 C016 C021 C022 C025 C026 C027 C028 C029
518 0111 000	CAP, TRIM 4.5-20PF 50V	1.0 EA	C052
545 0309 101	RES 10 OHM 1% 1/4W 1206	6.0 EA	R036 R039 R042 R043 R050 R051
545 0309 118	RES 51.1 OHM 1% 1/4W 1206	4.0 EA	R026 R031 R062 R067
545 0309 119	RES 56.2 OHM 1% 1/4W 1206	3.0 EA	R012 R017 R040
545 0309 120	RES 61.9 OHM 1% 1/4W 1206	3.0 EA	R005 R022 R054
545 0309 201	RES 100 OHM 1% 1/4W 1206	1.0 EA	R035
545 0309 210	RES 237 OHM 1% 1/4W 1206	3.0 EA	R009 R019 R029
545 0309 213	RES 332 OHM 1% 1/4W 1206	1.0 EA	R030
545 0309 217	RES 475 OHM 1% 1/4W 1206	3.0 EA	R011 R018 R025
545 0309 218	RES 511 OHM 1% 1/4W 1206	3.0 EA	R013 R016 R055

545 0309 219	RES 562 OHM 1% 1/4W 1206	3.0 EA	R004 R023 R052
545 0309 220	RES 619 OHM 1% 1/4W 1206	4.0 EA	R063 R064 R065 R066
545 0309 301	RES 1K OHM 1% 1/4W 1206	4.0 EA	R033 R034 R044 R049
545 0309 308	RES 2K OHM 1% 1/4W 1206	6.0 EA	R001 R002 R003 R014 R015 R024
545 0309 309	RES 2.21K OHM 1% 1/4W 1206	3.0 EA	R007 R010 R021
545 0309 315	RES 3.92K OHM 1% 1/4W 1206	2.0 EA	R027 R028
545 0309 401	RES 10K OHM 1% 1/4W 1206	9.0 EA	R032 R037 R038 R041 R045 R046 R047 R048 R053
545 0309 403	RES 12.1K OHM 1% 1/4W 1206	3.0 EA	R006 R008 R020
843 5466 351	SCHEMATIC, PHASE CORRECTOR	0.0 EA	
843 5466 353	PWB, PHASE CORRECTOR	1.0 EA	

Table 8-44. PWA, 44 MHZ SAW - 992 9752 001

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (f)*
484 0451 000	SAW FILTER	1.0 EA	F001
610 0979 000	HDR 10C 2ROW VERTICAL	1.0 EA	J003
620 0700 000	*RECPT, MALE SMB,PC MOUNT	2.0 EA	J001 J002
843 5466 371	SCHEMATIC, 44 MHZ SAW	0.0 EA	
992 9752 002	*PWA, 44MHZ SAW, SMT	1.0 EA	

Table 8-45. *PWA, 44MHZ SAW, SMT - 992 9752 002

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (d)*
383 0063 000	IC MAV-11SM SMT ESD	2.0 EA	U001 U002
494 0485 000	INDUCTOR, 10UH, POWER, 20%	1.0 EA	L003
496 0036 000	IND CHIP 4.7 UH 10%	2.0 EA	L001 L002
496 0086 000	IND CHIP .180 UH 5%	2.0 EA	L004 L005
515 0043 000	*CAP 56PF 50V 5% 1206 COG	2.0 EA	C009 C010
515 0046 000	*CAP 100PF 50V 5% 1206 COG	1.0 EA	C008
515 0084 000	*CAP .01UF 50V 10% 1206 X7R	6.0 EA	C001 C002 C003 C004 C005 C006
522 0634 000	CAP 10UF 25V	1.0 EA	C007
545 0309 220	RES 619 OHM 1% 1/4W 1206	8.0 EA	R001 R002 R003 R004 R005 R006 R007 R008
843 5466 373	PWB, 44 MHZ SAW	1.0 EA	

Table 8-46. PWA, DOWNCONVERTER,EXCITER,DTV - 992 9787 001

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (f)*
522 0590 000	CAP 470UF 25V 20%	4.0 EA	C050 C059 C060 C061
610 0900 000	HEADER 3 CKT STRAIGHT	2.0 EA	JP001 JP002
610 0979 000	HDR 10C 2ROW VERTICAL	1.0 EA	J003
612 1184 000	SHUNT JUMPER 0.1" CENTERS	2.0 EA	1/JP001 1/JP002
620 0700 000	*RECPT, MALE SMB,PC MOUNT	3.0 EA	J001 J002 J004
620 2896 000	JACK RECEPTACLE, BULKHEAD, SMB	1.0 EA	J005
843 5466 411	SCH, DOWNCONVERTER EXCITER	0.0 EA	
917 2462 136	COVER, DTV DOWN CONVERTER	1.0 EA	B001
992 9787 002	*PWA, DOWN CONVERTER, SMT	1.0 EA	

