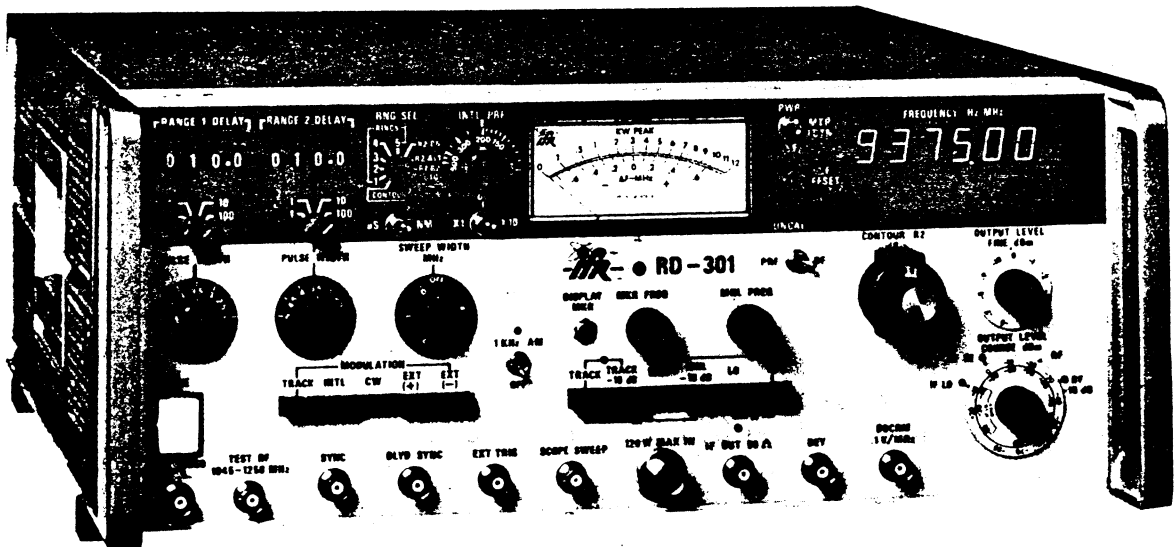




# MAINTENANCE DATA PACKAGE

## RD-301 RADAR TEST SET



10200 West York Street/Wichita, Kansas 67215 U.S.A./ (316) 522-4981/TWX 910-741-6952  
1007-4901-000

PUBLISHED BY  
IFR SYSTEMS, INC.  
Wichita, Kansas

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Manual Part Number: 1007-4901-000  
Original Date of Publication: February, 1987  
First Revision: May, 1988

# **WARNING:**

## **HIGH VOLTAGE EQUIPMENT**

**THIS EQUIPMENT CONTAINS CERTAIN CIRCUITS AND/OR COMPONENTS OF EXTREMELY HIGH VOLTAGE POTENTIALS, CAPABLE OF CAUSING SERIOUS BODILY INJURY OR DEATH. WHEN PERFORMING ANY OF THE PROCEDURES CONTAINED IN THIS MANUAL, HEED ALL APPLICABLE SAFETY PRECAUTIONS.**

## **RESCUE OF SHOCK VICTIMS**

- 1. DO NOT ATTEMPT TO PULL OR GRAB THE VICTIM**
- 2. IF POSSIBLE, TURN OFF THE ELECTRICAL POWER.**
- 3. IF YOU CANNOT TURN OFF ELECTRICAL POWER, PUSH, PULL OR LIFT THE VICTIM TO SAFETY USING A WOODEN POLE, A ROPE OR SOME OTHER DRY INSULATING MATERIAL.**

## **FIRST AID**

- 1. AS SOON AS VICTIM IS FREE OF CONTACT WITH SOURCE OF ELECTRICAL SHOCK, MOVE VICTIM A SHORT DISTANCE AWAY FROM SHOCK HAZARD.**
- 2. SEND FOR DOCTOR AND/OR AMBULANCE.**
- 3. KEEP VICTIM WARM, QUIET AND FLAT ON HIS/HER BACK.**
- 4. IF BREATHING HAS STOPPED , ADMINISTER ARTIFICIAL RESUSCITATION. STOP ALL SERIOUS BLEEDING.**

**CAUTION**

- INTEGRATED CIRCUITS AND SOLID STATE DEVICES SUCH AS MOS FET'S, ESPECIALLY CMOS TYPES, ARE SUSCEPTIBLE TO DAMAGE BY ELECTROSTATIC DISCHARGES RECEIVED FROM IMPROPER HANDLING, THE USE OF UNGROUNDED TOOLS, AND IMPROPER STORAGE AND PACKAGING. ANY MAINTENANCE TO THIS UNIT MUST BE PERFORMED WITH THE FOLLOWING PRECAUTIONS:

1. BEFORE USING IN A CIRCUIT, KEEP ALL LEADS SHORTED TOGETHER EITHER BY THE USE OF VENDOR-SUPPLIED SHORTING SPRINGS OR BY INSERTING LEADS INTO A CONDUCTIVE MATERIAL.
2. WHEN REMOVING DEVICES FROM THEIR CONTAINERS, GROUND THE HAND BEING USED WITH A CONDUCTIVE WRISTBAND.
3. TIPS OF SOLDERING IRONS AND/OR ANY TOOLS USED MUST BE GROUNDED.
4. DEVICES MUST NEVER BE INSERTED INTO NOR REMOVED FROM CIRCUITS WITH POWER ON.
5. PC BOARD, WHEN TAKEN OUT OF THE SET, MUST BE LAID ON A GROUNDED CONDUCTIVE MAT OR STORED IN A CONDUCTIVE STORAGE BAG.

**NOTE**

Remove any built-in power source, such as a battery, before laying PC Boards on conductive mat or storing in conductive bag.

6. PC BOARDS, IF BEING SHIPPED TO THE FACTORY FOR REPAIR, MUST BE PACKAGED IN A CONDUCTIVE BAG AND PLACED IN A WELL-CUSHIONED SHIPPING BOX.

**CAUTION**

- THE USE OF SIGNAL GENERATORS FOR MAINTENANCE AND OTHER ACTIVITIES CAN BE A SOURCE OF ELECTROMAGNETIC INTERFERENCE TO AVIATION RECEIVERS, WHICH CAN CAUSE DISRUPTION AND INTERFERENCE TO AERONAUTICAL SERVICE OUT TO A DISTANCE OF SEVERAL MILES.
- USERS OF THIS EQUIPMENT SHOULD SCRUTINIZE ANY OPERATION WHICH RESULTS IN RADIATION OF A SIGNAL (DIRECTLY OR INDIRECTLY) AND ENSURE COMPLIANCE WITH INSTRUCTIONS OUTLINED IN FAA CIRCULAR AC 170-6C, DATED FEBRUARY 19, 1981.

RD-301  
MAINTENANCE DATA PACKAGE  
SECTION 1 - INTRODUCTION

1-1 This data package contains basic maintenance information for the RD-301 Radar Test Set. This Test Set is designed for precision simulator testing of aircraft weather radar and narrow pulse marine radar instruments.

1-2 The data package is divided into seven sections as follows:

<u>SECTION</u>	<u>TITLE</u>
Section 1	INTRODUCTION
Section 2	SPECIFICATIONS
Section 3	CALIBRATION
Section 4	MECHANICAL ASSEMBLY DRAWINGS
Section 5	PC BOARD DRAWINGS
Section 6	SCHEMATICS
Section 7	BILLS OF MATERIAL (Numerical Sequence by Assy Part #)

NOTE:

In Sections 4, 5 and 6, drawings are sequenced in the order of precedence where first referenced in the calibration procedure. Each section, in turn, has its own alphabetical index.

1-3 Refer to Operation Manual for:

1 - Description (physical and mechanical description and a list of features).

2 - Operation (installation; description of controls, indicators and connectors; performance check and general operating procedures).

## SECTION 2 - SPECIFICATIONS

### 2-1 RF SIGNAL GENERATOR

Variable Mode Frequency:	Continuously variable from 9.295 to 9.500 GHz.	
Tracking Mode:	Tracks radar transmitter frequencies 9.295 to 9.500 GHz and transmitter power from 0.1 to 12 kW.	
Tracking Accuracy:	<u>Radar Transmitter Pulse Width</u>	<u>Maximum Error</u>
	30 - 2 $\mu$ s	$\pm$ 25 kHz *
	<2 - .5 $\mu$ s	$\pm$ 60 kHz
	<.5 - .1 $\mu$ s	$\pm$ 600 kHz
	<.1 - .05 $\mu$ s	$\pm$ 2 MHz
		*(10 kHz typical)
$\Delta$ F Mode (during track):	Signal Generator frequency may be offset $\pm$ 0.75 MHz from tracking frequency for AFC Centering tests. Front Panel Meter reads $\Delta$ F offset. Accuracy is $\pm$ 20 kHz plus 10% of reading.	
Output Power:	-50 to -127 dBm in 1 and 10 dB steps calibrated at R/T. Accuracy is $\pm$ 2 dB.	
Contour Boost:	Contour Control provides 0 to 20 dB signal boost above the selected RF Output. Accuracy of Contour Boost is $\pm$ 1 dB from 9.310 through 9.410 GHz. This boost applies to output attenuator settings of -75 dBm to -127 dBm.	
Range Number 2 Attenuation:	0-59 dB $\pm$ 1.5 dB below the RF Output level of Range One, in 1 dB steps. Minimum RF signal level of Range 2 is -127 dBm.	
RF Pulse Width:	.05 $\mu$ s to 500 $\mu$ s continuously variable.	

RF ON/OFF Ratio: 70 dB minimum  
1 kHz AM: 30% AM nominal (1 kHz  $\pm$  100 Hz)  
Source VSWR at Waveguide Coupler: 1.25:1 maximum

## 2-2 IF SIGNAL GENERATOR

Frequency: Continuously variable from 20 to 70 MHz.  
Sweep Width: Continuously variable from 0 to 4 MHz.  
Marker Frequency: Continuously variable from 20 to 70 MHz.  
Power: +20 to -130 dBm in 1 and 10 dB steps in two ranges; accuracy is  $\pm 2.5$  dB plus 1% of setting.  
Pulse Width: Continuously variable from 0.5  $\mu$ s to 500  $\mu$ s.  
ON/OFF Ratio: 48 dB minimum.

## 2-3 MODULATION MODES

TRACK: PRF same as Radar-Under Test (50 Hz to 20 kHz).  
INTL (Internal): PRF continuously variable from 50 to 5000 Hz.  
CW: Continuous wave output.  
EXT (+), EXT (-): External synchronization pulse (see INPUTS, EXT TRIG).

## 2-4 RANGE

Range Number 1: 0.1-999.9  $\mu$ s or nautical miles (NM). Time referenced to the 50% point of leading edge of detected radar transmitter pulse. Residual delay: 0.1  $\mu$ s  $\pm$  .05  $\mu$ s.

Range Number 2: 0.2-999.9  $\mu$ s or nautical miles (NM). Time referenced to the 50% point of leading edge of detected radar transmitter pulse. Residual delay: 0.4  $\mu$ s  $\pm$  .05  $\mu$ s.

Range Accuracy: Residual delay  $\pm$ .01% of selected range delay. Range delay is referenced to 12.3589  $\mu$ s/NM.

Range Modes:

    CONTOUR: See RF Signal Generator, Contour Boost.

    RINGS 1, 2, 3, 4, 5: Selectable multiples of Range Number 1.

    R2 ON: Range Number 1 and 2 active.

    R2 ALT: Range Number 2 active every other detected radar pulse.

    R1, R2 AUTO: Either Range Number 1 or Range Number 2 according to detected radar transmitter pulse width. Threshold selection is internally adjustable from 0.2  $\mu$ s to 1.0  $\mu$ s. (Standard setting is 0.4  $\mu$ s.)

## 2-5 FREQUENCY COUNTER

RF: Displays RF output frequency of generator.  
Resolution: 10 kHz  
Accuracy:  $\pm$ 250 kHz

IF: Displays IF Generator frequency, or marker frequency upon pushbutton command.  
Resolution:  $\pm$ 1 kHz  
Accuracy: .01%

PRF: Displays pulse repetition frequency.  
Resolution: 1 Hz  
Accuracy:  $\pm$ 1 Hz plus .01%



## 2-6 POWER METER

Range: 0.1 kW to 12 kW peak standard.  
(1.0 kW to 120 kW optional\*)  
(10 W to 1200 W optional\*)

\*Optional power ranges include an external 10 dB attenuator not calibrated in the system.

Accuracy: Calibrated at R/T,  $\pm 0.6$  dB from 1 kW to 12 kW peak standard.

Load VSWR: 1.25:1 maximum.

## 2-7 OUTPUTS

DET (Detector): Detected radar transmitter signal (into 50 OHM load).

Spectrum Analyzer: Attenuated RF sample of radar  
(Back Panel) transmitter signal.

DSCRM: Frequency discriminator output.  
(Discriminator) 0.1v/MHz  $\pm 10\%$  (into 50 OHM load).

SYNC (Scope Sync): Positive polarity pulse simultaneous with radar transmitter pulse in Track Mode, Internal PRF Generator in Internal Mode, or External Trigger in EXT (+) or EXT (-) Mode.

DLYD SYNC (Delayed Sync): Simultaneous with Range 1 and Range 2 generator pulses.

SCOPE SWEEP: 100 Hz ramp output approximately 5 volt peak-to-peak.

AUX RF OUT (Back Panel): Auxiliary RF output from X-Band front end.

VCO OUT (Back Panel): Sample L-Band signal from VCO.

## 2-8 INPUTS

EXT TRIG (External Trigger): AC coupled, either polarity, 2 to 25V peak; 50 Hz to 20 kHz.

2-9 PHYSICAL CHARACTERISTICS

Power:

105 - 125 VAC,  
210 - 250 VAC

50 to 400 Hz

150 Watts

## SECTION 3 - CALIBRATION

### 3-1 GENERAL

This section contains calibration procedures for the following RD-301 Test Set Functions.

<u>CALIBRATION PROCEDURE NUMBER</u>	<u>CALIBRATION PROCEDURE TITLE</u>
3-2-1	Meter Mechanical Zero Check and Adjustment
3-2-2	Initial Procedure
3-2-3	Power Supply Voltage Test
3-2-4	100 MHz Clock/8.25 GHz LO
3-2-5	IF and Marker Oscillators
3-2-6	Prescaler and Counter Test
3-2-7	IF Generator Power Amplifier
3-2-8	X-Band Generator Tune Range
3-2-9	IF ON/OFF Ratio Test
3-2-10	Main Leveler and Contour Leveler
3-2-11	Internal PRF Control Dial
3-2-12	Discriminator Filter Alignment
3-2-13	Discriminator
3-2-14	Pulse Width (Range 1)
3-2-15	Pulse Width (Range 2)
3-2-16	Pulse Width Delay/Delay Switches
3-2-17	RF ON/OFF Ratio
3-2-18	Panel Peak Power Scale
3-2-19	External Triggering Test
3-2-20	1 kHz AM

#### NOTE:

Throughout text, item numbers in parentheses relate to Front Panel components shown in Figure 3-12.

#### 3-1-1 SAFETY PRECAUTIONS

As with any piece of electronic equipment, extreme caution should be taken when troubleshooting or working with "live" circuits. Certain circuits and/or components within the RD-301 contain extremely high voltage potentials, CAPABLE OF CAUSING SERIOUS BODILY INJURY OR DEATH (see WARNINGS on following page)! When performing the calibration procedures in this section, be sure to observe the following precautions:

WARNING:

THE REAR PANEL CONNECTOR AND POWER SUPPLY MODULE CARRIES 120 OR 240 VAC AS LONG AS POWER CORD IS CONNECTED TO THE RD-301 AND EXTERNAL AC POWER SOURCE. DO NOT CONTACT THESE OR ANY ASSOCIATED COMPONENTS DURING TROUBLESHOOTING OR CALIBRATION.

REMOVE ALL JEWELRY, OR OTHER APPAREL OF A CONDUCTIVE NATURE BEFORE PERFORMING ANY CALIBRATION PROCEDURES INVOLVING LIVE CIRCUITS.

WHEN WORKING WITH LIVE CIRCUITS OF HIGH POTENTIAL, KEEP ONE HAND IN POCKET OR BEHIND BACK, TO AVOID SERIOUS SHOCK HAZARD.

USE ONLY INSULATED TROUBLESHOOTING TOOLS WHEN WORKING WITH LIVE CIRCUITS.

FOR ADDED INSULATION, PLACE RUBBER BENCH MAT UNDERNEATH ALL POWERED BENCH EQUIPMENT, AND A RUBBER MAT UNDERNEATH TECHNICIAN'S CHAIR.

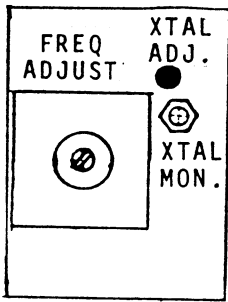
HEED ALL WARNINGS AND CAUTIONS CONCERNING MAXIMUM VOLTAGES AND POWER INPUTS.

### 3-1-2 TEST EQUIPMENT REQUIREMENTS

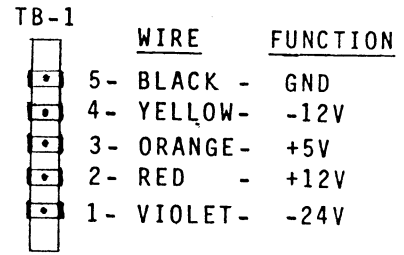
Paragraph 3-3 contains a comprehensive list of test equipment suitable for performing any of the calibration procedures in this Data Package. Any other test equipment meeting the specifications listed in Paragraph 3-3 may be substituted in place of the recommended models.

### 3-2 CALIBRATION PROCEDURES

It is assumed that the RD-301 Test Set is properly operating (except for final calibration) prior to performing the following calibration procedures. A check for proper operation, front panel control settings and repair of any malfunctions should be performed before continuing with the calibration procedures. Each separate test procedure initiates a test set-up, unless otherwise specified.



