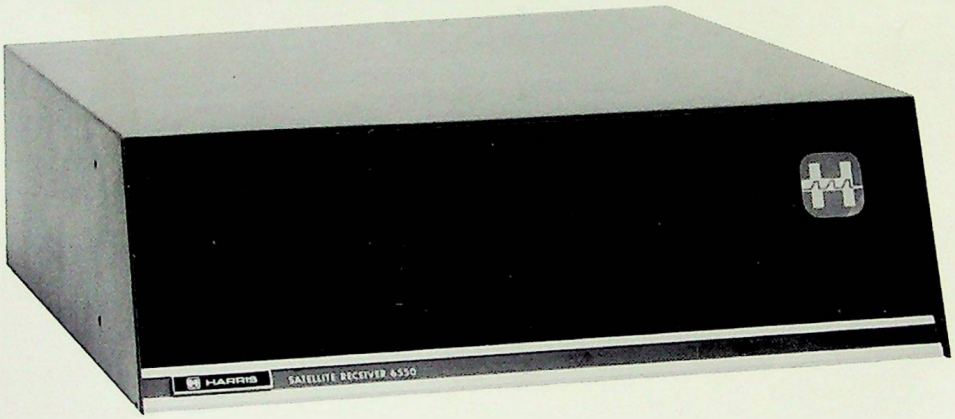
SATELLITE RECEIVER

MODEL 6550



- Operation
- Theory of Operation
- Field Maintenance

HARRIS

SATELLITE COMMUNICATIONS DIVISION

RECEIVER

MODEL 6550

- Operation
- Theory of Operation
- Field Maintenance

CAUTIONARY NOTICE

While the Manufacturer has attempted to detail in this manual all areas of possible danger to personnel in connection with the use of this equipment, personnel should use caution when installing, checking out, operating and servicing this equipment, especially when power is on. Like all electronic equipment, care should be taken to avoid electrical shock, in all circuits where substantial currents or voltages may be present, either through design or short circuit. Caution should be observed also in lifting and hoisting equipment especially regarding large structures during installation.

The manufacturer is specifically not liable for any damage or injury arising out of a worker's failure to follow the instructions contained in this manual, or his failure to exercise due care and caution in the installation, operation, checkout and service of this equipment.

****

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SECTION 1.0

GENERAL INFORMATION

1.0 GENERAL INFORMATION

1.1 Application

The Harris Model 6550 Satellite Receiver is designed to receive a wide range of services distributed nationally by geosynchronous satellites.

A single receiver can provide multiple services by adding the proper channel modules to the basic receiver unit.

Current services include:

- Newswire teleprinter channels
- News program audio
- Digital data in various forms
- Stereo or monaural program quality audio

The basic receiver consists of:

- Receiver chassis with six slots (A1 through A6) for channel processor modules.
- Modular power supply with built-in fault indicators.
- RF Downconverter, crystal controlled (3.7 - 4.2 GHz to 70 MHz IF) with built-in LNA power supply and bias tee.

Several channel configurations are available, depending on customer requirements. Customer application determines the quantity and type of modules furnished.

Customer options permit choice of:

- FM Demodulator
- Audio Subcarrier Processor
- Audio Distribution Amplifier
- Digital Demodulator
- Digital Demultiplexer (CRC-1055 Model B Subscriber Control Unit) used with the Digital Demodulator card if the demodulator card is selected as an option. See Figure 4.1 and Paragraph 2.7 for additional details.

All modules are easily removable and replaceable without the use of special equipment. Where appropriate, card mounted LEDs monitor individual module functions.

Figures 1.1-1 and 1.1-2 show the front and rear views of the receiver with a typical complement of channel processing cards extended for illustration.

Table 1.1 lists the basic receiver and optional module specifications.

Table 1.1. Specifications

Frequency Range	3.7 GHz to 4.2 GHz
Frequency Agility	Downconverter frequency change may be accomplished by plug-in crystals.
Primary Power	115 ± 10% Vac 57 - 63 Hz
Power Consumption	250 watts maximum

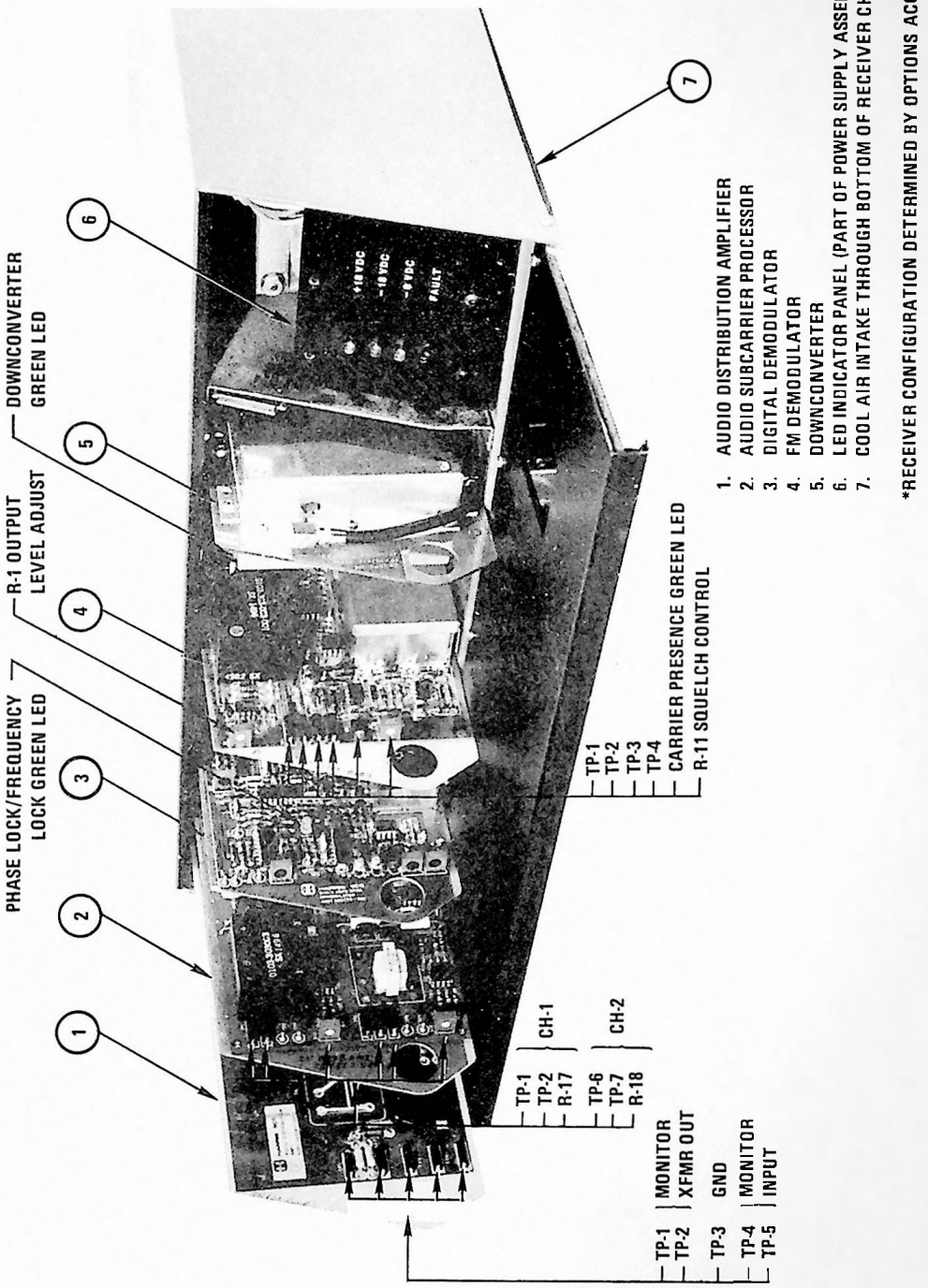
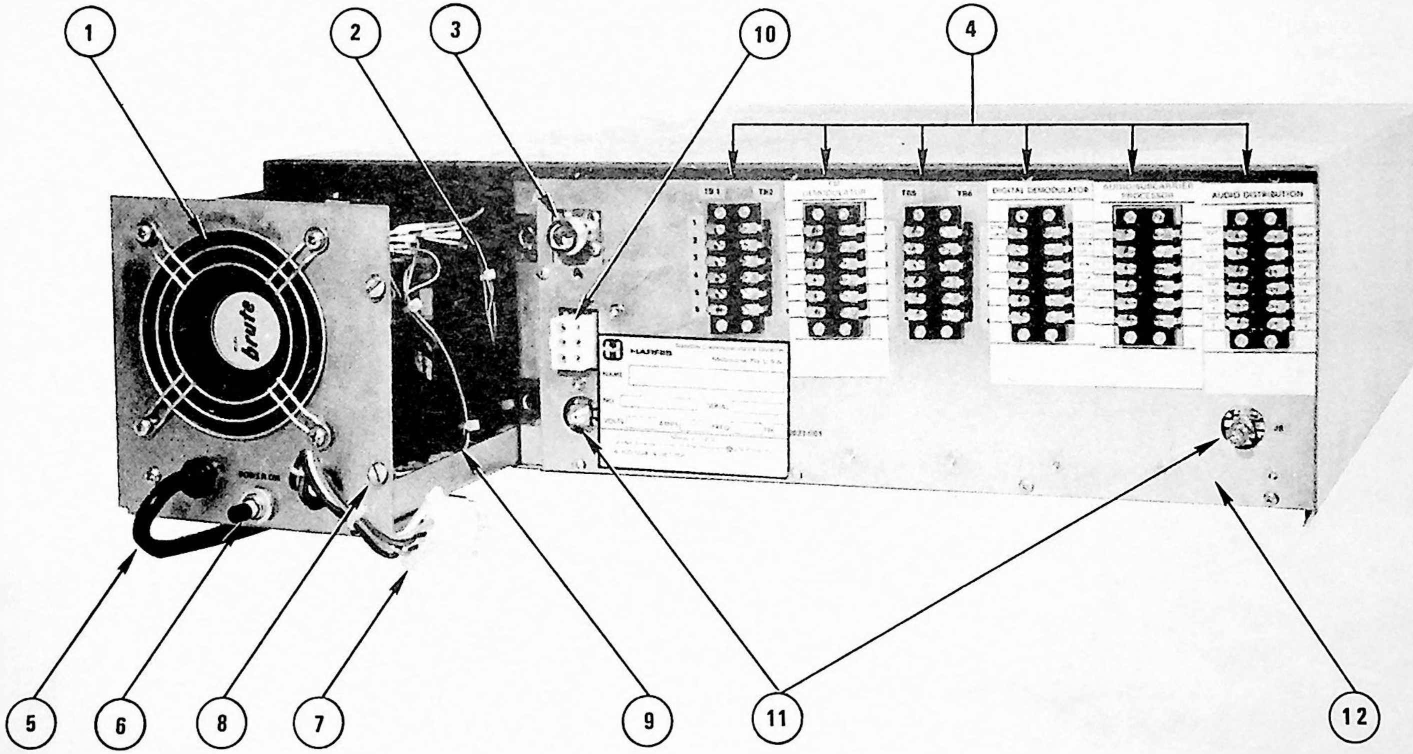


Figure 1.1-1. Receiver - Front View (Cards Extended for Illustration)



1. COOLING FAN/EXHAUST OUTLET
2. CAPTIVE RETAINING SCREW FOR BIAS TEE AND DOWNCONVERTER
3. J11 RF INPUT AND DC POWER TO LNA (CENTER CONDUCTOR HOT +16 V WITH RECEIVER ON)
4. INPUT/OUTPUT TB CONNECTIONS
5. AC POWER CORD
6. SYSTEM POWER ON/OFF CIRCUIT BREAKER
7. DC OUT AND SUMMARY FAULT INPUT TO SUM FAULT LED
8. CAPTIVE RETAINING SCREW FOR POWER SUPPLY ASSEMBLY
9. DC POWER SUPPLY
10. J9 DC INPUT TO RECEIVER MOTHERBOARD
11. J8, J10 IF OUTPUT/INPUT
12. RECEIVER MOTHERBOARD – REAR

M83-4-2

Figure 1.1-2. Receiver - Rear View

Table 1.1. Specifications (Continued)

Receiver Mounting	19 inch rack mount or desk table mount.
Audio Program Channel Performance	
Modulation	FM
Frequency Response	50 Hz to 5 kHz ±0.5 dB, 50 Hz to 7.5 kHz ±0.5 dB or 50 Hz to 15 kHz ±0.5 dB.
Signal-To-Noise Ratio	50 dB noncompanded in a 15 kHz channel, 75 kHz deviation, 13 dB C/N. 75 μs de-emphasis. Performance of other channels dependent on the particular transmission parameters.
Output	600 ohms, balanced, +8 dBm APL +18 dBm PPL
Return Loss	>23 dB
Longitudinal Balance	>35 dB
Companding	2:1, 3:1, optional
Audio/Subcarrier (Optional)	
Subcarrier Frequency	8-12 kHz, 8-16 kHz, 12-16 kHz, 16-20 kHz, 15-20 kHz
Baseband Response	300 Hz-3.4 kHz ±1 dB, 100 Hz-3.4 kHz ±1 dB, 50 Hz-5 kHz ±1 dB
Output Impedance	600 ohms balanced
Output Level	+8 dBm APL to +18 dBm PPL maximum
Frequency Offset	<5 Hz
Signal-To-Noise Ratio	Dependent on the particular transmission parameters.
Digital Channel (Optional)	
Data Rate	230.4 kb/s

Table 1.1. Specifications (Continued)

Modulation Type	QPSK differential encoded
Bit Error Rate	$<10^{-7}$ at E_b/N_o of 13.4 dB
Output Interface	CCITT V.35
Audio Distribution Amplifier (Optional)	
Input and Output Impedance	600 ohms, balanced
Number of Outputs	5
Gain	0 $\pm$0.5 dB at 1 kHz
Frequency Response	50 Hz to 20 kHz $\pm$0.5 dB
Isolation Between Ports	>40 dB
IF Interface	
IF Center Frequency	70 MHz
IF Connector	SMA female, rear panel
Impedance	50 ohms
Power Level	-50 to -20 dBm, actual level depends on station location, carrier power and length of RF cable between antenna and receiver.
Environmental	
Indoor:	
Temperature	0° C ($+32^{\circ}$ F) to $+50^{\circ}$ C ($+122^{\circ}$ F) operating; -40° C (-40° F) to -65° C ($+148^{\circ}$ F) nonoperating
Humidity	5% - 95% at $+25^{\circ}$ C ($+77^{\circ}$ F) operating
Altitude	Up to 10,000 feet operating; up to 50,000 feet nonoperating
Shock and Vibration	As normally encountered in shipping.

1.2 Optional Applications

The standard Model 6550 Receiver includes the downconverter which also supplies the +15 Vdc through the RF cable center conductor for powering Harris Model 6303 Low Noise Amplifiers. Consequently, if the receiver is used in applications where LNA power is not required, the +15 Vdc must be blocked to avoid damage to equipment used in alternate applications.

The receiver may also be used without the downconverter if an external IF (70 MHz) source is available from a compatible receiver tuned to the desired satellite transponder.

The receiver may also share a common antenna system with other RF equipment.

Refer to Section 2.0, Installation, for various applications of the Model 6550 Receiver.

1.3 Accessories

Table 1.3 lists the accessories available for Model 6550 Receiver installation. Selection of accessories is dependent upon receiver application.

Table 1.3. Model 6550 Receiver Accessories

Description	Part Number	Vendor
IF Filter	8BC 70/16-1-CC	Texscan
Matching Pad (50 Ω - 75 Ω)	ALAN-75Z50	Alan
Dc Block with Barrel Connector and Current Resistor	800994-001	Avantek/DCB-42

Table 1.3. Model 6550 Receiver Accessories (Continued)

Description	Part Number	Vendor
Bias Tee	435013-G01	Harris
Power Divider (2-Way)	PD20-3.95G 435023-G01	Merrimac Harris
SMA Male Connector BNC Male Connector BNC Female Connector	0109-509002-202 0109-901080-001 0109-509006-205	Harris Harris Harris
75 Ohm Coax Cable 50 Ohm Coax Cable 50 Ohm Coax Cable	RG-187 RG-188 RG-214	Note: Cable in variable lengths is available by order.
Crimp Lugs (Terminal Ring for TB Connections)	PN-22-2RC	Panduit Corp.
Digital Demultiplexer	CRC 1055 Model B Subscriber Control Unit	Control Resources Corp., Hackensack, N.J.

SECTION 2.0

INSTALLATION

2.0 INSTALLATION

2.1 Unpacking

The Model 6550 Receiver is shipped with all modules installed. After opening the shipping container, thoroughly inspect all contents for damage (for example, damaged components, dented cabinet, etc.). If any damage has occurred, immediately file a damage claim with the carrier company and notify the Customer Service Department of Harris.

NOTE

Save the shipping container and materials in case the receiver must be shipped at a later date.

2.2 Application Data Sheet

All Model 6550 Receivers are configured to customer order. The Application Data (AD) furnished with the equipment will specify the equipment supplied (i.e., Downconverter Transponder Assignment, FM Demodulator, Audio and/or Subcarrier Processor). The application data will specify the unique strapping arrangements made at the factory to provide the desired services as well as other details related to the equipment ordered.

The Application Data should be filed with this manual for future reference when ordering spare parts or performing maintenance.

2.3 Receiver Mounting

Receiver hardware allows installation in a 19-inch rack cabinet or table/desk mounting. In either case, care must

be taken to ensure that relatively cool air, less than 40° C (104° F), is available to enter through the bottom of the cabinet. Warm air is exhausted at the rear of the power supply assembly. Care should be taken to avoid placing obstructions to the airflow from the rear of the power supply.

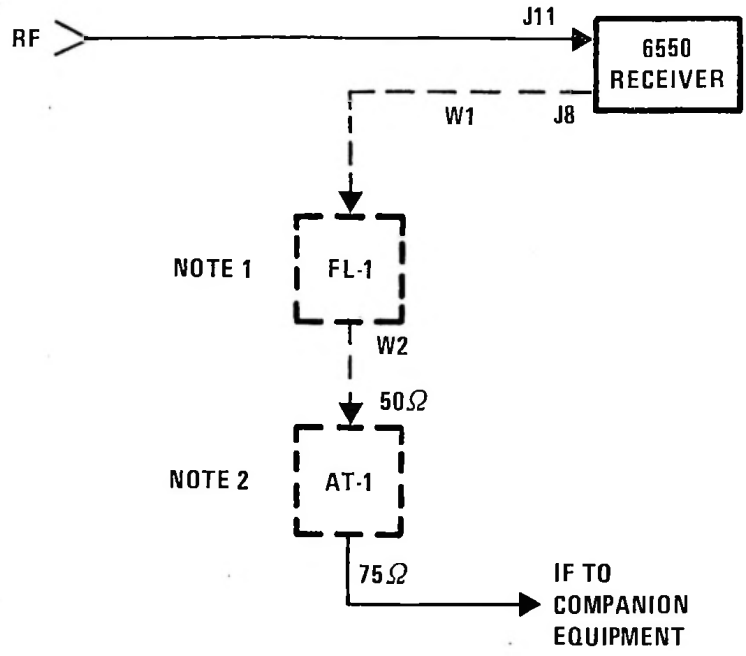
For tabletop mounting, install a tabletop mounting kit. For mounting in a standard EIA rack, use the rack mounting kit. Note that the rack mounting adapters may be installed with the flange toward either the front or rear of the chassis depending on whether flush or offset mounting is desired.

2.4 Optional Installations

2.4.1 Intermediate Frequency (IF) Input/Output

As previously mentioned, the receiver may be used without the downconverter if a compatible 70 MHz IF source is available (i.e., other manufacturer's downconverter tuned to the desired transponder frequency). In this instance, the 70 MHz IF from the external downconverter becomes the signal source for the frequency dependent modules in the receiver. The external IF source may be connected to the IF strip of the receiver via an SMA female connector located on the receiver rear panel (J-10). The impedance at this port is 50 ohms. Signal levels should be in the range of -50 dBm to -20 dBm per carrier. A 50 ohm termination should be connected to J8 (IF OUT) at the rear of the chassis when not terminated by other equipment.

The receiver may also be used to provide an IF source to other equipment when used with the supplied downconverter. Figures 2.4.1-1 and 2.4.1-2 are connection diagrams showing typical IF interconnects with companion equipment. Refer to the accessory list for available installation items.



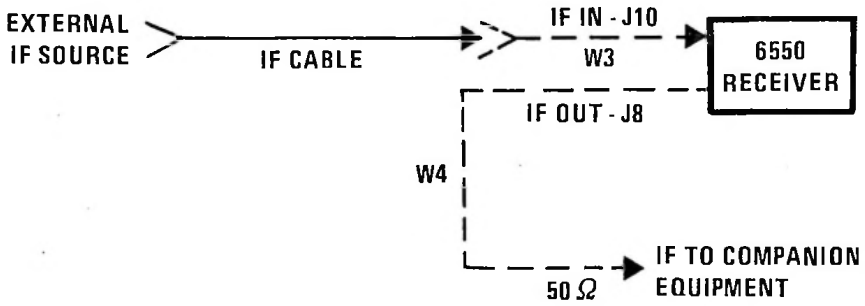
NOTE 1: FL-1 REQUIRED IF COMPANION EQUIPMENT DOES NOT HAVE IF FILTER.

NOTE 2: AT-1 FOR 50Ω TO 75Ω TRANSITION IF REQUIRED BY COMPANION EQUIPMENT.

REFER TO ACCESSORY LISTING FOR PART NUMBERS.

M83-4-13

Figure 2.4.1-1. Installation Diagram - Model 6550 IF Output to Companion Equipment



REFER TO ACCESSORY LISTING FOR PART NUMBERS.

M83-4-14

Figure 2.4.1-2. Installation Diagram - Model 6550 Operation with External IF Source

2.4.2 RF Input/Output and LNA Power

The downconverter supplied with the basic receiver has a built-in power supply with bias tee that can be used to power one Harris Model 6303 Low Noise Amplifier (LNA). Other LNAs which require +15 volts on the center conductor can also be used if current required is in the range of 85 - 165 mA.

Optional installation configurations using the Model 6550 Receiver, with the downconverter, should always consider the presence of +15 Vdc on the center conductor of J11. The +15 Vdc can be blocked to avoid damage to equipment when not required to power the LNA.

Figures 2.4.2-1 and 2.4.2-2 are connection diagrams showing typical RF connections with companion equipment and methods used for blocking the +15 Vdc. Refer to the accessory list for available installation items.

Figure 2.4.2-1 is a basic diagram showing the use of two Model 6550 Receivers, both equipped with downconverters. Receiver No. 1 is receiving the RF signal from an LNA and powering the LNA. Receiver No. 2 is receiving the same RF signal through the power divider. However, the +15 Vdc from the second receiver is blocked to the power divider by the dc block. The LNA current resistor (125 Ω 5 watts), terminated on the dc block as a dummy load, replaces the LNA as a load. Fault circuitry, therefore, recognizes a normal current load and prevents an erroneous fault on the downconverter (green LED) and the LED monitor panel (SUMMARY FAULT red LED).

If two Model 6550 Receivers are used and neither is used to power LNAs, both receivers must be blocked (i.e., block receiver No. 1 in the same manner as No. 2 is blocked).

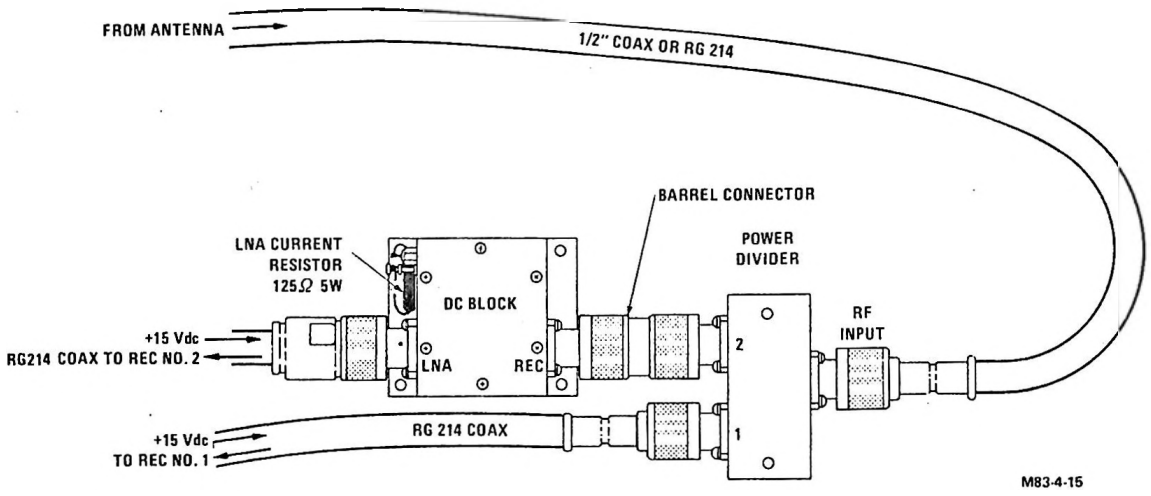
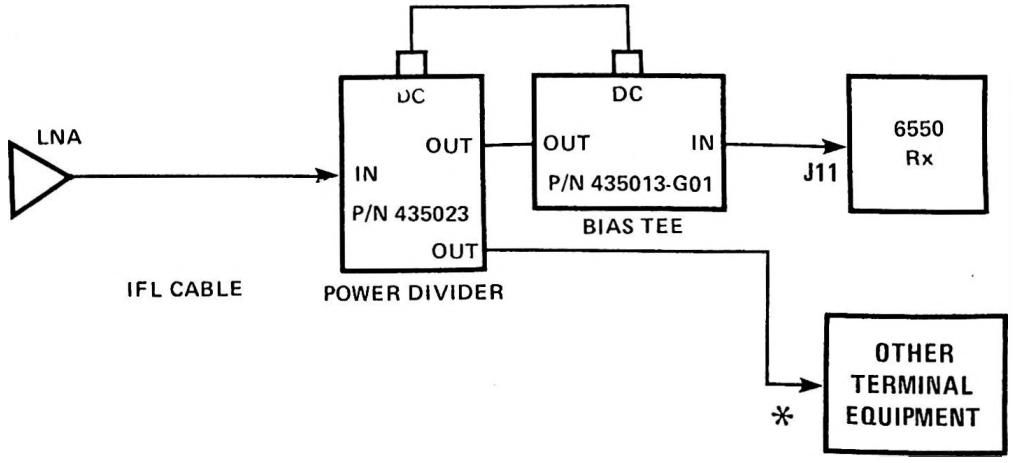


Figure 2.4.2-1. Installation Diagram - Model 6550 RF Connection with Dc Block and LNA Current Resistor



***IF OTHER TERMINAL EQUIPMENT IS MODEL 6550 RECEIVER, USE FIGURE 2.4.2-1. (REFER ALSO TO PARAGRAPH 2.4.2 FOR INSTALLATION DETAIL.)**

M83-4-3

Figure 2.4.2-2. Installation Diagram - RF Connection with Dc Block

Figure 2.4.2-2 is a basic diagram showing a Model 6550 Receiver powering an LNA. The dc block prevents application of the +15 Vdc to other RF terminal equipment. The current resistor is not used in this configuration to deceive fault indications.