Table 8-47. *PWA, DOWN CONVERTER, SMT - 992 9787 002

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (n)*
382 1608 000	IC, ERA-5SM ESD	1.0 EA	U009
383 0063 000	IC MAV-11SM SMT ESD	3.0 EA	U002 U003 U004
383 0110 000	MIXER LRMS-2MH ESD	1.0 EA	U001
383 0111 000	MIXER LRMS-1MH ESD	1.0 EA	U006
383 0113 000	IC AD9631R OPAMP ESD	1.0 EA	U007
383 0190 000	IC MAV-3SM (SMT) ESD	1.0 EA	U008
383 0277 000	IC, LM4040CIM3-2.5 ESD	1.0 EA	CR004
383 0304 000	IC, LMC6064 ESD	1.0 EA	U011
383 0305 000	IC, CLC446 ESD	2.0 EA	U005 U010
385 0013 000	DIODE, PIN ESD	1.0 EA	CR002
385 0018 000	DIODE, SCHOTTKY ESD	3.0 EA	CR001 CR003 CR005
415 0002 001	FERRITE CHIP, 1206 SIZE	4.0 EA	RFC001 RFC002 RFC003 RFC004
494 0487 000	INDUCTOR 100UH POWER 20% SMT	1.0 EA	L022
496 0019 000	IND CHIP .330 UH 10%	1.0 EA	L015
496 0028 000	IND CHIP 1 UH 10%	9.0 EA	L001 L003 L009 L010 L011 L012 L013 L014 L029
496 0040 000	IND CHIP 10 UH 10%	8.0 EA	L002 L016 L017 L018 L019 L027 L030 L031
496 0069 000	IND CHIP .390UH 10%	1.0 EA	L020
496 0070 000	IND CHIP .270UH 10%	2.0 EA	L021 L026
496 0071 000	IND CHIP .220UH 5%	1.0 EA	L005
496 0073 000	IND CHIP .150UH 5%	2.0 EA	L004 L006
496 0077 000	IND CHIP, 100UH 10%	3.0 EA	L023 L024 L025
515 0134 023	CAP 8.2PF 100V+/-.5PF 0805 C0G	1.0 EA	C046
515 0134 103	CAP 12PF 100V 5% 0805 C0G	2.0 EA	C011 C017
515 0134 105	CAP 15PF 100V 5% 0805 C0G	1.0 EA	C044
515 0134 113	CAP 33PF 100V 5% 0805 C0G	1.0 EA	C052
515 0134 115	CAP 39PF 100V 5% 0805 C0G	2.0 EA	C047 C051
515 0134 117	CAP 47PF 100V 5% 0805 C0G	3.0 EA	C013 C015 C038
515 0134 205	CAP 150PF 100V 5% 0805 C0G	2.0 EA	C045 C053
515 0136 301	CAP 1000PF 100V 10% 0805 X7R	5.0 EA	C001 C003 C005 C073 C075
515 0136 401	CAP 0.01UF 100V 10% 0805 X7R	5.0 EA	C006 C030 C031 C034 C035
515 0136 501	CAP 0.1UF 50V 10% 0805 X7R	31.0 EA	C002 C004 C007 C008 C009 C010 C018 C020 C021 C023 C024 C025 C026 C028 C029 C032 C036 C037 C041 C042 C043 C048 C054 C055 C056 C057 C067 C071 C074 C076 C081
515 0138 601	CAP 1UF 50V 20% 1812 X7R	10.0 EA	C012 C039 C058 C062 C063 C064 C068 C069 C072 C079
523 0003 101	CAP 10UF 35V 20% SMT	8.0 EA	C027 C033 C040 C049 C066 C070 C077 C080
545 0308 023	RES 8.25 OHM 1% 0.1W 0805	4.0 EA	R037 R039 R068 R069
545 0308 101	RES 10 OHM 1% 0.1W 0805	2.0 EA	R012 R052
545 0308 103	RES 12.1 OHM 1% 0.1W 0805	4.0 EA	R010 R013 R028 R030
545 0308 106	RES 16.2 OHM 1% 0.1W 0805	1.0 EA	R003
545 0308 109	RES 22.1 OHM 1% 0.1W 0805	1.0 EA	R004
545 0308 111	RES 26.7 OHM 1% 0.1W 0805	1.0 EA	R006
545 0308 114	RES 35.7 OHM 1% 0.1W 0805	1.0 EA	R008
545 0308 115	RES 39.2 OHM 1% 0.1W 0805	1.0 EA	R002
545 0308 116	RES 43.2 OHM 1% 0.1W 0805	1.0 EA	R001
545 0308 117	RES 47.5 OHM 1% 0.1W 0805	2.0 EA	R005 R033
545 0308 118	RES 51.1 OHM 1% 0.1W 0805	8.0 EA	R007 R020 R031 R034 R036 R054 R065 R071
545 0308 201	RES 100 OHM 1% 0.1W 0805	4.0 EA	R009 R029 R035 R059
545 0308 205	RES 150 OHM 1% 0.1W 0805	2.0 EA	R038 R070
545 0308 208	RES 200 OHM 1% 0.1W 0805	3.0 EA	R050 R051 R060

545 0308 210	RES 237 OHM 1% 0.1W 0805	1.0 EA	R021
545 0308 211	RES 267 OHM 1% 0.1W 0805	4.0 EA	R026 R027 R048 R049
545 0308 218	RES 511 OHM 1% 0.1W 0805	1.0 EA	R022
545 0308 223	RES 825 OHM 1% 0.1W 0805	3.0 EA	R041 R042 R043
545 0308 301	RES 1K OHM 1% 0.1W 0805	2.0 EA	R055 R067
545 0308 317	RES 4.75K OHM 1% 0.1W 0805	1.0 EA	R061
545 0308 501	RES 100K OHM 1% 0.1W 0805	2.0 EA	R056 R057
545 0308 518	RES 511K OHM 1% 0.1W 0805	3.0 EA	R011 R053 R064
545 0308 621	RES 6.81MEG OHM 1% 0.1W 0805	2.0 EA	R062 R063
545 0309 217	RES 475 OHM 1% 1/4W 1206	9.0 EA	R014 R015 R016 R017 R018 R019 R023 R024 R025
545 0309 218	RES 511 OHM 1% 1/4W 1206	5.0 EA	R044 R045 R046 R047 R066
551 0017 301	TRIMPOT 1K OHM 1/4W 4MM SQ	2.0 EA	R040 R058
551 0024 000	TRIMPOT 100 OHM 1/4W 4MM SQ	1.0 EA	R032
843 5466 411	SCH, DOWNCONVERTER EXCITER	0.0 EA	
843 5466 413	PWB, DOWNCONVERTER EXCITER	1.0 EA	