VIEW "A-A"



DETAIL "B"

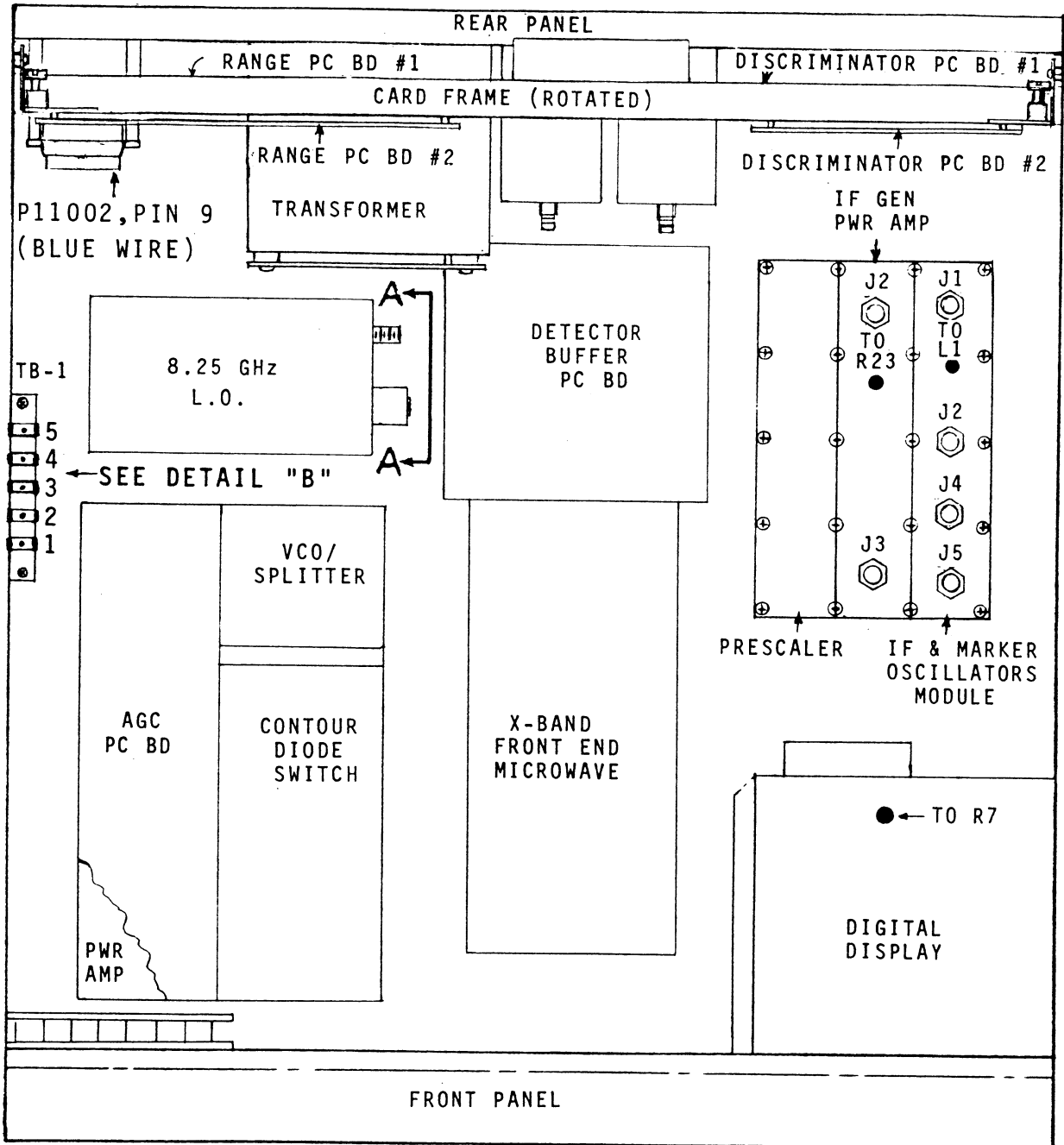


Figure 3-1 RD-301 Internal Structure

3-2-1

CALIBRATION

PROCEDURE: METER MECHANICAL ZERO CHECK AND ADJUSTMENT

PREREQUISITE: None

SPECIAL ACCESSORY

EQUIPMENT REQ'D: Small Screwdriver

TEST SET-UP

DIAGRAM: None

STEP

PROCEDURE

1. Test Set power is OFF.
2. Verify PANEL METER (34) needle at  $\emptyset$  on scale.
3. If needle is not  $\emptyset$ , turn small screwdriver in appropriate direction to PANEL METER ZERO Control (35) to zero the meter.

3-2-2

CALIBRATION  
PROCEDURE: INITIAL PROCEDURE

PREREQUISITE: Paragraph 3-2-1

SPECIAL ACCESSORY  
EQUIPMENT REQ'D: Digital Voltmeter

TEST SET-UP  
DIAGRAM: None

- | STEP | PROCEDURE   |
|------|---|
| 1.   | Disconnect power cable from RD-301 Test Set.        |
| 2.   | Remove RD-301 top cover.                            |
| 3.   | Set up Digital Voltmeter to verify following steps. |

NOTE:

Two 5-pin Molex connectors are tied together on top of T-1 transformer: one is marked for 110 VAC, the other is marked for 220 VAC. Insert the applicable connector to receptacle on top of transformer to match the external power to be used.

- |    |   |
|----|---|
| 4. | Verify the 50 Hz to 400 Hz power source is 117 VAC ( $\pm 11.7$ VAC), or 234 VAC ( $\pm 16$ VAC) when RD-301 is wired for the alternate voltage. Record measured value. |
| 5. | Connect RD-301 to 117/234 VAC, 50 to 400 Hz power source and press LINE Switch (22) ON. Allow 15 minutes warm-up time before proceeding with calibration procedures.    |

3-2-3

CALIBRATION  
 PROCEDURE: POWER SUPPLY VOLTAGE TEST

PREREQUISITE: Paragraph 3-2-2

SPECIAL ACCESSORY  
 EQUIPMENT REQ'D: 1 Digital Voltmeter  
 1 Oscilloscope

TEST SET-UP  
 DIAGRAM:

- STEP PROCEDURE
1. Use Digital Voltmeter and Oscilloscope to measure and record voltages and ripple voltages at Test Points listed below (see Figure 3-1 Detail "B" for location of Test Points).

TEST POINT	VOLTAGE	RIPPLE VOLTAGE
TB-1-5	GND	N/A
TB-1-3	( +4.7 _____ +5.3 VDC) _____	(15 mV p-p Max)
TB-1-2	( +11.4 _____ +12.6 VDC) _____	(15 mV p-p Max)
TB-1-4	( -11.4 _____ -12.6 VDC) _____	(15 mV p-p Max)
TB-1-1	( -22.0 _____ -25.2 VDC) _____	(20 mV p-p Max)
High Voltage*	( +155 _____ +180 VDC) _____	N/A

\*(Rear Panel, P11002, Pin 9)

*Blue wire*



3-2-4

CALIBRATION

PROCEDURE: 100 MHz CLOCK/8.25 GHz L0

PREREQUISITE: Paragraph 3-2-2

SPECIAL ACCESSORY

EQUIPMENT REQ'D: 1 Frequency Counter

TEST SET-UP

DIAGRAM: None

STEP

PROCEDURE

3-2-4a 100 MHz CLOCK

1. Connect RF Frequency Counter to TP1 on Range Board No. 1, P.C. Assy Board (See Section 5). Set Miles/ $\mu$ Sec switch to  $\mu$ Sec.
2. Adjust L-2 to 100 MHz ( $\pm 5000$  Hz).
3. Set Miles/ $\mu$ Sec switch to MILES Mode.
4. Verify the 8.09133 MHz Oscillator is operating ( $\pm 10$  Hz).

3.2.4b 8.25 GHz L0 (See Figure 3-1, View "A-A")

1. Connect Frequency Counter to XTAL MON connection on right side of L0.
2. Set the frequency to 103.125 MHz and allow it to stabilize for 15 minutes. If needed, adjust XTAL ADJ to a setting within tolerance ( $\pm 2.1$  kHz).

3-2-5

CALIBRATION

PROCEDURE: IF AND MARKER OSCILLATORS CALIBRATION

PREREQUISITE: Paragraph 3-2-2

SPECIAL ACCESSORY

EQUIPMENT REQ'D: 1 Frequency Counter  
1 Digital Voltmeter  
1 Spectrum Analyzer

TEST SET-UP

DIAGRAM:

STEP

PROCEDURE

3-2-5a MARKER OSCILLATOR ADJUSTMENT

1. Disconnect power from RD-301.
2. Disconnect coaxial cables from J-2, J-4 and J-5 of IF and MKR Oscillator Module (Figure 3-1).
3. Remove screws from top cover of IF and MKR Oscillator Module before removing IF/MKR Oscillators Board from housing. Support board on extender brackets or lay on cardboard for insulation.
4. Connect Frequency Counter to J-5 on IF and Marker Oscillators Board.
5. Apply power to RD-301.
6. Press DISPLAY MKR Switch (14) and set MKR FREQ Control (12) full cw.
7. Adjust C-34 on IF and Marker Oscillators Board (See Section 5) until Frequency Counter indicates  $\geq 77$  MHz.
8. Allow 20 minutes for the counter to stabilize at a frequency between 72 and 74 MHz.
9. If necessary, adjust C-34.
10. While pressing DISPLAY MKR Switch (14), rotate MKR FREQ Control (12) completely ccw. Verify Frequency Counter reading is between 17 and 19 MHz (no adjustment available).

### 3-2-5b IF OSCILLATOR TUNE CIRCUIT ADJUSTMENT

1. Disconnect power from RD-301.
2. Connect Frequency Counter to J-4 on IF and MKR Oscillator Module (Figure 3-1).
3. Connect Oscilloscope, DC Coupled to IF OSC Tune Line (Coax 20).
4. Apply power to RD-301. Select IF HI on RF/IF MODE (10).
5. Rotate outer knob (coarse) of MNL FREQ Control (8) cw to maximum position.
6. Set R-44 on AGC PC Board to -18 V.
7. Rotate MNL FREQ Control (8) ccw and adjust R37 on AGC PC Board to -2.0 V.
8. Repeat Steps 5 through 7 to calibrate -2 V to -18 V on Tune Line.
9. Adjust MNL FREQ Control (8) fully cw and adjust L-1 on IF and MKR Oscillator Board (Figure 3-1)  $\approx 71.5$  MHz ( $\pm 0.5$  MHz) on Frequency Counter.
10. Rotate MNL FREQ Control (8) (coarse knob) ccw to minimum position.
11. Verify  $\approx 18.5$  MHz on Frequency Counter.
12. Because of interaction between R-44 and R-37, Steps 5 through 7 of 3-2-5b (IF Oscillator Tune Circuit Adjustment) should be repeated as necessary, to obtain a frequency span wide enough to cover the 20 to 70 MHz requirements of the IF Oscillator Tune circuit. The minimum frequency should be  $\approx 18.5$  MHz and maximum frequency should be  $\approx 71.5$  MHz.
13. Disconnect Digital Voltmeter.

### 3-2-5c MIXER BALANCE ADJUSTMENT

- | STEP | PROCEDURE   |
|------|---|
| 1.   | Connect Spectrum Analyzer to J-2 on IF and Marker Oscillators Board (Figure 3-1).   |
| 2.   | Set Spectrum Analyzer controls to:<br>60 MHz Center Frequency<br>10 MHz/DIV Span Width<br>20 dB/RF Attenuation<br>10 dB/DIV Log Display             |
| 3.   | Set MNL FREQ Control (8) to obtain 60 MHz analyzer display.   |
| 4.   | Adjust Mixer Balance potentiometer (R24) on IF and Marker Oscillators Board (see Section 5) for maximum 60 MHz signal and minimum spurious signals. |

### 4-2-5d MARKER LEVEL CHECK

1. Press DISPLAY MKR Switch (14) and rotate MKR FREQ Control (12) until marker frequency is close to 60 MHz IF carrier on analyzer display.
2. Marker frequency should be from -30 dBc to -20 dBc. If not, select resistor of appropriate value for R-36 on IF and Marker Oscillators Board to obtain value within this range.
3. Release Display MKR Switch (14).
4. Rotate MNL FREQ Control (8) until Frequency Counter indicates 30 MHz.
5. Set Spectrum Analyzer to 30 MHz.
6. Press DISPLAY MKR Switch (14) and rotate MKR FREQ Control (12) until marker frequency is close to the 30 MHz IF carrier on analyzer display.
7. Marker frequency should be between -24 dBc and -18 dBc. If not, select resistor of appropriate value for R-36 on IF and Marker Oscillators Board, to obtain this value.

## STEP

## PROCEDURE

## 3-2-5e SWEEP WIDTH ADJUSTMENT

1. Set Spectrum Analyzer to carrier frequency (30 MHz) at 0.5 MHz span width.
2. Set sweep speed to 50 mS/DIV.
3. Verify carrier just starts to sweep when SWEEP WIDTH MHz Control (25) dial is just  $>0$ .
4. If necessary, to reset dial:
  - Remove dial.
  - Rotate control shaft until carrier just begins to sweep.
  - Without rotating control, replace dial so index mark is aligned with  $0$  and tighten two set screws.
5. Set SWEEP WIDTH MHz control (25) to 4 MHz.
6. Adjust SWEEP WIDTH Potentiometer (R-7) on Counter Boards for swept carrier display of 8.0 divisions (4 MHz p-p). (Access to R-7 is through hole in top of Digital Display Assembly, See Figure 3-1).
7. Set SWEEP WIDTH MHz Control (25) to 2 MHz.
8. Analyzer should indicate swept carrier of 4.0 divisions ( $\pm 10\%$ ).
9. If necessary, adjust R-7 until swept carrier at 2 and 4 MHz is within 10% of dial setting.
10. Disconnect test equipment and power from RD-301 and reinstall IF and Marker Oscillators Board. Connect coaxes.

3-2-6

CALIBRATION  
PROCEDURE: PRESCALER AND COUNTER TEST

PREREQUISITE: Paragraph 3-2-5

SPECIAL ACCESSORY  
EQUIPMENT REQ'D: 1 Frequency Counter

TEST SET-UP  
DIAGRAM: None

STEP PROCEDURE

1. Set the following RD-301 controls to the indicated settings:

<u>CONTROL</u>	<u>SETTING</u>
RF/IF Switch (10) .....	IF HI
PRF/RF Switch (2) .....	RF

2. Connect Frequency Counter to IF OUT Connector (9).
3. Adjust OUTPUT LEVEL COARSE dBm Control (5) for adequate counter reading.
4. RD-301 Digital Display (1) should match Counter Frequency reading.
5. Rotate MNL FREQ Controls (8) to verify Digital Display (1) indicates increasing frequency with cw rotation and decreasing frequency with ccw rotation.
6. Press DISPLAY MKR Switch (14) and hold down.
7. Rotate MKR FREQ Controls (12) to verify Digital Display (1) indicates increasing frequency with cw rotation and decreasing frequency with ccw rotation.

3-2-7

CALIBRATION

PROCEDURE: IF GENERATOR POWER AMPLIFIER CHECK AND ADJUSTMENT

PREREQUISITE: Paragraph 3-2-5

SPECIAL ACCESSORY

EQUIPMENT REQ'D: 1 Spectrum Analyzer

TEST SET-UP

DIAGRAM: None

STEP PROCEDURE

1. Set the following RD-301 controls to the indicated settings:

<u>CONTROL</u>	<u>SETTING</u>
RF/IF Switch (10) .....	HI
MODULATION Switches (19) .....	CW
OUTPUT LEVEL COARSE (5) .....	0 dBm

2. Connect Spectrum Analyzer to RD-301 IF OUT Connector (9).
3. Rotate MNL FREQ Control (8) to select 30 MHz.
4. Spectrum Analyzer should indicate 0 dBm ( $\pm 2.5$  dB). If not, adjust R-23 (via access hole in IF Gen. Pwr. Amp. Module; see Figure 3-1) until this value is obtained.
5. Rotate MNL FREQ Control (8) to select 60 MHz.
6. Spectrum Analyzer should indicate 0 dBm ( $\pm 2.5$  dBm). If not, adjust R-23 to obtain optimum value.

3-2-8

CALIBRATION

PROCEDURE: X-BAND GENERATOR TUNE RANGE\*

PREREQUISITE: Paragraph 3-2-2

SPECIAL ACCESSORY

EQUIPMENT REQ'D: None

TEST SET-UP

DIAGRAM: None

STEP

PROCEDURE

1. Set the following RD-301 controls to the indicated settings:

CONTROL

SETTING

PRF RF (2) .....	RF
RF/IF Switches (10) .....	MNL

2. Verify Digital Display (1) range from 9295 MHz (or less) to 9500 MHz (or more) by rotating MNL FREQ Controls (8) completely ccw and cw.
3. Set MNL FREQ Controls (8) to full cw position.
4. Adjust R-35 (GAIN potentiometer) on AGC PC Board (see Section 5) until Digital Display (1) indicates 9504 MHz ( $\pm 1$  MHz).
5. Set MNL FREQ Controls (8) to full ccw position.
6. Adjust R-39 (OFFSET potentiometer) on AGC PC Board, to 9291 MHz.
7. Repeat Steps 3 through 6 until MNL FREQ range limits are from 9291 MHz to 9504 MHz.



3-2-9

CALIBRATION  
PROCEDURE: IF ON/OFF RATIO TEST

PREREQUISITE: Paragraph 3-2-7

SPECIAL ACCESSORY  
EQUIPMENT REQ'D: Spectrum Analyzer

TEST SET-UP  
DIAGRAM: None

STEP PROCEDURE

1. Set the following RD-301 controls to the indicated settings:

<u>CONTROL</u>	<u>SETTING</u>
RF/IF Switches (10) .....	IF HI
OUTPUT LEVEL COARSE (5) .....	+20 dBm
MODULATION Switches (19) .....	CW
PRF/RF (2) .....	RF
MNL FREQ (8) .....	30 MHz

2. Connect Spectrum Analyzer to IF OUT Connector (9).
3. Measure power level on Spectrum Analyzer. Set reference.
4. Change MODULATION Switch (19) to EXT (+). Do not apply external trigger.
5. Measure power level on Spectrum Analyzer.
6. IF ON/OFF ratio is difference between ON Level (Step 3) and OFF Level (Step 5). ON/OFF ratio should be greater than 58 dB.
7. Set MNL FREQ Control (8) to 60 MHz.
8. ON/OFF Ratio should be greater than 50 dB.