2.5 Module Locations and Connections

The total complement of modules in a receiver is subject to the options selected by customer order. The receiver provides 6 plug-in spaces for signal processing modules. The spaces are labeled A1 through A6 from left to right. The downconverter occupies space A7. Input/output capabilities of A1-A6 are identical so that any module will operate in any of the six slots after appropriate input/output connections have been made on the receiver rear panel. Due to physical limitations, however, the FM demodulator should not be installed in position A6 when a downconverter is used.

Factory placement of modules considered airflow through the cabinet for maximum cooling of existing modules greater cooling airflow is present at the right hand spaces. Factory installed labels on the terminal strips on the rear of the receiver should always coincide with module location connections between modules are made at the rear panel when required, refer to Application Data Sheet for details. Figure 2.5 shows examples of the labels on the rear of the receiver for available module options.

TB — DIGITAL DEMODULATOR

ODD		EVEN	
SYNC LOCK	1	1	DATA OUT+
	2	2	DATA OUT –
	3	3	RTN
	4	4	CLK OUT+
	5	5	CLK OUT –
	6	6	

TB — FM DEMODULATOR

ODD		EVEN	
GND	1	1	
BB OUT	2	2	
AUD OUT	3	3	
AUD OUT	4	4	
EXT IN	5	5	EXT OUT
AGC OUT	6	6	

TB — AUDIO/SUBCARRIER PROCESSOR

ODD		EVEN	
GND	1	1	GND
EXT 1 IN	2	2	EXT 2 IN
AUD 1 OUT	3	3	AUD 2 OUT
AUD 1 OUT	4	4	AUD 2 OUT
BB 1 IN	5	5	BB 2 IN
EXT 1 OUT	6	6	EXT 2 OUT

TB — AUDIO DISTRIBUTION AMPLIFIER

ODD		EVEN	
T - 3 OUT	1	1	T - 4 AUD IN
T - 3 OUT	2	2	T - 4 AUD IN
T - 2 OUT	3	3	T - 5 OUT
T - 2 OUT	4	4	T - 5 OUT
T - 1 OUT	5	5	T - 6 OUT
T - 1 OUT	6	6	T - 6 OUT

NOTE: FIGURE 2.7 FOR DETAIL INTERFACE WITH CRC MODEL 1055 SCU.

M83-4-4

Figure 2.5. Module Input/Output Connections (Rear Panel)

2.6 Motherboard-to-Module Connections

The motherboard connectors, Figure 2.6, supply the necessary voltages, ground and IF distribution to receiver modules.

2.7 Digital Demodulator-to-CRC Model 1055 SCU

The following are interconnect instructions for the cable between the Harris Digital Demodulator and the CRC Model 1055 SCU.

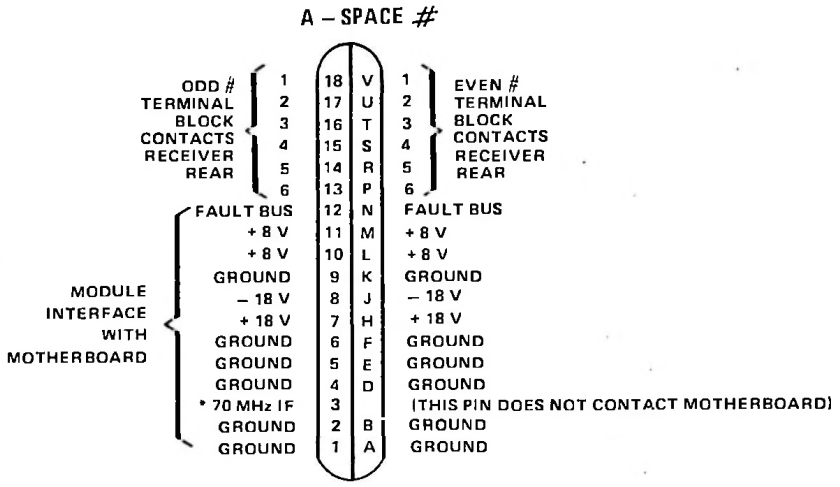
The interconnect cable (Figure 2.7) has a connector on one end which plugs into the 1055 SCU and has stripped and tinned leads on the other end which connect to the Demodulator. The Harris Demodulator interface is on a labeled terminal block mounted on the rear of the receiver. Make the necessary connections as shown in Figure 2.7.

2.8 Signal Acquisition

2.8.1 General

When received, the frequency-dependent modules of the receiver will have been tuned and aligned to the desired satellite transponder frequency and customer specified satellite carriers. The subcarrier demodulators will output the desired services (i.e., voice, digital data, teleprinter).

Installation instructions assume that the receive antenna has been positioned on the satellite of interest and the desired transponder is active with the desired carriers.



* BRIDGED WITH J - 8 and J - 10 RECEIVER REAR PANEL

MODULE POSITION	I/O TERMINAL BLOCKS
A1	TB11, TB12
A2	TB9, TB10
A3	TB7, TB8
A4	TB5, TB6
A5	TB3, TB4
A6	TB1, TB2
A7 DOWNCONVERTER	N/A
A8 POWER SUPPLY	N/A

M83-4-5

Figure 2.6. Motherboard-to-Module Pin Assignments

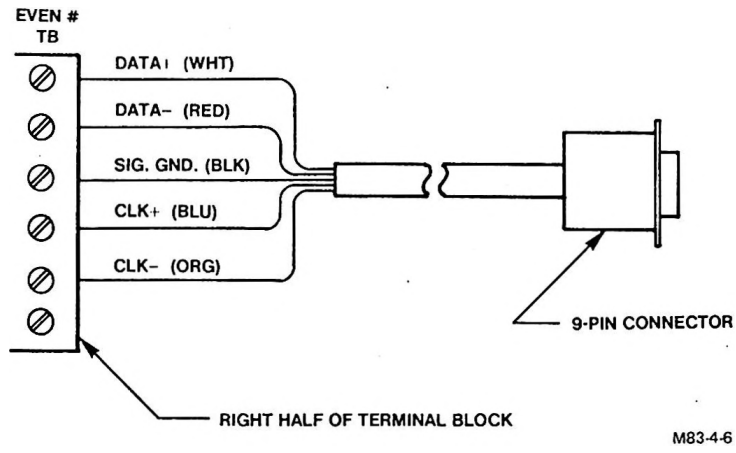
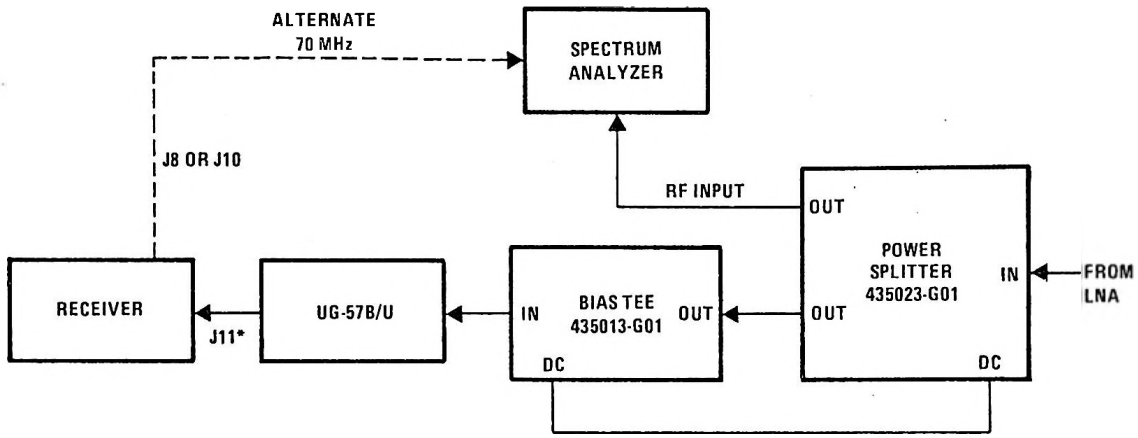


Figure 2.7. Digital Demod to Demux Interconnect Cable

2.8.2 Signal Acquisition - Spectrum Analyzer

Harris recommends that the antenna be peaked on the satellite signal using a spectrum analyzer tuned to the RF signal of the desired transponder. (Note: If the Harris Model 6303 Low Noise Amplifier is used in the terminal installation, the LNA receives its 15 volt dc power from the receiver via the RF coaxial cable.) The configuration shown in Figure 2.8.2 allows the receiver to power the LNA while monitoring the RF signal with the spectrum analyzer. As an alternative, the antenna may be peaked with the LNA connected directly to the receiver allowing the spectrum analyzer to monitor the transponder directly from the receiver at the IF (52 - 88 MHz) level.



REQUIRED EQUIPMENT LIST

ITEM	DESCRIPTION
1	SPECTRUM ANALYZER HP 141T, 8552B, 8555B OR EQUIVALENT.
2	TRUE RMS VOLTMETER HP 3400B OR EQUIVALENT.
3	HEADPHONES WITH TIP PLUGS.
4	POWER SPLITTER, HARRIS PN 435023-G01.
5	BIAS TEE, HARRIS PN 435013-G01.
6	TYPE N DOUBLE MALE ADAPTER, UG-57B/U.
7	CABLE, RS-214/U WITH TYPE N MALE CONNECTORS, 5 FEET LONG.

*CAUTION: DC POWER IS PRESENT AT THE RF INPUT OF THE RECEIVER. DAMAGE TO THE SPECTRUM ANALYZER MAY RESULT IF DC IS NOT PROPERLY BLOCKED.

M83-4-17

Figure 2.8.2. Signal Acquisition Equipment Configuration - Spectrum Analyzer

2.8.3 Signal Acquisition - Receiver Only

This method requires that the receiver be connected to the RF input source (Low Noise Amplifier) with the antenna properly pointed at the satellite of interest.

Observation of the "Carrier Present" LEDs on either the Data Demodulator or the FM Demodulator may be used to indicate maximum signal reception rather than the preferred Spectrum Analyzer method.

As noted in Table 5.3, the LEDs on the two cards respond to 70 MHz IF carrier presence. Since the FM Demodulator response is not dependent upon "phase lock", its use is recommended for antenna peaking rather than the Data Demodulator.

For this method of peaking the antenna, proceed as follows:

1. Apply power to the receiver.

2. While observing the Carrier Present LED on either the Data Demodulator or FM Demodulator, adjust the antenna look angle position first in one direction, then the other, until the monitored LED illuminates.

3. With the LED illuminated, continue adjusting the antenna look angle position until the LED extinguishes. Note the adjusted position of the antenna when the LED extinguishes.

4. Reverse the direction of the antenna adjustment until the LED illuminates and then extinguishes. Note the position of the antenna when the LED extinguishes.

5. The final position of the antenna should be centered between the two extremes noted in step 3. and step 4.

6. Verify reception of the desired services by monitoring the teleprinter, audio or data outputs.

2.9 User Adjustments

2.9.1 General

The adjustments contained in this section may be made by the user as indicated in the following procedures. Although there are other receiver adjustments, they were preset during manufacture; therefore, further adjustment should not be attempted.

Consult other sections of this manual, as applicable, for identification of controls, monitor points and input/output connections before attempting adjustments.

2.9.2 FM Demodulator Adjustments - Squelch

The squelch circuit has been factory adjusted using special equipment and should not require field adjustment. If conditions require adjustment (refer to Theory of Operation - FM Demodulator), proceed as follows:

1. With the receiver ON, block the RF signal from the satellite to the LNA by either of the following methods: (Note - The receiver will still receive noise developed by the LNA.)

   - Move antenna reflector UP in elevation, off the satellite elevation look angle. This is the preferred method.

- Block the signal reflected from the main reflector to the feed aperture with metal foil. (Long handle shovel is convenient on some installations.)

- If the Harris Delta Gain antenna is being used and not moved in elevation, wrap the entire space between the end of the feed support and the subreflector with aluminum foil to block the signal.

2. With the signal blocked, adjust R11 on the FM Demodulator (Figure 1.1-1) until the carrier presence LED illuminates. Reverse the adjustment and stop at the position that extinguishes the LED.

3. Restore the previously blocked RF signal. If a carrier is present, the LED should be illuminated and the SUM FAULT indicator on the LED monitor panel should be extinguished.

2.9.3 FM Demodulator Adjustments - Output

Connect an RMS voltmeter to monitor test points TP1 and TP2 at the front of the FM demodulator card. Adjust R1 at the card edge for the desired output level. This is normally +8 dBm at Average Program Level (APL) on an audio channel. If instead, teletype or facsimile is being received, the output level is generally set to -16 dBm, but it may vary for particular services. Check the teletype printer to ensure that the proper service is being received and the copy is error free.

2.9.4 Audio/Subcarrier Processor Adjustments - Output

Monitor the output signals (Figure 1.1-1) at the front of the card using test points TP1 and TP2 for channel 1 or

TP6 and TP7 for channel 2. A true RMS voltmeter should be used. To obtain the desired output levels, adjust R17 for channel 1 and R18 for channel 2. The levels are set at the same point as they would be for the FM demodulator. When required, the output may be set to lower levels.

2.9.5 Frequency Change Procedure

Changes in the downlink frequency of the satellite transponder requires a crystal change in the downconverter first local oscillator.

Changing the crystal is done in the following steps:

1. Turn OFF power to the receiver.

2. Disconnect the coax cable connection to the RF input (J11).

3. Fully loosen the captive screw holding J11 in place.

4. Remove the downconverter from the FRONT of the receiver.

5. With the downconverter removed, locate the first local oscillator (Figure 2.9.5) on the downconverter.

6. Remove the hex nuts holding the oscillator housing to the Printed Wiring Board (PWB).

7. Lift the oscillator away from the board and remove the unwanted crystal from the socket at Y-1.

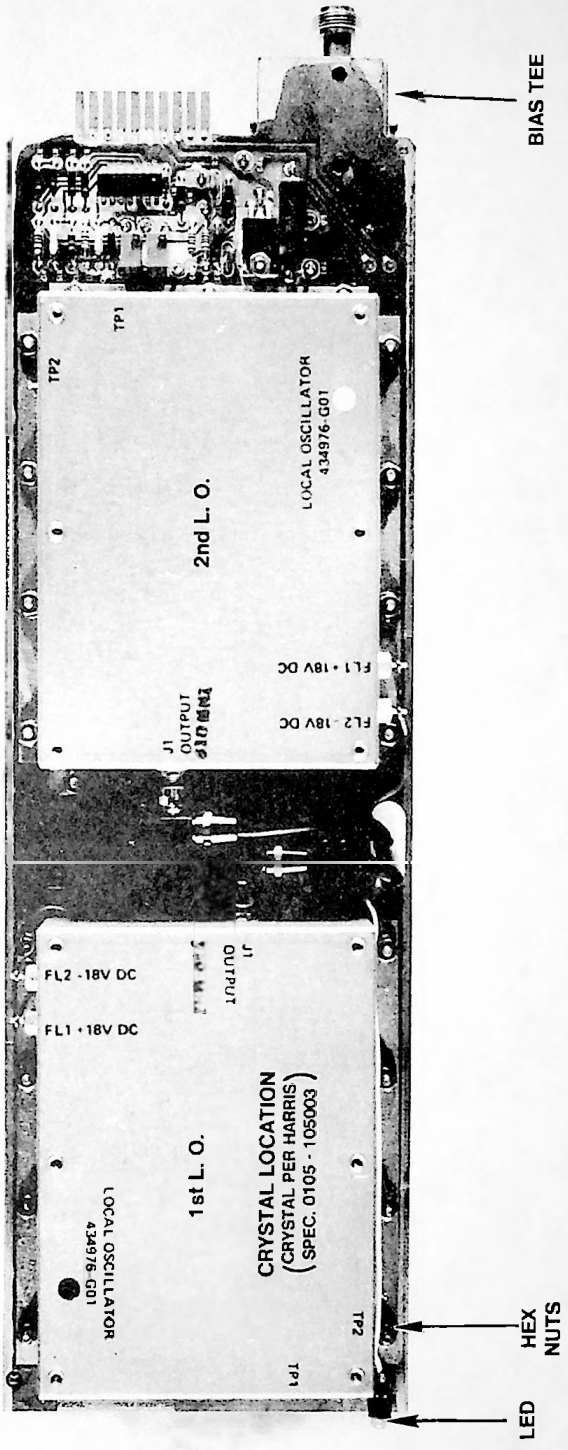


Figure 2.9.5. Downconverter (1st, 2nd LO)

8. Insert the correct frequency crystal, seated firmly.

9. Replace the oscillator on the PWB.

10. Reinstall the downconverter in the receiver, properly seated on the receiver guides.

11. When assured that the downconverter is properly seated in position, tighten the captive screw to hold the downconverter in place.

12. Reconnect the coax cable to J11.

13. Turn receiver power ON and confirm that the LED on the front panel of the downconverter is illuminated.

14. Check receiver outputs and fault indications to ensure system is operational.

SECTION 3.0

OPERATING PROCEDURES

3.0 OPERATION

3.1 Receiver Power

Activation of the circuit breaker/switch at the rear of the power supply assembly provides ac power to the power supply, cooling fan and motherboard.

3.2 Typical Operational Checks

The following operational checks should be made periodically:

a. Confirm all LEDs ON or OFF on the power supply fault monitor panel and channel cards respond to the NORMAL STATE listed in Table 5.3.

b. Monitor equipment connected to receiver outputs for proper reception of desired audio, teleprinter or data services.

c. Adjust FM demodulator, audio/subcarrier processor and squelch control as indicated in Paragraph 2.9 User Adjustments.

SECTION 4.0

THEORY OF OPERATION

4.0 THEORY OF OPERATION

4.1 General

Figure 4.1 illustrates the signal flow through each of the modules described in the following paragraphs.

4.2 Downconverter

The downconverter module is tuned to select the desired satellite transponder center frequency from the amplified RF band of 3.7 to 4.2 GHz (received from the LNA) and convert it to an Intermediate Frequency (IF) band between 52 and 88 MHz (70 MHz IF ±18 MHz). The output IF is routed to the demodulators via the receiver motherboard. Retuning of the downconverter is accomplished by changing a crystal in the first local oscillator. A correct crystal can be obtained from Harris by specifying the proper transponder channel or frequency.

The downconverter module consists of the following subassemblies:

- First Downconverter
- First Local Oscillator
- Second Downconverter
- Second Local Oscillator

The downconverter uses a typical downconverter technique as follows:

a. The 3.7 - 4.2 GHz band is selected by a bandpass filter. This band is mixed in the first downconverter with the crystal controlled local oscillator #1 producing the first IF at 880 MHz (±18 MHz).

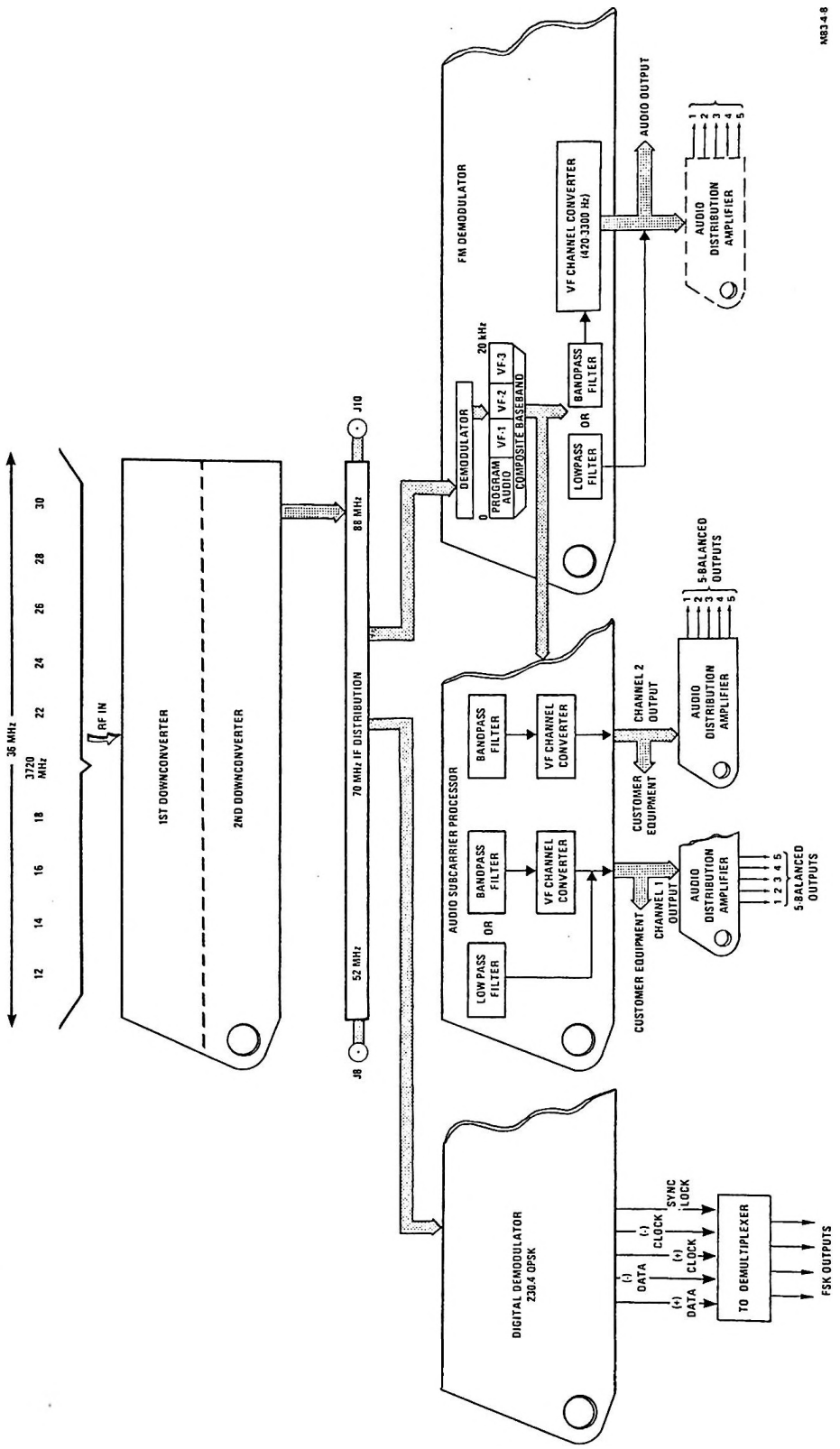


Figure 4.1. Satellite Receiver Functional Diagram

b. The 880 MHz IF is then fed to the second downconverter where it is mixed with an 810 MHz signal from the second local oscillator fixed frequency crystal of 810 MHz to produce a final IF output of 70 MHz (52 - 88 MHz).

4.3 FM Demodulator

The FM demodulator (Figure 4.3) receives IF signals between 52 and 88 MHz (factory selected) from the downconverter. The IF subcarrier signal, containing the baseband information, is converted to a 10.7 MHz IF which is further processed in the demodulator module. The presence of the 70 MHz (±18 MHz) carrier is monitored by a level detector which provides a voltage to operate a CARRIER ON indicator on the front panel of the demodulator. In the absence of a carrier, the level detector activates a squelch circuit to quiet the demodulator outputs and also produces a Fault signal (at the demodulator output pin connectors) to activate the SUMMARY FAULT LED on the receiver indicator panel.

Changes in the downlink components (antenna system through the downconverter) may require resetting of the squelch control to indicate a true condition of "CARRIER ON/CARRIER OFF". Refer to Section 2.9, User Adjustments, for squelch adjustment procedures. The module utilizes a phase-locked loop circuit for converting the 10.7 MHz IF signal to composite baseband. One of the resulting audio or data channels can be processed by the on-board audio section while the others are recovered through an audio/subcarrier processor. The FM demodulator audio section de-emphasizes the composite baseband with a 0, 24, 50 or 75 microsecond time constant. The signal is next passed through a sharp cutoff passive low-pass or bandpass filter to attenuate all undesired channels and establish the audio bandwidth. If a bandpass filter is used, the subcarrier signal must also pass through an optional VF channel converter to obtain the baseband

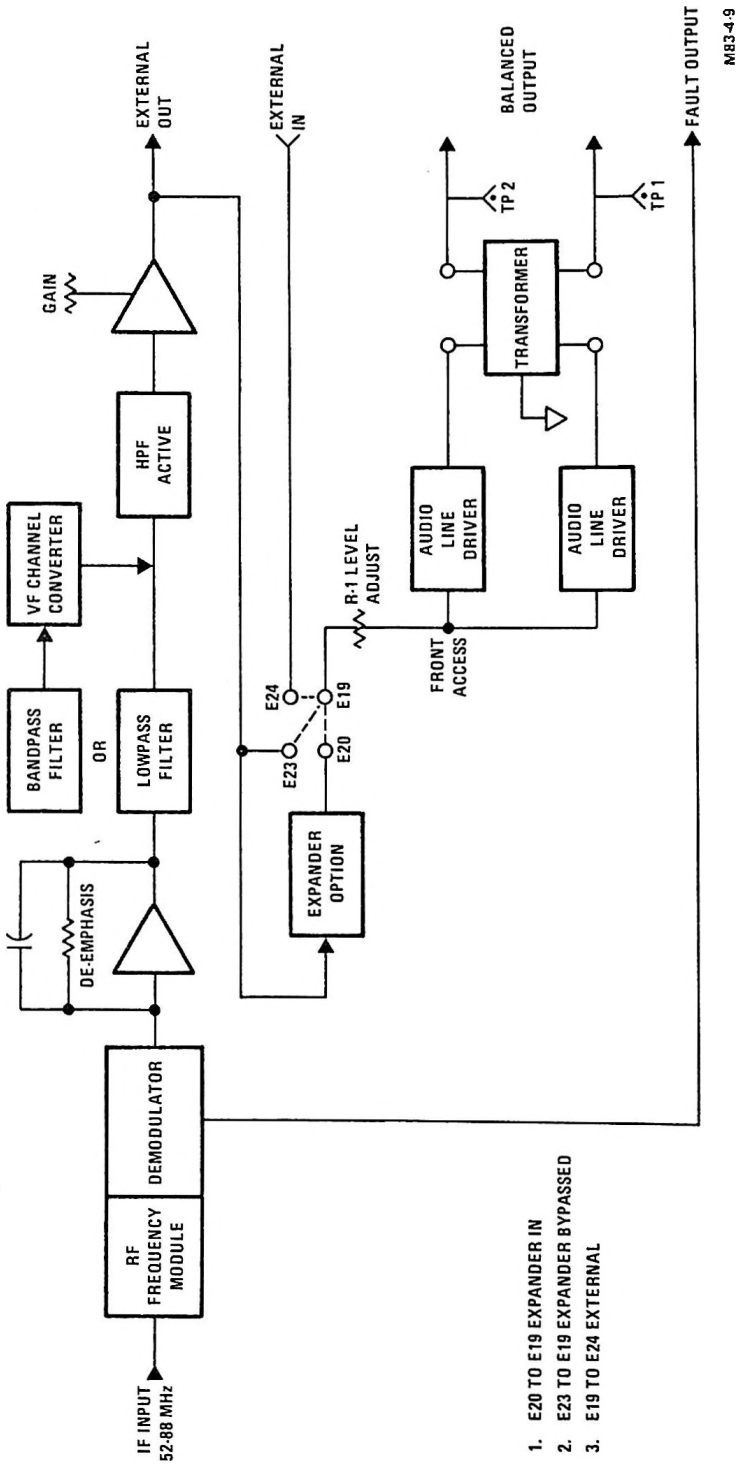


Figure 4.3. FM Demodulator Functional Diagram

equivalent. Installation of a specific crystal is required to translate the desired subcarrier channel. The signal is next fed through an active four-pole high-pass filter to limit the low frequency response to 50 Hz.