Table 8-48. PWA, TRANSPORT/TRANSMISSION - 992 9808 001

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (f)*
358 3383 000	JUMPER, 0.1" LG, 0.125" H	2.0 EA	JP001 JP002
384 0780 000	LED, RED ESD	1.0 EA	DS003
384 0904 000	LED, GRN, T-1 ESD	2.0 EA	DS001 DS002
404 0673 000	SOCKET 8 PIN DIP (DL)	2.0 EA	XU002 XU013
444 3020 000	OSC, 43.048951MHZ ESD	1.0 EA	U016
444 3022 000	OSC, 19.392658MHZ, TTL, SMT	1.0 EA	U003
610 0830 000	HEADER, 10 PIN PC RIBBON	2.0 EA	J015 J016
610 0900 000	HEADER 3 CKT STRAIGHT	5.0 EA	JP004 JP005 JP006 JP007 JP008
612 1184 000	SHUNT JUMPER 0.1" CENTERS	5.0 EA	JPR004 JPR005 JPR006 JPR007 JPR008
620 2883 000	JACK, OSX PWB MTG	12.0 EA	J002 J003 J004 J005 J008 J009 J010 J011 J012 J013 J014 J017
817 2462 039	SOFTWARE INSTR, U002,TRANSPORT	0.0 EA	
817 2462 040	SOFTWARE INSTR, TRANSPORT	0.0 EA	
817 2462 041	SOFTWARE INSTR, TRANSPORT,	0.0 EA	
817 2462 207	SOFTWARE INSTR, TRELLIS	0.0 EA	
843 5466 611	SCH, TRANSPORT TO TRANSMISSION	0.0 EA	
917 2462 130	FIRMWARE PKG TRANSPORT	1.0 EA	
917 2462 202	FIRMWARE, TRANSPORT, U14	1.0 EA	
917 2462 203	FIRMWARE, TRANSPORT,CD1-A,U018	1.0 EA	
992 9808 002	*PWA, TRANSPORT, SMT	1.0 EA	

Table 8-49. *PWA, TRANSPORT, SMT - 992 9808 002

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (k)*
000 0000 010	B/M NOTE:	0.0 EA	*OSC U003 IS NOT INSTALLED AT THIS LEVEL*
383 0090 000	IC, EPF81500A ESD	1.0 EA	U012
383 0193 000	IC, IDT71028 ESD	2.0 EA	U007 U008
383 0201 000	IC, 1007 SMT ESD	1.0 EA	U015
383 0253 000	IC, LM358 ESD	1.0 EA	U019
383 0295 000	IC, 74FCT240 ESD	2.0 EA	U017 U020
385 0001 000	DIODE, RECT 4148 / 914 ESD	1.0 EA	CR003
387 0010 006	DIODE, TVS 5.0V 1500W ESD	1.0 EA	CR004
387 0010 017	DIODE, TVS 15V 1500W ESD	2.0 EA	CR001 CR002

393 0042 000	IC, EPF81188A ESD	1.0 EA	U001
404 0868 000	SOCKET, PLCC-44 SMT	2.0 EA	#U014 #U018
404 0869 000	SOCKET, PLCC-32 SMT	3.0 EA	#U009 #U010 #U011
404 0891 000	SOCKET, PLCC, SMT W/O LOCATORS	3.0 EA	#U004 #U005 #U006
515 0084 000	*CAP .01UF 50V 10% 1206 X7R	59.0 EA	C005 C006 C007 C008 C009 C010 C011 C012 C013 C014 C015 C016 C017 C018 C019 C020 C021 C022 C023 C024 C025 C026 C027 C028 C029 C030 C031 C032 C033 C034 C035 C036 C037 C038 C039 C040 C041 C042 C043 C044 C045 C046 C047 C048 C049 C050 C051 C052 C053 C054 C055 C056 C057 C058 C060 C067 C068 C069 C076
515 0088 000	CAP CHIP .047UF 10% 50V	2.0 EA	C059 C063
515 0137 501	CAP 0.1UF 50V 10% 1206 X7R	5.0 EA	C001 C002 C003 C004 C066
522 0634 000	CAP 10UF 25V	8.0 EA	C061 C070 C071 C072 C073 C074 C075 C077
522 0635 000	CAP 100UF 25V	3.0 EA	C062 C064 C065
545 0118 000	RES 750K OHM 1/4W 5% 1206	2.0 EA	R014 R015
545 0309 121	RES 68.1 OHM 1% 1/4W 1206	7.0 EA	R002 R019 R024 R026 R027 R028 R033
545 0309 301	RES 1K OHM 1% 1/4W 1206	11.0 EA	R001 R005 R008 R009 R016 R017 R018 R020 R021 R022 R023
545 0309 308	RES 2K OHM 1% 1/4W 1206	4.0 EA	R010 R011 R012 R013
545 0309 312	RES 3.01K OHM 1% 1/4W 1206	1.0 EA	R004
545 0309 321	RES 6.81K OHM 1% 1/4W 1206	1.0 EA	R003
545 0309 401	RES 10K OHM 1% 1/4W 1206	1.0 EA	R007
545 0309 511	RES 267K OHM 1% 1/4W 1206	1.0 EA	R006
545 0309 999	RES ZERO OHM JUMPER 1206	18.0 EA	R029 R030 R031 R032 R034 R035 R036 R037 R038 R039 R040 R041 R042 R043 R044 R045 R046 R047
611 0001 000	HEADER 20 PIN SMT	3.0 EA	J001 J006 J007
843 5466 611	SCH, TRANSPORT TO TRANSMISSION	0.0 EA	
843 5466 613	PWB, TRANSPORT TO TRANSMISSION	1.0 EA	

Table 8-50. PWA, CORRECTOR - 992 9809 001

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (c)*
000 0000 010	B/M NOTE:	0.0 EA	“JP001 IS NOT INSTALLED”
383 0141 000	IC, HSP43216 ESD	4.0 EA	U012 U013 U015 U016
384 0904 000	LED, GRN, T-1 ESD	1.0 EA	DS001
404 0673 000	SOCKET 8 PIN DIP (DL)	1.0 EA	XU002
620 2883 000	JACK, OSX PWB MTG	2.0 EA	J002 J008
843 5466 191	SCH, CORRECTOR	0.0 EA	
917 2462 112	FIRMWARE, CORRECTOR, U2	1.0 EA	U002
992 9809 002	*PWA, CORRECTOR, SMT	1.0 EA	