3-2-10

CALIBRATION

PROCEDURE: MAIN LEVELER AND CONTOUR LEVELER

PREREQUISITE: Paragraph 3-2-7

SPECIAL ACCESSORY

EQUIPMENT REQ'D: 1 Power Meter  
1 N-Type 10 dB Pad  
1 Bandpass Filter

TEST SET-UP

DIAGRAM: None

STEP PROCEDURE

1. Set the following RD-301 controls to the indicated settings:

<u>CONTROL</u>	<u>SETTING</u>
MODULATION Switches (19) .....	CW
RF/IF (10) .....	MNL
OUTPUT LEVEL COARSE (5) .....	-50
OUTPUT LEVEL FINE (4) .....	Ø
CONTOUR R2/dB (3) .....	Ø
PRF/RF (2) .....	RF
RNG SEL (31) .....	RING 1

2. Connect serialized coax cable to RF I/O connector (11) and to Power Meter through N-Type 10 dB Pad and Bandpass Filter.
3. Rotate MNL FREQ Controls (8) to set Digital Display (1) at 9350 MHz.
4. Adjust R-1 on AGC PC Board (see Section 5) to display -40 dBm plus coupler adjustment value (i.e., mean value of coupler furnished with RD-301 minus 20 dB) on Power Meter.
5. Vary MNL FREQ Control (8) from 9300 to 9500 MHz. Record the power level for reference.
6. Set OUTPUT LEVEL COARSE Control (5) to -60 dBm and record power level for reference.
7. Set the following RD-301 controls to the indicated settings:

<u>CONTROL</u>	<u>SETTING</u>
OUTPUT LEVEL COARSE (5) .....	-70 dBm
CONTOUR R2/dB (3) .....	+10 dB
RNG SEL (31) .....	CONTOUR

STEP

PROCEDURE

- 8. Adjust R2 on AGC PC Board, until power level equals reference level of Step 7.
- 9. Set the following RD-301 controls to the indicated settings:

<u>CONTROL</u>	<u>SETTING</u>
OUTPUT LEVEL COARSE (5) .....	-80 dBm
CONTOUR/R2 dB (3) .....	+20 dBm

- 10. Verify level remains same as reference level of Step 6.
- 11. Reduce CONTOUR/R2 dB Control (3) to +10 dB; then increase in 1 dB steps to verify performance of this control.

3-2-11

CALIBRATION  
PROCEDURE: INTERNAL PRF CONTROL DIAL CALIBRATIONS

PREREQUISITE: Paragraph 3-2-4

SPECIAL ACCESSORY  
EQUIPMENT REQ'D: None

TEST SET-UP  
DIAGRAM: None

STEP PROCEDURE

1. Set the following RD-301 controls to the indicated settings:

<u>CONTROL</u>	<u>SETTING</u>
MODULATION Switches (19) .....	INTL
PRF/RF (2) .....	PRF
X1/X10 INTL PRF (33) .....	X1

2. Rotate INTL PRF Control (32) ccw to minimum setting and verify dial is aligned to 50. (If not, loosen set screws and realign dial.)
3. With INTL PRF Control (32) at 50, verify Digital Display (1) of 50 ( $\pm 2$  Hz).
4. If requirement of Step 3 is not met, adjust 50 Hz ADJ at R-74 on Range Board #2 (see Section 5) until Digital Display (1) indicates 50 ( $\pm 2$  Hz).
5. Rotate INTL PRF Control (32) to 500 and verify Digital Display (1) of 500 ( $\pm 5$  Hz).
6. If requirement of Step 5 is not met, adjust 500 Hz ADJ at R-79 on Range Board #2 until Digital Display indicates 500 ( $\pm 5$  Hz).
7. Leaving INTL PRF control (32) at 500, switch X1/X10 INTL PRF Switch (33) to X10. Verify Digital Display (1) of 5000 ( $\pm 10\%$ ). (No adjustment).
8. Leaving X1/X10 INTL PRF Switch (33) at X10, dial down to 50 on INTL PRF Control (32). Verify Digital Display (1) of 500 ( $\pm 10\%$ ). (No adjustment).

3-2-12

CALIBRATION  
PROCEDURE: DISCRIMINATOR FILTER ADJUSTMENT

PREREQUISITE: Paragraph 3-2-2

SPECIAL ACCESSORY  
EQUIPMENT REQ'D: 1 Tracking Generator  
1 Spectrum Analyzer

TEST SET-UP  
DIAGRAM: None

NOTE:

At time of initial calibration, or when circuit performance indicates maladjustment, filter adjustment is required. Adjustments of filters may be initiated with covers removed. Final adjustments must be made with covers in place.

- | STEP | PROCEDURE   |
|------|---|
| 1.   | Connect a Tracking Generator to "Input" of Filter and a Spectrum Analyzer to "Output". Adjust filters as specified in Figures 3-4A, 3-4B and 3-4C.          |
| 2.   | Refer to Figure 3-2. Filters A (475 MHz Filter) and B (Bandpass Filter) are located on bottom of Discriminator Board No. 1. Both are not bi-directional.    |
| 3.   | For Filter A, remove semi-rigid coaxes from Filter A and connect Analyzer and Generator for readings.   |
| 4.   | For Filter B, remove semi-rigid coaxes from Filter B and connect Analyzer and Generator for readings.   |
| 5.   | For Filter C (Presence of Signal Filter), Generator should be connected to J-13 (Input), and Analyzer connected to TP-7 (Output) for readings (Figure 3-3). |

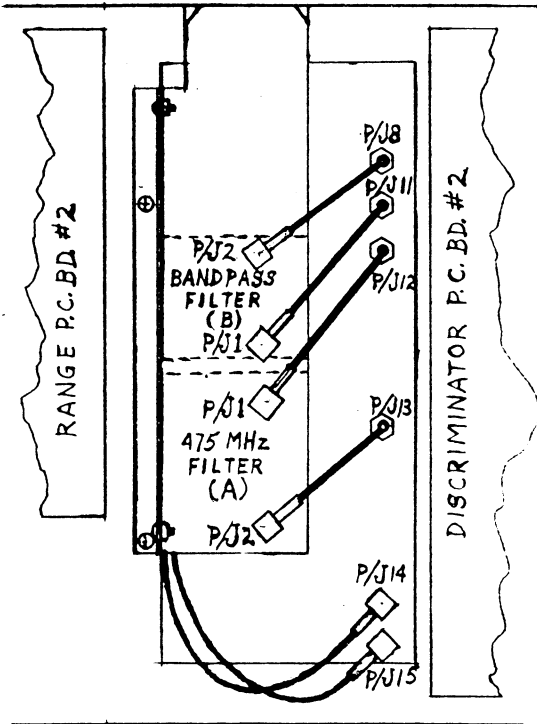


Figure 3-2 Filter Test Locations, 475 MHz Filter (A) and 570-775 MHz Bandpass Filter (B)

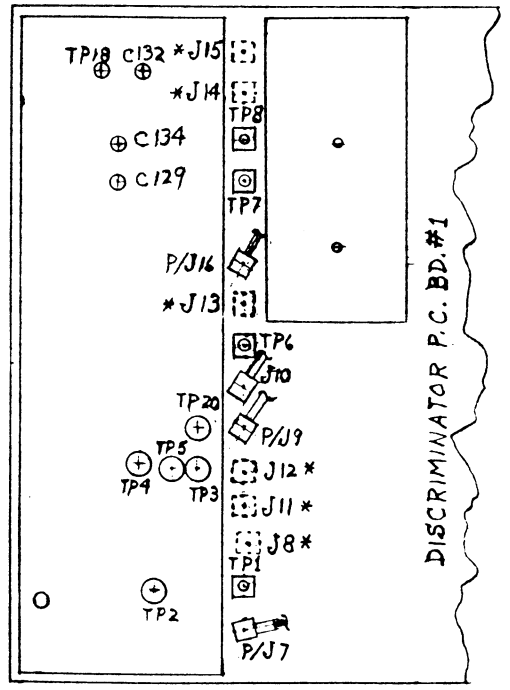


Figure 3-3 Top Of Discriminator P.C. Board #1  
\*(Opposite end of connector shown in Figure 3-2)

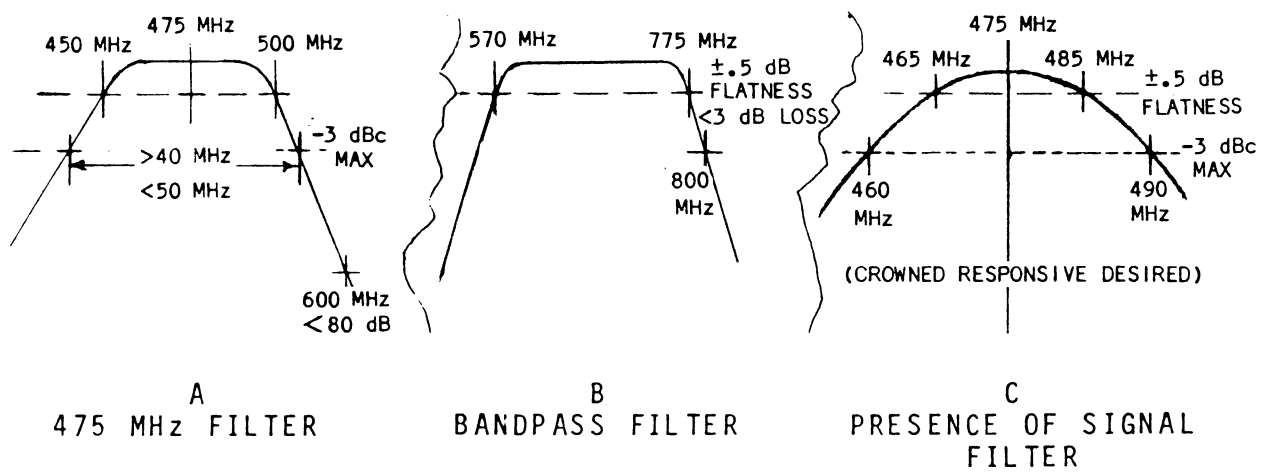


Figure 3-4 Filter Signal Representations

3-2-13

CALIBRATION  
PROCEDURE: DISCRIMINATOR

PREREQUISITE: Paragraph 3-2-2

SPECIAL ACCESSORY  
EQUIPMENT REQ'D:

- 1 External D.C. Supply
- 1 Spectrum Analyzer
- 1 Calibrating RF Pulse Generator
- 1 Tracking Generator
- 1 Oscilloscope
- 1 L-Band Sweep Generator
- 1 RF Counter

TEST SET-UP  
DIAGRAM:

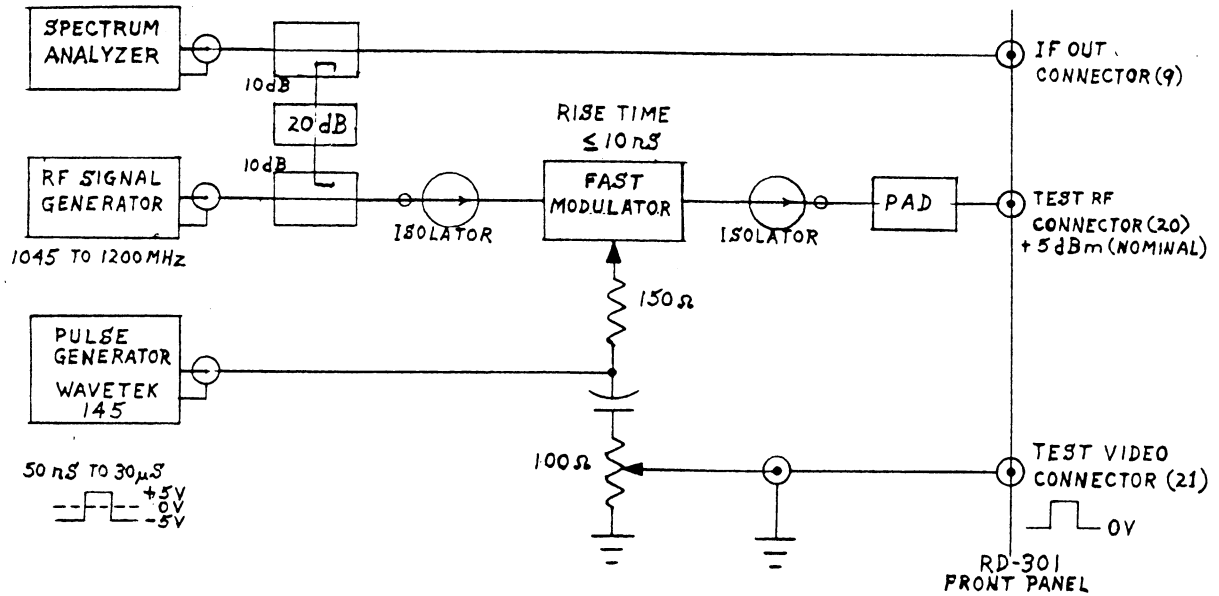


Figure 3-5 Discriminator Test Set-Up Diagram

NOTE:

When connecting the RF Pulse Generator to the RD-301 TEST RF Connector (20), the RF waveform must be delayed 3 nS from the video waveform, measured at the RD-301 front panel (see Figure 3-6).

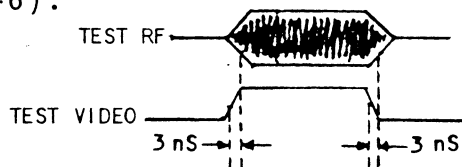


Figure 3-6 TEST RF/TEST VIDEO Waveforms





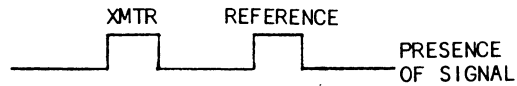


Figure 3-7 Presence of Signal

STEP

PROCEDURE

10. Move Spectrum Analyzer to TP-6. Verify reference and real 475 MHz pulses appear  $\approx -50$  dB, and signals within 25 MHz are attenuated ( $\leq 80$  dB).
11. Disconnect coax from 475 MHz Filter, J1 Input in Figure 3-2. Connect L-Band Sweep Generator to this connection.
12. Sweep from 400 MHz to 600 MHz. Verify output shape at TP-6 (see Figure 3-4A).
13. Move analyzer to TP-18. Check compression level through limiter stages.

S-CURVE ALIGNMENT (Figure 3-8)

14. Connect Sawtooth from Sweep Generator into DC X-Input (Horizontal) of Oscilloscope.
15. With Oscilloscope in X-Mode, calibrate Generator for reference dot, centered on display.
16. Manually tune Sweep Width from 450 MHz to 500 MHz to obtain full scale deflection. Verify 475 MHz display at center of display.
17. Connect RF output of Sweep Generator to J-13 at -30 dBm.
18. Connect DC Y-Input (vertical) of Oscilloscope to RD-301 DSCRM Connector (6). Terminate with  $50\Omega$ .
19. Adjust R-158 Discriminator Board #1 (see Section 5) for zero volts deflection. Manually sweep generator to 485 MHz.
20. Adjust Discriminator Gain (R182) for -1 V.
21. Manually sweep to 465 MHz and verify +1 V reading. Return to 475 MHz.
22. Place Sweep Generator in Sweep Mode. Single "S-Curve" should appear on scope display (see Figure 3-8).

## STEP

## PROCEDURE

23. Adjust scope vertical gain for full scale deflection of displayed signal. "S-Curve" should be centered on zero crossing and symmetrical ( $\pm 1.6$ " of delay line  $\pm \approx 5$  MHz).

NOTE:

C-132 may be adjusted to obtain a symmetrical curve.

24. Adjust Discriminator Gain (R-182) for fine adjustment, as needed.

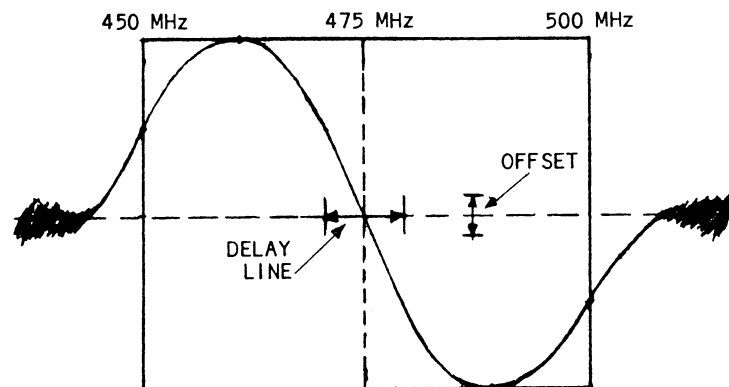


Figure 3-8 S-Curve

NOTE:

SWEEP (sawtooth) must be linear, i.e., voltage vs. frequency. If sweep (sawtooth) of L-Band Generator is not linear, the following may be done: Use Tektronix 7L13 in 7313 frame and Tektronix TR502 in TM503 frame. Use sawtooth from 7L13 and TR502 as RF source. Connect Aux RF out of TR502 to RF Counter. Set scan of 7L13 to 5 mS/DIV and Freq Span to 5 MHz/DIV.

## 3/4-WIDTH PULSE DISPLAY

25. To verify 3/4-Width Pulse Circuit is working, use Dual Trace Oscilloscope.
26. Connect Channel A to TP-14.
27. Connect Channel B to TP-16.
28. Adjust Pulse Generator for positive pulses with base line at 0 V, Pulse Width of 5  $\mu$ S and PRF of 1 kHz. Adjust peak of positive video pulses on RD-301 PANEL Meter (34) to 1 kW.

STEP

PROCEDURE

NOTE:

Test video  $\approx 3$  V.

- 29. Vary Pulse Generator from .2  $\mu$ S to 40  $\mu$ S.
- 30. Channel B should present pulse display, 3/4-width of Channel A Pulse, and delay of 12 nS (Figure 3-14).