If desired, the high-pass filter may be followed by one of two expander options. These include a plug-in 3:1 dBx card or a 2:1 on-board unit. Jumpers are available to bypass or go through the expander. The audio signal level at this point can be controlled from the front panel. The line driver utilizes an integrated power amplifier in a bridge circuit to provide a balanced output. The power amplifier is capable of delivering +18 dBm into a 600 ohm load with less than 0.5% distortion at 1 kHz for a baseband channel or 1.0% for a subcarrier channel.

Additional demodulator modules may be installed in the receiver mainframe to support customer options that exceed the capabilities of a single module.

4.4 Audio/Subcarrier Processor

The audio/subcarrier processor is a plug-in module which operates in conjunction with the FM demodulator to derive one or two program audio or data channels from the composite baseband signal. Each of the two available processing sections have the same options and possible configurations.

Referring to the block diagram (Figure 4.4), the composite baseband signal from the FM demodulator is amplified and de-emphasized with a 0, 25, 50 or 75 microsecond time constant. The signal then passes through a low-pass or bandpass filter to obtain the desired baseband or subcarrier channel. For subcarrier channels, the optional VF channel converter is also utilized to obtain the baseband equivalent. This is followed by a high-pass filter to limit the low frequency response to 50 Hz. The next option is a 2:1 on-board expander which may be bypassed if it is not needed.

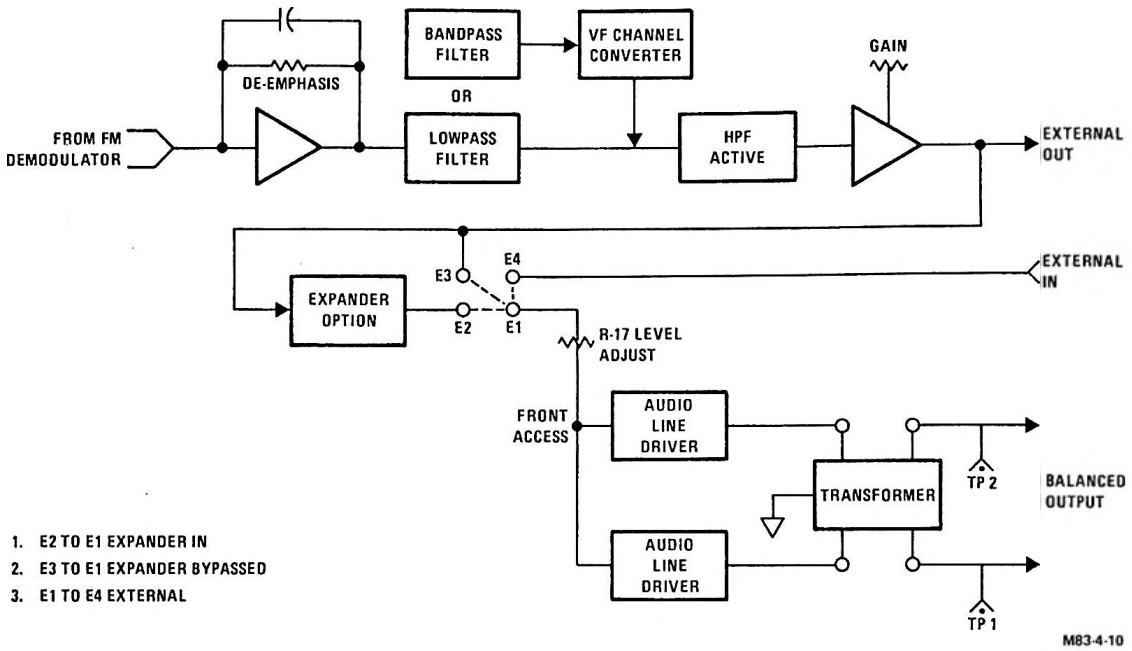


Figure 4.4. Audio/Subcarrier Processor Functional Diagram - Channel 1

The final output level for each processor channel may be controlled from the front panel. Integrated power amplifiers provide balanced outputs. The amplifiers can deliver +18 dBm into a 600 ohm load with less than 0.5% distortion for a baseband channel and 1.0% distortion for a subcarrier channel.

4.5 Distribution Amplifier

This plug-in module (Figure 4.5) accepts a single 600 ohm input from the FM demodulator or Audio/Subcarrier processor module and provides five 600 ohm balanced outputs at a level of +18 dBm peak.

Frequency response of the amplifier is 50 Hz to 20,000 Hz. Optional input isolation and output isolation are available. These options are factory installed.

Input and output terminals for the module are accessible at the TB related to the mainframe location of the distribution amplifier.

The distribution amplifier is supplied with its input terminated in 600 ohms. For high impedance bridging application, the jumper adjacent to R18 may be cut to provide a high impedance input (refer to Figure 4.5).

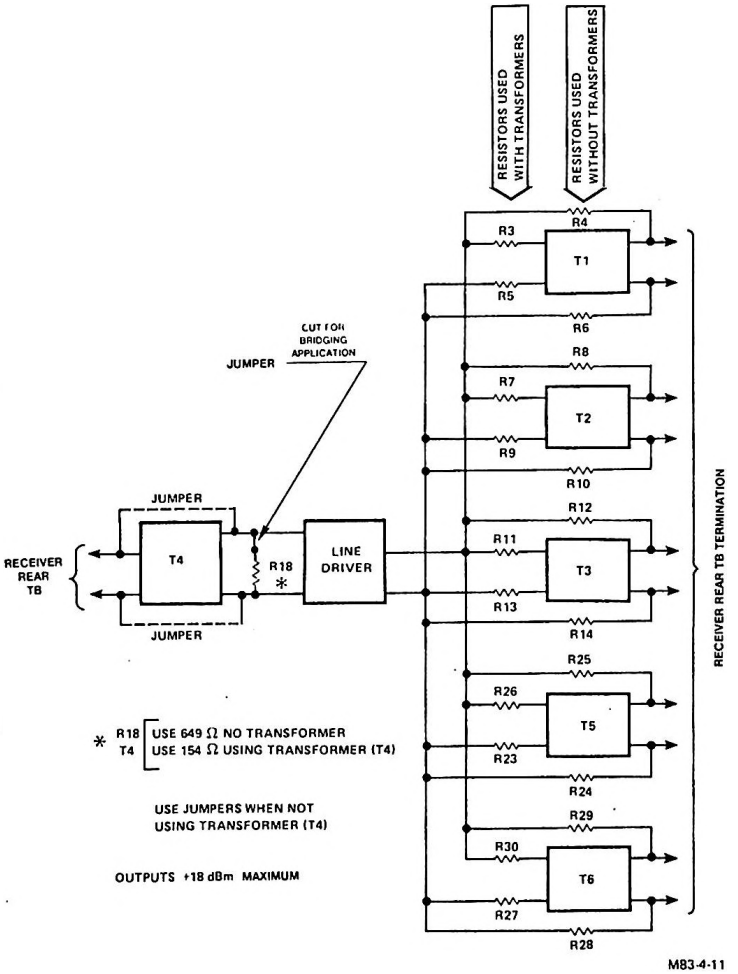


Figure 4.5. Distribution Amplifier

4.6 Digital Demodulator

The QPSK demodulator provides the capability of demodulating a 230.4 kb/s data stream broadcast via the satellite link. The data stream consists of a number of 50 to 75 baud TTY channels, as well as data channels up to 9.6 kb/s.

The receiver mainframe provides the unregulated dc power and 70 MHz (52 - 88 MHz) signal. The terminal strip on the rear of the receiver provides access to the module output connections.

The demodulator basic functions are:

- IF Conversion from 52 - 88 MHz to a lower IF
- Carrier Recovery
- Phase Lock Detection
- Frequency Lock Detection
- Clock Recovery
- Data Detection
- QPSK Type Differential Decoding
- Parallel to Serial Conversion
- V.35 Descrambler
- Data and Clock Interface Drivers
- Fault Detection

The module IF strip is factory adjusted to accept the subcarrier signal in the 52 - 88 MHz range. The input signal is filtered and mixed with a local oscillator to produce a lower IF. The lower IF is filtered and amplified, using AGC to prevent overloading in the IF strip during strong signal conditions. The lower IF signal is applied to the demodulator where it is "phase locked" and "frequency locked" to a reference signal derived from a Voltage Controlled Oscillator (VCO). Comparators are used to make data decisions. The comparator outputs are sampled (clocked) at the optimum sample time to recover the received

data. The data and the recovered clock are then sent out as RS-422 signals to the module rear connectors.

4.6.1 Phase Lock

The output of the phase lock detector contains a dc component when in lock, and zero dc when out of lock. When no dc is detected, a slow sweep is activated and the AMBER LED (Figure 1.1-1) is illuminated indicating that "phase lock" has not occurred. When phase lock has occurred, the AMBER LED will extinguish. A hold circuit is connected in this line to compensate for short term loss of lock due to a phase transient that would otherwise cause the sweep to be activated resulting in erratic operation of the AMBER LED and SUM FAULT indicators.

4.6.2 Frequency Lock

A dc signal proportional to the frequency difference between the incoming lower IF signal and a VCO frequency is connected to a window comparator. If the dc voltage is outside the window, indicating a large frequency error, a fast sweep is turned on. If the dc voltage is then within the window, indicating a frequency error smaller than the "false lock" point, the fast sweep is turned off and "frequency lock" is declared.

The presence of both "phase lock" and "frequency lock" together causes a "lock indication" (Figure 1.1-1, green LED illuminated). This indication is also sent to the SYNC LOCK line on the rear connector.

If a NO LOCK condition exists, the receiver SUM FAULT LED will illuminate. This will coincide with the demodulator AMBER LED being ON and the GREEN LED being OFF.

4.7 Power Supply Assembly

The power supply assembly (Figures 1.1-1 and 1.1-2) contains the ac to dc supply, the cooling fan and the LED FAULT indicator panel.

A three-pronged ac cord provides the means for applying ac power to the system. A rear cable connection (J9) interfaces the assembly with the motherboard for distribution of the +8 and ±18 Vdc (unregulated) to the receiver modules. The cable also provides an input from the motherboard to the SUM FAULT LED on the indicator panel.

Activation of the circuit breaker/switch at the rear of the assembly provides ac power to the power supply section of the assembly and the cooling fan. The indicator panel monitors the dc output of the power supply with appropriate LEDs.

The entire assembly is removable from the rear of the receiver cabinet by disconnecting the interface cable and the loosening of a captive screw at the lower right of the cooling fan guard.

SECTION 5.0

MAINTENANCE

5.0 MAINTENANCE

5.1 General

Each of the previously described components have an individual role to play in order to provide the desired services. Their importance should not be minimized. However, before attempting fault isolation on the equipment, consider some of the outside influences that can affect overall performance or the reception of the desired signal.

5.2 Outside Influences

5.2.1 Antenna

Any change to the RF environment or line-of-sight environment from that existing at time of installation can affect the performance of the system. This would include any physical damage to the antenna, the antenna mount, the feed assembly or cable between the antenna and receiver. Any structural damage to the antenna, its mount or foundation can offset its view of the satellite and reduce or negate the reception of the desired signal.

5.2.2 Adverse Weather Conditions

Rain attenuates a microwave signal in two ways: The water absorbs energy and the raindrops scatter it. The amount of attenuation is a function of the drop size, the temperature and the volume of water, as well as the operational Radio Frequency (RF). In other words, the bigger the raindrops and the higher the frequency, the greater the attenuation will be. If the effect of rain is severe enough, this may be noticed by noise on the monitored audio output, erratic garbled copy on a teletype machine or fluctuation of the GREEN "Carrier ON" LED on the FM demodulator.

If these effects coincide with the weather, the circuits should restore gradually as the rain subsides without equipment adjustment. (NOTE: Extremely heavy rains would be required to cause noticeable signal degradation.)

5.2.3 Sun Outage

There is a predictable period of time during the months of March and October when the earth station antenna is directly exposed to the sun's rays at the same azimuth and elevation in which it is focused upon the satellite. At this point in time, the sun's energy will override the desired signal and, in effect, act as an interfering RF carrier of intense signal strength covering the entire bandwidth of the receiver. As the sun leaves the field of view of the antenna, the desired signal will restore without any equipment adjustment.

These occurrences are predictable for the specific geographical location of an earth station. The period of outage may last for up to 10 minutes at a given time of day. Duration of outage is related to the earth station's geographical location and antenna size. Outage will occur several days in succession at approximately the same time of day. This may also be observed visually by looking at the antenna (dish). It will obviously be illuminated by direct rays of the sun along with a shadow of the feed on the center of the dish.

5.2.4 Satellite Problems

Though few in nature, problems in the satellite uplink and downlink are not to be discounted. The subscriber will normally be advised of any disruption in service well in advance of any planned outage.

5.3 Equipment Fault Isolation

In typical applications of the satellite receiver, rapid return of the unit to service after a failure is the most important consideration. Therefore, this manual provides module-level fault isolation procedures requiring little or no test equipment.

Most tests make use of the front panel LED indicators on certain modules and/or the voltage indicator LEDs and summary fault light.

Visual inspection of point-to-point connections, the teletype copy or the audible quality of the program voice circuit can also be an aid to fault isolation.

Logical deductions can be made by a basic understanding of system operation, as described in this manual.

The LED's ON or OFF condition responds to normal and abnormal conditions as described in Table 5.3.

Figure 5.3 may be used as a guide in isolating system faults.

Table 5.3. Fault/No Fault Indications

Section	Name	Normal State	Fault State	Function/Fault
Power Supply Indicator Panel	ON/OFF POWER	PUSH-ON		SYSTEM POWER/RECEIVER & LNA
	+18 V Green	ON		Normal current load (.2 - 2.5 A)
	+18 V Green		OFF	Power supply failure

Table 5.3. Fault/No Fault Indications (Continued)

Section	Name	Normal State	Fault State	Function/Fault
Power Supply Indicator Panel (Cont'd)	-18 V Green	ON		Normal current load (.1 - 1.5 A)
	-18 V Green		OFF	Power supply failure
	+8 V Green	ON		Normal current load (.75 - 7.5 A)
	+8 V Green		OFF	Power supply failure
	Sum Fault	OFF		Normal no fault
	Red		ON	• Downconverter fault
	Red		ON	• Data demod fault
	Red		ON	• Baseband demod fault (refer to following)
RF Downconverter	LNA-Power Green-LED	ON		Normal current load (85 - 165 mA) drawn from bias-tee
	Green-LED		OFF	Current load outside normal limits, open or short from bias-tee link-to-LNA; LNA fault; loss of +18 V supply
FM Demod	Carrier Presence Green-LED	ON		Normal 70 MHz IF signal present at demod from downconverter or external IF source
			OFF	Loss of 70 MHz IF voice frequency carrier

Table 5.3. Fault/No Fault Indications (Continued)

Section	Name	Normal State	Fault State	Function/Fault
Data Demod	Amber LED	OFF		Phase lock declared
			ON	Phase lock search - (Sum Fault ON)
	Green LED	ON		Phase lock and frequency lock declared
			OFF	Phase lock/frequency lock NOT declared; loss of 70 MHz data carrier; data demod failure

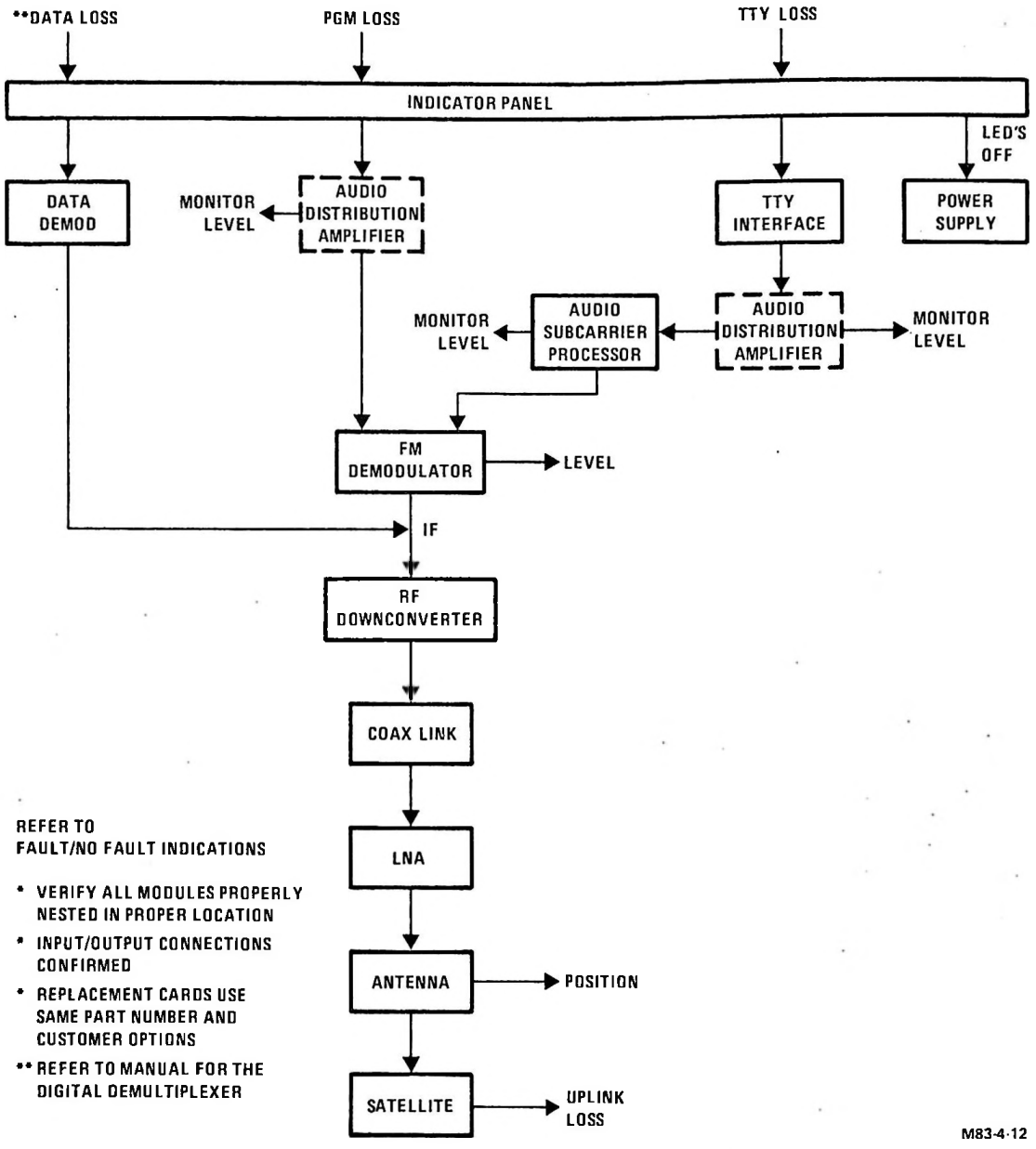


Figure 5.3. System Fault Isolation

5.4 Spare Parts

A complete replacement parts list is not normally furnished with an order, nor are they recommended as a customer requirement, however, a replacement parts list can be prepared by special order.

Certain parts, such as resistors and capacitors, can often be obtained locally. Replacement semiconductors must be of the same manufacturer and type number as the original.

Customers needing to do their own module or unit level repair can order component parts by sending Harris the component designation and the related module and/or unit designation. Designations are usually letter-number combination and are printed on the related circuit board, module or unit chassis.

SECTION 6.0

WARRANTY AND SERVICE

6.0 WARRANTY AND SERVICE

6.1 Warranty Statement

Seller warrants the items ordered hereunder at the time of shipment to be free from defects in material, workmanship and to conform with the contract specifications. Seller's liability under this Warranty will terminate one (1) year after date of shipment. Written notice of any defects will be given Seller upon discovery and Seller will promptly correct such defects by repair or replacement, at its option, without charge either FOB Seller's plant or service in the field. In no event will Seller's liability under this Warranty exceed the cost of repair or replacing such defective item and under no circumstances will Seller be liable for special or consequential damages.

Specifically excluded from the terms of this Warranty are:

1. Defects or nonconformance caused by and resulting from improper operation, maintenance or storage of the equipment.

2. Items of characteristically indeterminate life, such as bulbs, fuses, etc.

THIS WARRANTY CONSTITUTES SELLER'S SOLE AND EXCLUSIVE LIABILITY HEREUNDER AND BUYER'S SOLE AND EXCLUSIVE REMEDY FOR DEFECTIVE OR NONCONFORMING ITEMS AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS, IMPLIED OR STATUTORY (INCLUDING THE WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE).

Buyer assumes all responsibility for and risks of loss of, or damage to, the equipment upon delivery at Seller's shipping point, notwithstanding the fact that Seller may have selected the carrier.

Title to and right of possession of the equipment remains with Seller until payment of the purchase price in full. If payment is delayed, Buyer, if requested by Seller, will execute and deliver to Seller a security agreement or other documents sufficient to enable Seller to comply with applicable filing and recording laws. Buyer hereby authorizes Seller, or its assignee, where permitted by applicable state law, to sign and file financing statements in order to perfect the security interest of Seller hereunder.

6.2 Customer Service

6.2.1 Repair/Maintenance Services

Warranty Repair - Terms of Warranty Repair are given above. Warranty repair items may be shipped to Harris using the procedure given below.

Nonwarranty Repair - After receiving a nonwarranty repair item, Harris will estimate the repair cost and notify the customer by telephone, telex or mail; repair work will then begin only after customer approval. Shipping instructions are given below.

6.2.2 Shipping

Before shipping any repair item to Harris Corporation, Satellite Communications Division, call, write or telex the Customer Service Department for shipping authorization.

Telephone: 1-305-724-3000
Telex: 56-7488
Correspondence: Harris Corporation
Satellite Communications Division
Customer Service Department
P.O. Box 1700
Melbourne, Florida 32901, U.S.A.

Unless otherwise instructed, freight should be shipped to:

Harris Corporation
Satellite Communications Division
Attention: Customer Service
1380 Harris Road
Melbourne, Florida 32901, U.S.A.

SATELLITE RECEIVER

MODEL 6550

SCHEMATIC DIAGRAMS

June 1983

CAUTIONARY NOTICE

While the Manufacturer has attempted to detail in this manual all areas of possible danger to personnel in connection with the use of this equipment, personnel should use caution when installing, checking out, operating and servicing this equipment, especially when power is on. Like all electronic equipment, care should be taken to avoid electrical shock, in all circuits where substantial currents or voltages may be present, either through design or short circuit. Caution should be observed also in lifting and hoisting equipment especially regarding large structures during installation.

The manufacturer is specifically not liable for any damage or injury arising out of a worker's failure to follow the instructions contained in this manual, or his failure to exercise due care and caution in the installation, operation, checkout and service of this equipment.

****

Model 6550
Satellite Receiver

CONTENTS

REVISIONS					
ZONE	LTR	DESCRIPTION		DATE	APPROVED
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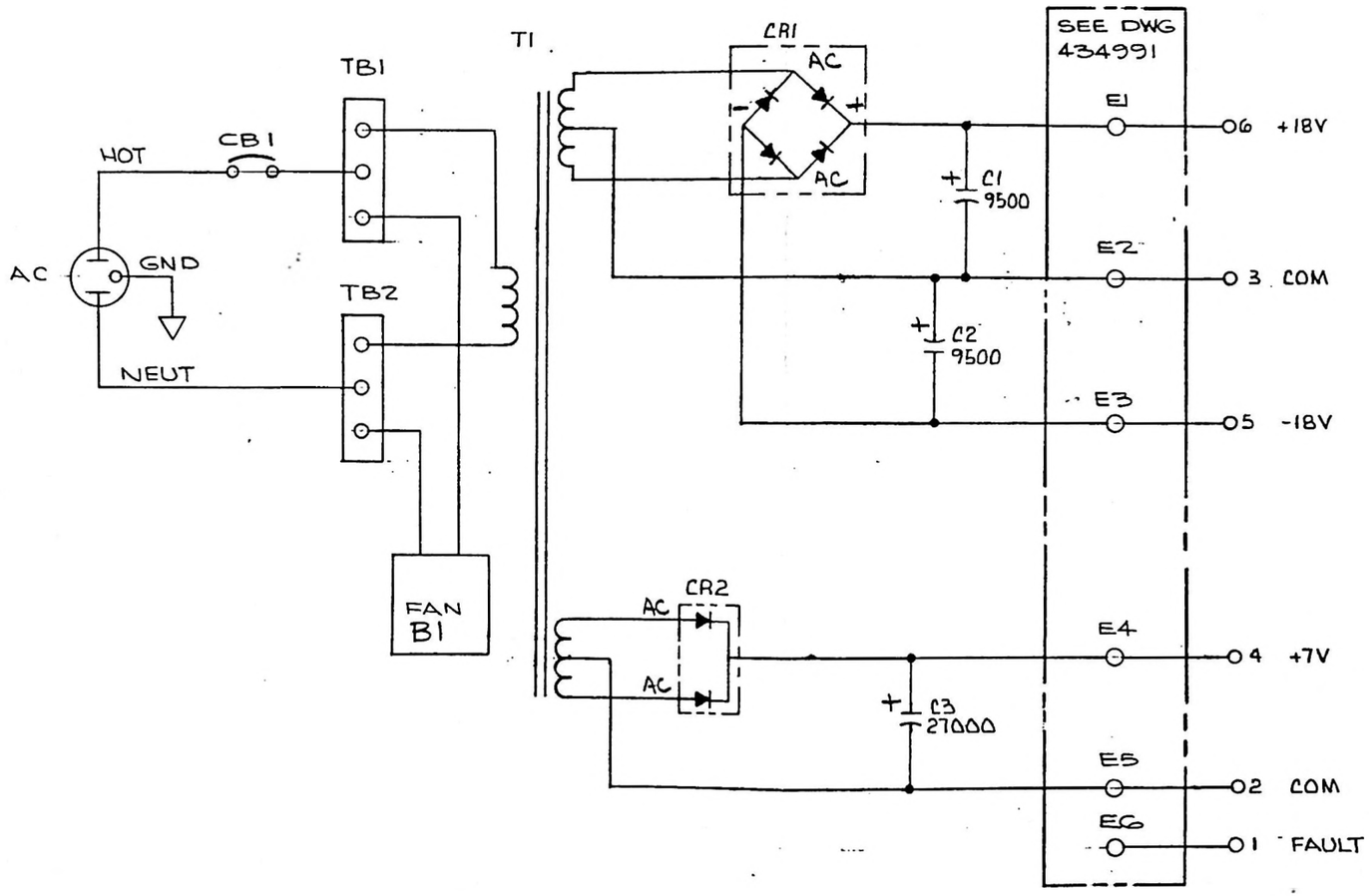

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UNLESS OTHERWISE SPECIFIED! PART TO BE FREE OF BURRS & SHARP EDGES. COMMERCIAL TOLERANCES TO STOCK SIZES DRAWING INTERPRETATION PER ANSI Y14.