Table 8-51. *PWA, CORRECTOR, SMT - 992 9809 002

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (j)*
000 0000 010	B/M NOTE:	0.0 EA	R144 AND R180 ARE NOT INSTALLED
383 0101 000	IC, GC2011 ESD	1.0 EA	U009
383 0166 000	IC, 71024/7C109/6226 ESD	4.0 EA	U003 U004 U005 U006
383 0309 000	IC, 70261 ESD	4.0 EA	U007 U008 U010 U011

387 0010 006	DIODE, TVS 5.0V 1500W ESD	1.0 EA	CR001
393 0042 000	IC, EPF81188A ESD	1.0 EA	U001
404 0890 000	SOCKET, PLCC-84, SMT	4.0 EA	XU012 XU013 XU015 XU016
515 0084 000	*CAP .01UF 50V 10% 1206 X7R	58.0 EA	C003 C004 C005 C006 C007 C010 C011 C012 C013 C014 C015 C016 C017 C018 C019 C020 C021 C022 C023 C024 C025 C026 C027 C028 C029 C030 C031 C033 C035 C036 C037 C038 C039 C040 C041 C042 C043 C044 C045 C046 C047 C048 C049 C050 C052 C053 C054 C055 C056 C057 C059 C060 C061 C062 C063 C064 C065 C066
523 0001 201	CAP 100UF 6.3V 20% SMT	8.0 EA	C001 C002 C008 C009 C032 C034 C051 C058
545 0309 113	RES 33.2 OHM 1% 1/4W 1206	1.0 EA	R017
545 0309 201	RES 100 OHM 1% 1/4W 1206	78.0 EA	R001 R002 R003 R004 R005 R006 R007 R008 R009 R010 R011 R012 R013 R014 R015 R016 R044 R045 R046 R047 R049 R050 R053 R054 R055 R056 R061 R062 R064 R065 R067 R068 R081 R082 R087 R088 R089 R091 R092 R095 R097 R099 R100 R105 R107 R108 R113 R115 R116 R118 R119 R120 R123 R125 R126 R132 R138 R140 R141 R143 R145 R148 R151 R152 R157 R158 R159 R164 R165 R166 R170 R171 R172 R174 R175 R182 R183 R184
545 0309 205	RES 150 OHM 1% 1/4W 1206	1.0 EA	R179
545 0309 208	RES 200 OHM 1% 1/4W 1206	1.0 EA	R128
545 0309 301	RES 1K OHM 1% 1/4W 1206	7.0 EA	R035 R038 R040 R041 R129 R142 R178
545 0309 401	RES 10K OHM 1% 1/4W 1206	70.0 EA	R018 R019 R020 R021 R022 R023 R024 R025 R026 R027 R028 R029 R030 R031 R032 R033 R034 R036 R037 R039 R042 R043 R048 R051 R052 R057 R058 R059 R060 R063 R066 R069 R070 R071 R072 R073 R074 R075 R076 R077 R078 R079 R080 R083 R084 R085 R086 R090 R093 R094 R098 R101 R102 R106 R109 R110 R114 R117 R124 R127 R133 R134 R135 R136 R137 R149 R150 R156 R163 R169
611 0001 000	HEADER 20 PIN SMT	1.0 EA	J001
611 0002 000	HEADER, 40 PIN, SMT	5.0 EA	J003 J004 J005 J006 J007
843 5466 191	SCH, CORRECTOR	0.0 EA	
843 5466 193	PWB, CORRECTOR	1.0 EA	

Table 8-52. PWA, DSP CONTROLLER - 992 9810 001

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (d)*
000 0000 010	B/M NOTE:	0.0 EA	JP001 JP002 JP003 JP006 JP008 ARE LEFT OFF INTENTIONALLY
358 3383 000	JUMPER, 0.1" LG, 0.125" H	6.0 EA	JP004 JP005 JP007 JP009 JP010 JP011
610 1133 000	HDR 14C 2ROW STRAIGHT	1.0 EA	J007
612 1154 000	RECPT 9 PIN D RT ANGLE	1.0 EA	J008
620 2883 000	JACK, OSX PWB MTG	1.0 EA	J002
843 5466 511	SCH, CORRECTION CONTROLLER	0.0 EA	
917 2462 201	FIRMWARE, DSP CTLR U018	1.0 EA	
992 9810 002	*PWA, CORRECTION CTLR, SMT	1.0 EA	
999 2920 001	HARDWARE LIST, PWA, DSP CTLR	1.0 EA	