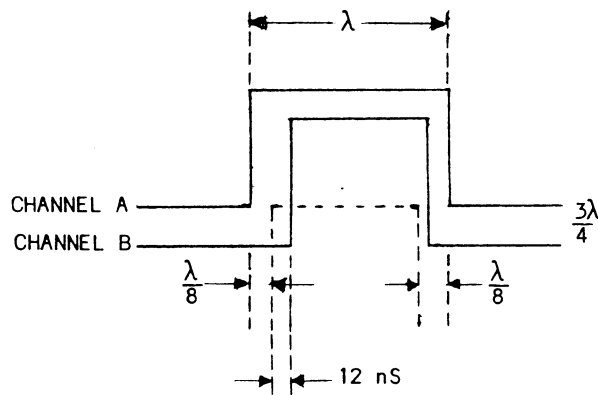


Figure 3-9 3/4-Width Pulse

- 31. Verify 80 MHz Oscillator at Pin 3 of U1 on Discriminator Board #2 ( $\pm 10$  MHz) (see Section 5).

AUTO POINT

- 32. Connect coax between DET and Channel A of Oscilloscope, terminate into 50 $\Omega$ . Connect a second coax between DLYD SYNC and Channel B of Oscilloscope.
- 33. Set the following RD-301 controls to the indicated settings:

<u>CONTROL</u>	<u>SETTING</u>
RNG SEL .....	R1,R2/AUTO
RANGE 1 DELAY .....	2 $\mu$ S
RANGE 2 DELAY .....	10 $\mu$ S
R1 PULSE WIDTH .....	5 $\mu$ S
R2 PULSE WIDTH .....	10 $\mu$ S
MODULATION .....	TRACK

- 34. Set the Video Generator Pulse Width to .4  $\mu$ S to Channel A of Oscilloscope.

NOTE:

The Auto Point may be adjusted from 0.2  $\mu$ S to 1  $\mu$ S, as required.

## STEP

## PROCEDURE

35. Adjust R-12 on Discriminator Bd No. 1 fully cw, then slowly ccw until displayed pulse just changes.
36. Adjust Video Generator above and below 0.4  $\mu$ S to verify switching at 0.4  $\mu$ S ( $\pm 0.05$   $\mu$ S).

NOTE:

$\approx 2.0$  V applied to TP-10 from external DC supply should now be removed.

## PULSE PERIOD OFFSET ADJUSTMENT

37. Provide Pulse Generator Signal at TEST VIDEO Connector (21).
38. Connect calibrating RF Pulse Generator to TEST RF Connector (20).
39. Monitor TP-11 on Discriminator Bd No. 1 (See Section 5) with Oscilloscope probe.
40. Apply 3  $\mu$ S pulse. Adjust reference sample pulse period to be co-linear with noise line (see Figure 3-10), using R-60.

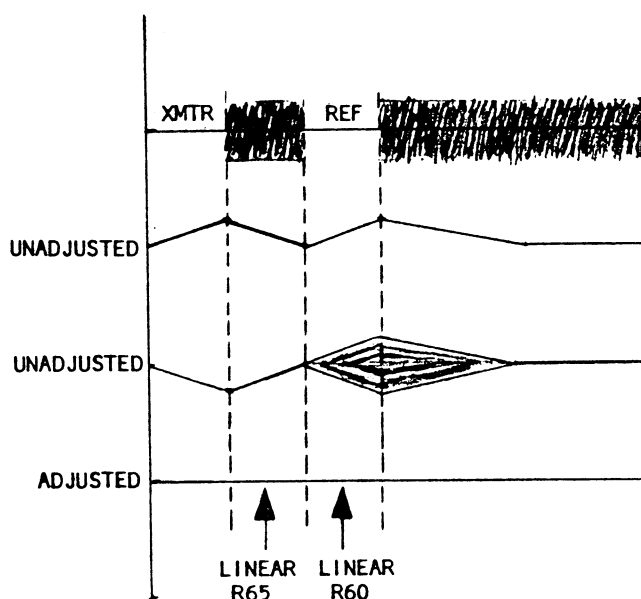


Figure 3-10 Co-linear Pulse and Noise Line

41. Adjust transmitter sample pulse period to be co-linear with noise line, using R-65. Verify pulse period for pulse width from 50 nS to 30  $\mu$ S.
42. Connect RF Counter to TP-1 to 475 MHz Oscillator on Discriminator Bd. No. 1 (see Figure 3-3). Use R-158 if fine adjustment is required.

STEP

PROCEDURE

TRACKING ACCURACY

- 43. Vary Calibrating Generator frequency in 10 MHz increments from 9295 MHz to 9500 MHz to verify Tracking Accuracy. Check response at each step for wide-through-narrow pulses (30  $\mu$ S to 50 nS).

$\Delta$ F OFFSET

- 44. Set frequency of calibrating RF Pulse Generator to 9375 MHz.
- 45. Set the following RD-301 controls to the indicated settings:

CONTROL

SETTING

MTR FCTN Switch (36) .....	$\Delta$ F
$\Delta$ F OFFSET (37) .....	CAL (Detent)

- 46. Adjust R-69 on Discriminator Board No. 1 (see Section 5) to zero PANEL Meter (34).
- 47. Turn  $\Delta$ F OFFSET Control (37) cw out of detent, until frequency on Digital Display (1) reads 9375 MHz.
- 48. Adjust R-90 on Discriminator Bd No. 1 to zero Panel Meter (34).
- 49. Continue to move  $\Delta$ F OFFSET Control (37) cw to -0.50 MHz on Panel Meter (34). Adjust R-77 for Digital Display (1) of 9375.50 MHz.
- 50. Continue to move  $\Delta$ F OFFSET Control cw to -0.50 MHz on Panel Meter (34). Digital Display should be 9375.50.
- 51. Verify Digital Display (1) can be varied (+) or (-) from a 9375 MHz "zero" by the amount displayed on Panel Meter (34). Adjust as needed.

3-2-14

CALIBRATION

PROCEDURE: PULSE WIDTH (RANGE 1)

PREREQUISITE: Paragraph 3-2-4

SPECIAL ACCESSORY

EQUIPMENT REQ'D: 1 Heterodyne Device  
1 X-Band to L-Band Down Converter  
1 L-Band Generator

TEST SET-UP

DIAGRAM: None

STEP

PROCEDURE

1. Down convert the output of RF I/O connector (11) from X-Band to L-Band and take output through Heterodyne device (connected to L-Band Generator).
2. Connect Oscilloscope to synchronize Heterodyne device with signal output.
3. Set the following RD-301 controls to the indicated settings:

<u>CONTROL</u>	<u>SETTING</u>
RANGE 1 DELAY (29) .....	000.3
RANGE 2 DELAY (30) .....	900.0
INTL PRF (32) .....	150 Hz
RNG SEL (31) .....	1 RING
MODULATION Switches (19) .....	INTL
RF/IF Switches (10) .....	MNL
PULSE WIDTH MULTIPLIER (RG1) .... (26)	.1
PULSE WIDTH (RG1) (23) .....	.5
μS/NM Switch (28) .....	μS

4. On Range Board #2 (see Section 5), adjust R22 for .05 μS width.
5. Change the following controls:  
PULSE WIDTH MULTIPLIER (RG1) .... 1  
(26)  
PULSE WIDTH (RG1) (23) .....
6. Adjust R21 on Range Board #2 for .5 μS width.
7. Change the following controls:  
PULSE WIDTH MULTIPLIER (RG1) .... 100  
(26)  
PULSE WIDTH (RG1) (23) .....

STEP

PROCEDURE

8. Adjust R10 on Range Board #2 for 500  $\mu$ S width.
9. Select each value on PULSE WIDTH MULTIPLIER (RG1) (26). Verify pulse width typically stays within 10% of the settings of PULSE WIDTH Control (RANGE 1) (23).

3-2-15

CALIBRATION  
PROCEDURE: PULSE WIDTH (RANGE 2)

PREREQUISITE: Paragraph 3-2-4

SPECIAL ACCESSORY  
EQUIPMENT REQ'D: 1 Heterodyne Device  
1 X-Band to L-Band Down Converter  
1 L-Band Generator

TEST SET-UP  
DIAGRAM: None

- | STEP | PROCEDURE   |
|------|---|
| 1.   | Down convert output of RF I/O Connector (11) from X-Band to L-Band and take output through Heterodyne device (connected to L-Band Generator). |
| 2.   | Connect Oscilloscope to synchronize Heterodyne device with signal output.   |
| 3.   | Set the following RD-301 controls to the indicated settings:  |

<u>CONTROL</u>	<u>SETTING</u>
RANGE 1 DELAY (29) .....	900.00
RANGE 2 DELAY (30) .....	000.3
INTL PRF (32) .....	150 Hz
RNG SEL (31) .....	2 ON
MODULATION Switches (19) .....	INTL
RF/IF Switches (10) .....	MNL
PULSE WIDTH MULTIPLIER (RG2) ....	.1
(27)	
PULSE WIDTH (RG2) (24) .....	.5
μS/NM Switch (28) .....	μS

- |    |  |
|----|--|
| 4. | Adjust R42 on Range Board #2 for .05 μS width. |
| 5. | Change the following RD-301 control settings:  |

<u>CONTROL</u>	<u>SETTING</u>
PULSE WIDTH MULTIPLIER (RG2) ....	1
(27)	
PULSE WIDTH (RG2) (24) .....	.5

- |    |   |
|----|---|
| 6. | Adjust R41 on Range Board #2 for .5 μS width. |
|----|---|



STEP

PROCEDURE

7. Change the following RD-301 control settings:

<u>CONTROL</u>	<u>SETTING</u>
PULSE WIDTH MULTIPLIER (RG2) (27)	.... 100
PULSE WIDTH (RG2) (24)	..... 5

8. Adjust R31 on Range Board #2 for 500  $\mu$ S width.

9. Select each value on PULSE WIDTH MULTIPLIER (RG2) (27). Verify pulse width typically stays within 10% of settings of PULSE WIDTH Control (RANGE 2) (24).

3-2-16

CALIBRATION

PROCEDURE: PULSE RANGE DELAY SWITCHES

PREREQUISITE: Paragraph 3-2-14  
Paragraph 3-2-15

SPECIAL ACCESSORY

EQUIPMENT REQ'D: 1 Oscilloscope  
1 Heterodyne Device  
1 X-Band to L-Band Down Converter  
1 L-Band Generator

TEST SET-UP

DIAGRAM: None

STEP

PROCEDURE

1. Set the following RD-301 controls to the indicated settings:

<u>CONTROL</u>	<u>SETTING</u>
RANGE 1 DELAY (29) .....	900.00
INTL PRF (32) .....	150 Hz
RNG SEL (31) .....	R2 ON
MODULATION Switches (19) .....	INTL
RF/IF Switches (10) .....	MNL
PULSE WIDTH MULTIPLIER (RG2) ....	.1
(27)	
PULSE WIDTH (RG2) (24) .....	.5
$\mu$ S/NM Switch (28) .....	$\mu$ S
RANGE 2 DELAY (30) .....	000.2 $\mu$ S

2. Adjust R-47 on Range Board No. 1 (see Section 5) to 0.6  $\mu$ S pulse display on Oscilloscope.
3. Connect Oscilloscope to down-converted heterodyne device signal.
4. Step through the 0.1  $\mu$ S positions on RANGE 2 DELAY Thumbwheels (30) and verify .1 through .9  $\mu$ S range delay. Repeat this step for 1  $\mu$ S, 10  $\mu$ S and 100  $\mu$ S positions of RANGE 2 DELAY Thumbwheel Switches (30).
5. Change the following RD-301 Control settings:

<u>CONTROL</u>	<u>SETTING</u>
RANGE 1 DELAY (29) .....	000.3
RANGE 2 DELAY (30) .....	900.0
RNG SEL (31) .....	1 Ring

STEP

PROCEDURE

- 6. Repeat step 4 using the RANGE DELAY Thumbwheel Switches (29), to verify proper operation.
- 7. Change the following RD-301 Control settings:

<u>CONTROL</u>	<u>SETTING</u>
RANGE 1 DELAY (29) .....	900.00
RANGE 2 DELAY (30) .....	000.3
RNG SEL (31) .....	2

- 8. Step RNG SEL Switch (31) from RING 1 through RING 5. Verify, at each setting, RANGE 1 reply repeats at appropriate intervals.

3-2-17

CALIBRATION

PROCEDURE: RF ON/OFF RATIO

PREREQUISITE: Paragraph 3-2-10

SPECIAL ACCESSORY

EQUIPMENT REQ'D: 1 X-Band to L-Band Down Converter  
1 Spectrum Analyzer

TEST SET-UP

DIAGRAM: None

STEP

PROCEDURE

1. Set the following RD-301 controls to the indicated settings:

<u>CONTROL</u>	<u>SETTING</u>
MODULATION Switches (19) .....	CW
RF/IF Switches (10) .....	MNL
OUTPUT LEVEL COARSE (5) .....	-50 dBm
PRF/RF (2) .....	RF
MNL FREQ (8) .....	9375 MHz
CONTOUR/R2 dB (3) .....	00

2. Connect "X-Band to L-Band Down Converter" to RF I/O Connector (11) with serialized coax cable.
3. Connect output of Down Converter to Spectrum Analyzer.
4. Measure power level with Spectrum Analyzer.
5. Change MODULATION Switch (19) to EXT (+) and measure power level with Spectrum Analyzer.

NOTE:

Difference between "ON" level of Step 4 and "OFF" level of Step 5 should be  $\geq 70$  dB.

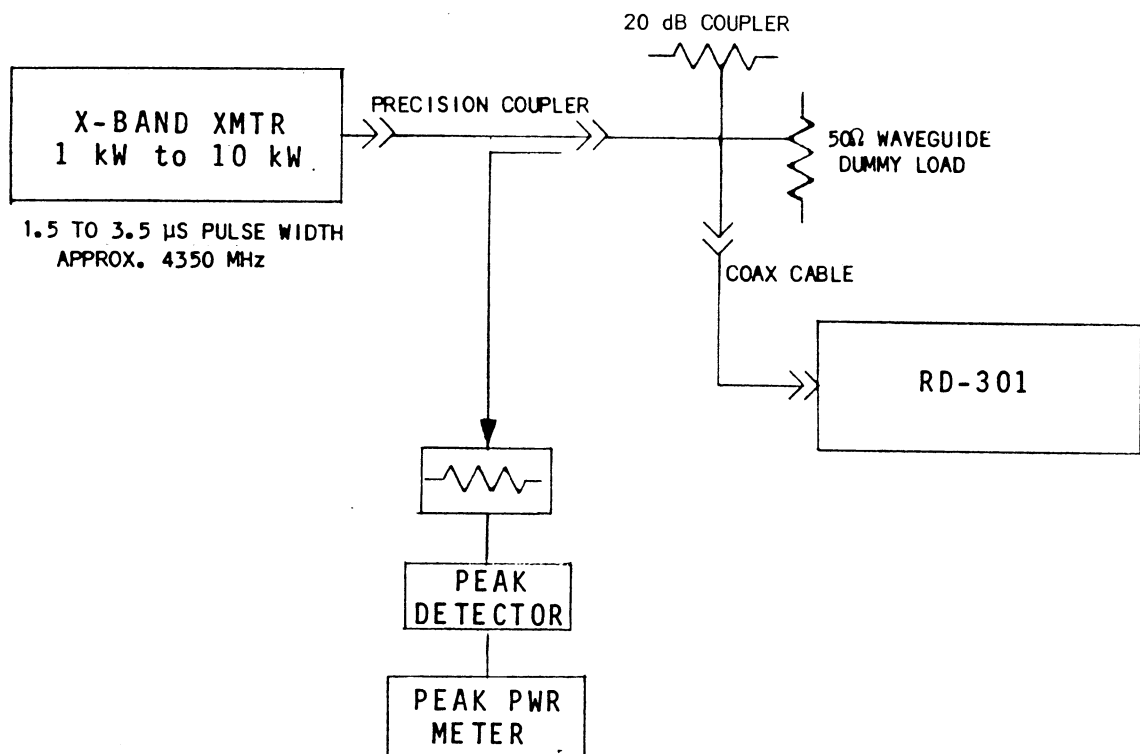
3-2-18

CALIBRATION  
PROCEDURE: PANEL PEAK POWER SCALE CALIBRATION

PREREQUISITE: Paragraph 3-2-2

SPECIAL ACCESSORY  
EQUIPMENT REQ'D: 1 X-Band XMTR

TEST SET-UP  
DIAGRAM:



NOTE:

20 dB coupler, waveguide dummy load and coax cable must be serialized and calibrated with the specific RD-301 test set (component of each set).

Figure 3-11 Panel Peak Power Scale Calibration Test Set-Up

STEP

PROCEDURE

1. Connect X-Band XMTR to RD-301 as shown in Figure 3-11.
2. Set the following RD-301 Controls to the indicated settings:

<u>CONTROL</u>	<u>SETTING</u>
----------------	----------------

PRF/RF Switches (2) .....	RF
MTR FCTN (36) .....	PWR

3. Apply 2 kW from Radar (X-Band XMTR) to RD-301. Adjust R-15 on Detector Buffer Board (see Section 5) for PANEL Meter (34) reading of 2 kW.
4. Apply 10 kW from Radar (X-Band XMTR) to RD-301. Adjust R-5 on Detector Buffer Board for PANEL Meter (34) reading of 10 kW.
5. Repeat Steps 3 and 4 as required.

3-2-19

CALIBRATION

PROCEDURE: EXTERNAL TRIGGERING TEST

PREREQUISITE: Paragraph 3-2-2

SPECIAL ACCESSORY

EQUIPMENT REQ'D: 1 Oscilloscope  
1 Signal Generator

TEST SET-UP

DIAGRAM: None

STEP

PROCEDURE

1. Set the following RD-301 controls to the indicated settings:

<u>CONTROL</u>	<u>SETTING</u>
$\mu$ S/NM (28) .....	$\mu$ S
RNG SEL (31) .....	1 Ring
CONTOUR/R2 dB (3) .....	00
MODULATION Switches (19) .....	EXT (+)

2. Connect Oscilloscope Channel A to DLYD SYNC Connector (17).
3. Connect Signal Generator to EXT TRIG Connector (16) and to Oscilloscope Channel B.
4. Trigger Oscilloscope from positive edge of Signal Generator input.
5. Set Signal Generator controls for .10  $\mu$ S positive pulse output, 50 Hz to 20 kHz.
6. Adjust output level of Signal Generator until delayed sync pulse appears. Vary Signal Generator frequency from 50 Hz to 20 kHz.

NOTE:

The highest output level required to trigger delayed sync pulse is less than 2 V.