TO CONVERT TO METRIC SYSTEM, MULTIPLY INCHES SHOWN ON DRAWING BY 25.4 TO OBTAIN MILLIMETERS.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE APPLIED FINISH TOLERANCES

2 PLACE DIM. ± 3 PLACE DIM. ± ANGLES ±

DO NOT SCALE DRAWING

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1ST APPLICATION

CONTRACT NO.

DWN BY 6-12-80 E.M.SEKULA | CHK BY

ENGINEER 8-14-80 J.V. Hagen | PROJECT ENGINEER 8/18/80

MANUFACTURING

APPROVAL: CONFIGURATION ENGINEER 9/7

APPROVAL: PRODUCT MANAGER W. Willems 8/14/80

APPROVAL 9/8/80

HARRIS SATELLITE COMMUNICATIONS DIVISION
P.O. BOX 1700
MELBOURNE, FLORIDA 32901

TITLE SCHEMATIC DIAGRAM
POWER SUPPLY
UPI

SIZE	CODE INDENT NO.		REV
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SCALE ~ SHEET 1 OF 1

434980 REV A

HSCD 813

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PROPRIETARY DATA

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REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
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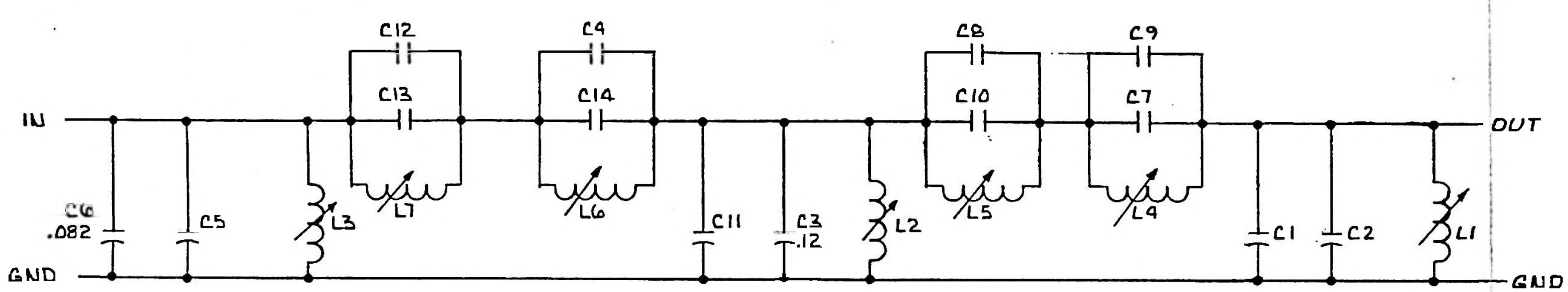

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435033 REV

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ENGINEER J. Mansfield 9/8/80 | PROJECT ENGINEER CRB 9/8/80

MANUFACTURING 9/8/80

APPROVAL: CONFIGURATION ENGINEER 9ZJ

APPROVAL: PRODUCT MANAGER

APPROVAL 9/9/80

HARRIS SATELLITE COMMUNICATIONS DIVISION P.O. BOX 1700 MELBOURNE, FLORIDA 32901

TITLE

SCHEMATIC DIAGRAM SUBCARRIER BANDPASS FILTER

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HSCD 015

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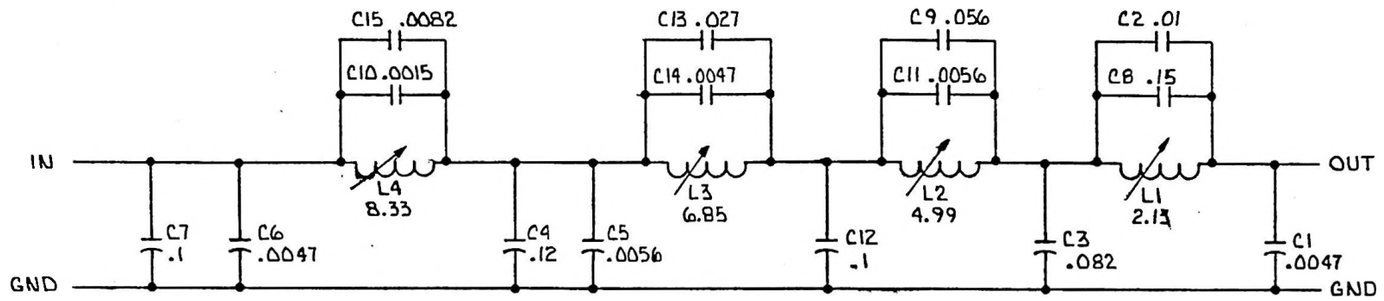

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ENGINEER 9/8/80 PROJECT ENGINEER

MANUFACTURING 9/8/80

APPROVAL: CONFIGURATION ENGINEER

APPROVAL: PRODUCT MANAGER

APPROVAL 9/8/80

HARRIS SATELLITE COMMUNICATIONS DIVISION
P.O. BOX 1700
MELBOURNE, FLORIDA 32901

TITLE SCHEMATIC DIAGRAM
LOWPASS FILTER

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SCALE ~ SHEET 1 of 1

435041 REV B

HSCD 015

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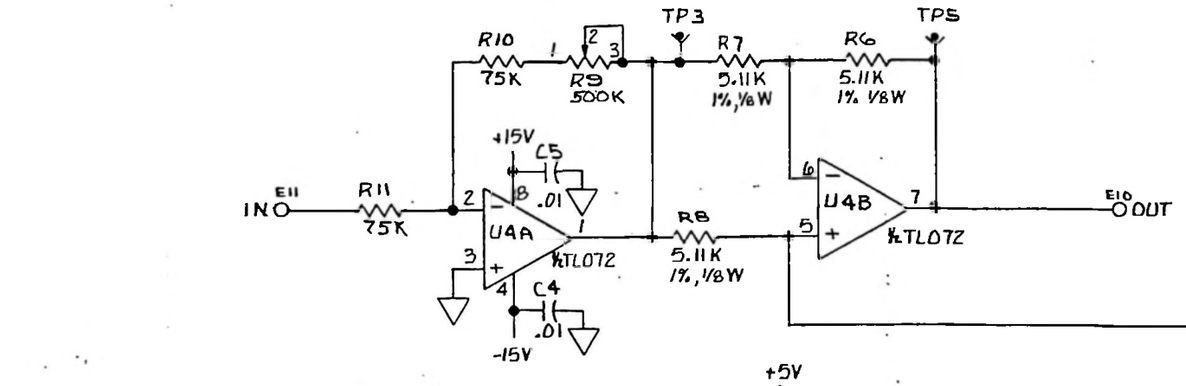

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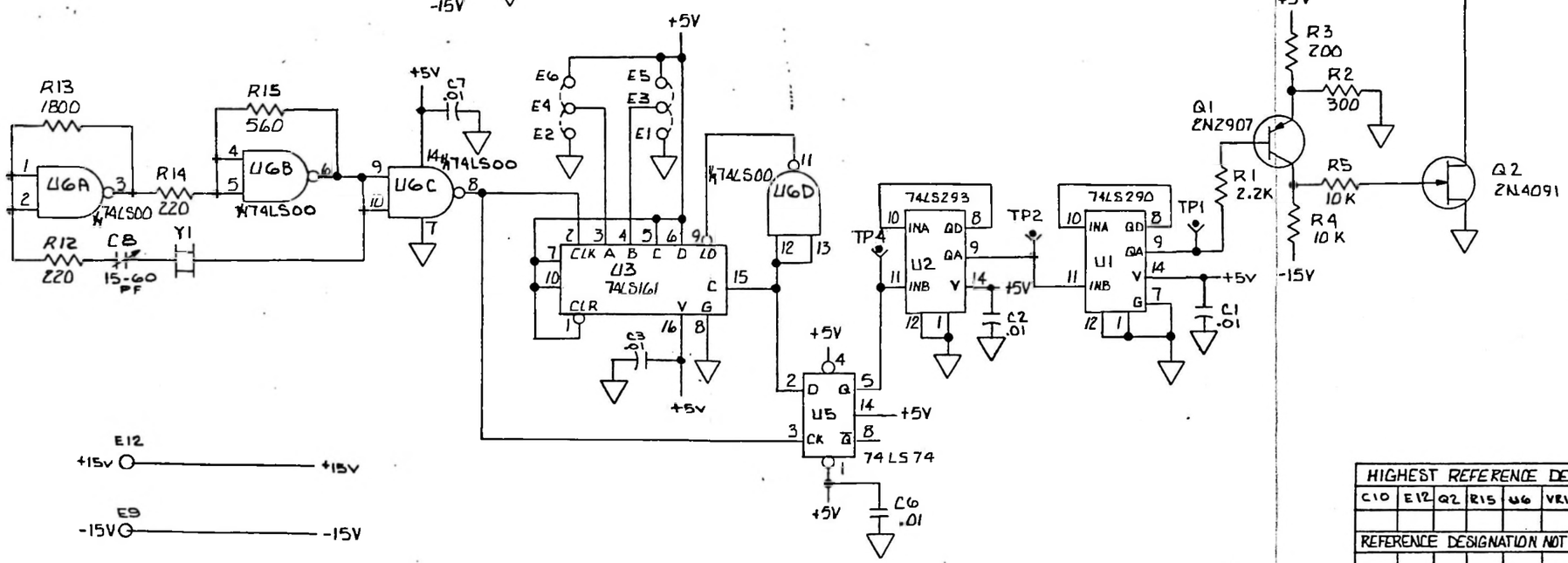
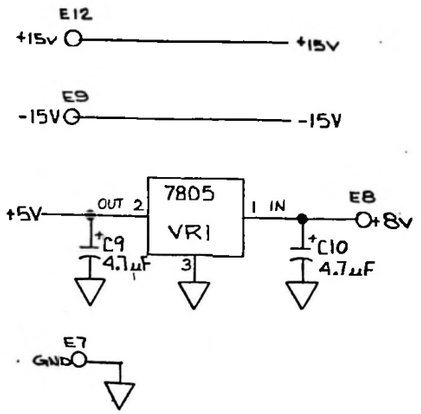




HIGHEST REFERENCE DESIGNATION							
C10	E12	Q2	R15	U6	VR1	Y1	
REFERENCE DESIGNATION NOT USED							

ITEM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	CODE IDENT	QUANTITY REQUIRED

LIST OF MATERIALS OR PARTS LIST

UNLESS OTHERWISE SPECIFIED! PART TO BE FREE OF BURRS & SHARP EDGES. COMMERCIAL TOLERANCES TO STOCK SIZES APPLY. DRAWING INTERPRETATION PER ANSI Y14.

TO CONVERT TO METRIC SYSTEM, MULTIPLY INCHES SHOWN ON DRAWING BY 25.4 TO OBTAIN MILLIMETERS.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE APPLIED FINISH TOLERANCES

2 PLACE DIM. ± 3 PLACE DIM. ± ANGLES ±

DO NOT SCALE DRAWING

DASH NO.	NEXT ASSY	USED ON
	435444	6550

1ST APPLICATION

CONTRACT NO.

DWN BY 9-22-81 L. HERRBURGER — CHK BY

ENGINEER 1-19-83 H.A. Walker — PROJECT ENGINEER

MANUFACTURING 1-19-83

APPROVAL: CONFIGURATION ENGINEER

APPROVAL: PRODUCT MANAGER 1/19/83

APPROVAL 1/19/83

HARRIS SATELLITE COMMUNICATIONS DIVISION P.O. BOX 1700 MELBOURNE, FLORIDA 32901

TITLE SCHEMATIC DIAGRAM VF CHANNEL CONVERTER

SIZE	CODE IDENT NO.		REV
C		435442	D

SCALE — SHEET 1 OF 1

435442 REV D

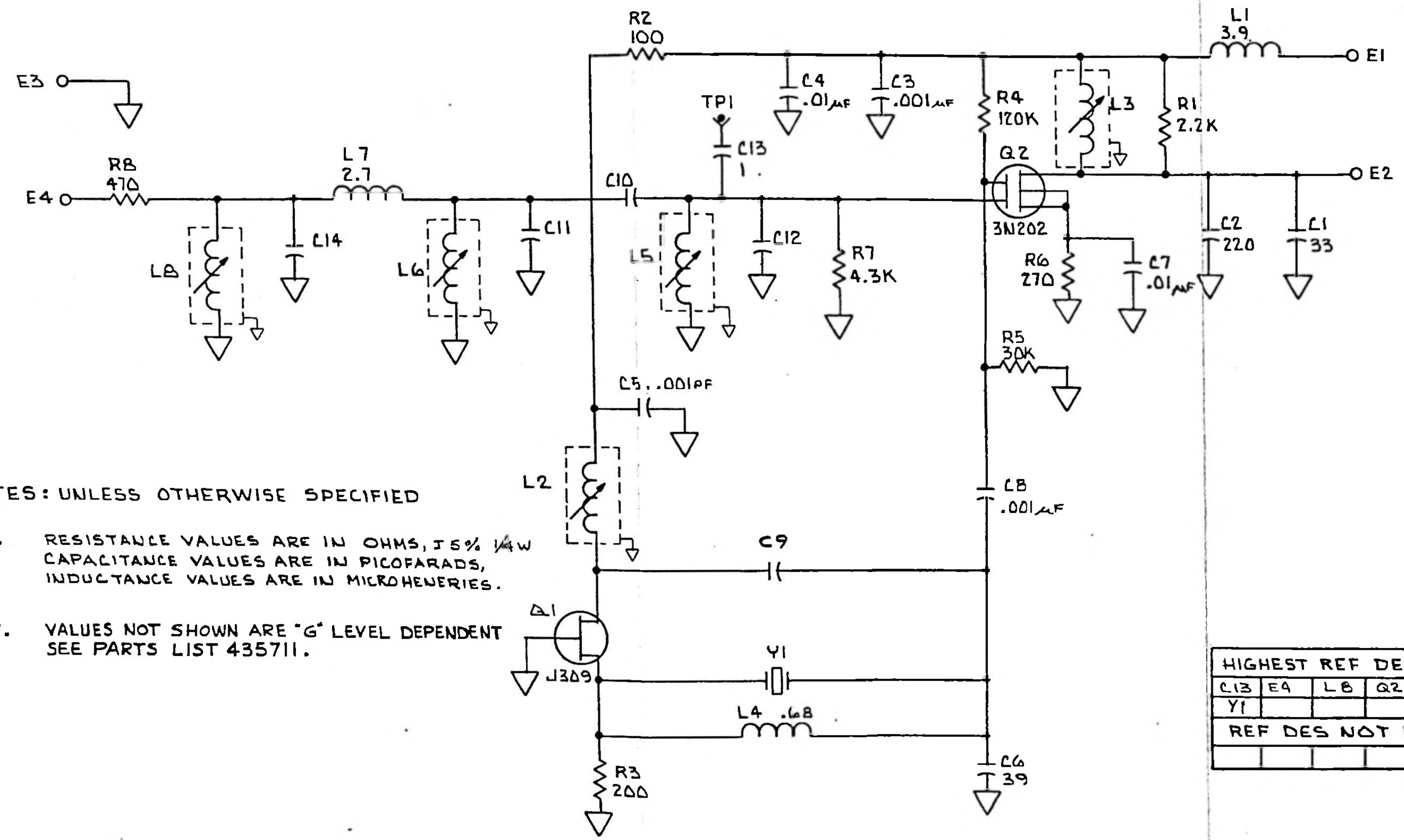
AF 24078E

PROPRIETARY DATA

THIS DOCUMENT CONTAINS PROPRIETARY DATA OF SATELLITE COMMUNICATIONS DIVISION OF HARRIS CORPORATION. NO DISCLOSURE, REPRODUCTION, OR USE OF ANY PART THEREOF MAY BE MADE EXCEPT BY WRITTEN PERMISSION OF HARRIS SCD COUNSEL.

REVISIONS

LTR	DESCRIPTION	DATE	APPROVED
A	CHG BY 1-21-83 CHK BY ~ ECO NO ~ WAS ENGRG DEV DWG	1-24-83	
B	SD 9/18/84 9/18/84 3958 INC ECO B1		



NOTES: UNLESS OTHERWISE SPECIFIED

1. RESISTANCE VALUES ARE IN OHMS, ±5% 1/4W
   CAPACITANCE VALUES ARE IN PICOFARADS,
   INDUCTANCE VALUES ARE IN MICROHENERIES.

2. VALUES NOT SHOWN ARE "G" LEVEL DEPENDENT
   SEE PARTS LIST 435711.

HIGHEST REF DES USED					
C13	E4	L8	Q2	R8	TP1
Y1					
REF DES NOT USED					

QTY REQD	ITEM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION

LIST OF MATERIAL OR PARTS LIST

UNLESS OTHERWISE SPECIFIED: PART TO BE FREE OF BURRS & SHARP EDGES. COMMERCIAL TOLERANCES TO STOCK SIZES APPLY. DRAWING INTERPRETATION PER ANSI Y14.

TO CONVERT TO METRIC SYSTEM, MULTIPLY INCHES SHOWN ON DRAWING BY 25.4 TO OBTAIN MILLIMETERS.

435710	6550
NEXT ASSY	USED ON

DASH NO. — 1ST APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE APPLIED FINISH. TOLERANCES: 2 PLACE DIM. ~ 3 PLACE DIM. ~ ANGLES ~

DO NOT SCALE DRAWING

CONTRACT NO.
DWN BY 1-6-82 CHK BY
ENGINEER 1-7-83 PROJ ENG
MANUFACTURING 1-19-83
APPROVAL: CONFIGURATION ENGINEER
APPROVAL: PRODUCT MANAGER C.R. 1/19/83
APPROVAL 1/19/83

HARRIS — SATELLITE COMMUNICATIONS DIVISION, PO BOX 1700 MELBOURNE, FLORIDA 32901

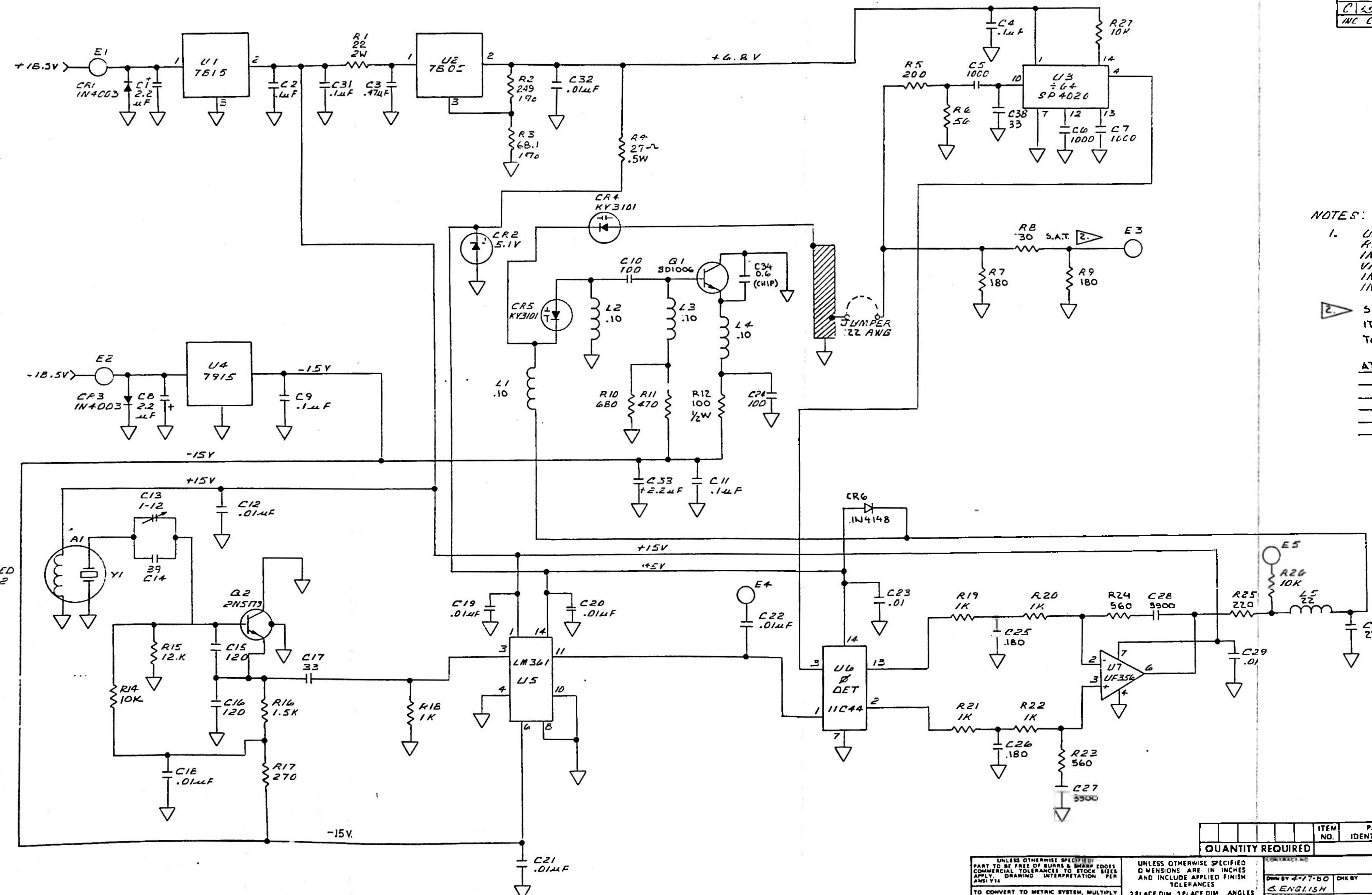
TITLE SCHEMATIC DIAGRAM RF FREQUENCY MODULE

SIZE	FSCM NO.	DWG. NO.	REV.
C		435709	B

SCALE ~ SHEET 1 of 1

DWG. NO. 435709 SH REV. B

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	CHNG BY C.B. / CHK BY — / ECO NO —	8/18/80	
		WAS ENGR DEV. REL WITH C.L.-		
	B	RLW 2-6-81 / 1847, 1944, 1986	2-9-81	
		REVISED EXTENSIVELY		
	C	5/23/85 / 2799	6/7/85	
		INC C1 - CNG'D VALUE OF C11		



NOTES:

1. UNLESS OTHERWISE SPECIFIED RESISTANCE VALUES ARE EXPRESSED IN OHMS 5%, 1/4W. CAPACITANCE VALUES ARE IN PICOFARADS. INDUCTANCE VALUES ARE EXPRESSED IN MICROHENRIES.

2. SELECT AT TEST OUTPUT ATTENUATOR. IT MAY BE NECESSARY TO ADJUST PAD TO MAINTAIN CORRECT R.F. OUTPUT LEVEL—

ATTENUATOR	R7	R8	R9
5 dB	180	30	180
4 dB	220	24	220
3 dB	300	18	300
6 dB	150	36	150
7 dB	130	43	130

HIGHEST REFERENCE DESIGNATIONS						
C34	R27	L5	U7	Q2	CR6	

DESIGNATIONS NOT USED						
R13						

QUANTITY REQUIRED	ITEM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	CODE IDENT
LIST OF MATERIALS OR PARTS LIST				

UNLESS OTHERWISE SPECIFIED: PART TO BE FREE OF BURRS & SHARP EDGES. COMMERCIAL TOLERANCES TO STOCK SIZES APPLY. DRAWING INTERPRETATION PER ANSI Y14

TO CONVERT TO METRIC SYSTEM, MULTIPLY INCHES SHOWN ON DRAWING BY 25.4 TO OBTAIN MILLIMETERS

DASH NO	NEXT ASSY	USED ON
	435758	6550
	434976	9056

1ST APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE APPLIED FINISH TOLERANCES

2 PLACE DIM / 3 PLACE DIM. / ANGLES

DO NOT SCALE DRAWING

CONTRACT NO

DWN BY 4-17-80 G ENGLISH | CHK BY

ENGINEER J ALATZAKI | PROJECT ENGINEER

MANUFACTURING

APPROVAL: CONFIGURATION ENGINEER

APPROVAL PRODUCT MANAGER W. Willems 8/14/80

APPROVAL

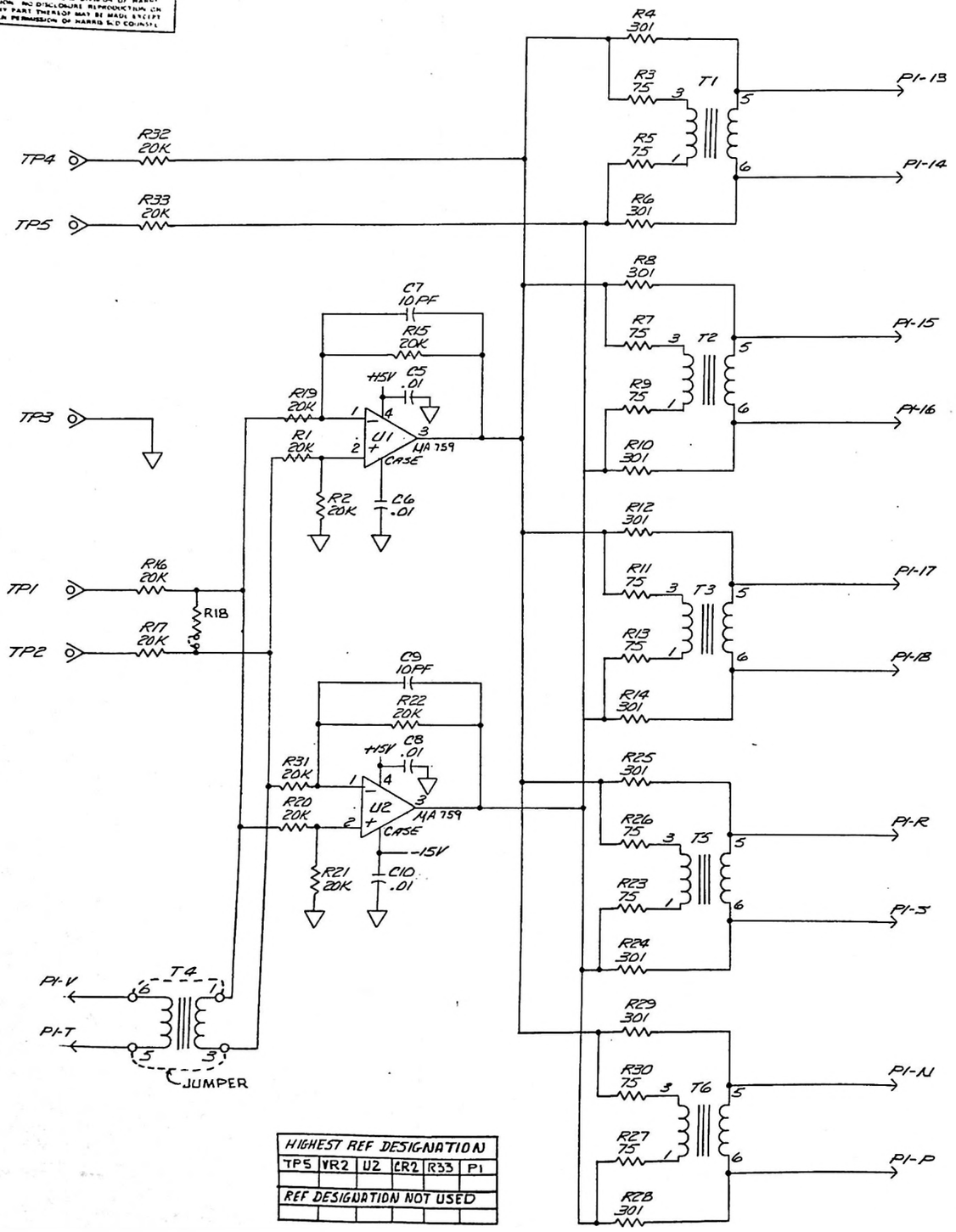
HARRIS SATELLITE COMMUNICATIONS DIVISION, P.O. BOX 1700, MELBOURNE, FLORIDA 32901

TITLE: SCHEMATIC DIAGRAM LOCAL OSCILLATOR

SIZE D | CODE IDENT NO | 562126 | REV C

SCALE | SHEET 1 OF 1

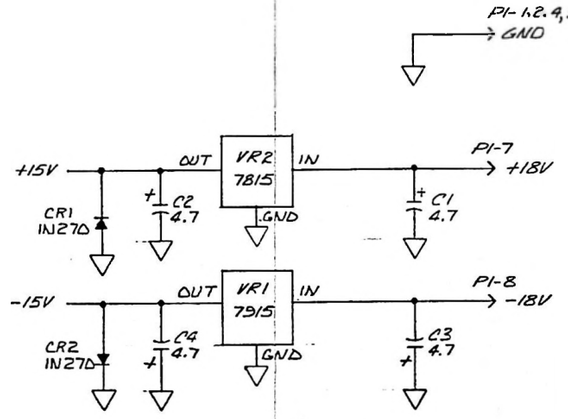
REVISIONS					
ZONE	LTR	DESCRIPTION		DATE	APPROVED
	B	CHNGD BY ~ CHK BY ~ ECO NO ~		11/16/81	
		WAS ENGRG DEV DWG			



HIGHEST REF DESIGNATION					
TP5	VR2	U2	CR2	R33	P1
REF DESIGNATION NOT USED					

NOTES: UNLESS OTHERWISE SPECIFIED.