Table 8-53. *PWA, CORRECTION CTLR, SMT - 992 9810 002

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (I)*
000 0000 010	B/M NOTE:	0.0 EA	*R004, R005, R006, & R019 ARE LEFT OFF INTENTIONALLY*
381 0029 000	FET, 2N7002 SMT ESD	3.0 EA	Q001 Q002 Q003
382 1550 000	IC, DS1004, 5TAP,5NS DELAY ESD	1.0 EA	U020
383 0010 000	IC, 74ACT32 ESD	1.0 EA	U009
383 0074 000	IC, 74HC86 ESD	1.0 EA	U022
383 0126 000	*IC MAX705/ADM705 WATCHDOG ESD	1.0 EA	U003
383 0138 000	IC, 74AC74 DUAL D F-F ESD	1.0 EA	U006
383 0238 000	IC, 74AC08 ESD	1.0 EA	U008
383 0239 000	IC 74AC04 ESD	2.0 EA	U010 U023
383 0270 000	IC, ADM560 ESD	1.0 EA	U004
383 0271 000	IC, 74FCT138 ESD	2.0 EA	U007 U013
383 0286 000	IC, LM3940 3.3V REG, SMT ESD	1.0 EA	U019
383 0289 000	IC, DSP56303 ESD	1.0 EA	U001
383 0290 000	IC 74FCT16244 ESD	2.0 EA	U014 U021
383 0306 000	IC, 16212 ESD	1.0 EA	U005
383 0336 000	IC 74FCT162245 ESD	1.0 EA	U011
383 0374 000	IC, 74LVTH244 ESD	1.0 EA	U002
383 0385 000	IC, 74ABT16273 ESD	1.0 EA	U015
385 0001 000	DIODE, RECT 4148 / 914 ESD	2.0 EA	CR001 CR002
387 0010 006	DIODE, TVS 5.0V 1500W ESD	1.0 EA	CR004
389 0010 001	LED, RED, 1.4MM RECT ESD	1.0 EA	DS001
404 0869 000	SOCKET, PLCC-32 SMT	1.0 EA	XU018
515 0057 000	CAP CHIP 820PF 5% 50V	1.0 EA	C001
515 0084 000	*CAP .01UF 50V 10% 1206 X7R	48.0 EA	C002 C003 C004 C005 C006 C007 C008 C009 C010 C011 C012 C013 C014 C015 C016 C017 C018 C019 C020 C021 C022 C023 C024 C025 C026 C027 C028 C029 C030 C031 C034 C035 C036 C037 C038 C039 C040 C041 C042 C043 C045 C056 C057 C058 C059 C060 C061 C062
522 0634 000	CAP 10UF 25V	5.0 EA	C046 C047 C048 C049 C051
523 0001 201	CAP 100UF 6.3V 20% SMT	5.0 EA	C050 C052 C053 C054 C055
545 0309 201	RES 100 OHM 1% 1/4W 1206	1.0 EA	R022
545 0309 210	RES 237 OHM 1% 1/4W 1206	1.0 EA	R021
545 0309 217	RES 475 OHM 1% 1/4W 1206	1.0 EA	R033
545 0309 301	RES 1K OHM 1% 1/4W 1206	1.0 EA	R037
545 0309 317	RES 4.75K OHM 1% 1/4W 1206	1.0 EA	R020
545 0309 401	RES 10K OHM 1% 1/4W 1206	33.0 EA	R001 R002 R003 R007 R008 R009 R010 R011 R012 R013 R014 R015 R016 R017 R018 R023 R024 R025 R026 R027 R028 R029 R030 R031 R032 R038 R039 R040 R041 R042 R043 R044 R046
545 0309 999	RES ZERO OHM JUMPER 1206	2.0 EA	R036 R045
604 1162 000	DIPSWITCH, 8 SPST SMT	1.0 EA	S003
604 1163 000	SWITCH, SPST SMT	1.0 EA	S002
611 0001 000	HEADER 20 PIN SMT	3.0 EA	J001 J005 J006
611 0002 000	HEADER, 40 PIN, SMT	2.0 EA	J003 J004
843 5466 511	SCH, CORRECTION CONTROLLER	0.0 EA	
843 5466 513	PWB, CORRECTION CONTROLLER	1.0 EA	

Table 8-54. PWA, EMBEDDED CLOCK RECOVERY - 992 9933 001

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (a)*
383 0293 000	IC, MC10H125 ESD	2.0 EA	U003 U008
383 0320 000	IC, CLC016 ESD	1.0 EA	U007
540 1600 103	RES 12 OHM 3W 5%	1.0 EA	R025
610 0679 000	PLUG, SHORTING, .25" CTRS	9.0 EA	JP001 JP002 JP005 JP006 JP007 JP008 JP009 JP010 JP011
610 0830 000	HEADER, 10 PIN PC RIBBON	1.0 EA	J005
610 0900 000	HEADER 3 CKT STRAIGHT	2.0 EA	J003 J004
612 0901 000	JACK, PC MT	34.0 EA	
612 1184 000	SHUNT JUMPER 0.1" CENTERS	2.0 EA	JPR003 JPR004
620 2883 000	JACK, OSX PWB MTG	6.0 EA	J002 J003 J004 J006 J007 J010
843 5466 821	SCH, EMBEDDED CLOCK RECOVERY	0.0 EA	
917 2462 204	FIRMWARE, SMPTE PT20.04, U013	1.0 EA	U013
992 9933 002	*PWA, CLOCK RECOVERY, SMT	1.0 EA	

Table 8-55. *PWA, CLOCK RECOVERY, SMT - 992 9933 002

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (f)*
382 1549 000	IC, MC79M05CDT, NEG 5V REG ESD	1.0 EA	U005
382 1550 000	IC, DS1004, 5TAP,5NS DELAY ESD	1.0 EA	U014
383 0115 000	IC, MC10ELT28 ESD	2.0 EA	U011 U012
383 0179 000	IC, MC10EL16 ESD	2.0 EA	U009 U010
383 0200 000	IC, 74ACT240 SMT ESD	1.0 EA	U015
383 0239 000	IC 74AC04 ESD	1.0 EA	U006
383 0292 000	IC, GS9004A ESD	3.0 EA	U001 U002 U004
385 0001 000	DIODE, RECT 4148 / 914 ESD	2.0 EA	CR002 CR004
387 0010 006	DIODE, TVS 5.0V 1500W ESD	1.0 EA	CR003
387 0010 017	DIODE, TVS 15V 1500W ESD	1.0 EA	CR001
389 0004 101	LED, RED, 2.4MM ROUND ESD	1.0 EA	DS002
389 0004 102	LED, GRN, 2.4MM ROUND ESD	1.0 EA	DS001
404 0868 000	SOCKET, PLCC-44 SMT	1.0 EA	XU013
404 0886 000	SOCKET, PLCC SURFACE MTG	2.0 EA	XU003 XU008
404 0891 000	SOCKET, PLCC, SMT W/O LOCATORS	1.0 EA	XU007
478 0429 000	XFMR, RF MODEL T4-1 SMT	1.0 EA	T001
515 0128 000	*CAP .01UF 100V 10% 1206 X7R	4.0 EA	C019 C042 C045 C047
515 0135 301	CAP 1000PF 100V 5% 1206 C0G	20.0 EA	C020 C024 C029 C031 C033 C036 C040 C046 C049 C050 C056 C058 C061 C062 C064 C067 C068 C071 C072 C074
515 0137 501	CAP 0.1UF 50V 10% 1206 X7R	32.0 EA	C001 C002 C003 C005 C007 C008 C009 C010 C011 C014 C015 C016 C017 C018 C021 C022 C023 C026 C027 C030 C034 C037 C039 C044 C048 C051 C057 C059 C065 C066 C069 C073
523 0001 201	CAP 100UF 6.3V 20% SMT	11.0 EA	C025 C028 C035 C038 C041 C043 C052 C055 C060 C063 C070
526 0385 000	CAP, 22UF 16V 10%	7.0 EA	C004 C006 C012 C013 C032 C053 C054
545 0309 111	RES 26.7 OHM 1% 1/4W 1206	1.0 EA	R046
545 0309 115	RES 39.2 OHM 1% 1/4W 1206	2.0 EA	R010 R011
545 0309 118	RES 51.1 OHM 1% 1/4W 1206	3.0 EA	R017 R020 R028
545 0309 122	RES 75 OHM 1% 1/4W 1206	6.0 EA	R005 R007 R033 R034 R035 R036