7. Change MODULATION Switch (19) to EXT (-).
8. Set GEN for 10  $\mu$ S negative pulse to trigger Scope from negative edge of Signal Generator input.
9. Adjust output level of Signal Generator until delayed sync pulse appears.

STEP

PROCEDURE

10. Vary Signal Generator frequency from 50 Hz to 20 kHz.

NOTE:

The highest output level required to trigger delayed sync pulse is less than -2 V.



3-2-20

CALIBRATION  
PROCEDURE: 1 kHz AM

PREREQUISITE: Paragraph 3-2-2

SPECIAL ACCESSORY  
EQUIPMENT REQ'D: 1 X-Band to L-Band Down Converter  
1 Modulation Meter

TEST SET-UP  
DIAGRAM: None

STEP PROCEDURE

1. Set the following RD-301 controls to the indicated settings:

<u>CONTROL</u>	<u>SETTING</u>
MODULATION Switches (19) .....	CW
RF/IF Switches (10) .....	MNL
OUTPUT LEVEL COARSE (5) .....	-50 dBm
MNL FREQ (8) .....	9375 MHz

2. Connect X-Band to L-Band Down Converter and RF I/O Connector (11) with serialized coax cable.
3. Connect L-Band output from Down Converter to Modulation Meter.
4. Switch 1 kHz AM Switch (15) to "ON" position.
5. Adjust R-3 on AGC Board for 30% AM level on Modulation Meter.

## RD-301 FRONT PANEL

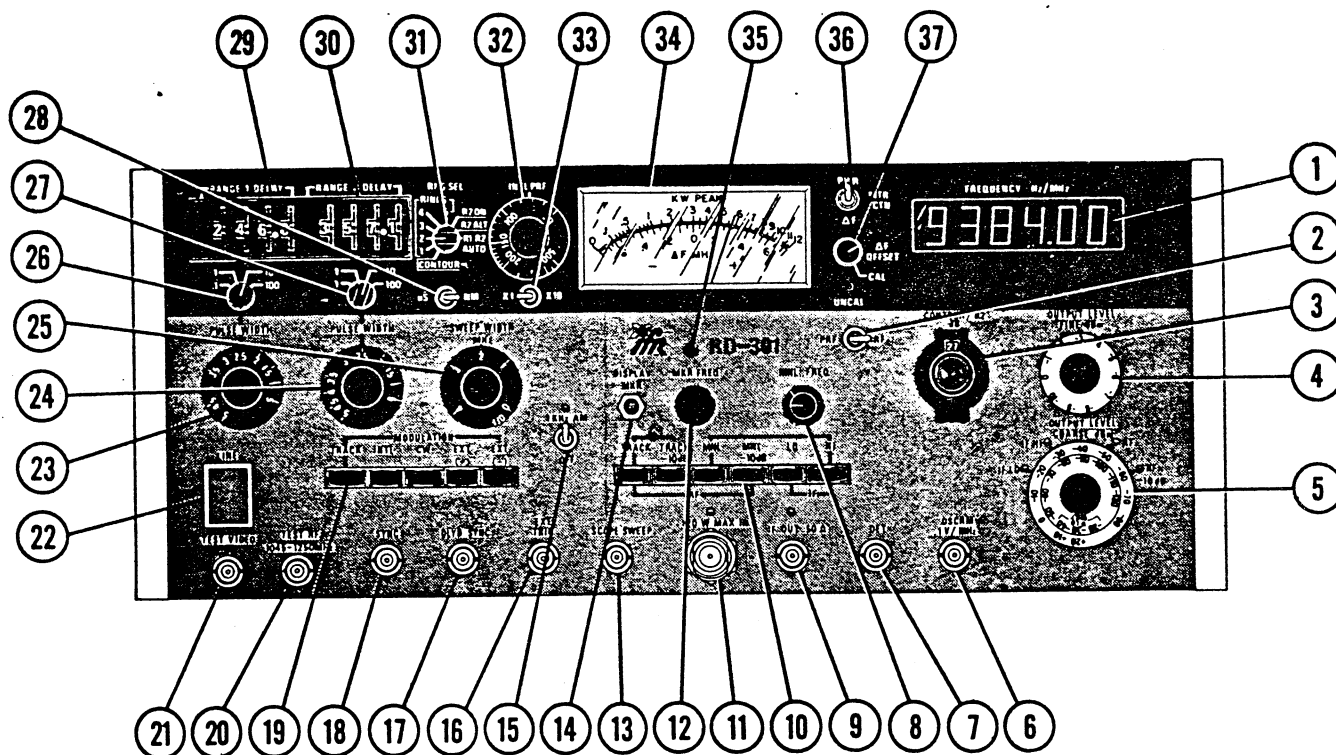


Figure 3-12 RD-301 Front Panel

- |  |  |
|--|--|
| <ol style="list-style-type: none"> <li>1. FREQUENCY Hz/MHz Digital Display</li> <li>2. PRF/RF Switch</li> <li>3. CONTOUR/R2 dB Control</li> <li>4. OUTPUT LEVEL FINE dBm Control</li> <li>5. OUTPUT LEVEL COARSE dBm Control *</li> <li>6. DSCRM .1 V/MHz Connector</li> <li>7. DET Connector</li> <li>8. MNL FREQ Controls</li> <li>9. IF OUT 50Ω Connector *</li> <li>10. RF/IF MODE Pushbutton Switches *</li> <li>11. RF INPUT/OUTPUT Connector<br/>(120 W MAX IN) *</li> <li>12. MKR FREQ Controls</li> <li>13. SCOPE SWEEP Connector</li> <li>14. DISPLAY MKR Switch</li> <li>15. 1 kHz AM Switch *</li> <li>16. EXT TRIG Connector</li> <li>17. DLYD SYNC Connector</li> <li>18. SYNC Connector</li> <li>19. MODULATION MODE Pushbutton Switches</li> </ol> | <ol style="list-style-type: none"> <li>20. TEST RF 1045-1250 MHz Connector</li> <li>21. TEST VIDEO Connector</li> <li>22. LINE Switch</li> <li>23. PULSE WIDTH Control (RANGE 1)</li> <li>24. PULSE WIDTH Control (RANGE 2)</li> <li>25. SWEEP WIDTH MHz Control</li> <li>26. PULSE WIDTH MULTIPLIER Control<br/>(RANGE 1)</li> <li>27. PULSE WIDTH MULTIPLIER Control<br/>(RANGE 2)</li> <li>28. μS/NM Switch</li> <li>29. RANGE 1 DELAY Thumbwheel Switches</li> <li>30. RANGE 2 DELAY Thumbwheel Switches</li> <li>31. RNG SEL Switch *</li> <li>32. INTL PRF Control</li> <li>33. X1/X10 INTL PRF Switch</li> <li>34. PANEL Meter</li> <li>35. PANEL METER ZERO Control</li> <li>36. MTR FCTN Switch</li> <li>37. ΔF OFFSET Control *</li> </ol> |
|--|--|

\* Light Emitting Diode (LED) Indicators, associated with control or switch, indicate that particular function is active. LED indicator is explained further under description of control or switch, where necessary.

### 3-3 TEST EQUIPMENT LIST

Adaptor, Type N to Type SMA

Amplifier, TWT, Hewlett-Packard Model 495A, or equivalent

Attenuator, 20 dB Coaxial, Texscan FP-50-20 dB, or equivalent

Calibrating RF Pulse Generator (See Figure 4-10)

Coaxial Cable, Flexible

Coaxial Tee

Detector, Crystal, Hewlett-Packard Model 423A, or equivalent

50 Ohm Load, Hewlett-Packard Model 10100C, or equivalent

Filter, High Pass, (if required), Addington Laboratories Model 103300239, or equivalent

Frequency Counter (VHF), Fluke Model 7220, or equivalent

Heterodyne (Micro Mixer, Watkins Johnson Model WJM 1-H)

Insulated Screwdriver or Metal Tipped Tuning Tool

Insulated Tuning Tool

Oscilloscope, Tektronix Model 465, 100 MHz, or equivalent

Power Meter, Boonton 4210 Microwatt meter with 4210-4B Power Sensor, or equivalent

Power Supply, 0-5 V dc

Pulse Generator, Wavetek Model 145, or equivalent

Signal Generator, L-Band Laboratory, Hewlett-Packard Model 8640B  
Frequency Double Option 002, or equivalent

Signal Generator, X-Band, Hewlett-Packard Model 8620/86290A, or  
equivalent

Tracking Generator, Tektronix TR502 or equivalent

Voltmeter, Digital (DVM), Fluke Model 830, or equivalent

VSWR Bridge

X-Band to L-Band Down Converter

## SECTION 4 - MECHANICAL ASSEMBLY DRAWINGS

### 4-1 INTRODUCTION

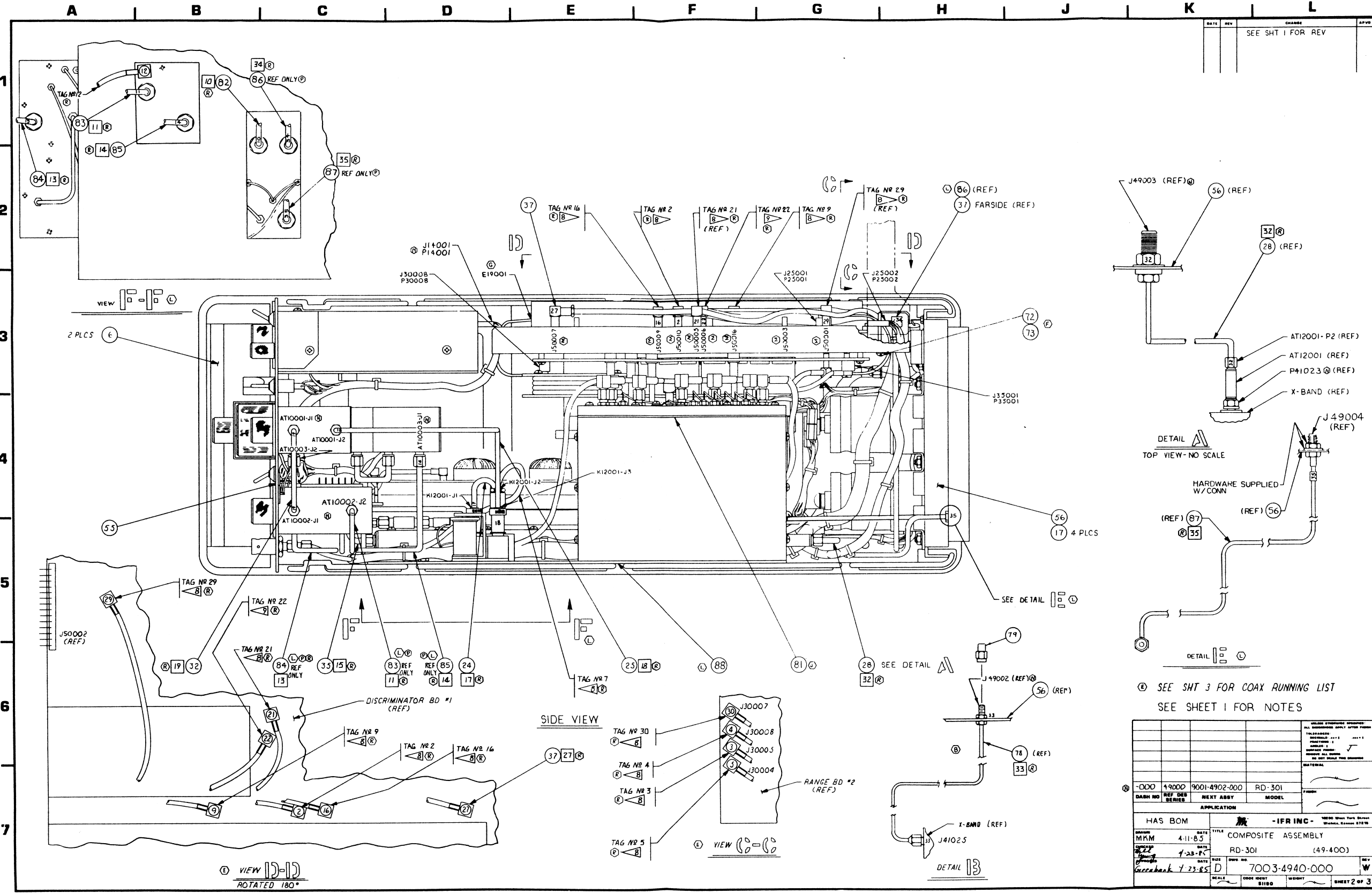
This section contains Mechanical Assembly drawings of the various modules in the RD-301. These drawings are aids for:

1. Locating and identifying various connectors, components, adjustment pots, etc.
2. Disassembly of individual modules.

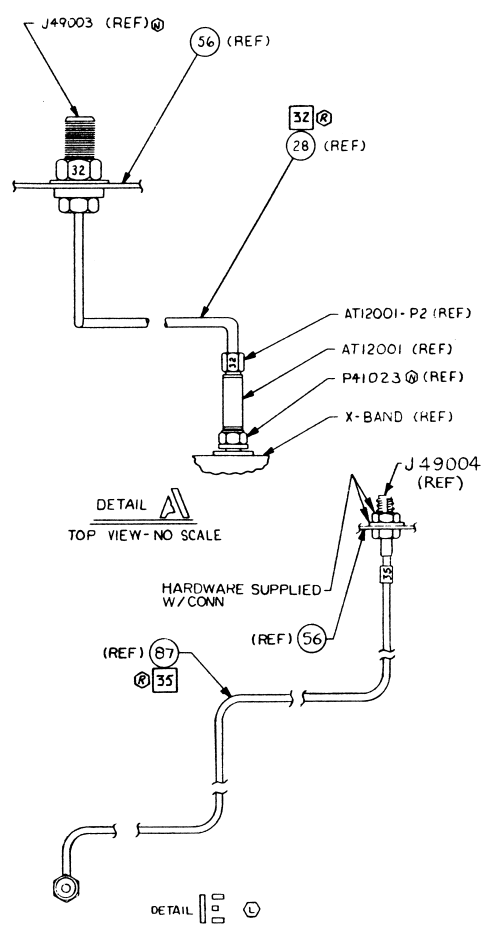
### 4-2 ALPHABETICAL INDEX OF MECHANICAL ASSEMBLIES

<u>TITLE</u>	<u>DRAWING NO.</u>	<u>PAGE</u>
Card Frame .....	7005-4940-600 .. (2 Sheets)	4-10, 4-11
Counter, Display ....	7005-4940-400 ..	4-9
Composite, RD-301 ...	7003-4940-000 .. (3 Sheets)	4-2 thru 4-4
Delay Line .....	7005-4940-800 ..	4-12
Floor Assy .....	7005-4941-300 ..	4-13
Front Panel .....	7005-4940-100 .. (2 Sheets)	4-7, 4-8
Main Diode .....	7005-4940-900 ..	4-16
Rear Panel .....	7005-4940-200 .. (2 Sheets)	4-5, 4-6
VCO #2 .....	7005-4942-400 .. (2 Sheets)	4-14, 4-15





DATE	REV	CHANGE	APPROV
		SEE SHT 1 FOR REV	



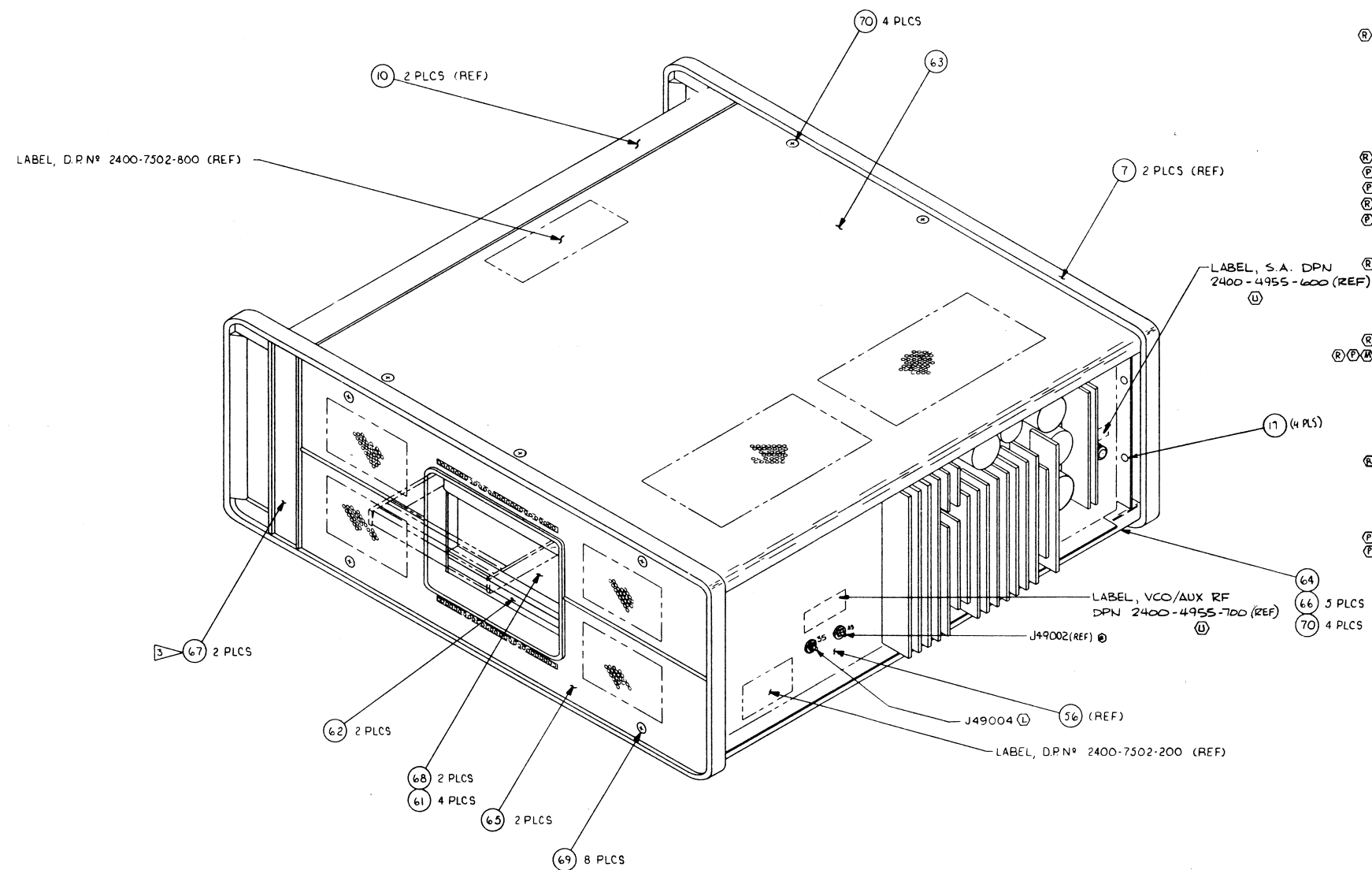
SEE SHT 3 FOR COAX RUNNING LIST  
SEE SHEET 1 FOR NOTES

APPLICATION				MATERIAL	
① -000	49000	9001-4902-000	RD-301		
DASH NO	REF DES	NEXT ASSY	MODEL		
HAS BOM				-IFR INC -	
MKM	4-11-85	DATE	TITLE	COMPOSITE ASSEMBLY	
	4-23-85	DATE	RD-301	(49-400)	
Garcaback 4-23-85		DATE	SIZE	7003-4940-000	REV W
		SCALE	CODE	WEIGHT	SHEET 2 OF 3