1. RESISTORS ARE EXPRESSED IN OHMS ± 1%, 1/4 WATT. CAPACITORS ARE EXPRESSED IN MICROFARADS.



POWER AND GROUND

ITEM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	CODE IDENT
QUANTITY REQUIRED		LIST OF MATERIALS OR PARTS LIST	

UNLESS OTHERWISE SPECIFIED! PART TO BE FREE OF BURRS & SHARP EDGES COMMERCIAL TOLERANCES TO STOCK SIZES APPLY DRAWING INTERPRETATION PER ANSI Y14

TO CONVERT TO METRIC SYSTEM, MULTIPLY INCHES SHOWN ON DRAWING BY 25.4 TO OBTAIN MILLIMETERS

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE APPLIED FINISH TOLERANCES

3 PLACE DIM ±3 PLACE DIM. ANGLES ±

DO NOT SCALE DRAWING

DASH NO	NEXT ASSY	USED ON
	562587	9047

1ST APPLICATION

CONTRACT NO

DWN BY CHK BY

ENGINEER PROJECT ENGINEER 1/15/81

MANUFACTURING 1/15/81

APPROVAL: CONFIGURATION ENGINEER

APPROVAL: PRODUCT MANAGER 1/15/81

APPROVAL 1/16/81

HARRIS SATELLITE COMMUNICATIONS DIVISION P.O. BOX 1700 MELBOURNE, FLORIDA 32901

TITLE SCHEMATIC DIAG ELECTRICAL AUDIO DISTRIBUTION AMPLIFIER

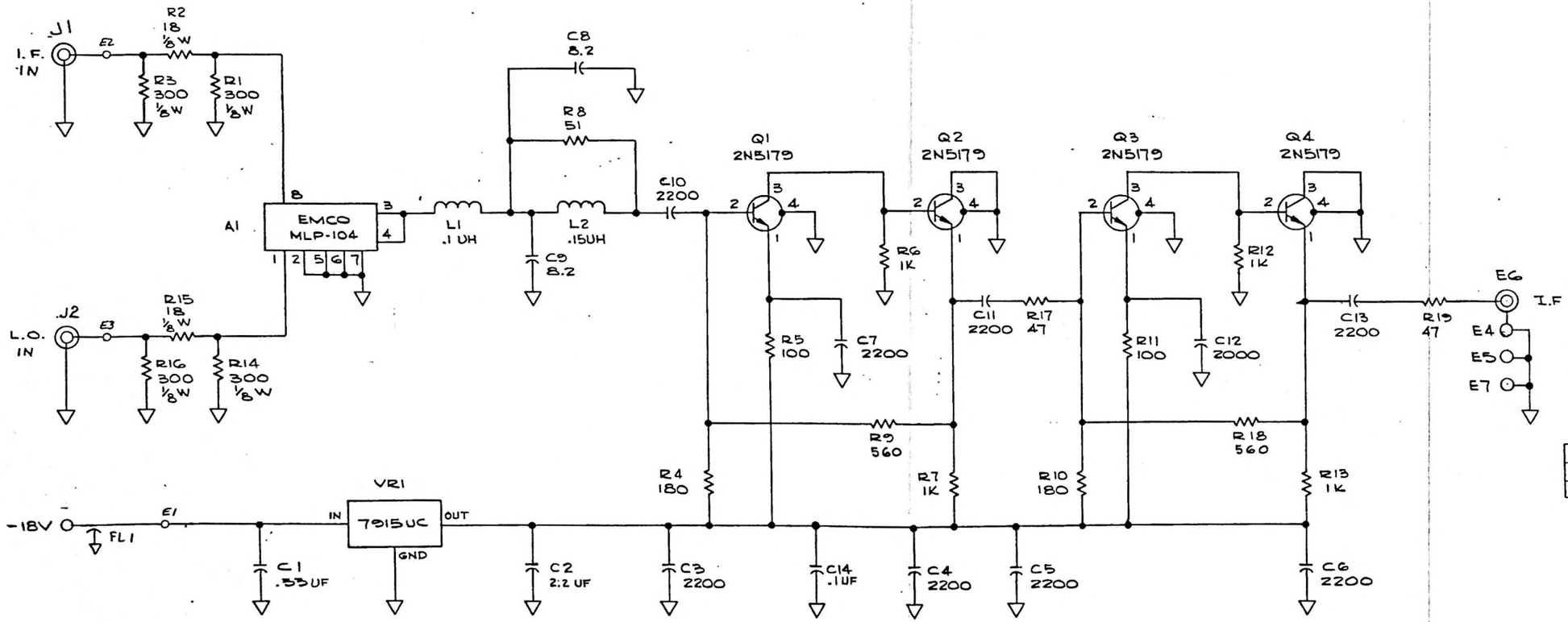
SIZE	CODE IDENT NO		REV
D		5625585	B

SCALE ~ SHEET

REVISIONS					
ZONE	LTR	DESCRIPTION		DATE	APPROVED
	A	CHNG BY C.B. ENG BY — ECO NO —		5/10/80	
		WAS ENGR REV REL WITH ECO			
	B	RLW 2-3-81	1913, 1950	1-7-81	
		R9 & R18 WERE 820 Ω, C2 WAS .1UF.			

NOTES:

1. UNLESS OTHERWISE SPECIFIED:
   RESISTANCE VALUES ARE IN OHMS, ¼W ±5%.
   CAPACITANCE VALUES ARE IN PICOFARADS



HIGHEST REF DES CHART				
A1	C14	L2	Q4	R19
VR1	E7	J2	FL1	

ITEM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	CODE IDENT
QUANTITY REQUIRED		LIST OF MATERIALS OR PARTS LIST	

UNLESS OTHERWISE SPECIFIED: PART TO BE FREE OF BURRS & SHARP EDGES COMMERCIAL TOLERANCES TO STOCK SIZES APPLY. DRAWING INTERPRETATION PER ANSI Y14

TO CONVERT TO METRIC SYSTEM, MULTIPLY INCHES SHOWN ON DRAWING BY 25.4 TO OBTAIN MILLIMETERS

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE APPLIED FINISH TOLERANCES
2 PLACE DIM ±.03 3 PLACE DIM ±.010 ANGLES ±1°
DO NOT SCALE DRAWING

DASH NO.	NEXT ASSY	USED ON
	562589	6550
	434978	6550
	1ST APPLICATION	

CONTRACT NO

DRAWN 6-3-80 CHK BY

ENGINEER 6-11-80 PROJECT ENGINEER

MANUFACTURING

APPROVAL: CONFIGURATION ENGINEER

APPROVAL: PRODUCT MANAGER W. Willan 8/14/80

APPROVAL

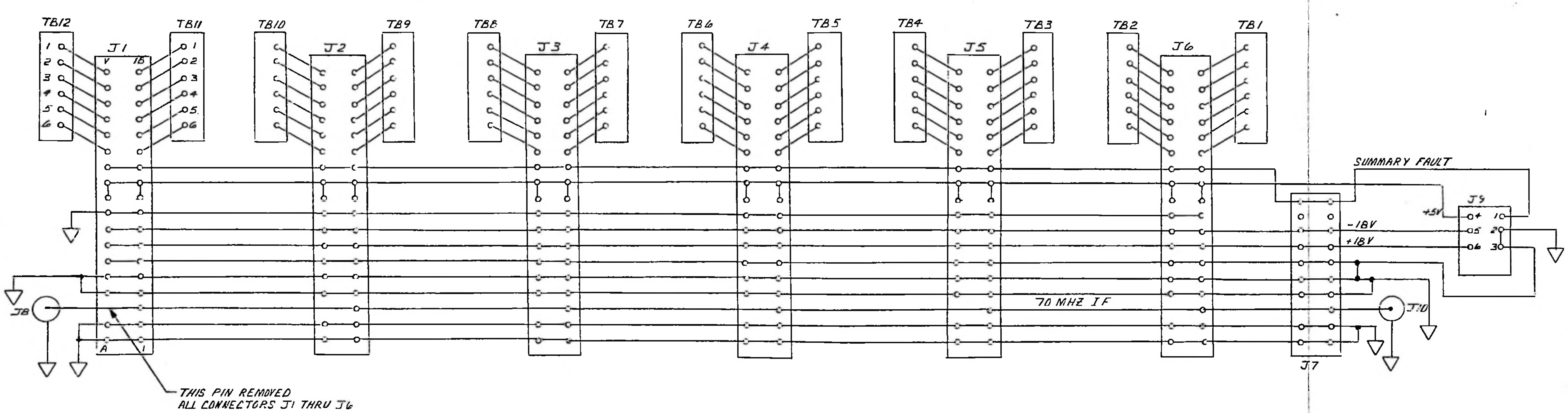
HARRIS SATELLITE COMMUNICATIONS DIVISION P.O. BOX 1700 MELBOURNE, FLORIDA 32901

TITLE
SCHEMATIC DIAGRAM, 2ND DOWN CONVERTER

SIZE	CODE IDENT NO		REV
D		562589	B

SCALE — SHEET 1

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APP
	—	WAS ENGR DEV REL WITH CIC	9/4/80	



QUANTITY REQUIRED	ITEM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	CODE IDENT

LIST OF MATERIALS OR PARTS LIST

UNLESS OTHERWISE SPECIFIED: PART TO BE FREE OF BURRS & SHARP EDGES. COMMERCIAL TOLERANCES TO STOCK SIZES APPLY. DRAWING INTERPRETATION PER ANSI Y14

TO CONVERT TO METRIC SYSTEM, MULTIPLY INCHES SHOWN ON DRAWING BY 25.4 TO OBTAIN MILLIMETERS

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE APPLIED FINISH TOLERANCES

2 PLACE DIM. 3 PLACE DIM. ANGLES

DO NOT SCALE DRAWING

DASH NO	NEXT ASSY	USED ON
	562565	655A

1ST APPLICATION

CONTRACT NO

DWN BY: 8-14-80 B ENGLISH | CHK BY

ENGINEER: 8-14-80 G.V. Hason | PROJECT ENGINEER: CP? 9/.

MANUFACTURING

APPROVAL: CONFIGURATION ENGINEER

APPROVAL: PRODUCT MANAGER W. Wilson 8/14/80

APPROVAL

HARRIS SATELLITE COMMUNICATIONS DIVISION P.O. BOX 1700 MELBOURNE, FLORIDA 32901

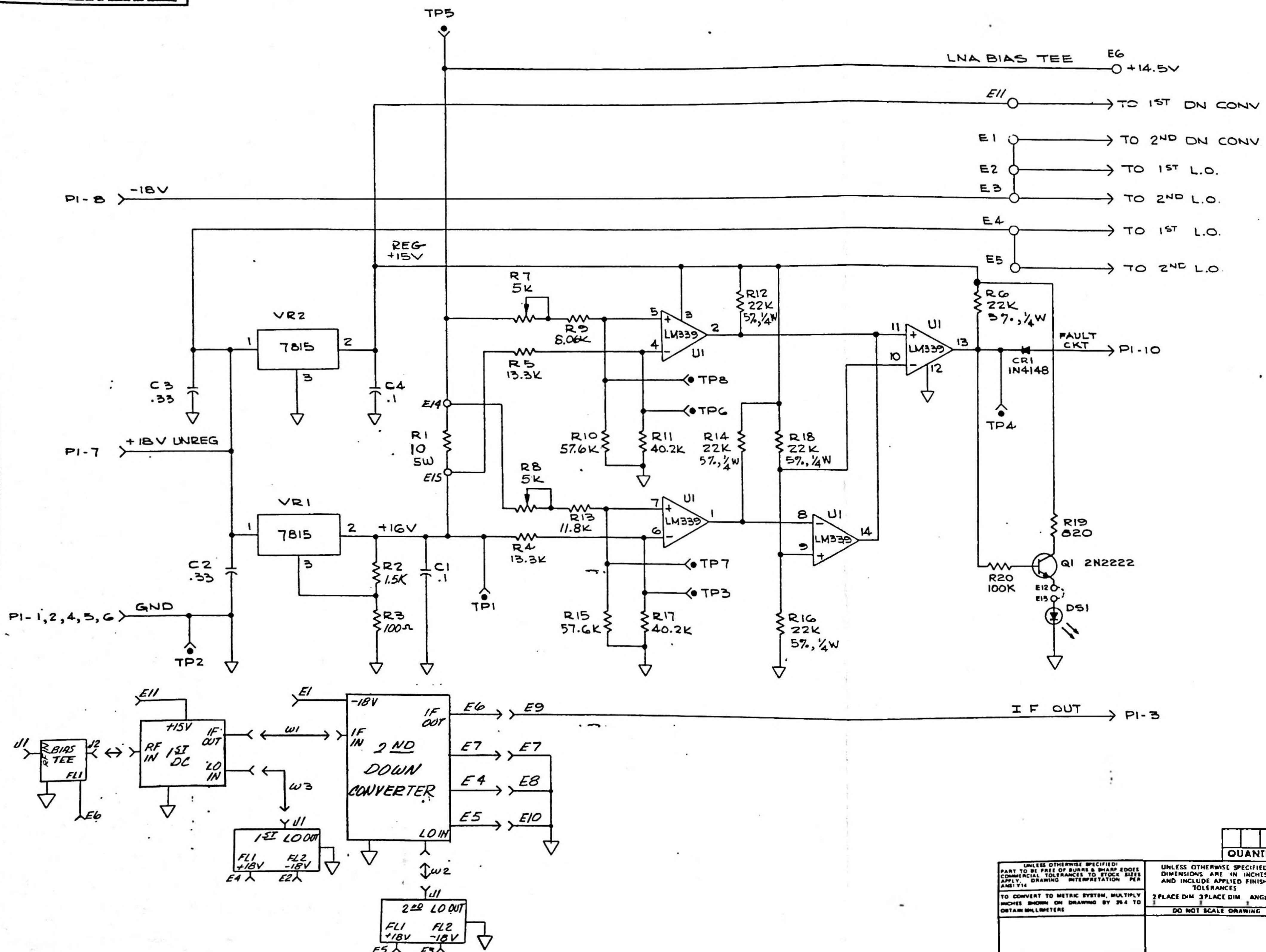
TITLE: SCHEMATIC R.D.T. MOTHERBOARD

SIZE	CODE INDENT NO		REV
D		562733	

SCALE | SHEET

PROPRIETARY DATA

ZONE	LTR	REVISIONS DESCRIPTION	DATE	APPROVED
	B	WAS ENGRG DEV DWG RELEASED WITH CHANGE		



NOTES:

1. UNLESS OTHERWISE SPECIFIED:
   RESISTANCE VALUES ARE IN OHMS, 1/2W, ±1%.
   CAPACITANCE VALUES ARE IN MICROFARADS.

						ITEM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	CODE IDENT
QUANTITY REQUIRED						LIST OF MATERIALS OR PARTS LIST			

UNLESS OTHERWISE SPECIFIED: PART TO BE FREE OF BURRS & SHARP EDGES. COMMERCIAL TOLERANCES TO STOCK SIZES APPLY. DRAWING INTERPRETATION PER ANSI Y14

TO CONVERT TO METRIC SYSTEM, MULTIPLY INCHES SHOWN ON DRAWING BY 25.4 TO OBTAIN MILLIMETERS

NEXT ASSY	USED ON
563749	6550
562916	6550

1ST APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE APPLIED FINISH TOLERANCES

2 PLACE DIM 3 PLACE DIM ANGLES

DO NOT SCALE DRAWING

CONTRACT NO. DWN BY CHK BY ENGINEER 11-10-80 PROJECT ENGINEER 1/14/81 MANUFACTURING 1/14/81 APPROVAL: CONFIGURATION ENGINEER APPROVAL: PRODUCT MANAGER 1/14/81 APPROVAL

HARRIS SATELLITE COMMUNICATIONS DIVISION P O BOX 1700 MELBOURNE, FLORIDA 32901

TITLE: SCHEMATIC DIAGRAM/ INTERCONNECT RF DOWN CONVERTER

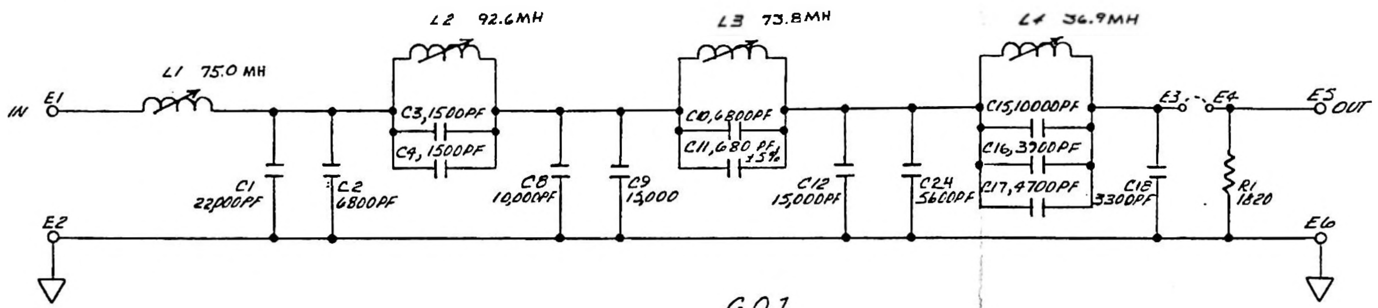
SIZE	CODE INDENT NO		REV
D		562916	B

SCALE SHEET

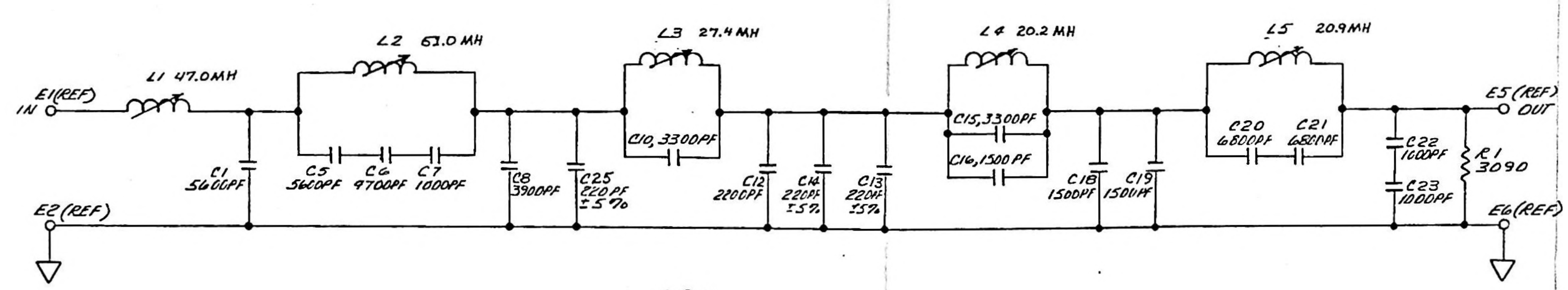
REVISIONS

LTR	DESCRIPTION			DATE	APPROVED
C	CHG BY 1-17-83	CHK BY	ECO NO.	1-24-83	
	WAS ENGRG DEV DWG				

NOTES:
1. UNLESS OTHERWISE SPECIFIED:
RESISTANCE VALUES ARE IN OHMS ± 1% 1/8 WATT.
CAPACITANCE VALUES ARE IN PICOFARADS ± 1%.



G0 1



G0 2

HIGHEST REFERENCE DESIGNATION						
C24	E6	L5	R1			
REFERENCE DESIGNATION NOT USED						

QUANTITY REQUIRED	ITEM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
			LIST OF MATERIAL OR PARTS LIST

UNLESS OTHERWISE SPECIFIED: PART TO BE FREE OF BURRS & SHARP EDGES. COMMERCIAL TOLERANCES TO STOCK SIZES APPLY. DRAWING INTERPRETATION PER ANSI Y14.

TO CONVERT TO METRIC SYSTEM, MULTIPLY INCHES SHOWN ON DRAWING BY 25.4 TO OBTAIN MILLIMETERS

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE APPLIED FINISH
TOLERANCES
2 PLACE DIM. ± 3 PLACE DIM. ± ANGLES ±
DO NOT SCALE DRAWING

DASH NO	NEXT ASSY	USED ON
	563669	6550
	1ST APPLICATION	

CONTRACT NO.
DWN BY 11-16-81 ENGLISH | CHK BY
ENGINEER 1-19-83 | PROJECT ENGINEER
MANUFACTURING 1-19-83
APPROVAL: CONFIGURATION ENGINEER
APPROVAL: PRODUCT MANAGER 1/19/83
APPROVAL 1/19/83

HARRIS SATELLITE COMMUNICATIONS DIVISION
P.O. BOX 1700
MELBOURNE, FLORIDA 32901

TITLE
0-5KHz/0-15KHz
AUDIO LOWPASS FILTER

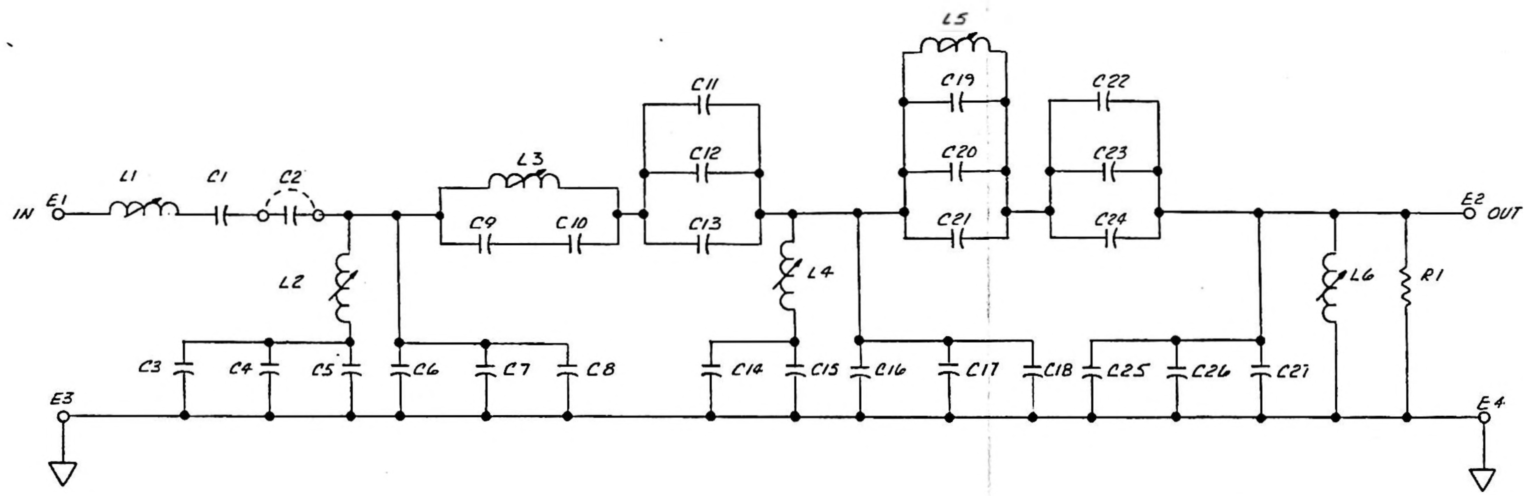
SIZE D | FSCM NO. | DWG NO. 563667 | REV C
SCALE | SHEET 1 OF 1

DWG NO. 563667 SH 1 REV C

REVISIONS				
LTR	DESCRIPTION		DATE	APPROVED
A	CHG BY ... 1-19-83 CHK BY ...	ECO NO. —	1-24-83	
WAS FACKG DET DWG				

NOTES:

1. SEE PL-563703 FOR APPROPRIATE COMPONENT VALUES.



HIGHEST REFERENCE DESIGNATION						
C27	E4	L6	R1			
REFERENCE DESIGNATION NOT USED						

QUANTITY REQUIRED	ITEM NO.	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION

LIST OF MATERIAL OR PARTS LIST

UNLESS OTHERWISE SPECIFIED: PART TO BE FREE OF BURRS & SHARP EDGES. COMMERCIAL TOLERANCES TO STOCK SIZES APPLY. DRAWING INTERPRETATION PER ANSI Y14.