545 0309 201	RES 100 OHM 1% 1/4W 1206	16.0 EA	R001 R002 R008 R009 R012 R013 R022 R023 R039 R041 R042 R047 R048 R053 R054 R056
545 0309 205	RES 150 OHM 1% 1/4W 1206	1.0 EA	R003
545 0309 212	RES 301 OHM 1% 1/4W 1206	2.0 EA	R014 R024
545 0309 216	RES 432 OHM 1% 1/4W 1206	4.0 EA	R049 R050 R051 R052
545 0309 217	RES 475 OHM 1% 1/4W 1206	1.0 EA	R037
545 0309 220	RES 619 OHM 1% 1/4W 1206	2.0 EA	R030 R031
545 0309 221	RES 681 OHM 1% 1/4W 1206	6.0 EA	R015 R016 R019 R021 R027 R029
545 0309 301	RES 1K OHM 1% 1/4W 1206	1.0 EA	R058
545 0309 401	RES 10K OHM 1% 1/4W 1206	5.0 EA	R032 R038 R040 R045 R060
545 0309 418	RES 51.1K OHM 1% 1/4W 1206	2.0 EA	R043 R044
545 0309 999	RES ZERO OHM JUMPER 1206	7.0 EA	R004 R006 R018 R026 R055 R057 R059
611 0001 000	HEADER 20 PIN SMT	1.0 EA	J001
843 5466 821	SCH, EMBEDDED CLOCK RECOVERY	0.0 EA	
843 5466 823	PWB, EMBEDDED CLOCK RECOVERY	1.0 EA	

Table 8-56. PWA, P/S & CTLR INTERFACE - 992 9939 001

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (b)*
358 2997 000	END PLATE,236 TERM MODULE	1.0 EA	TB001
384 0205 000	DIODE SILICON 1N914/4148 ESD	2.0 EA	CR001 CR002
384 0719 000	TRANSZORB 1N6373 5V 5W ESD	2.0 EA	CR003 CR004
384 0720 000	TRANSZORB 1N6377 15V 5W ESD	2.0 EA	CR005 CR006
384 0904 000	LED, GRN, T-1 ESD	4.0 EA	DS001 DS002 DS003 DS004
522 0590 000	CAP 470UF 25V 20%	3.0 EA	C001 C002 C003
540 1600 103	RES 12 OHM 3W 5%	1.0 EA	R013
548 2400 269	RES 511 OHM 1/2W 1%	3.0 EA	R014 R015 R018
548 2400 318	RES 1.5K OHM 1/2W 1%	2.0 EA	R016 R017
548 2400 363	RES 4.42K OHM 1/2W 1%	2.0 EA	R003 R009
548 2400 450	RES 32.4K OHM 1/2W 1%	2.0 EA	R006 R012
548 2400 459	RES 40.2K OHM 1/2W 1%	4.0 EA	R001 R004 R007 R010
550 0958 000	POT 10K OHM 1/2 W 10%	4.0 EA	R002 R005 R008 R011
610 0893 000	CONN 25 PIN D STRATE POST	1.0 EA	J016
610 0979 000	HDR 10C 2ROW VERTICAL	3.0 EA	J010 J011 J014
610 0981 000	HDR 20C 2ROW VERTICAL	1.0 EA	J013
610 1172 000	HDR, 2PIN,1ROW,STRT,POLAR	4.0 EA	J018 J020 J022 J024
610 1287 000	HEADER, VERT, 20 POS	10.0 EA	J001 J002 J003 J004 J005 J006 J007 J008 J009 J026
610 1298 000	HEADER, 5PIN, 0.1 CENTERS,	4.0 EA	J019 J021 J023 J025
612 1163 000	RECEPTACLE 37 POS D	1.0 EA	J015
612 1227 000	RCPT, 9 PIN D PC MT	2.0 EA	J012 J017
614 0790 000	TERM MODULE,1C PC MTG 236	2.0 EA	TB001
843 5466 831	SCH, POWER DISTRIBUTION,	0.0 EA	
843 5466 833	PWB, POWER DISTRIBUTION,	1.0 EA	

Table 8-57. PWA, 1W AMP - 992 9941 001

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (d)*
007 4060 084	BRZ, PH FGR STOCK	2.0 EA	
055 0100 005	*THERMAL COMPOUND, 8OZ JAR	0.0 EA	
086 0001 002	*SEALANT, MEDIUM STRENGTH	0.0 EA	
302 0012 000	SCR, 2-56 X 1/4	4.0 EA	2/J002 2/J003
302 0106 000	SCR, 6-32 X 3/8	4.0 EA	4/COVER
302 0110 000	SCR, 6-32 X 3/4	4.0 EA	2/U004 2/U005