DATE	REV	CHANGE	APPRO
		SEE SHT 1 FOR REV	

COAX RUNNING LIST

ITEM N°	TAG N°	FROM TERMINAL	REF N°	TO TERMINAL	REF N°	D.P. NUMBER	NOTES
(R)(M)	1	FRONT PANEL	J10007	DETECTOR	J17001	6050-0062-220	TEST VIDEO
(R)	2		J10008	DISCRIMINATOR #1	J50010	6050-0063-300	TEST RF
(R)	3		J10009	RANGE #2	J30005	6050-0062-650	SYNC
(R)	4		J10010	RANGE #2	J30008	6050-0062-650	DELAYED SYNC
(R)	5		J10011	RANGE #2	J30004	6050-0062-400	EXIT TRIG
(R)	29		J10016	X-BAND	J41024	6042-4980-900	I20W IN
(R)	7		J10013	RELAY / NO	K12001-J2	6050-0091-050	IF OUT
(R)	8		J10014	DETECTOR	J17004	6050-0061-100	DET OUT
(R)(M)	9	FRONT PANEL	J10015	DISCRIMINATOR #1	J50016	6050-0062-220	01V/MHz
(P)(L)	B2	VCO	J49004	PRESCALER	J23001	6042-4985-700	REF ONLY
(P)(L)	B3		J48008	MAIN ATTEN	A70002-J2	6042-4986-000	REF ONLY
(R)(P)	12		J48007	IF GEN	J36003	6050-0931-650	REF ONLY
(P)(L)	B4		J48010	R2 ATTEN	A70003-J2	6042-4985-000	REF ONLY
(L)	B5	VCO	J48011	R2 ATTEN	A70003-J1	6042-4985-900	
(L)	35	Y-BAND	J41027	AT49001-P1		6042-4983-800	
(R)(M)	16	AT49001-J1		DISCRIMINATOR #1	J50009	6050-0562-100	
(R)	24	MAIN DIODE SW		RELAY / NC	K12001-J1	6042-4980-300	
(R)	25	RELAY / COMM	K12001-J3	AT10001-J2		6042-4980-400	
(R)	32	AT10002-J1		AT10001-J1		6042-4982-200	
(R)	20	AUXILIARY BD	J28003	IF OSC	J33001	6050-0562-750	
(R)(M)	21	AUXILIARY BD	J28004	DISCRIMINATOR #1	J50003	6050-0043-100	
(R)(P)(M)(L)	22	VCO	J49002	DISCRIMINATOR #1	J25006	6050-1022-B20	REF ONLY
(R)	B9	X-BAND	J41028	8.25 GHz	J42001	6042-4986-400	REF ONLY
(R)	24	PRESCALER	J23002	IF OSC	J33005	6050-0930-375	
(R)	25	IF OSC	J33004	PRESCALER	J23003	6050-0930-300	
(L)	26	NOT USED					
(L)	37	DISCRIMINATOR #1	J25007		BULKHEAD COMM	6042-4984-000	
(R)	28	IF GEN	J36002	IF OSC	J33002	6050-0930-275	
(R)(M)	29	DETECTOR	J17005	DISCRIMINATOR #1	J50001	6050-0041-420	
(R)	30	DETECTOR	J17006	RANGE #2	J30007	6050-0042-020	
(L)	26	Y-BAND	J41026	MAIN DIODE SW	J37002	6042-4980-500	
(L)	28	AT12001-P2		REAR PANEL	J11083	6042-4980-800	SECRETARY
(L)	78	Y-BAND AUX OUT	J41025	REAR PANEL	J11084	6042-4985-500	
(P)(L)	B6	VCO	J48002	MTG BRACKET	BULKHEAD COMM	6042-4985-600	REF ONLY
(P)(L)	B7	VCO	J48001	REAR PANEL	BULKHEAD COMM	6042-4986-300	REF ONLY



TRIM INSTALLATION

SEE SHEET 1 FOR NOTES

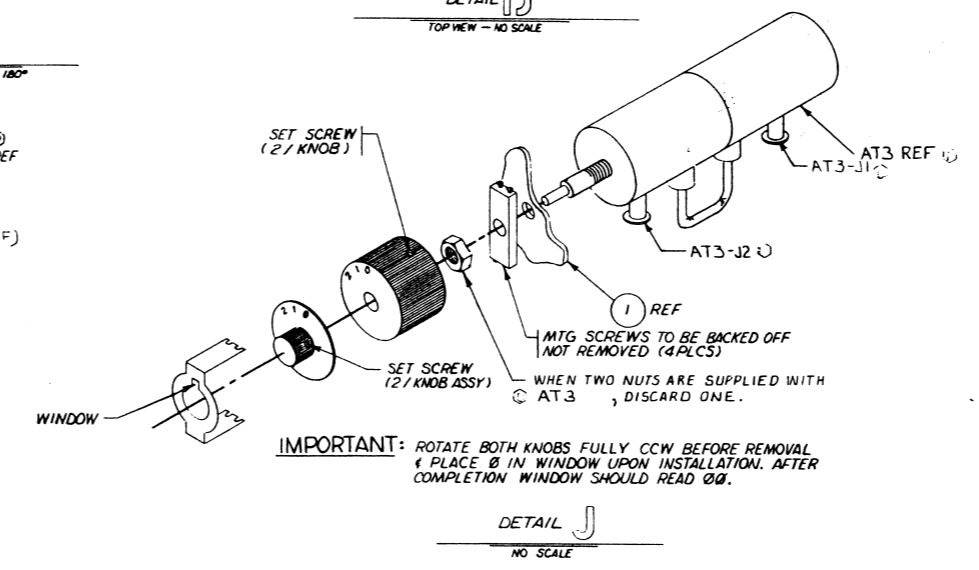
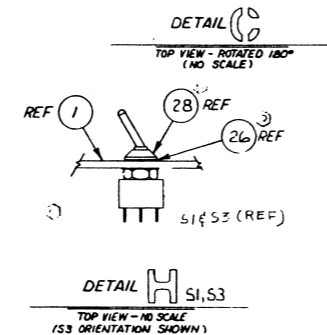
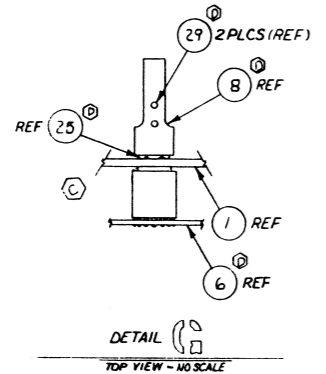
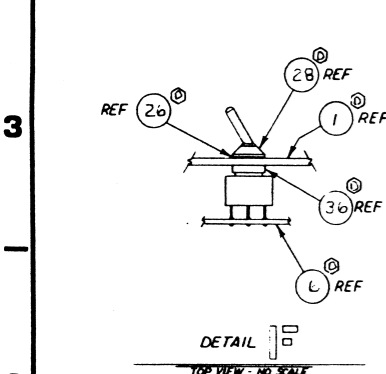
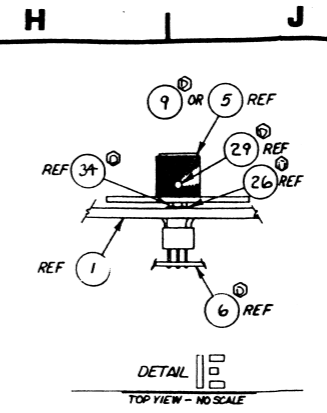
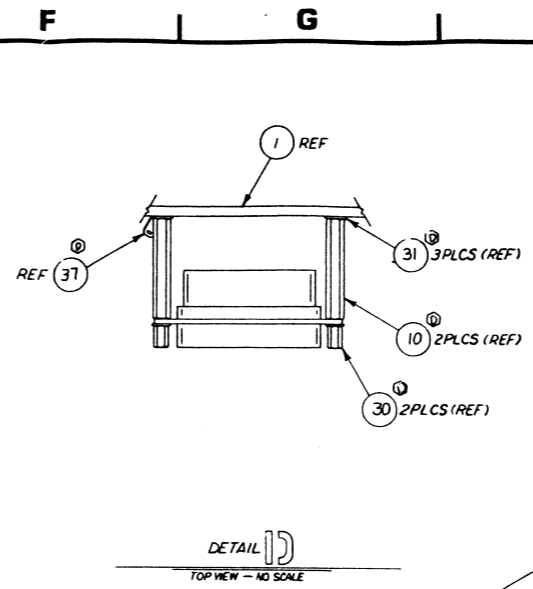
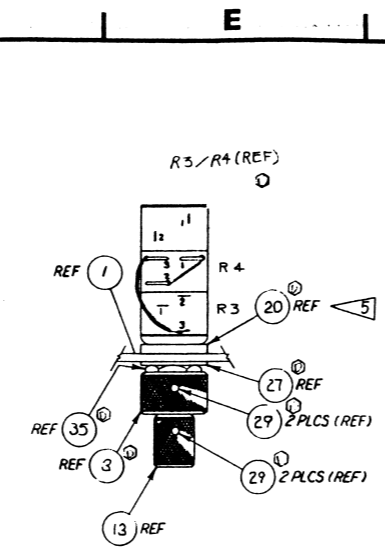
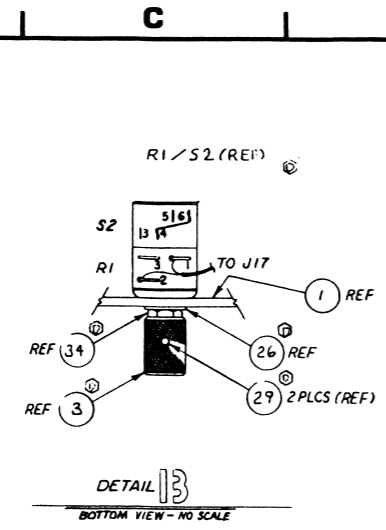
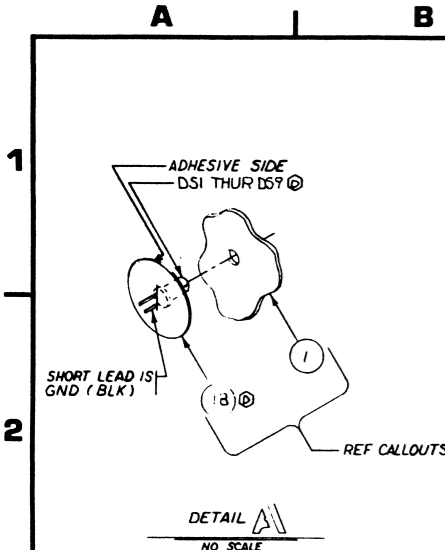
-000 49000		9001-4902-000		RD-301	
DASH NO	REF DES	NEXT ASSY	MODEL	APPLICATION	
				HAS BOM	
DATE	4-12-83	TITLE	COMPOSITE ASSEMBLY		
DATE	4-23-83	DATE	RD-301 (49-400)		
DATE	Greenbank 7-23-85	DATE	7003-4940-000		
SCALE	CODE	WEIGHT	SHEET 3 OF 3		





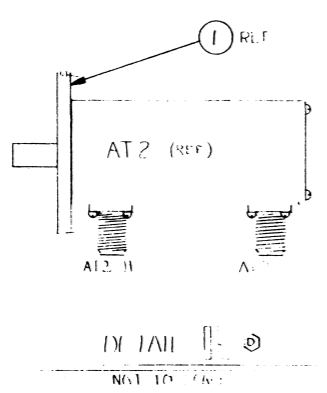
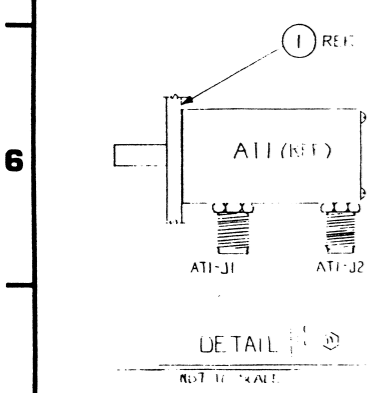
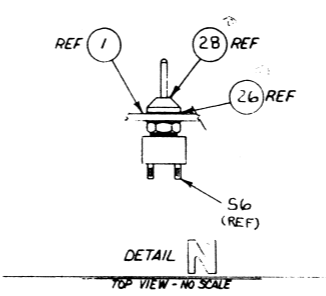
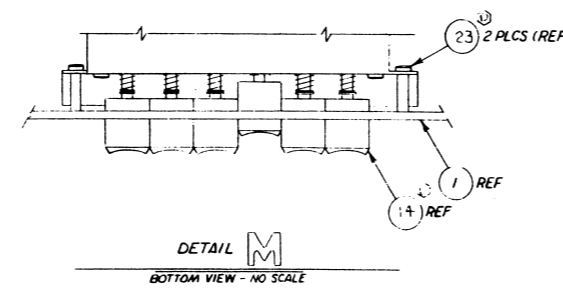
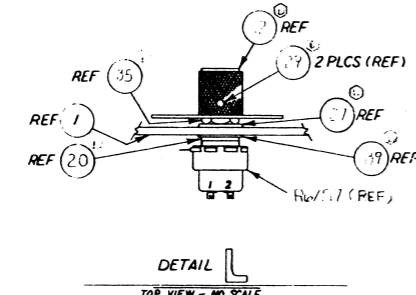
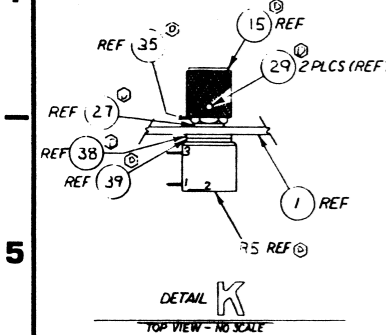


DATE	REV	CHANGE	APPR
1/15/55	A	PROD. RELEASE. ECN 6490	TE
3/24/55	B	INC RL 7003	MTA
4-29-55	C	INC RC 7719	SLR
11/24/55	D	INC RL 8097	LAH
1-8-56	E	INC ECN 9393	JS



**NOTE:**

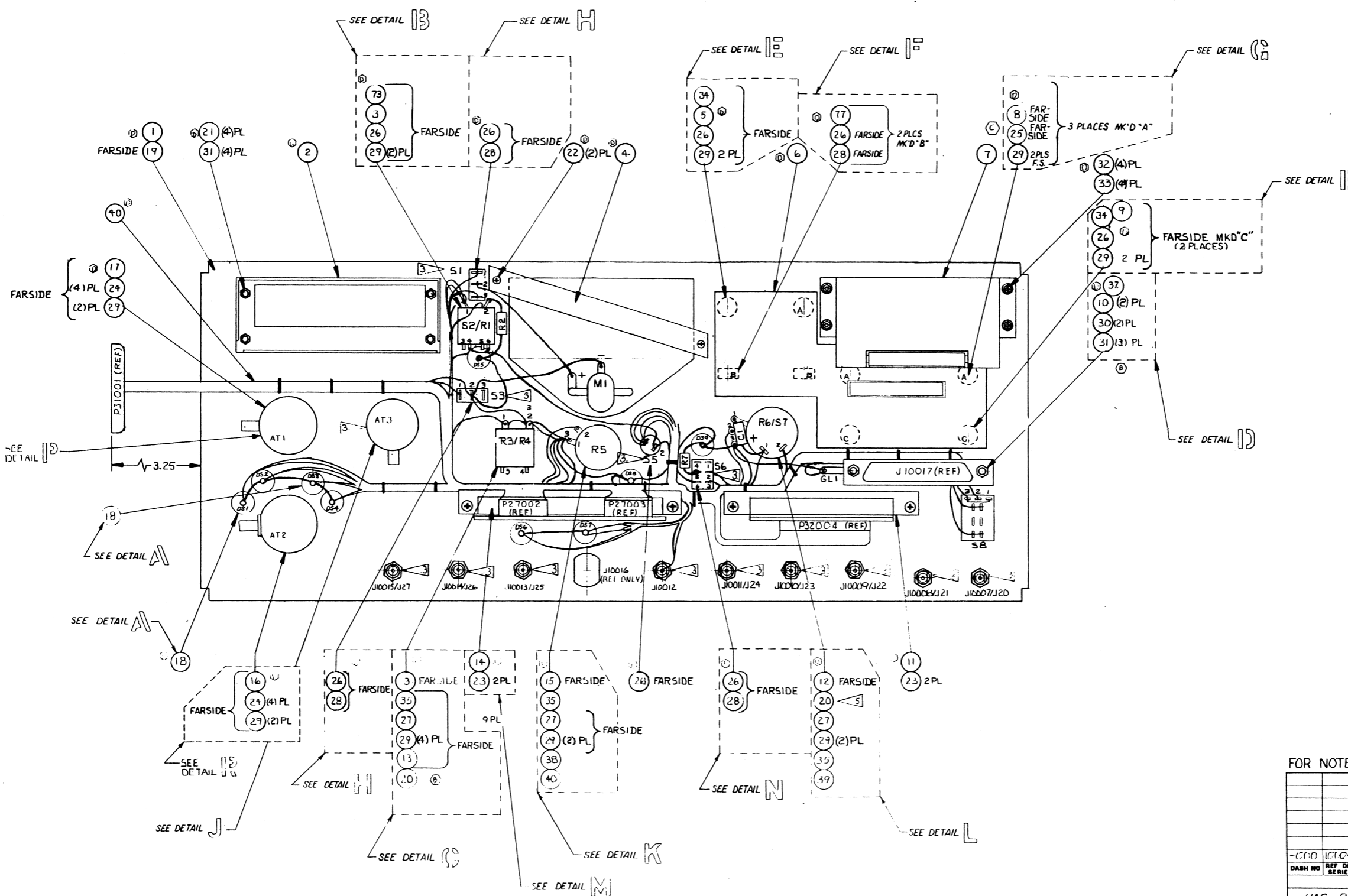
- ALL REF NO'S CARRY AN ASSIGNED DESIGNATOR SERIES. THIS DWG CARRIES SERIES 10000 (eg. R1 is R10001).
- LAST REF NO USED: J19 C1, R7 AT4, S8, P4, M1, DS9, GL1
- MTG HARDWARE SUPPLIED WITH PART.
- REFERENCE DESIGNATORS NOT USED: S4
- ITEM 46, SPACER, MAY REQUIRE SELECTIVE "FITTING".