TO CONVERT TO METRIC SYSTEM, MULTIPLY INCHES SHOWN ON DRAWING BY 25.4 TO OBTAIN MILLIMETERS

DASH NO.	NEXT ASSY	USED ON
	563703	6550

1ST APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE APPLIED FINISH

TOLERANCES

2 PLACE DIM. ± ~ 3 PLACE DIM. ± ~ ANGLES ± ~

DO NOT SCALE DRAWING

CONTRACT NO.

DWN BY 1-19-83 B. English — CHK BY

ENGINEER 1-19-83 H.A. Walker — PROJECT ENGINEER

MANUFACTURING 1-19-83

APPROVAL: CONFIGURATION ENGINEER

APPROVAL: PRODUCT MANAGER C.R. Evans 1/19/83

APPROVAL SR Tr...

HARRIS SATELLITE COMMUNICATIONS DIVISION
P.O. BOX 1700
MELBOURNE, FLORIDA 32901

TITLE

SCHEMATIC DIAGRAM BAND-PASS FILTER

SIZE	FSCM NO.		REV.
D		563701	A

SCALE ~ SHEET 1 of 1

DWG. NO 563701 SH 1 REV A

PROPRIETARY DATA

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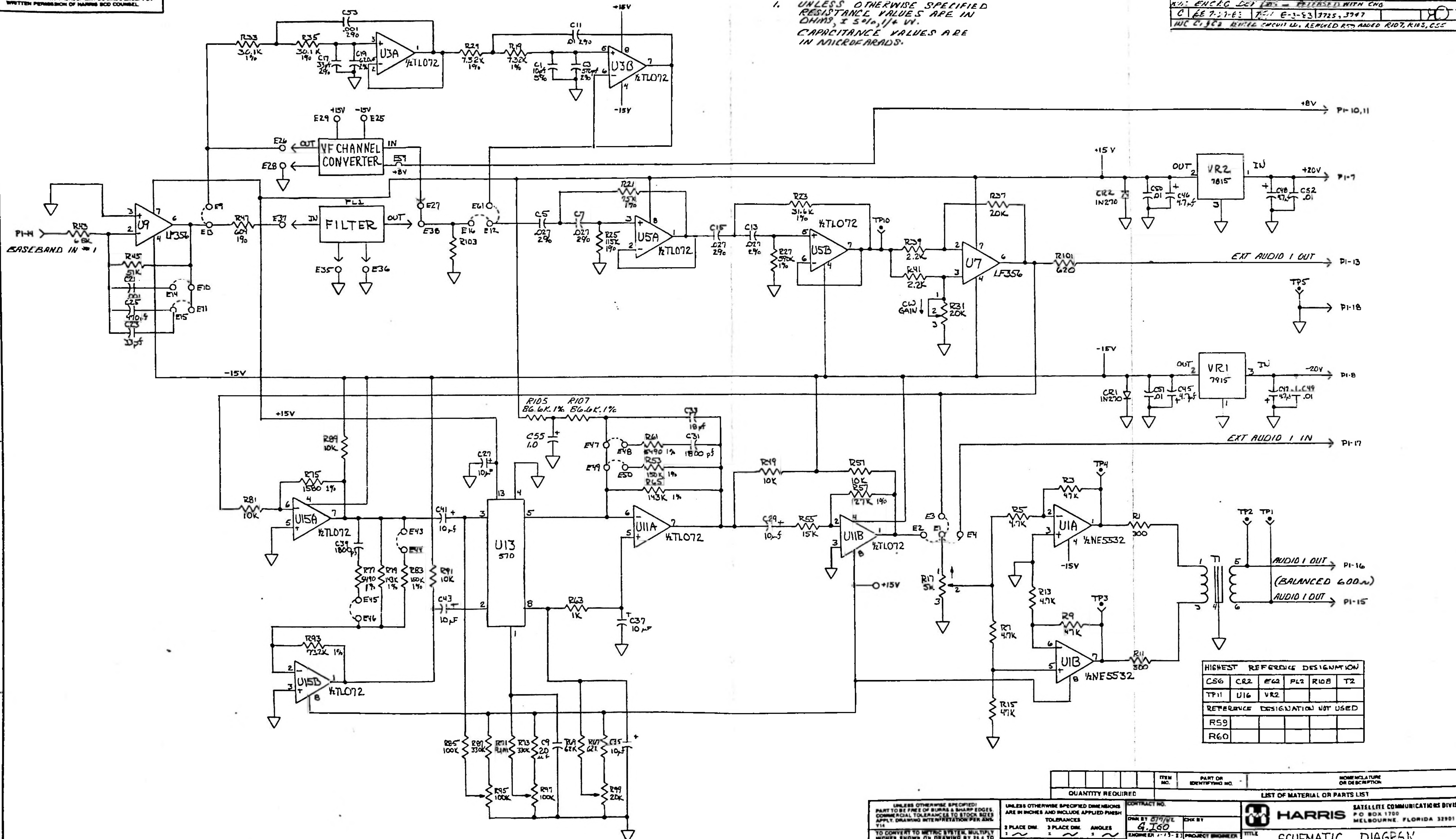
NOTES:

1. UNLESS OTHERWISE SPECIFIED RESISTANCE VALUES ARE IN OHMS, ± 5%, 1/4 W. CAPACITANCE VALUES ARE IN MICROFARADS.

REVISIONS					
LTR	DESCRIPTION			DATE	APPROVED
B	CHG BY C 1-19-83	CHK BY ~	ECO NO. ~	1-24-83	
	ENG'G DEV DWG — RELEASED WITH CNG				
C	EE 7-27-83	8-3-83	3725, 3947		
	W/C C1 & C2 REVISED CIRCUIT W. REMOVED R? ADDED R107, R105, C55				



HIGHEST REFERENCE DESIGNATION					
C56	CR2	E62	PL2	R108	T2
TP11	U16	VR2			
REFERENCE DESIGNATION NOT USED					
R59					
R60					

QUANTITY REQUIRED	ITEM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
		LIST OF MATERIAL OR PARTS LIST	

UNLESS OTHERWISE SPECIFIED: PART TO BE FREE OF BURRS & SHARP EDGES. COMMERCIAL TOLERANCES TO STOCK SIZES APPLY. DRAWING INTERPRETATION PER ANSI Y14

TO CONVERT TO METRIC SYSTEM, MULTIPLY INCHES SHOWN ON DRAWING BY 25.4 TO OBTAIN MILLIMETERS

DASH NO.	NEXT ASSY	USED ON
	563719	6550

1ST APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE APPLIED FINISH

TOLERANCES: 2 PLACE DIM. ± ~ 3 PLACE DIM. ± ~ ANGLES ± ~

DO NOT SCALE DRAWING

CONTRACT NO.

DWN BY 8/7/82 G. IGO — CHK BY

ENGINEER 1-19-83 H.A. Wa... — PROJECT ENGINEER

MANUFACTURING 1-19-83

APPROVAL: CONFIGURATION ENGINEER

APPROVAL: PRODUCT MANAGER C.R. Bush 1/19/83

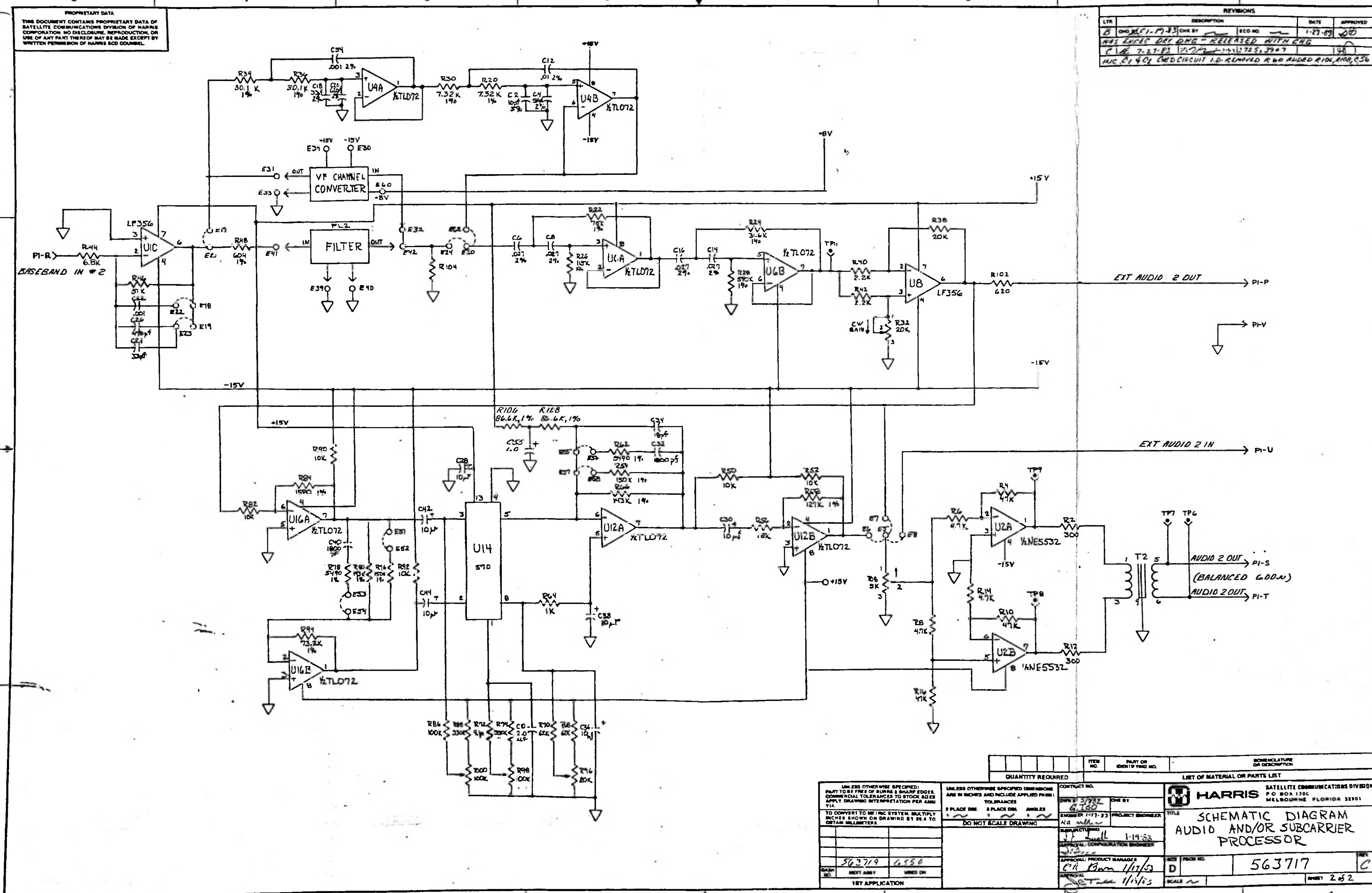
APPROVAL 1/19/83

HARRIS SATELLITE COMMUNICATIONS DIVISION P O BOX 1700 MELBOURNE, FLORIDA 32901

TITLE: SCHEMATIC DIAGRAM AUDIO AND/OR SUBCARRIER PROCESSOR

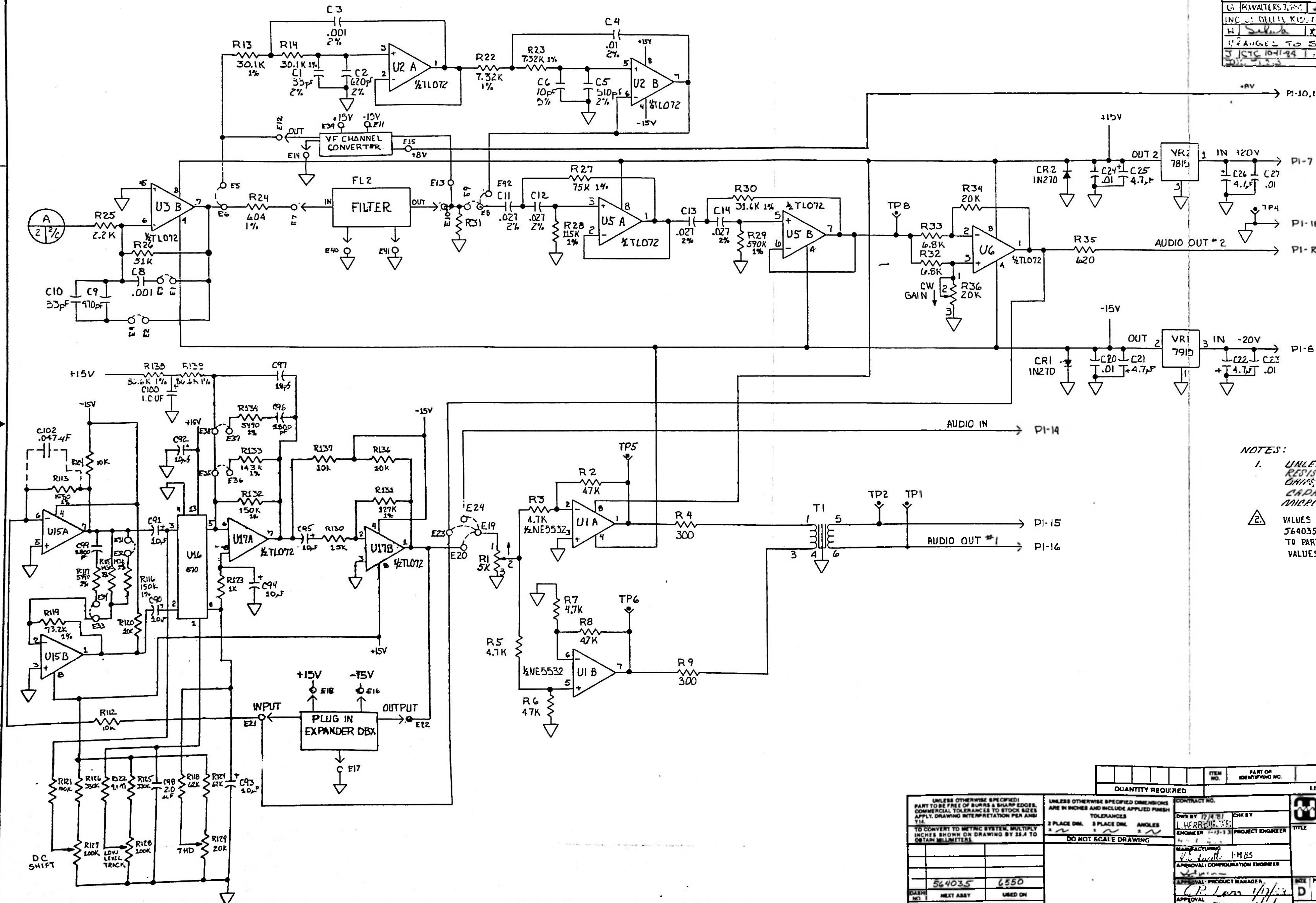
SIZE D — FSCM NO. — 563717 — REV C

SCALE ~ — SHEET 1 of 2


PROPRIETARY DATA
THIS DOCUMENT CONTAINS PROPRIETARY DATA OF SATELLITE COMMUNICATIONS DIVISION OF HARRIS CORPORATION. NO DISCLOSURE, REPRODUCTION, OR USE OF ANY PART THEREOF MAY BE MADE EXCEPT BY WRITTEN PERMISSION OF HARRIS SCD COUNSEL.
REVISIONS
LTR
DESCRIPTION
DATE
APPROVED
VF CHANNEL CONVERTER
FILTER
OUT
IN
BASEBAND IN #2
EXT AUDIO 2 OUT
EXT AUDIO 2 IN
AUDIO 2 OUT
(BALANCED 600Ω)
U14
570
LF356
½TL072
½NE5532
+15V
-15V
+8V
P1-R
P1-P
P1-V
P1-U
P1-S
P1-T
QUANTITY REQUIRED
ITEM NO.
PART OR IDENTIFYING NO.
NOMENCLATURE OR DESCRIPTION
LIST OF MATERIAL OR PARTS LIST
UNLESS OTHERWISE SPECIFIED: PART TO BE FREE OF BURRS & SHARP EDGES. COMMERCIAL TOLERANCES TO STOCK SIZES. APPLY DRAWING INTERPRETATION PER ANSI Y14.
TO CONVERT TO METRIC SYSTEM, MULTIPLY INCHES SHOWN ON DRAWING BY 25.4 TO OBTAIN MILLIMETERS.
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE APPLIED FINISH
TOLERANCES
DO NOT SCALE DRAWING
563719
6550
DASH NO.
NEXT ASSY
USED ON
1ST APPLICATION
CONTRACT NO.
HARRIS
SATELLITE COMMUNICATIONS DIVISION
P O BOX 1700
MELBOURNE FLORIDA 32901
SCHEMATIC DIAGRAM
AUDIO AND/OR SUBCARRIER PROCESSOR
D
563717
C
SHEET 2 of 2
563717

REVISIONS

LTR	DESCRIPTION			DATE	APPROVED
F	CHD BY	CHK BY	ECO NO.		
	[illegible] RELEASED WITH [illegible]				
F	M.WILSON 7/1/83		3723 3742 3825 3864	7-1-83	
	INC F1-F4 NUMEROUS CHANGES				
G	R.WALTERS		3945	8/15/83	
	INC [illegible]				
H			4094, 4114	11/30/83	
	CHANGES TO SHEETS 2 & 3. INC H1 & H2 ECO				
J	ICTC 10-11-84		4773, 4803, 4767		



NOTES:

1. UNLESS OTHERWISE SPECIFIED:
RESISTANCE VALUES ARE IN OHMS, ±5%, 1/4 W.
CAPACITANCE VALUES ARE IN MICROFARADS.

2. VALUES FOR PARTS INDICATED APPLY TO ASSEMBLY 564035-G01 ONLY. FOR OTHER G-LEVELS, REFER TO PARTS LIST PL564035 TO OBTAIN CORRECT VALUES.

QUANTITY REQUIRED	ITEM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
		LIST OF MATERIAL OR PARTS LIST	

UNLESS OTHERWISE SPECIFIED: PART TO BE FREE OF BURRS & SHARP EDGES. COMMERCIAL TOLERANCES TO STOCK SIZES APPLY. DRAWING INTERPRETATION PER ANSI Y14.

TO CONVERT TO METRIC SYSTEM, MULTIPLY INCHES SHOWN ON DRAWING BY 25.4 TO OBTAIN MILLIMETERS.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE APPLIED FINISH

TOLERANCES: 2 PLACE DIM. ± ~ 3 PLACE DIM. ± ~ ANGLES ± ~

DO NOT SCALE DRAWING

DASH NO.	NEXT ASSY	USED ON
	564035	6550

1ST APPLICATION

CONTRACT NO.
DWN BY 12/4/81 L. HERR[illegible] CHK BY
ENGINEER PROJECT ENGINEER
MANUFACTURING 1-14-83
APPROVAL: CONFIGURATION ENGINEER
APPROVAL: PRODUCT MANAGER
APPROVAL

HARRIS SATELLITE COMMUNICATIONS DIVISION
P.O. BOX 1700
MELBOURNE, FLORIDA 32901

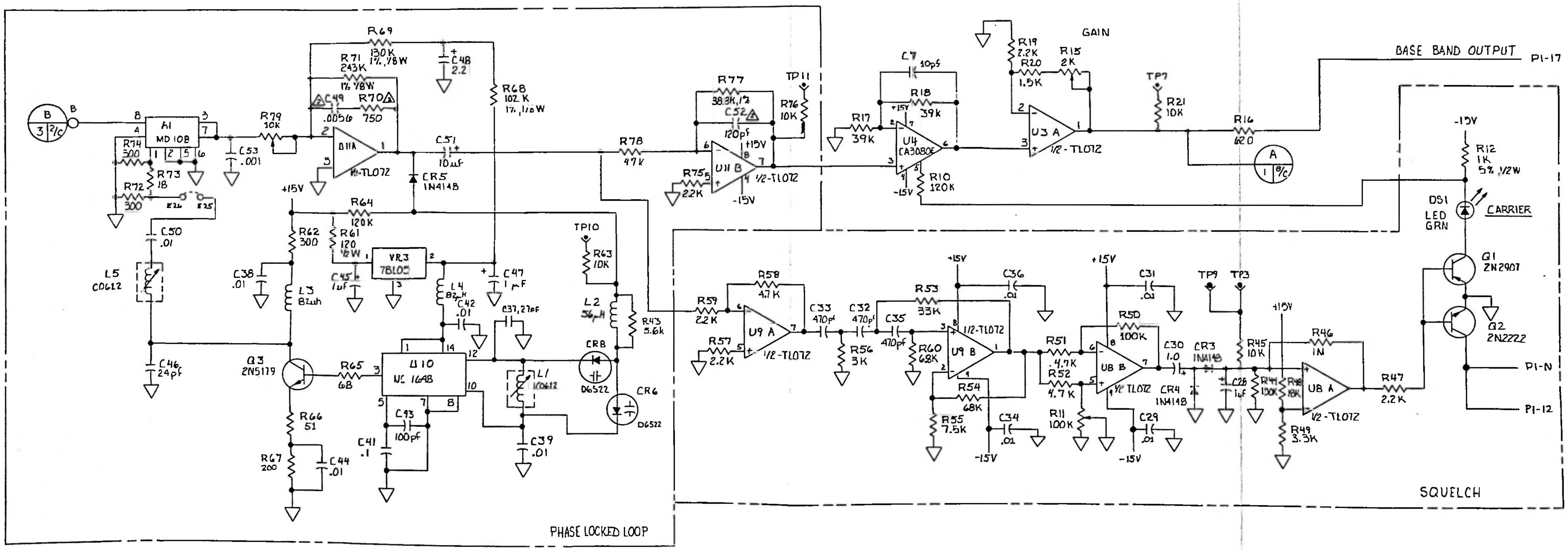
TITLE: SCHEMATIC DIAGRAM FM DEMODULATOR

SIZE D FSCM NO. 564033 REV J

SCALE ~ SHEET 1 of 3

REVISIONS

LTR	DESCRIPTION			DATE	APPROVED
E	CHG BY 1-19-83	CHK BY	ECO NO	1-24-83	
WAS INITIAL DEFDWG - RELEASED WITH CHG					
F	M. WILSON 7/1/83		3723 3884	7-1-83	
INC F1-F4	NUMEROUS CHGS.				
H		R. Nialott			
J			4883, 4773, 4967		
INC J1.2.3					



QUANTITY REQUIRED	ITEM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
LIST OF MATERIAL OR PARTS LIST			

UNLESS OTHERWISE SPECIFIED: PART TO BE FREE OF BURRS & SHARP EDGES. COMMERCIAL TOLERANCES TO STOCK SIZES APPLY. DRAWING INTERPRETATION PER ANSI Y14.

TO CONVERT TO METRIC SYSTEM, MULTIPLY INCHES SHOWN ON DRAWING BY 25.4 TO OBTAIN MILLIMETERS.

DASH NO	NEXT ASSY	USED ON
	564036	6550
1ST APPLICATION		

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE APPLIED FINISH
TOLERANCES
2 PLACE DML ± 3 PLACE DML ± ANGLES ±

DO NOT SCALE DRAWING

CONTRACT NO.
DWN BY 12/03/81 L. HERRBURGER
CHK BY
ENGINEER 1-11-83 H.O. Walt
PROJECT ENGINEER
MANUFACTURING 1-14-83
APPROVAL: CONFIGURATION ENGINEER
APPROVAL: PRODUCT MANAGER 1/19/83
APPROVAL

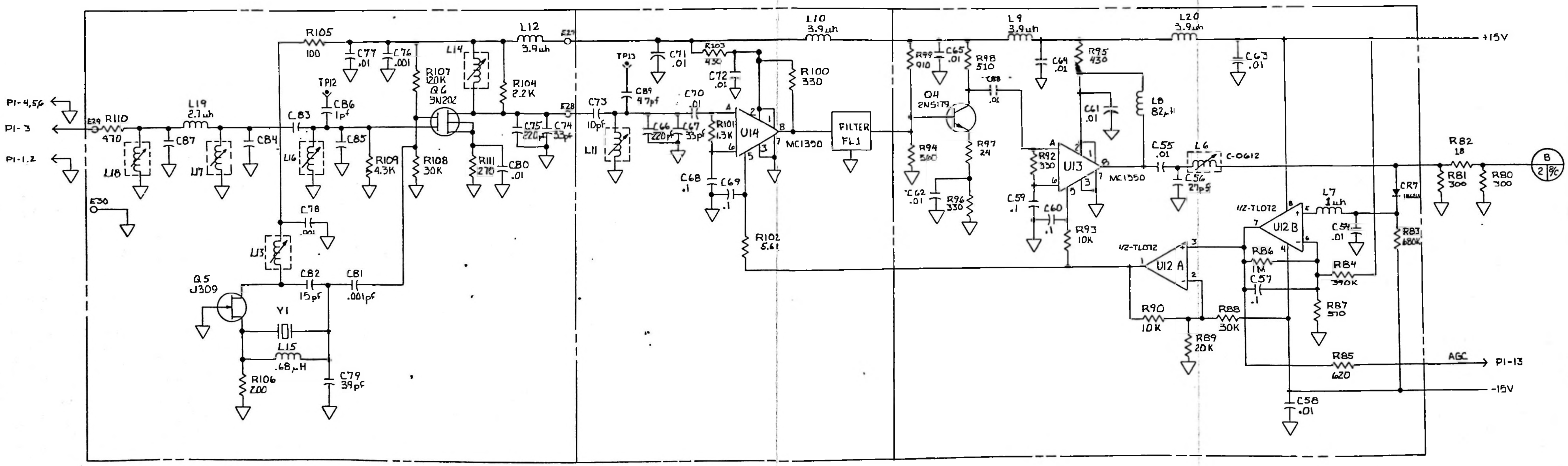
HARRIS SATELLITE COMMUNICATIONS DIVISION
P.O. BOX 1700
MELBOURNE, FLORIDA 32901

TITLE
SCHEMATIC DIAGRAM
FM DEMODULATOR

SIZE D | FSCM NO. | DWG NO. 564033 | REV J
SCALE | SHEET 2 of 3

DWG NO 564033 SH 2 REV J

REVISIONS



HIGHEST REFERENCE DESIGNATION						
A1	C102	CR8	DS1	E41	FL2	L20
Q6	R139	T1	TP13	U17	VR3	Y1
REFERENCE DESIGNATION NOT USED						
C15-19	C37	R36-42	R91	U7	R135	C101

QUANTITY REQUIRED	ITEM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	CODE IDENT

LIST OF MATERIALS OR PARTS LIST

UNLESS OTHERWISE SPECIFIED: PART TO BE FREE OF BURRS & SHARP EDGES. COMMERCIAL TOLERANCES TO STOCK SIZES APPLY. DRAWING INTERPRETATION PER ANSI Y14.

TO CONVERT TO METRIC SYSTEM, MULTIPLY INCHES SHOWN ON DRAWING BY 25.4 TO OBTAIN MILLIMETERS

564035	6550
NEXT ASSY	USED ON

DASH NO.