302 0441 000	SCR, 4-40 X 3/8	2.0 EA	J001
310 0012 000	WASHER FLAT 6	4.0 EA	4/COVER
314 0001 000	WASHER, SPLIT-LOCK 2	4.0 EA	2/J002 2/J003
314 0005 000	WASHER, SPLIT-LOCK 6	8.0 EA	2/U004 2/U005 4/COVER
335 0289 000	WASHER, CONDUCTIVE ELASTOMER	1.0 EA	
358 1214 000	SCREWLOCK, FEMALE	1.0 EA	J001
358 3406 000	STANDOFF, 6-32 X 7/8"	4.0 EA	
382 1499 000	IC CA5815C ESD	2.0 EA	U004 U005
494 0218 000	CHOKE WIDE BAND	2.0 EA	RFC001 RFC002
610 1288 000	PLUG 9 PIN	1.0 EA	J001
620 2944 000	RECEPTACLE, SMA FLANGE MOUNT	2.0 EA	J002 J003
843 5466 841	SCH, 1 WATT AMP	0.0 EA	
952 9202 115	BOX, 1 WATT AMP	1.0 EA	
992 9941 002	PWA, 1W AMP SMT PARTS,	1.0 EA	

Table 8-58. PWA, 1W AMP SMT PARTS, - 992 9941 002

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (c)*
302 0106 000	SCR, 6-32 X 3/8	12.0 EA	BASE
310 0012 000	WASHER FLAT 6	12.0 EA	BASE
314 0005 000	WASHER, SPLIT-LOCK 6	12.0 EA	BASE
382 1341 000	IC LRPS-2-4 ESD	2.0 EA	U007 U008
382 1608 000	IC, ERA-5SM ESD	1.0 EA	U003
383 0171 000	IC MAR-3SM ESD	2.0 EA	U001 U002
383 0256 000	IC, TL072 OP AMP SMT ESD	1.0 EA	U006
385 0027 000	DIODE, 2800 SCHOTTKY SMT ESD	2.0 EA	CR001 CR002
496 0028 000	IND CHIP 1 UH 10%	3.0 EA	L001 L002 L003
515 0046 000	*CAP 100PF 50V 5% 1206 COG	5.0 EA	C012 C013 C014 C015 C016
515 0084 000	*CAP .01UF 50V 10% 1206 X7R	8.0 EA	C001 C003 C005 C007 C008 C009 C010 C011
515 0135 301	CAP 1000PF 100V 5% 1206 C0G	13.0 EA	C002 C004 C006 C019 C022 C023 C024 C025 C026 C027 C028 C029 C030
515 0137 501	CAP 0.1UF 50V 10% 1206 X7R	4.0 EA	C017 C018 C020 C021
545 0121 000	RES 1M OHM 1/4W 5% 1206	2.0 EA	R011 R017
545 0309 021	RES 6.81 OHM 1% 1/4W 1206	1.0 EA	R008
545 0309 201	RES 100 OHM 1% 1/4W 1206	4.0 EA	R010 R014 R015 R016
545 0309 210	RES 237 OHM 1% 1/4W 1206	8.0 EA	R003 R005 R006 R026 R027 R028 R029 R030
545 0309 303	RES 1.21K OHM 1% 1/4W 1206	8.0 EA	R001 R002 R020 R021 R022 R023 R024 R025
545 0309 418	RES 51.1K OHM 1% 1/4W 1206	2.0 EA	R012 R018
545 0309 501	RES 100K OHM 1% 1/4W 1206	2.0 EA	R013 R019
620 2994 000	DIRECTIONAL COUPLER 20DB	1.0 EA	DC001
843 5466 841	SCH, 1 WATT AMP	0.0 EA	
843 5466 843	PWB, 1 WATT AMP	1.0 EA	
952 9202 211	BASE, 1W AMP	1.0 EA	

Table 8-59. PWA, AGC - 992 9942 001

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (c)*
384 0904 000	LED, GRN, T-1 ESD	1.0 EA	DS001
610 0900 000	HEADER 3 CKT STRAIGHT	1.0 EA	JP001
610 1155 000	HDR 20C 2 ROW .1" CTRS	1.0 EA	J001
612 1184 000	SHUNT JUMPER 0.1" CENTERS	1.0 EA	#JP001
612 1227 000	RCPT, 9 PIN D PC MT	1.0 EA	J004
620 0700 000	*RECPT, MALE SMB,PC MOUNT	2.0 EA	J002 J003