DASH NO	REF DES SERIES	NEXT ASSY	MODEL
-100	10000	7003-4940-000	RD301
APPLICATION			
HAS B.O.M.		-IFR INC-	
DRAWN	DATE	TITLE	
L.A. Meis, Jr.	16 FEB 55	MECH ASSY FRONT PANEL RD-301 (49-401)	
CHECKED	DATE	REV	
WIK	2-2-55	E	
APPROVED	DATE	SIZE	DWG NO.
S. A. B. J.	2-2-55	D	7005-4940-100
SCALE		CODE IDENT	WEIGHT
NOTED		5180	SHEET 1 OF 2

A B C D E F G H J K L

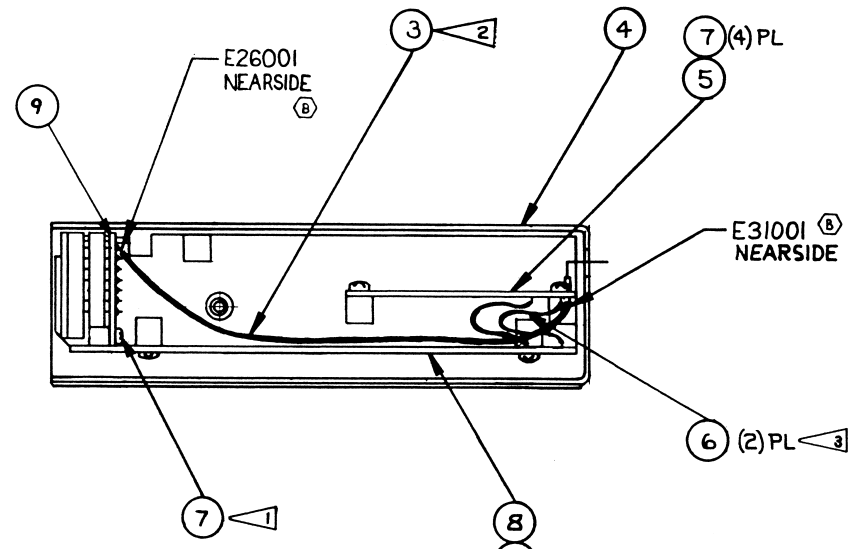
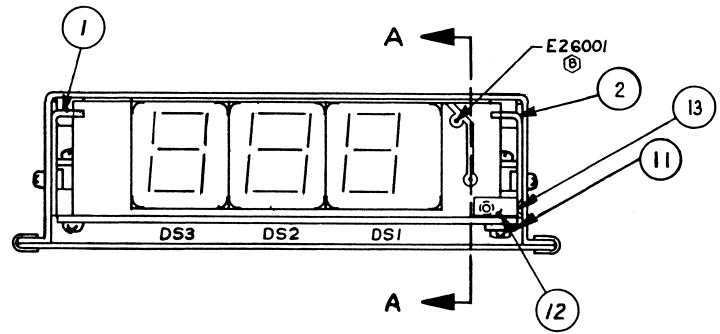
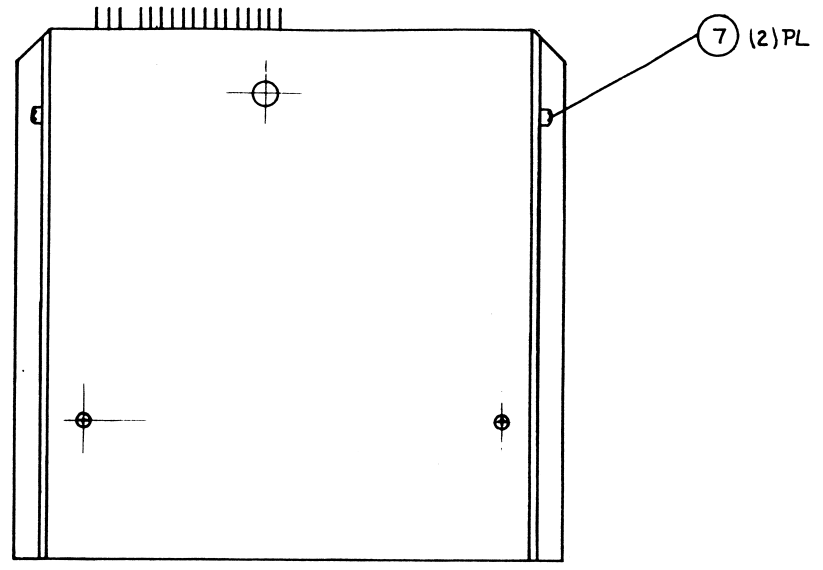
DATE	REV	CHANGE	APPROV
		SEE SHY 1 FOR REVISIONS	



FOR NOTES & DETAILS, SEE SHEET 1

-C-10		10102	7003-4940-000	RD-301
DASH NO	REF DES	NEXT ASSY	MODEL	FINISH
APPLICATION				
HAS B.O.M.		-IFR INC-		1000 West Park Street Wichita, Kansas 67215
DRAWN	DATE	TITLE		
C. LYDAY	7-31-84	MECH ASSY	FRONT PANEL	
CHECKED	DATE		(49-401)	
	2-21-85			
APPROVED	DATE	SIZE	DWG NO.	REV
		D	7005-4940-100	2
SCALE	CODE IDENT.	WEIGHT	SHEET 2 OF 2	
	B180			

DATE	REV	CHANGE	APVD
	A	PROTOTYPE RELEASE	
2/20/85	A	PRDD. RELEASE ELN 649D	VH
1/9/85	B	INC RC 8170 SJA	



VIEW A-A  
SCALE: NONE

NOTE:

- 1 ▽
- 2 ▽ (B)
- 3 ▽ (B)

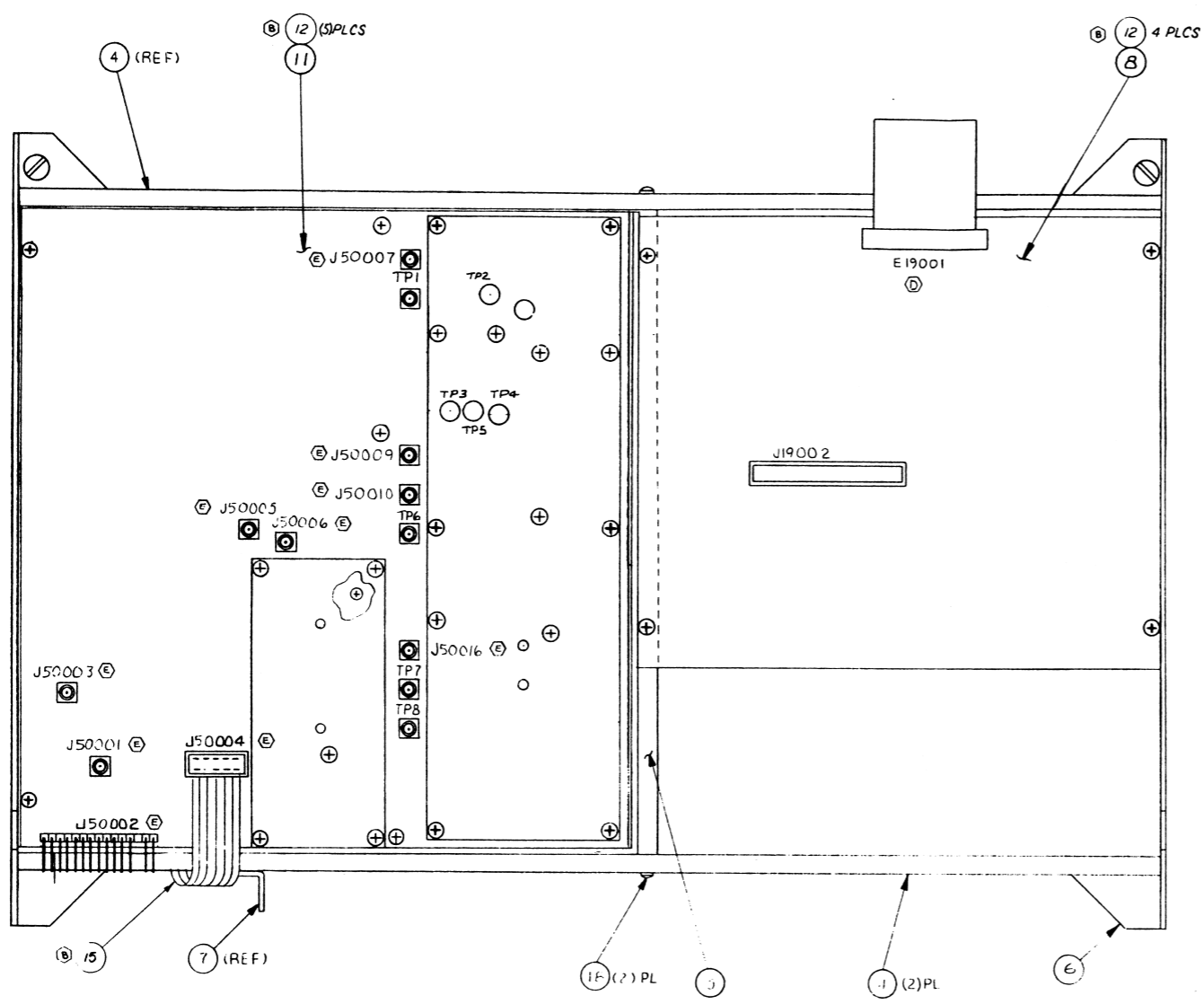
INSTALL MTG BLK ITEM\*12 ON PCB ITEM\*9. THEN FASTEN TO BRK'T ITEM\*2.  
ALIGN PC LANDS AND SOLDER TO CONNECT ITEM 9  
DISPLAY BD. TO ITEM 8 LOGIC BD

WIRE ITEM 3, SOLDERS FROM E31001 (BOTTOM SIDE OF  
ITEM 5 GATING BD) TO E26001 ITEM 9, DISPLAY BD.

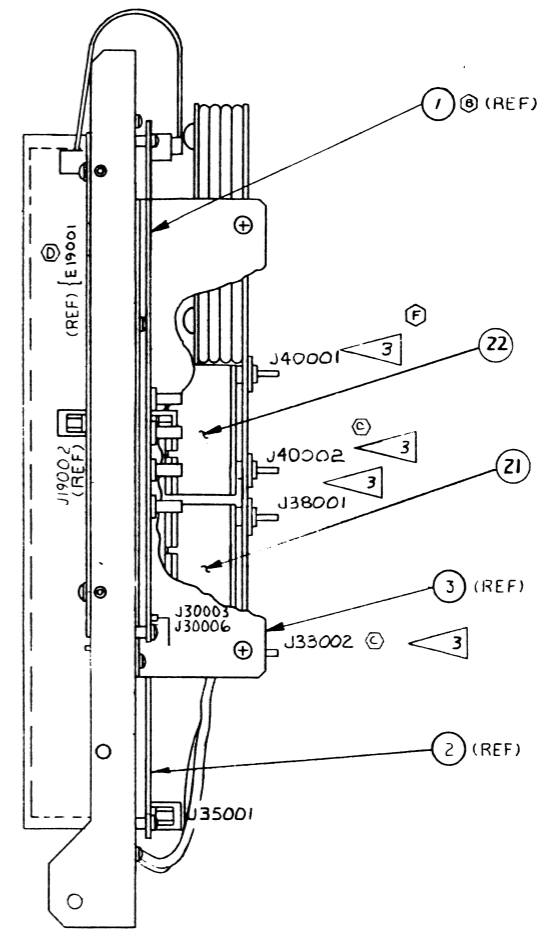
SOLDER FLEXSTRIPS ITEM\*6 TO PCBs ITEM\*5 (BOTTOM SIDE) &  
ITEM\*8 TOPSIDE BEFORE FASTENING TO NUT BLK'S.  
(E21003 TO E31003 & E21004 TO E31004)

UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS APPLY AFTER FINISH			
TOLERANCES: DECIMALS: .015 .005 FRACTIONS: 1/16 ANGLES: 1/2			
SURFACE FINISH: <input checked="" type="checkbox"/> / REMOVE ALL BURRS DO NOT SCALE THE DRAWING			
MATERIAL SEE B.O.M.			
FINISH //			
(B) -400	14000	7003-4940-000	RD-301
DASH NO	REF DES SERIES	NEXT ASSY	MODEL
APPLICATION			
- IFR INC - 1000 West York Street Wichita, Kansas 67215			
DRAWN C. LYDAY	DATE 10-19-84	TITLE MECH ASSY, DISPLAY COUNTER (49-404)	
CHECKED Kell Young	DATE 2-18-85	SIZE C	DWG NO. 7005 4940-400
APPROVED Greenbank	DATE 2-20-85	SCALE 1:1	REV B
CODE IDENT 51180		WEIGHT //	SHEET   OF

DATE	REV	CHANGE	APPROV
	A	FORMAL DRAWING	
02 NOV 1964	B	REV PER MKUP	W
3/2/65	B	PRCD RELEASE ECN1470	W
5-2-65	C	INC RC 6990 RW	SR
5/11/65	D	INC RC 7797 JS	
1-8-66	E	INC ECN 8053 JS	W
1-7-66	F	INC ECN 8078 WAW	VH



TOP VIEW



NOTES:

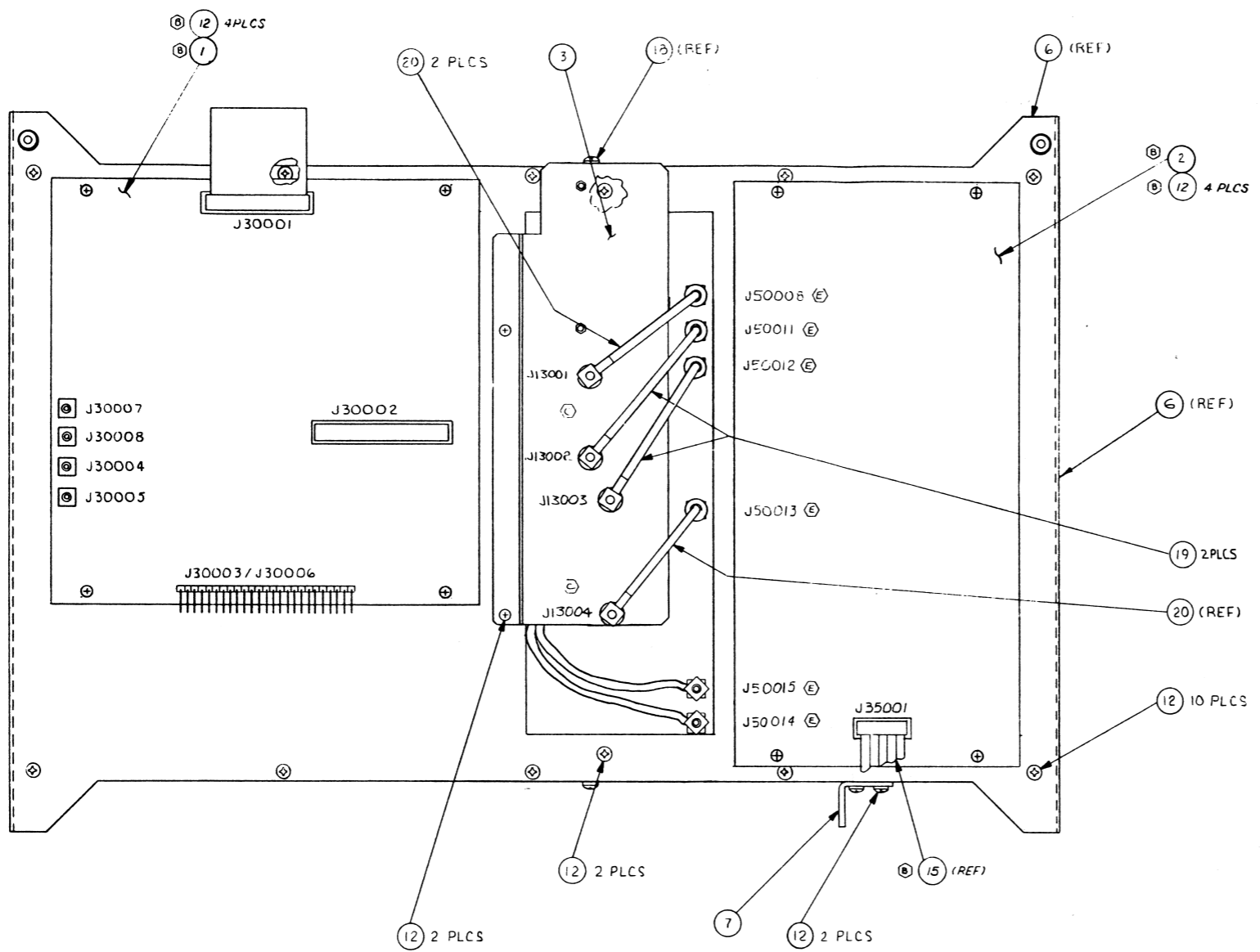
- ALL REF. N°'S CARRY AN ASSIGNED DESIGNATOR SERIES. THIS DWG CARRIES SERIES 13XXX (e.g., J1 IS J13001).
- ITEM N° NOT USED: 9, 10, 13, 14, 16, 17