1ST APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE APPLIED FINISH TOLERANCES

2 PLACE DIM. 3 PLACE DIM. ANGLES

DO NOT SCALE DRAWING

CONTRACT NO

DWN BY 12/09/81 HERRBURGER

CHK BY

ENGINEER 1-17-83

PROJECT ENGINEER

MANUFACTURING 1-19-83

APPROVAL: CONFIGURATION ENGINEER

APPROVAL: PRODUCT MANAGER 1/19/83

APPROVAL

HARRIS SATELLITE COMMUNICATIONS DIVISION P.O. BOX 1700 MELBOURNE, FLORIDA 32901

TITLE SCHEMATIC DIAGRAM FM DEMODULATOR

SIZE D CODE INDENT NO 564033 REV J

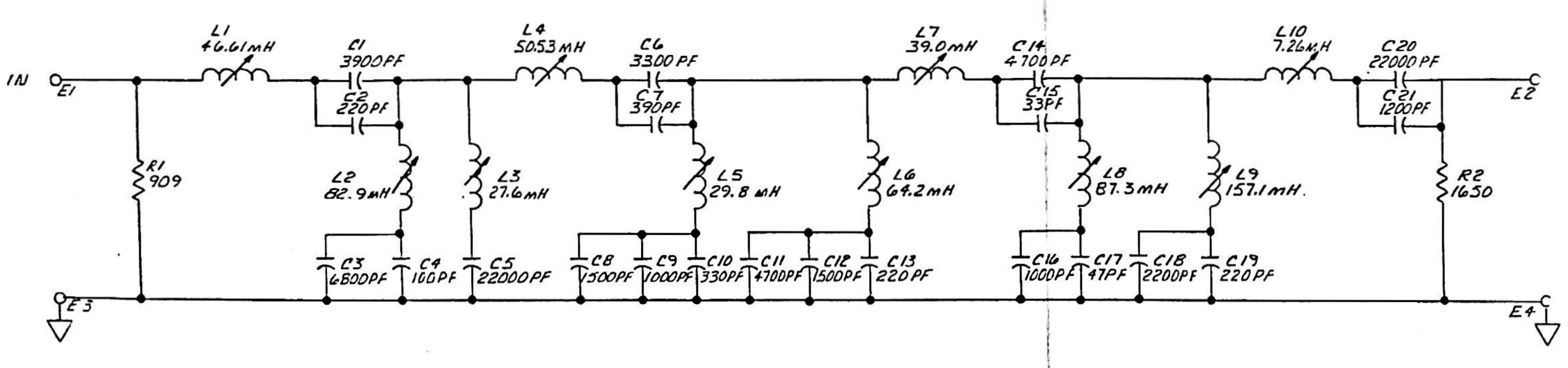
SCALE ~ SHEET 3 of 3

HSCO 814

PROPRIETARY DATA

THIS DOCUMENT CONTAINS PROPRIETARY DATA OF SATELLITE COMMUNICATIONS DIVISION OF HARRIS CORPORATION. NO DISCLOSURE, REPRODUCTION, OR USE OF ANY PART THEREOF MAY BE MADE EXCEPT BY WRITTEN PERMISSION OF HARRIS SCD COUNSEL.

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	CHG BY SCI-M CHK BY — ECO NO. — WAS ENGRG DEV DWG	1-24-83	



NOTES:

1. UNLESS OTHERWISE SPECIFIED; RESISTANCE VALUE ARE IN OHMS 1/4W ± 5%. CAPACITANCE VALUES ARE IN PICOFARADS.

HIGHEST REFERENCE DESIGNATION						
C21	E4	L10	R2			
REFERENCE DESIGNATION NOT USED						

DWG. NO. 564368 SH 1 REV.

QUANTITY REQUIRED	ITEM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION

LIST OF MATERIAL OR PARTS LIST

UNLESS OTHERWISE SPECIFIED: PART TO BE FREE OF BURRS & SHARP EDGES. COMMERCIAL TOLERANCES TO STOCK SIZES APPLY. DRAWING INTERPRETATION PER ANSI Y14.

TO CONVERT TO METRIC SYSTEM, MULTIPLY INCHES SHOWN ON DRAWING BY 25.4 TO OBTAIN MILLIMETERS.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE APPLIED FINISH

TOLERANCES: 2 PLACE DIM. ± 3 PLACE DIM. ± ANGLES ±

DO NOT SCALE DRAWING

DASH NO.	NEXT ASSY	USED ON
	564370	6550

1ST APPLICATION

CONTRACT NO.

DRAWN 12/21/82 G. ENGLISH — CHK BY

ENGINEER 1-19-83 H Q Walker — PROJECT ENGINEER

MANUFACTURING J. E. Lunch 1-19-83

APPROVAL: CONFIGURATION ENGINEER

APPROVAL: PRODUCT MANAGER C.R. Mann 1/19/83

APPROVAL R Tandel 1/11/83

HARRIS SATELLITE COMMUNICATIONS DIVISION P.O. BOX 1700 MELBOURNE, FLORIDA 32901

TITLE: SCHEMATIC DIAGRAM 8-16 KHz BANDPASS FILTER

SIZE D — PSCM NO. 564368 — REV A

SCALE — SHEET 1 OF 1

PROPRIETARY DATA

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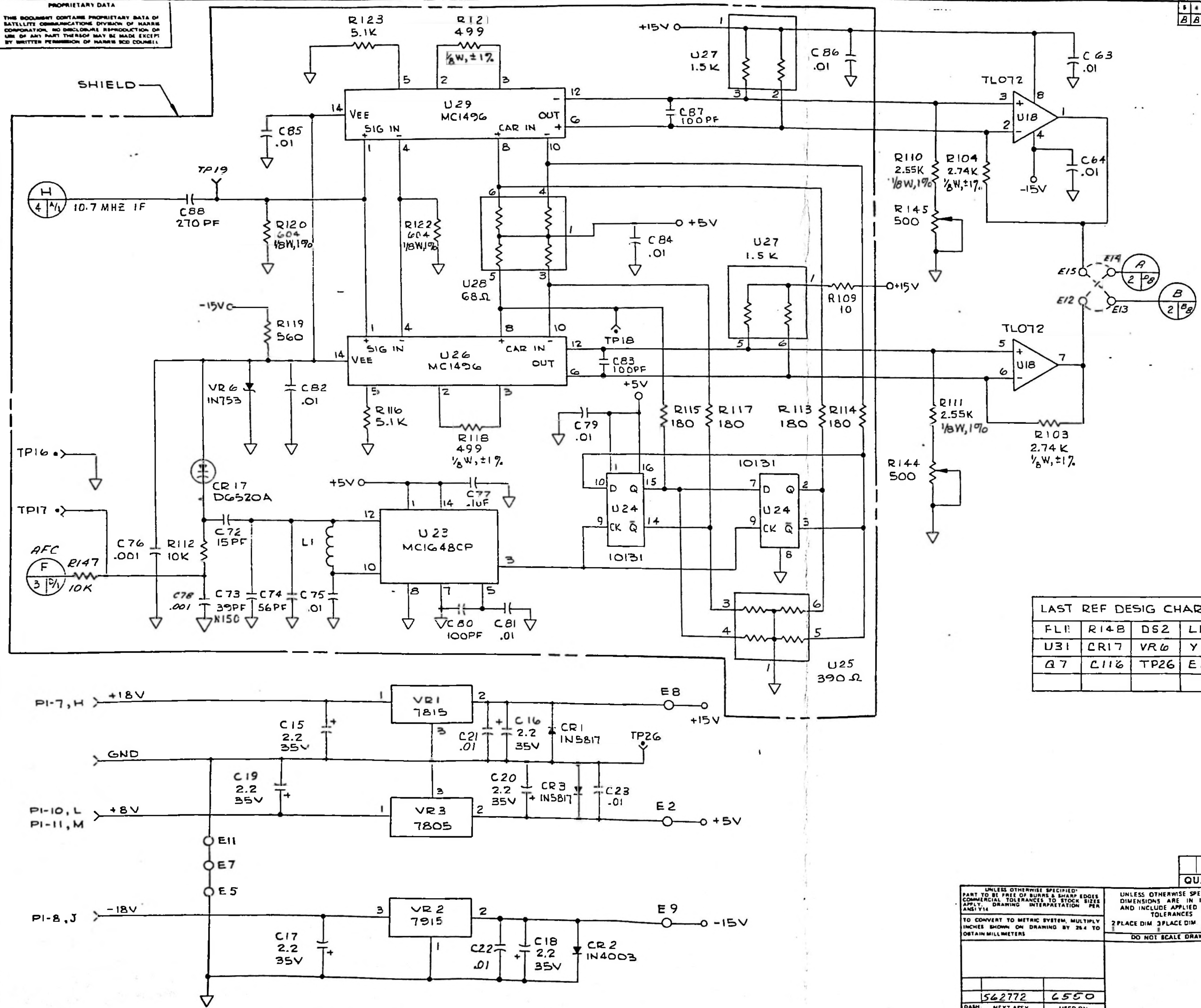
LTR	DESCRIPTION	DATE	APPROVED
B	WAS ENGRG DEV DWG	1/6/81	



NOTES:

1. UNLESS OTHERWISE SPECIFIED: RESISTANCE VALUES ARE IN OHMS 1/4 W, ± 5%, CAPACITANCE VALUES ARE IN MICROFARADS.

REFERENCE PRINT

LAST REF DESIG CHART

FL11	R148	DS2	L12
U31	CR17	VR6	Y1
Q7	C116	TP26	E15

UNUSED DESIG

QUANTITY REQUIRED — ITEM NO. — PART OR IDENTIFYING NO — NOMENCLATURE OR DESCRIPTION — CODE IDENT

LIST OF MATERIALS OR PARTS LIST

UNLESS OTHERWISE SPECIFIED: PART TO BE FREE OF BURRS & SHARP EDGES. COMMERCIAL TOLERANCES TO STOCK SIZES APPLY. DRAWING INTERPRETATION PER ANSI Y14.

TO CONVERT TO METRIC SYSTEM, MULTIPLY INCHES SHOWN ON DRAWING BY 25.4 TO OBTAIN MILLIMETERS

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE APPLIED FINISH TOLERANCES

2 PLACE DIM 3 PLACE DIM ANGLES

DO NOT SCALE DRAWING

DASH NO	NEXT ASSY	USED ON
	562772	6550

1ST APPLICATION

DWN BY 5-10-80 — ENGINEER 1/6/81 — PROJECT ENGINEER 1/6/81 — MANUFACTURING 1/6/81 — APPROVAL PRODUCT MANAGER 1/6/81 — APPROVAL 1/6/81

HARRIS — SATELLITE COMMUNICATIONS DIVISION, P.O. BOX 1700, MELBOURNE, FLORIDA 32901

TITLE: SCHEMATIC DIAGRAM 230.4 KBPS QPSK DEMODULATOR

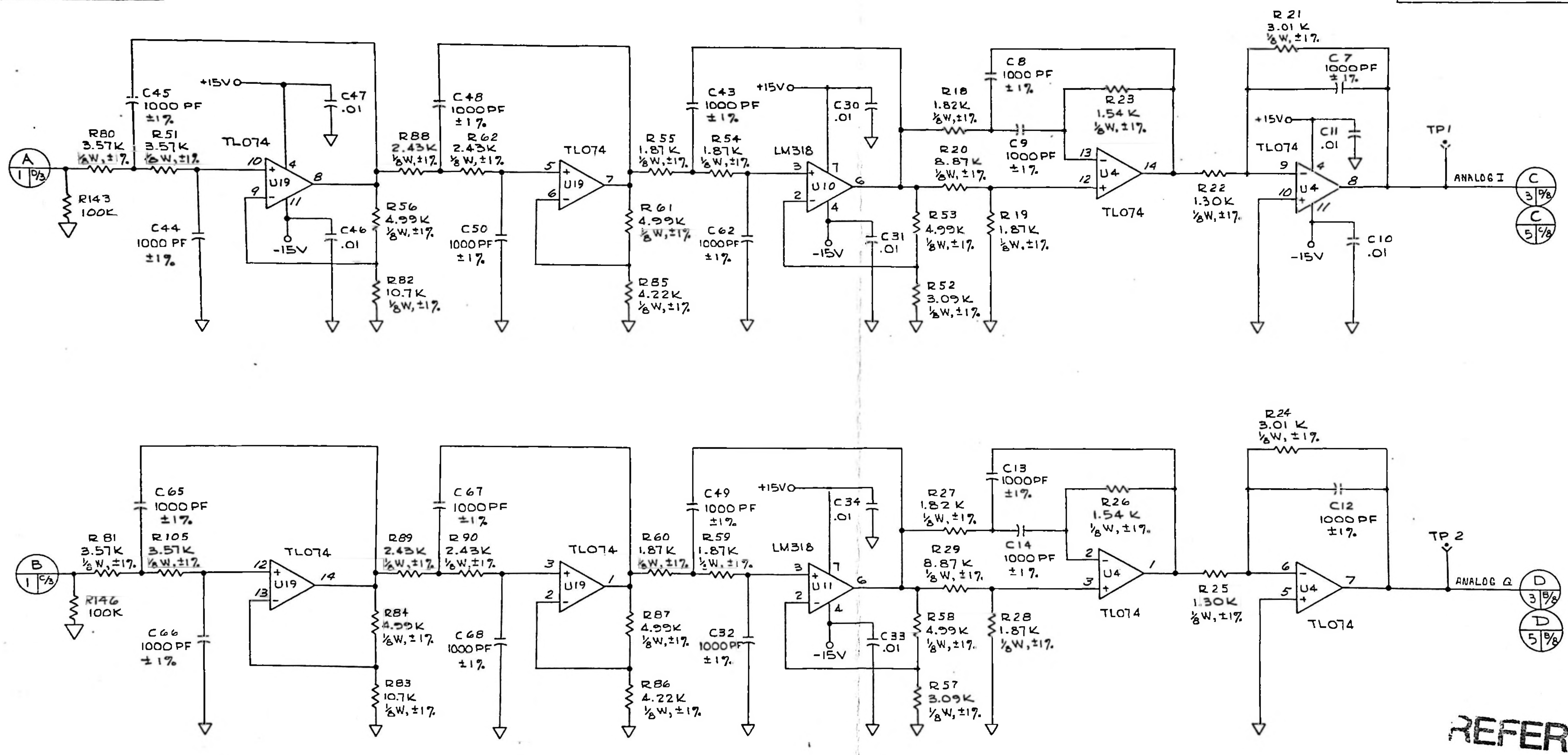
SIZE D — 562770 — REV B

SHEET 1 OF 5

PROPRIETARY DATA

THIS DOCUMENT CONTAINS PROPRIETARY DATA OF SATELLITE COMMUNICATIONS DIVISION OF HARRIS CORPORATION. NO DISCLOSURE, REPRODUCTION OR USE OF ANY PART THEREOF MAY BE MADE EXCEPT BY WRITTEN PERMISSION OF HARRIS SCD COUNSEL

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	B	WAS ENGRG DEV DWG	1/6/81	



REFERENCE

AUG 16 1983

PRINT

QUANTITY REQUIRED	ITEM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	CODE IDENT
		LIST OF MATERIALS OR PARTS LIST		

UNLESS OTHERWISE SPECIFIED: PART TO BE FREE OF BURRS & SHARP EDGES. COMMERCIAL TOLERANCES TO STOCK SIZES APPLY. DRAWING INTERPRETATION PER ANSI Y14

TO CONVERT TO METRIC SYSTEM, MULTIPLY INCHES SHOWN ON DRAWING BY 25.4 TO OBTAIN MILLIMETERS

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE APPLIED FINISH TOLERANCES

2 PLACE DIM. 3 PLACE DIM. ANGLES

DO NOT SCALE DRAWING

DASH NO	NEXT ASSY	USED ON
	1ST APPLICATION	

CONTRACT NO.

DWN BY 10-80 CHK BY

ENGINEER / PROJECT ENGINEER CRB 1/6/81

MANUFACTURING 1/6/81

APPROVAL: CONFIGURATION ENGINEER

APPROVAL: PRODUCT MANAGER 1/6/81

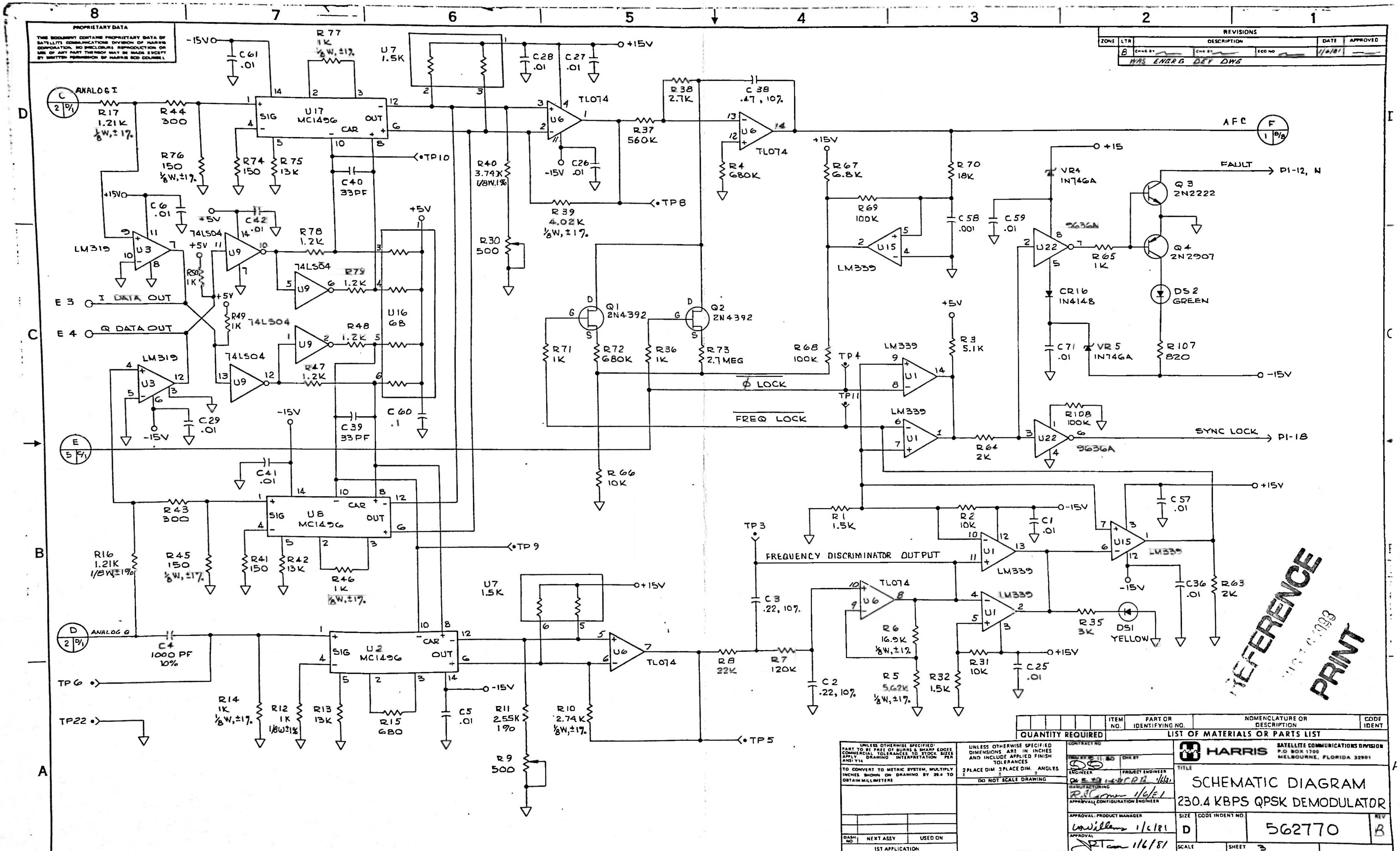
APPROVAL 1/6/81

HARRIS — SATELLITE COMMUNICATIONS DIVISION, P.O. BOX 1700, MELBOURNE, FLORIDA 32901

TITLE: SCHEMATIC DIAGRAM 230.4 KBPS QPSK DEMODULATOR

SIZE D | CODE IDENT NO | 562770 | REV B

SCALE | SHEET 2



UNLESS OTHERWISE SPECIFIED: PART TO BE FREE OF BURRS & SHARP EDGES. COMMERCIAL TOLERANCES TO STOCK SIZES APPLY. DRAWING INTERPRETATION PER ANSI Y14

TO CONVERT TO METRIC SYSTEM, MULTIPLY INCHES SHOWN ON DRAWING BY 25.4 TO OBTAIN MILLIMETERS

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE APPLIED FINISH TOLERANCES

2 PLACE DIM · 3 PLACE DIM · ANGLES

DO NOT SCALE DRAWING

DASH NO	NEXT ASSY	USED ON
	1ST APPLICATION	

QUANTITY REQUIRED · ITEM NO. · PART OR IDENTIFYING NO. · NOMENCLATURE OR DESCRIPTION · CODE IDENT

LIST OF MATERIALS OR PARTS LIST

HARRIS — SATELLITE COMMUNICATIONS DIVISION, P.O. BOX 1700, MELBOURNE, FLORIDA 32901

TITLE

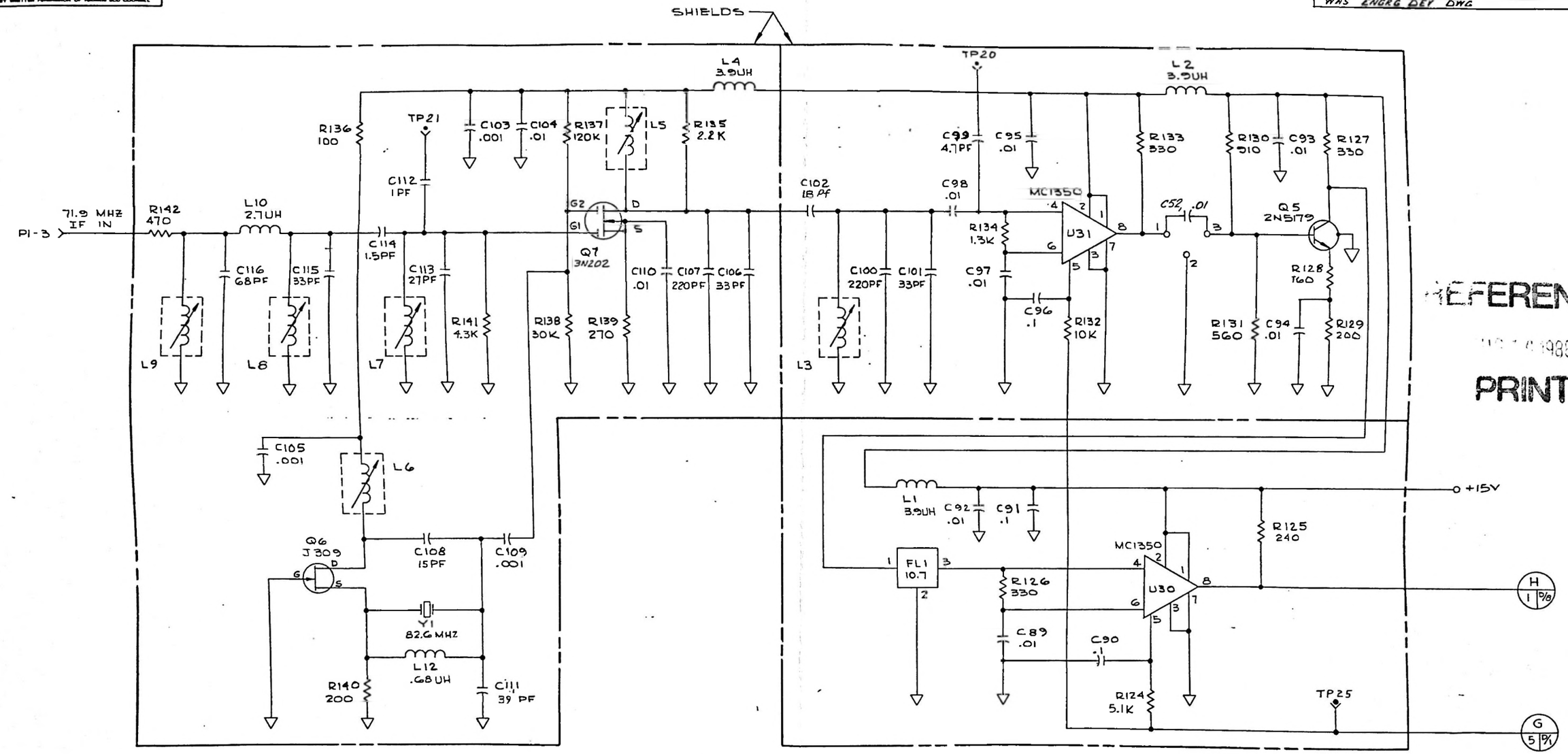
SCHEMATIC DIAGRAM
230.4 KBPS QPSK DEMODULATOR

SIZE D · CODE INDENT NO. · 562770 · REV B

SCALE · SHEET 3

HSCD 814

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	B	CHNG BY — ENG BY — ECO NO — WAS ENGRG DEV DWG	11/6/81	



REFERENCE

PRINT

ITEM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	CODE IDENT
QUANTITY REQUIRED		LIST OF MATERIALS OR PARTS LIST	

UNLESS OTHERWISE SPECIFIED: PART TO BE FREE OF BURRS & SHARP EDGES. COMMERCIAL TOLERANCES TO STOCK SIZES. APPLY DRAWING INTERPRETATION PER ANSI Y14. TO CONVERT TO METRIC SYSTEM, MULTIPLY INCHES SHOWN ON DRAWING BY 25.4 TO OBTAIN MILLIMETERS.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE APPLIED FINISH. TOLERANCES: 2 PLACE DIM. ±, 3 PLACE DIM. ±, ANGLES ±. DO NOT SCALE DRAWING.