843 5466 861	SCH, AGC	0.0 EA
992 9942 002	*PWA, AGC, SMT	1.0 EA

Table 8-60. *PWA, AGC, SMT - 992 9942 002

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (h)*
381 0003 002	XSTR, PNP MMBT3906 ESD	1.0 EA	Q001
381 0010 000	N-MOSFET BSS138 ESD	1.0 EA	Q002
382 1608 000	IC, ERA-5SM ESD	1.0 EA	U004
383 0038 000	IC, LM311 ESD	1.0 EA	U005
383 0063 000	IC MAV-11SM SMT ESD	1.0 EA	U007
383 0075 000	IC, LT1009S8 ESD	1.0 EA	U009
383 0076 000	IC, 74HC132 ESD	1.0 EA	U006
383 0174 000	IC, X9C103 ESD	1.0 EA	U008
383 0256 000	IC, TL072 OP AMP SMT ESD	2.0 EA	U002 U003
383 0259 000	IC, AD633 MULTIPLIER ESD	1.0 EA	U001
385 0001 000	DIODE, RECT 4148 / 914 ESD	1.0 EA	CR005
385 0013 000	DIODE, PIN ESD	4.0 EA	CR001 CR002 CR003 CR004
494 0485 000	INDUCTOR, 10UH, POWER, 20%	4.0 EA	L001 L002 L004 L005
496 0040 000	IND CHIP 10 UH 10%	4.0 EA	L003 L006 L007 L008
515 0128 000	*CAP .01UF 100V 10% 1206 X7R	1.0 EA	C037
515 0137 501	CAP 0.1UF 50V 10% 1206 X7R	28.0 EA	C001 C002 C003 C004 C005 C008 C010 C011 C012 C013 C014 C015 C016 C017 C018 C019 C020 C021 C022 C023 C025 C026 C027 C028 C030 C032 C038 C039
515 0138 509	CAP 0.22UF 100V 10% 1812 X7R	1.0 EA	C029
515 0138 517	CAP 0.47UF 100V 10% 1812 X7R	1.0 EA	C009
515 0139 601	CAP 1UF 50V 20% 1812 Z5U	6.0 EA	C024 C034 C035 C036 C040 C041
523 0001 201	CAP 100UF 6.3V 20% SMT	2.0 EA	C031 C033
523 0003 201	CAP 100UF 35V 20% SMT	2.0 EA	C006 C007
545 0121 000	RES 1M OHM 1/4W 5% 1206	2.0 EA	R035 R037
545 0308 608	RES 2MEG OHM 1% 0.1W 0805	1.0 EA	R051
545 0309 101	RES 10 OHM 1% 1/4W 1206	2.0 EA	R033 R050
545 0309 211	RES 267 OHM 1% 1/4W 1206	1.0 EA	R028
545 0309 213	RES 332 OHM 1% 1/4W 1206	1.0 EA	R034
545 0309 219	RES 562 OHM 1% 1/4W 1206	2.0 EA	R026 R031
545 0309 220	RES 619 OHM 1% 1/4W 1206	8.0 EA	R013 R015 R018 R020 R038 R039 R040 R043
545 0309 221	RES 681 OHM 1% 1/4W 1206	1.0 EA	R025
545 0309 224	RES 909 OHM 1% 1/4W 1206	1.0 EA	R036
545 0309 301	RES 1K OHM 1% 1/4W 1206	15.0 EA	R002 R003 R004 R009 R016 R019 R021 R032 R041 R042 R044 R045 R046 R048 R054
545 0309 306	RES 1.62K OHM 1% 1/4W 1206	2.0 EA	R027 R030
545 0309 320	RES 6.19K OHM 1% 1/4W 1206	1.0 EA	R008
545 0309 401	RES 10K OHM 1% 1/4W 1206	11.0 EA	R001 R005 R007 R011 R012 R014 R017 R022 R023 R029 R047
545 0309 512	RES 301K OHM 1% 1/4W 1206	1.0 EA	R052
551 0017 301	TRIMPOT 1K OHM 1/4W 4MM SQ	2.0 EA	R006 R010
551 0017 305	TRIMPOT 5K OHM 1/4W 4MM SQ	2.0 EA	R024 R049
551 0017 405	TRIMPOT 50K OHM 1/4W 4MM SQ	1.0 EA	R053
604 1163 000	SWITCH, SPST SMT	2.0 EA	S001 S002
843 5466 861	SCH, AGC	0.0 EA	
843 5466 863	PWB, AGC	1.0 EA	

Table 8-61. PWA,RESPONSE & DELAY CORRECTOR - 992 9968 001

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (c)*
604 1192 000	SWITCH TGL SPDT	1.0 EA	S001
610 0979 000	HDR 10C 2ROW VERTICAL	1.0 EA	J003
620 0700 000	*RECPT, MALE SMB,PC MOUNT	2.0 EA	J001 J002
843 5466 311	SCHEMATIC, RESPONSE CORRECTOR	0.0 EA	
917 2462 219	COIL 8-TURN, BIFILAR WOUND	1.0 EA	T003
917 2462 220	COIL 10-TURN, BIFILAR WOUND	1.0 EA	T002
917 2462 221	COIL 12-TURN, BIFILAR WOUND	1.0 EA	T001
992 9968 002	*PWA, RESPONSE & DELAY, SMT	1.0 EA	

Table 8-62. *PWA, RESPONSE & DELAY, SMT - 992 9968 002

HARRIS P/N	*DESCRIPTION*	*QTY/UM*	*REF. SYMBOLS/EXPLANATIONS (f)*
381 0008 000	XSTR, MMBTH10 SOT-23 NPN ESD	4.0 EA	Q001 Q002 Q003 Q004
383 0063 000	IC MAV-11SM SMT ESD	1.0 EA	U001
496 0058 000	IND CHIP 10UH 10%	1.0 EA	L001
515 0048 000	*CAP 150PF 50V 5% 1206 COG	3.0 EA	C001 C003 C015
515 0084 000	*CAP .01UF 50V 10% 1206 X7R	15.0 EA	C002 C004 C005 C006 C007 C008 C009 C010 C011 C012 C013 C014 C016 C017 C018
545 0309 017	RES 4.75 OHM 1% 1/4W 1206	6.0 EA	R001 R002 R003 R018 R019 R022
545 0309 101	RES 10 OHM 1% 1/4W 1206	4.0 EA	R005 R006 R015 R020
545 0309 114	RES 35.7 OHM 1% 1/4W 1206	1.0 EA	R024
545 0309 118	RES 51.1 OHM 1% 1/4W 1206	1.0 EA	R016
545 0309 201	RES 100 OHM 1% 1/4W 1206	2.0 EA	R026 R027
545 0309 205	RES 150 OHM 1% 1/4W 1206	2.0 EA	R023 R025
545 0309 209	RES 221 OHM 1% 1/4W 1206	1.0 EA	R007
545 0309 211	RES 267 OHM 1% 1/4W 1206	1.0 EA	R004
545 0309 212	RES 301 OHM 1% 1/4W 1206	1.0 EA	R021
545 0309 213	RES 332 OHM 1% 1/4W 1206	1.0 EA	R017
545 0309 220	RES 619 OHM 1% 1/4W 1206	4.0 EA	R009 R010 R011 R012
545 0309 301	RES 1K OHM 1% 1/4W 1206	3.0 EA	R028 R029 R030
545 0309 401	RES 10K OHM 1% 1/4W 1206	2.0 EA	R013 R014
551 0024 000	TRIMPOT 100 OHM 1/4W 4MM SQ	7.0 EA	R8 R85 R86 R87 R88 R89 R90
579 0001 000	RELAY, 12VDC DPDT	2.0 EA	K001 K002
843 5466 311	SCHEMATIC, RESPONSE CORRECTOR	0.0 EA	
843 5466 313	PWB, RESPONSE CORRECTOR	1.0 EA	