NEXT ASSY — USED ON — 1ST APPLICATION

DRAWN BY E.G. 80 — CHK BY — ENGINEER — PROJECT ENGINEER C.R.B. 1/6/81 — MANUFACTURING — APPROVAL/CONFIGURATION ENGINEER — APPROVAL: PRODUCT MANAGER — APPROVAL

HARRIS SATELLITE COMMUNICATIONS DIVISION P.O. BOX 1700 MELBOURNE, FLORIDA 32901

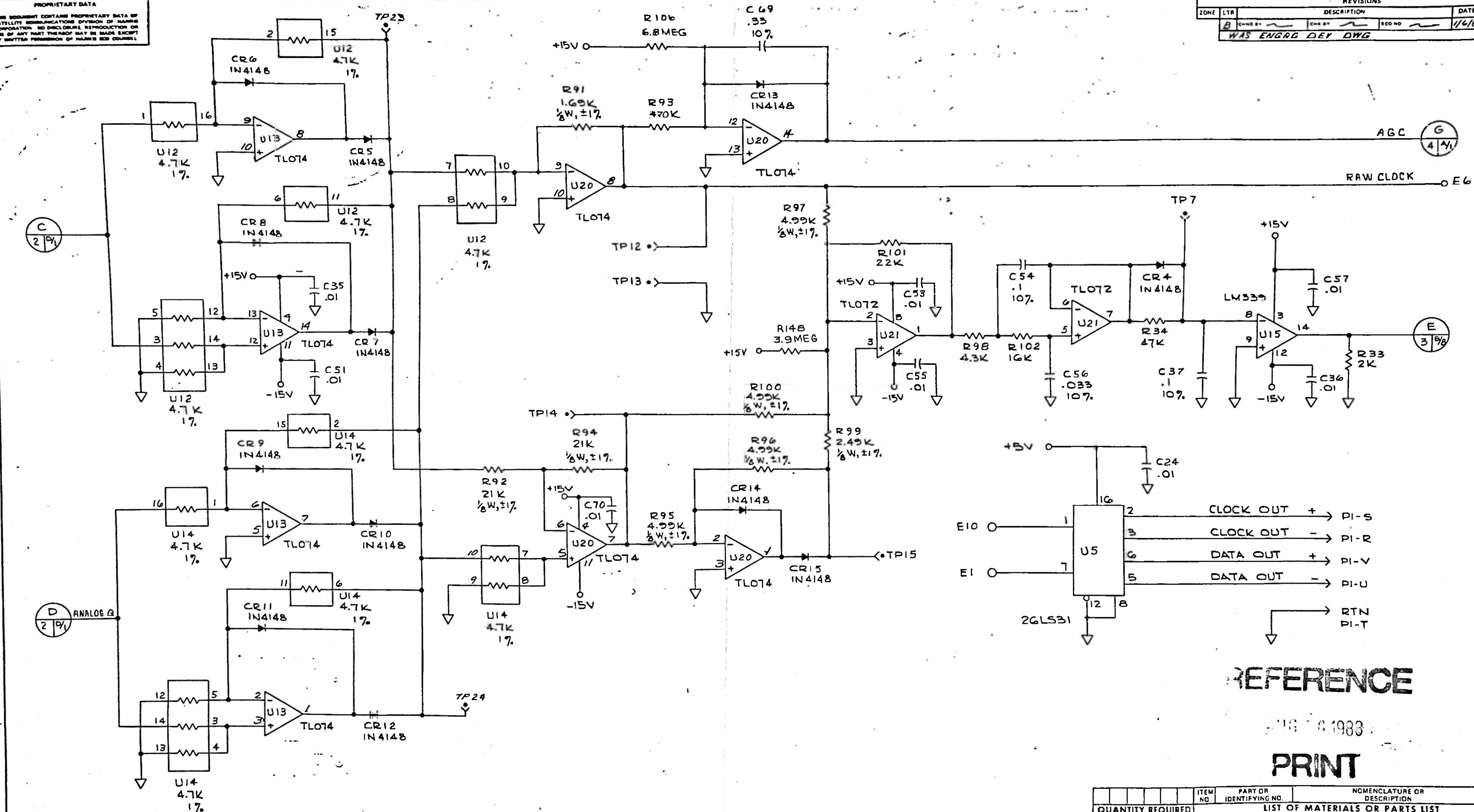
TITLE: SCHEMATIC DIAGRAM 230.4 KBPS QPSK DEMODULATOR

SIZE D — CODE IDENT NO. — 562770 — REV B — SCALE — SHEET 4

PROPRIETARY DATA

THIS DOCUMENT CONTAINS PROPRIETARY DATA OF SATELLITE COMMUNICATIONS DIVISION OF HARRIS CORPORATION. NO DISCLOSURE, REPRODUCTION OR USE OF ANY PART THEREOF MAY BE MADE EXCEPT BY WRITTEN PERMISSION OF HARRIS SCD COUNSEL.

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	B	WAS ENGRG DEV DWG	1/6/81	



REFERENCE

PRINT

ITEM NO	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	CODE IDENT
QUANTITY REQUIRED	LIST OF MATERIALS OR PARTS LIST		

UNLESS OTHERWISE SPECIFIED: PART TO BE FREE OF BURRS & SHARP EDGES. COMMERCIAL TOLERANCES TO STOCK SIZES APPLY. DRAWING INTERPRETATION PER ANSI Y14.

TO CONVERT TO METRIC SYSTEM, MULTIPLY INCHES SHOWN ON DRAWING BY 25.4 TO OBTAIN MILLIMETERS.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE APPLIED FINISH TOLERANCES

2 PLACE DIM 3 PLACE DIM ANGLES

DO NOT SCALE DRAWING

DASH NO	NEXT ASSY	USED ON
1ST APPLICATION		

CONTRACT NO.

DRAWN 12-17-80 CHK BY

ENGINEER / PROJECT ENGINEER C.R.R. 1/4/81

MANUFACTURING 1/6/81

APPROVAL/CONFIGURATION ENGINEER

APPROVAL PRODUCT MANAGER 1/6/81

APPROVAL 1/6/81

HARRIS — SATELLITE COMMUNICATIONS DIVISION, P.O. BOX 1700, MELBOURNE, FLORIDA 32901

TITLE: SCHEMATIC DIAGRAM 230.4 KBPS QPSK DEMODULATOR

SIZE	CODE IDENT NO		REV
D		562770	B

SCALE — SHEET 3

PROPRIETARY DATA

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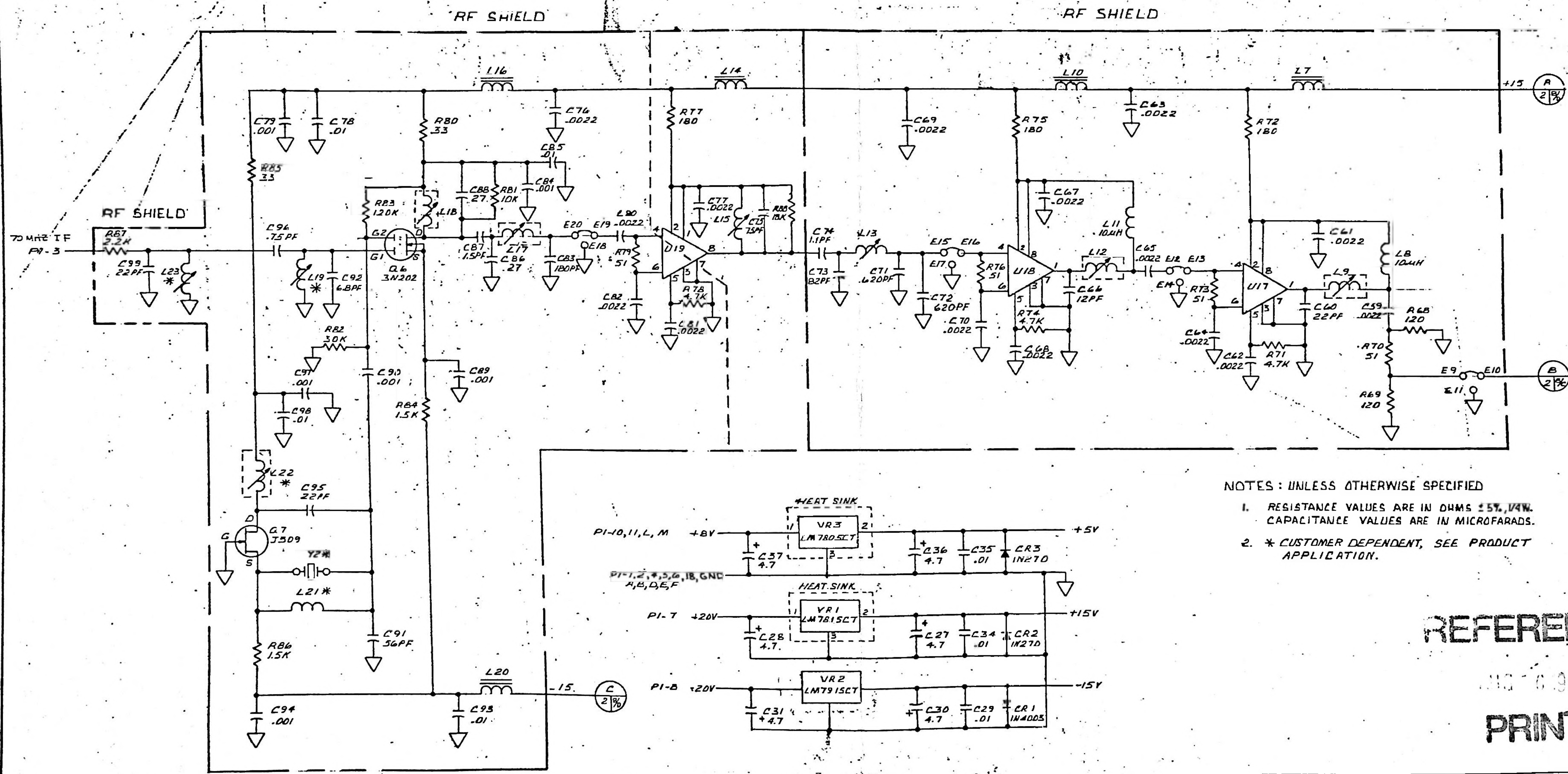
REVISIONS

LTR	DESCRIPTION	DATE	APPROVED
B	WAS ENGRG DEV DWG - RELEASED WITH CHANGE		
C	RLW 2-5-81 · 1947 — ADD P1-18 TO GND. REVISE SHT. 2.	2-4-81	
D	RJH 3-23-81 · 2078 — REVISED SHT 2 NLD.		



NOTES: UNLESS OTHERWISE SPECIFIED

1. RESISTANCE VALUES ARE IN OHMS ±5%, 1/4W. CAPACITANCE VALUES ARE IN MICROFARADS.
2. * CUSTOMER DEPENDENT, SEE PRODUCT APPLICATION.

REFERENCE

PRINT

HIGHEST REFERENCE DESIGNATION							
VR3	FL1	U19	T1	Y2	Q7	C100	R88
L23	TP14	E20	CR7				
DESIGNATION NOT USED							

UNLESS OTHERWISE SPECIFIED: PART TO BE FREE OF BURRS & SHARP EDGES. COMMERCIAL TOLERANCES TO STOCK SIZES APPLY. DRAWING INTERPRETATION PER ANSI Y14.

TO CONVERT TO METRIC SYSTEM, MULTIPLY INCHES SHOWN ON DRAWING BY 25.4 TO OBTAIN MILLIMETERS.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE APPLIED FINISH. TOLERANCES: 2 PLACE DIM. 3 PLACE DIM. ANGLES

DO NOT SCALE DRAWING

NEXT ASSY	USED ON
562570	6550

1ST APPLICATION

QUANTITY REQUIRED | ITEM NO. | PART OR IDENTIFYING NO. | NOMENCLATURE OR DESCRIPTION | CODE IDENT

LIST OF MATERIALS OR PARTS LIST

DRN BY 5-15-80 E.M.S.

HARRIS — SATELLITE COMMUNICATIONS DIVISION, P.O. BOX 1700, MELBOURNE, FLORIDA 32901

TITLE: SCHEMATIC DIAGRAM BASEBAND DEMODULATOR

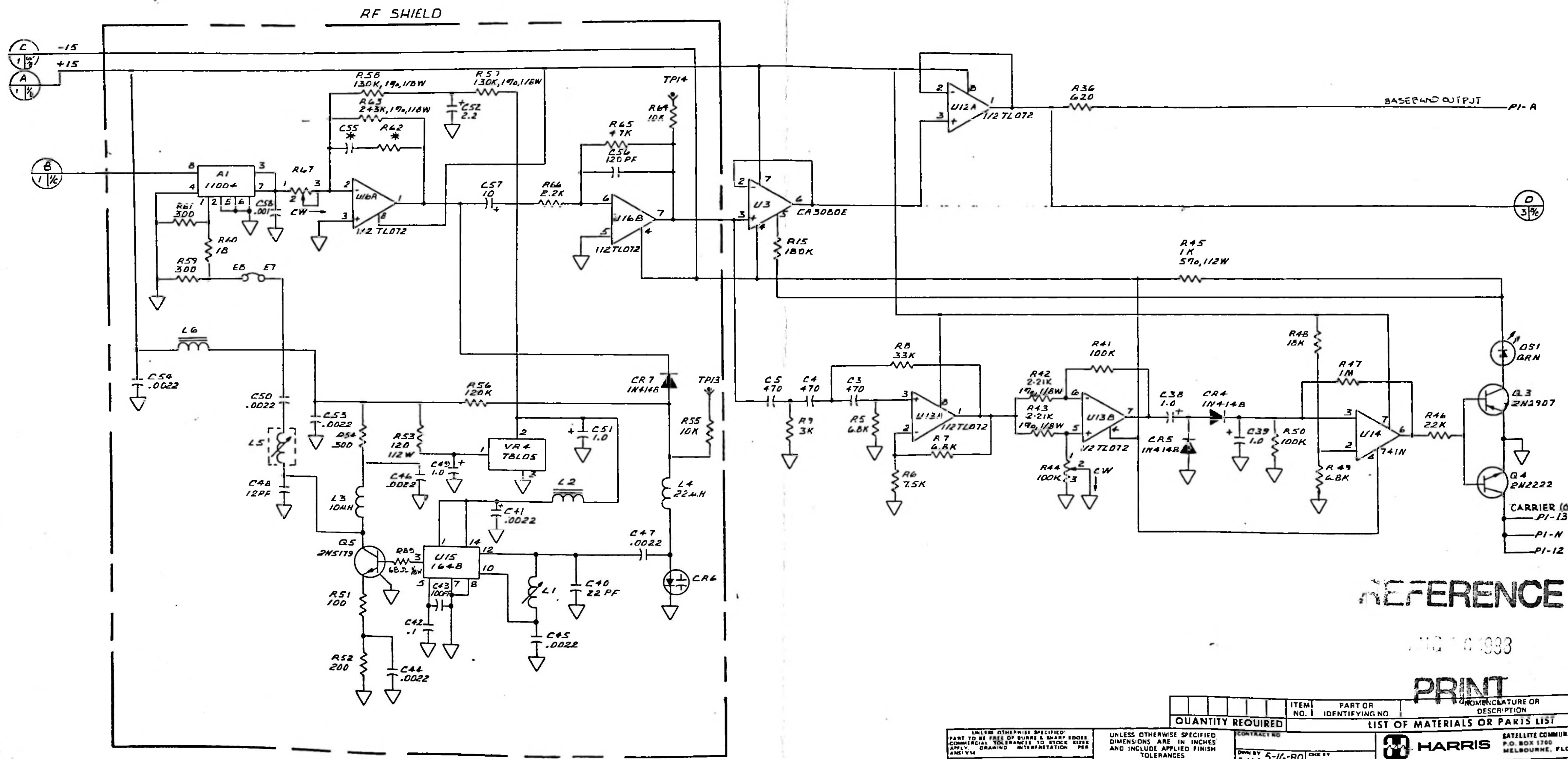
SIZE D | CODE IDENT NO. | 562568 | REV D

SCALE ~ | SHEET 1 of 3

PROPRIETARY DATA

THIS DOCUMENT CONTAINS PROPRIETARY DATA OF SATELLITE COMMUNICATIONS DIVISION OF HARRIS CORPORATION. NO DISCLOSURE, REPRODUCTION OR USE OF ANY PART THEREOF MAY BE MADE EXCEPT BY WRITTEN PERMISSION OF HARRIS SCD COUNSEL

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	B	CHNG BY — CHK BY — ECO NO —		
		WAS ENGRG DEV DWG-RELEASED WITH CHANGE.		
	C	RLW 2-3-81 · 1947	2-4-81	
		CARRIER (OFF) WAS "FAULT"; P1-13 WAS P1-U.		
	D	PJW. 5-22-81 · 2078	5/26/81	
		R42, R43 WERE 4.7K C56 WAS 43pF ADDED R88 INC D1		



REFERENCE PRINT

ITEM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	CODE IDENT

QUANTITY REQUIRED — LIST OF MATERIALS OR PARTS LIST

UNLESS OTHERWISE SPECIFIED: PART TO BE FREE OF BURRS & SHARP EDGES. COMMERCIAL TOLERANCES TO STOCK SIZES APPLY. DRAWING INTERPRETATION PER ANSI Y14

TO CONVERT TO METRIC SYSTEM, MULTIPLY INCHES SHOWN ON DRAWING BY 25.4 TO OBTAIN MILLIMETERS

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE APPLIED FINISH TOLERANCES
2 PLACE DIM. 3 PLACE DIM. ANGLES

DO NOT SCALE DRAWING

DASH NO	NEXT ASSY	USED ON
	1ST APPLICATION	

CONTRACT NO
DWN BY E.M.S. 5-16-80 — CHK BY
ENGINEER 5/21/80 — PROJECT ENGINEER
MANUFACTURING 8/26/80
APPROVAL CONFIGURATION ENGINEER
APPROVAL PRODUCT MANAGER W.a.Willa 8/27/80
APPROVAL 9/8/80

HARRIS — SATELLITE COMMUNICATIONS DIVISION, P.O. BOX 1700, MELBOURNE, FLORIDA 32901

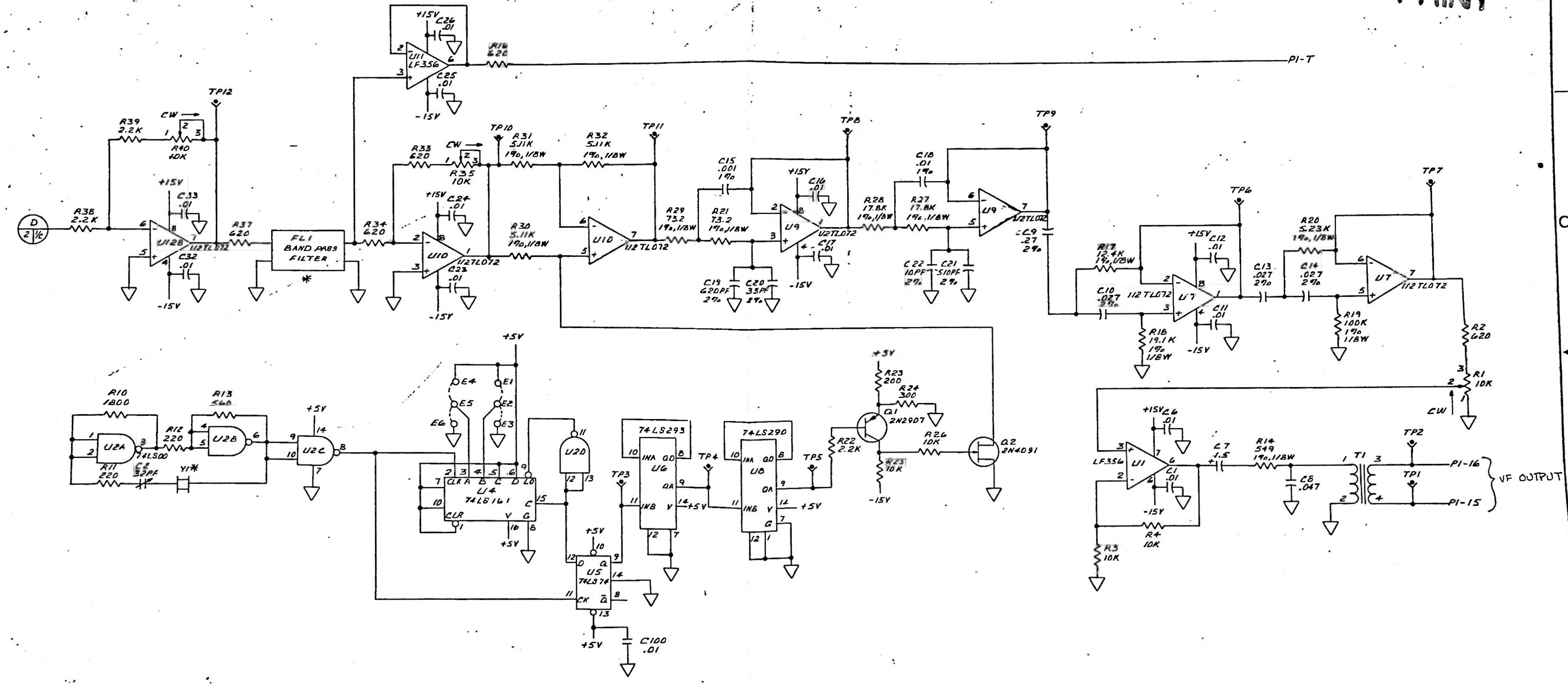
TITLE: SCHEMATIC DIAGRAM BASEBAND DEMODULATOR

SIZE	CODE IDENT NO.		REV
D		562568	D

SCALE ~ SHEET 2

ZONE	LTR	DESCRIPTION	DATE	APPROVED
	B	WAS ENGRG DEV DWG - RELEASED WITH CHANGE	9/17/80	

REFERENCE PRINT



QUANTITY REQUIRED	ITEM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	CODE IDENT

LIST OF MATERIALS OR PARTS LIST

UNLESS OTHERWISE SPECIFIED: PART TO BE FREE OF BURRS & SHARP EDGES. COMMERCIAL TOLERANCES TO STOCK SIZES APPLY. DRAWING INTERPRETATION PER ANSI Y14

TO CONVERT TO METRIC SYSTEM, MULTIPLY INCHES SHOWN ON DRAWING BY 25.4 TO OBTAIN MILLIMETERS

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE APPLIED FINISH TOLERANCES

2 PLACE DIM. 3 PLACE DIM. ANGLES

DO NOT SCALE DRAWING

DASH NO.	NEXT ASSY	USED ON
	1ST APPLICATION	

CONTRACT NO

DWN BY EMS 5-16-80 CHK BY

ENGINEER 6/23/80 PROJECT ENGINEER CPB

MANUFACTURING

APPROVAL: CONFIGURATION ENGINEER

APPROVAL: PRODUCT MANAGER W.A. Williams 5/22/80

APPROVAL 9/8/80

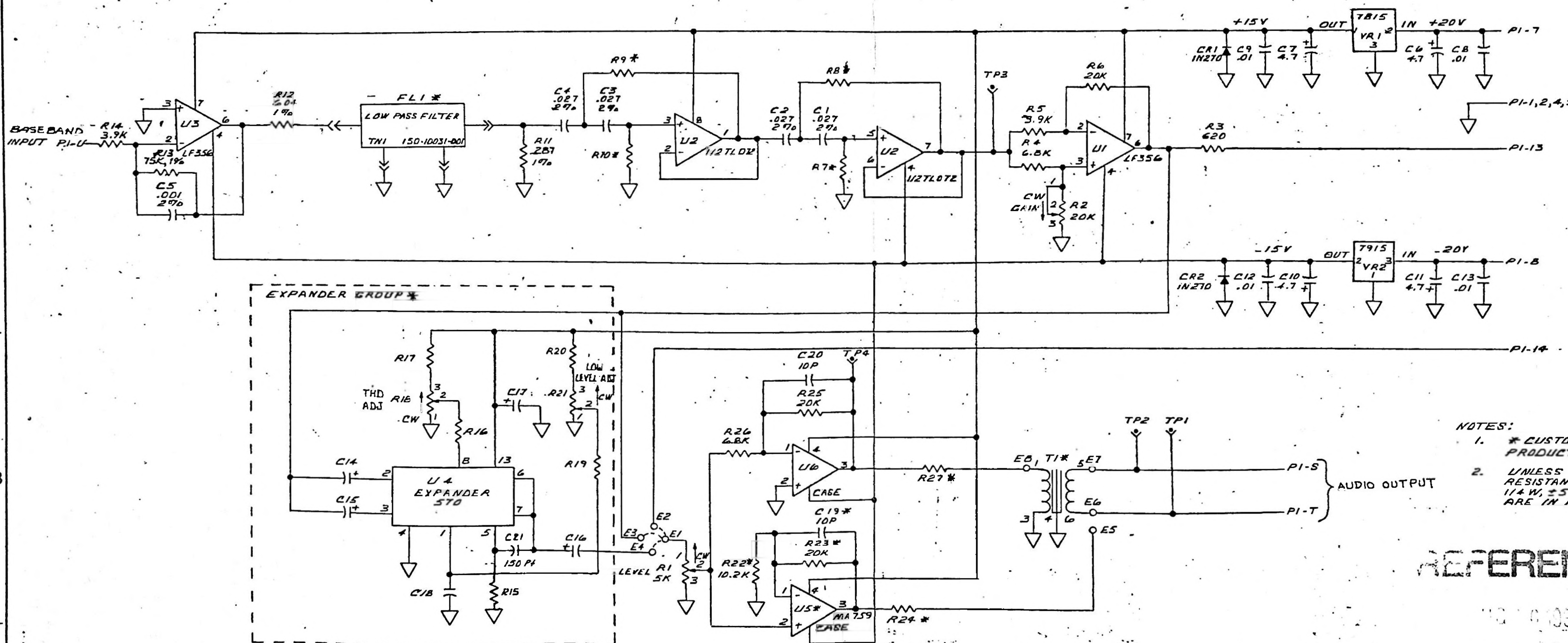
HARRIS SATELLITE COMMUNICATIONS DIVISION P.O. BOX 1700 MELBOURNE, FLORIDA 32901

TITLE SCHEMATIC DIAGRAM BASEBAND DEMODULATOR

SIZE D CODE INDENT NO. 562568 REV B

SCALE ~ SHEET 3

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	CHKD BY — CHK BY — WAS ENGRG DEV DWG	7/4/80	
	B	UG 2-3-81 / 1946 / ADDED C21, R13 WAS 7.5K, R11 WAS 604	2-7-81	
	C	BE 4-23-81 / 2077 / INC C?, R14 WAS 2.2K, R5 WAS 6.8K	4/21/81	



NOTES:

1. * CUSTOMER DEPENDENT. SEE PRODUCT APPLICATION.
2. UNLESS OTHERWISE SPECIFIED RESISTANCE VALUES ARE IN OHMS 1/4 W, ±5%. CAPACITANCE VALUES ARE IN MICROFARADS.

REFERENCE PRINT

HIGHEST REFERENCE DESIGNATIONS				
VR2	FL1	U6	T1	C21
R27	E8	CR2	TP4	
DESIGNATIONS NOT USED				

QUANTITY REQUIRED	ITEM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	CODE IDENT

LIST OF MATERIALS OR PARTS LIST

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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE APPLIED FINISH TOLERANCES

2 PLACE DIM. 3 PLACE DIM. ANGLES

DO NOT SCALE DRAWING

DASH NO	NEXT ASSY	USED ON
	562584	6550

1ST APPLICATION

CONTRACT NO

DWN BY 6-20-80 A. ENGLISH — CHK BY

ENGINEER 6/13/80 — PROJECT ENGINEER

MANUFACTURING 8/26/80

APPROVAL: CONFIGURATION ENGINEER

APPROVAL: PRODUCT MANAGER W. A. Willen 8/22/80

APPROVAL 9/8/80

HARRIS — SATELLITE COMMUNICATIONS DIVISION, P.O. BOX 1700, MELBOURNE, FLORIDA 32901

TITLE: SCHEMATIC DIAGRAM PROGRAM AUDIO PROCESSOR

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