(F) 3. HARDWARE FURNISHED WITH ASSYS

SEE SEPARATE BILL OF MATERIALS

DASH NO		00XXX	7003-4940-000	RD-301	FINISH
REF DES SERIES					
NEXT ASSY					
MODEL					
APPLICATION					
HAS BOM		-IFR INC-		10800 West York Street Wichita, Kansas 67202	
DRAWN	C. LYDAY	DATE	10-2-84	TITLE	MECH ASSY CARD FRAME
CHECKED	L. A. Mair, Jr.	DATE	20 MAR 85		49-406
APPROVED		DATE	3-29-85	SIZE	DWG NO
				D	7005-4940-600
				SCALE	WEIGHT
				1:1	1110
					SHEET 1 OF 2

DATE	REV	CHANGE	APVD
	A	SEE SHEET 1	



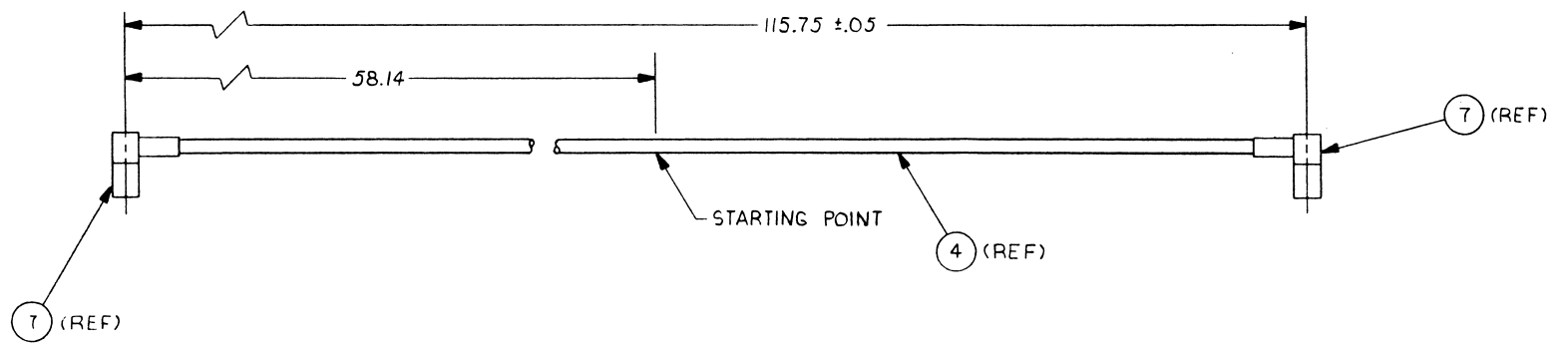
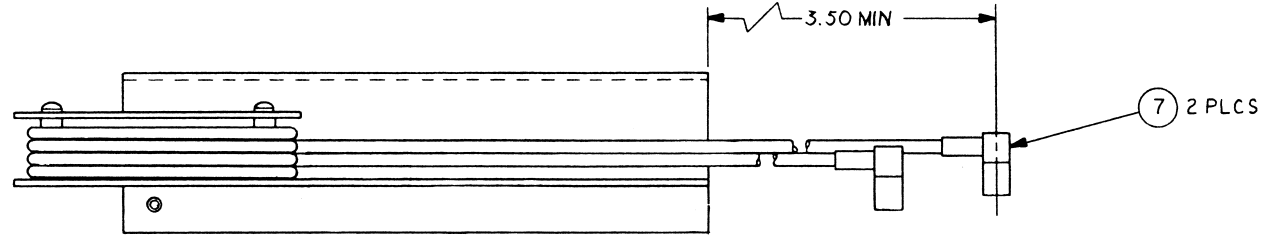
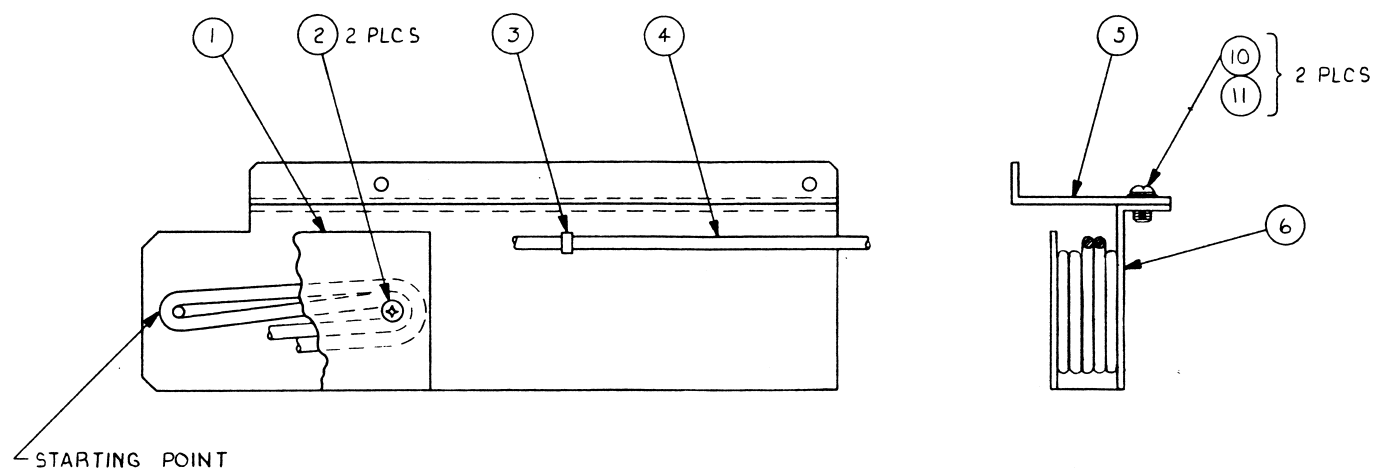
BOTTOM VIEW

SEE SHT 1 FOR NOTES

UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS APPLY AFTER FINISH			
TOLERANCES: *** ±			
FRACTIONS: 1/16 *** ±			
ANGLES: 1/2			
SURFACE FINISH: R0.8			
REMOVE ALL BURRS DO NOT SCALE FROM DRAWING			
MATERIAL: _____			
FINISH: _____			
DASH NO	REF DES	NEXT ASSY	MODEL
00XXX	7003-4940-000	RD-301	
APPLICATION: _____			
HAS BOM		- IFR INC - 10800 West York Street Wichita, Kansas 67218	
DRAWN	DATE	TITLE	REV
C. LYDAY	10-9-84	MECH ASSY	
CHECKED	DATE	CARD FRAME	
L. A. Mays, Jr.	29 MAR 85		49-406
APPROVED	DATE	SIZE	DWG NO
Green...k	3-29-85	D	7005-4940-600
SCALE: _____		CODE IDENT.	WEIGHT
		B180	
			SHEET 2 OF 2

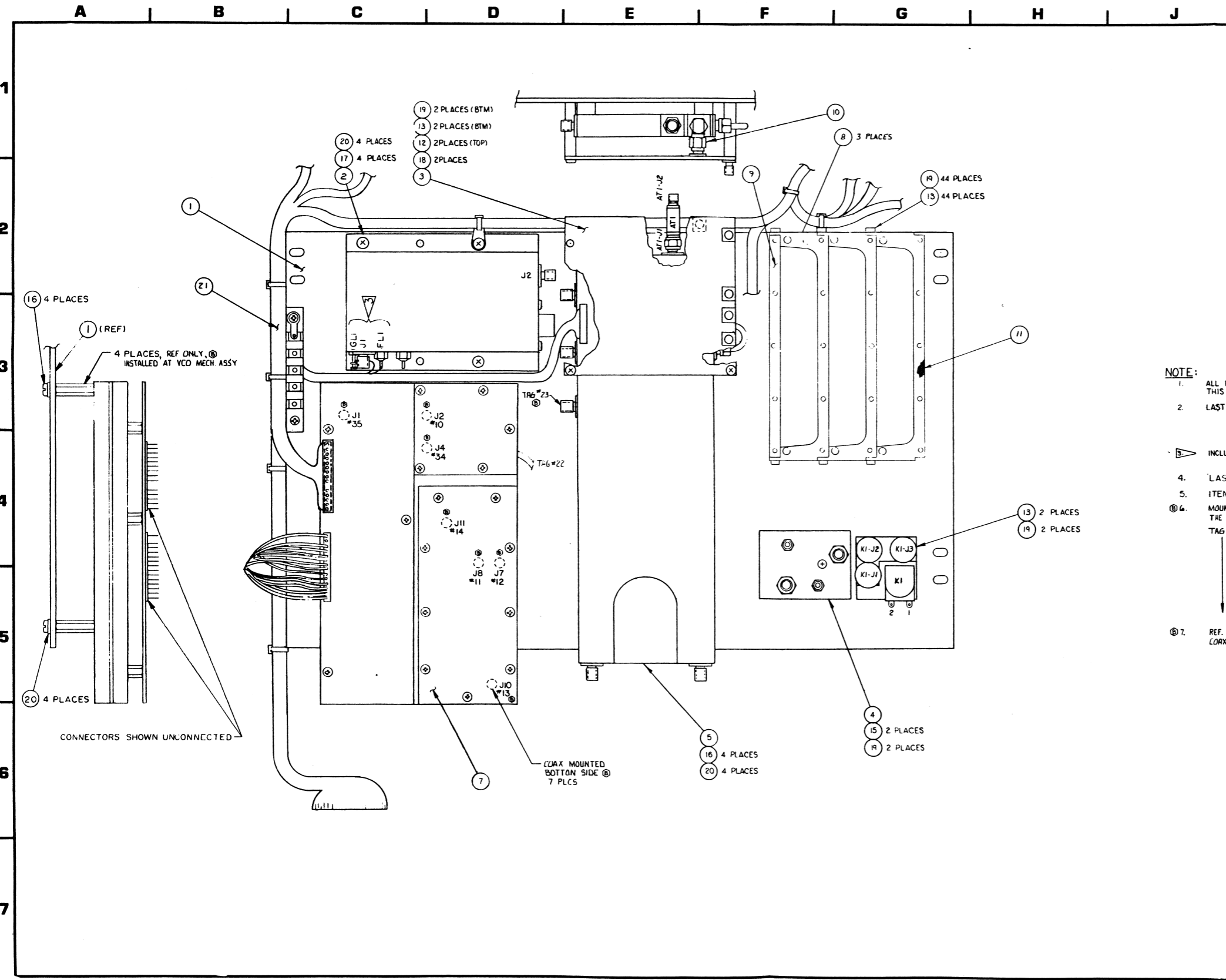
A B C D E F G H

DATE	REV	CHANGE	APVD
7/21/85	A	PRDD. RELEASE ECN 649D	72
1/1/86	B	INC ECN 807B WAW	VJH



UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS APPLY AFTER FINISH			
TOLERANCES: DECIMALS: ±0.05 ±0.2			
FRACTIONS: ±			
ANGLES: ±			
SURFACE FINISH: REMOVE ALL BURRS DO NOT SCALE THIS DRAWING			
MATERIAL			
FINISH			
DASH NO	REF DES SERIES	NEXT ASSY	MODEL
13 XXX	7005-4940-600	RD-301	
APPLICATION			
<b>- IFR INC -</b>			
10000 West York Street Wichita, Kansas 67215			
DRAWN	DATE	TITLE	
MKM	3-11-85	DELAY LINE ASSY	
CHECKED	DATE	RD-301	(49-408)
APPROVED	DATE	SIZE	DWG. NO.
G. ...	3-22-85	C	7005-4940-800
SCALE		CODE IDENT	WEIGHT
1:1		51190	
SHEET			OF 1

DATE	REV	CHANGED BY	APPROVED
2/16/84	A	PROD. REL. PER ECM BOSE	
5/5/87	B	INC ECM 8052 ADDED COMA TO DWG.	
	C	INC RC 9560	



**NOTE:**

1. ALL REF NO'S CARRY AN ASSIGNED DESIGNATOR SERIES. THIS DWG CARRIES SERIES SIXXX (eg GL1 is GL51001).
2. LAST REF NO USED: GL1 AT1-J2  
FL1 K1-J3  
J2  
K1  
AT1
3. INCLUDED IN PURCHASE OF ASSOCIATED SUBASSY.
4. LAST ITEM NO USED: 20
5. ITEM NO'S NOT USED: 14
6. MOUNT THE FOLLOWING CABLES BEFORE INSTALLING THE VCO TO THE FLOOR ASSY.  
TAG # 10-6042-4985-700  
11-6042-4986-000  
12-6050-0931-650  
13-6042-4985-800  
22-6050-1022-370  
34-6042-4985-600  
35-6042-4986-300  
14-6042-4985-700  
23-6042-4986-400
7. REF. COMPOSITE ASSY DRAWING FOR DETAILS ON COAX INSTALLATION (7003-4940-000)

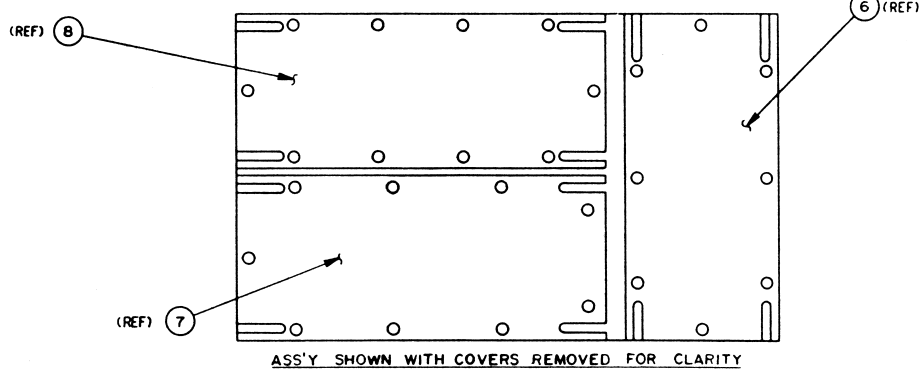
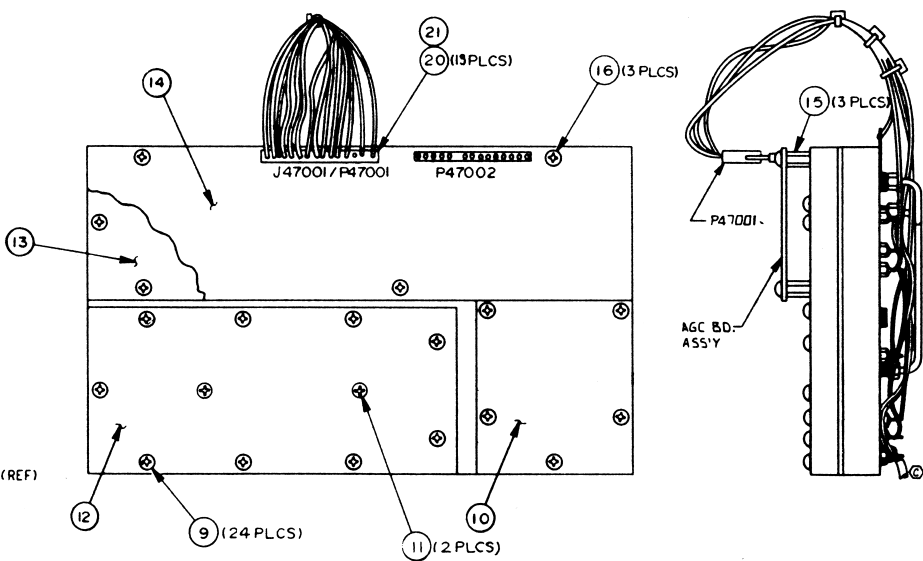
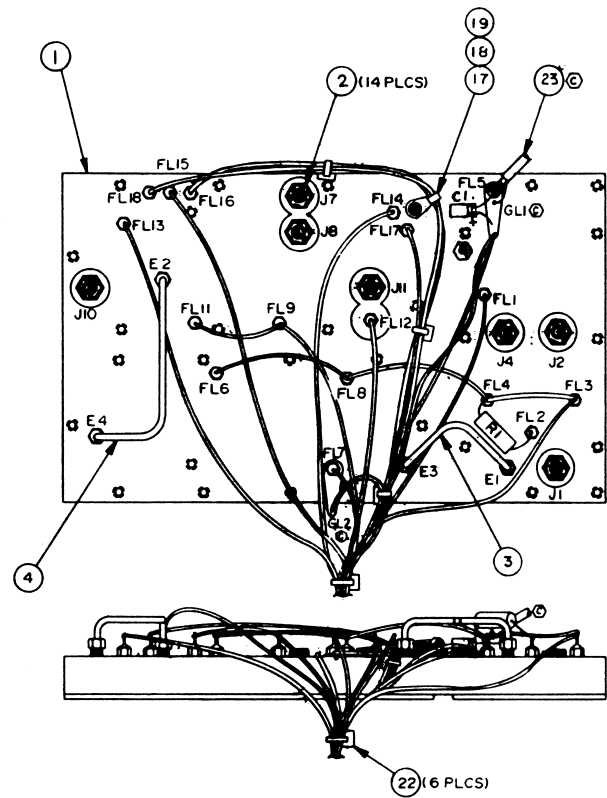
DASH NO		REF DES SERIES		NEXT ARBY		MODEL	
7003-4940-000		RD301					
APPLICATION							
- IFR INC -							
DRAWN		DATE		TITLE		REV	
SIGLER		12/16/83		MECH ASSY - FLOOR			
CHECKED		DATE		49-413			
10/10/85		12-23-85					
APPROVED		DATE		DASH NO		REV	
E. Wheeler		12/24/85		7005-4941-300		C	
SCALE		CODE IDENT.		WEIGHT		SHEET [OF]	
1:1		8180				1 OF 1	



REV	NO	DATE	BY	CHKD	REASON
1	A				ISSUED FOR CONSTRUCTION
2	B				1 INC RC 8200
3	C				1 INC ECN 8641
4	D				1 INC ECN 90271 7027A DAW
5	E				1 INC RC 9268
6	F				1 INC ECN 10238
7	G				1 INC ECN 10847 "CHILDS"

LINE NO	FROM	TO	COLOR	AWG	LG
1	P47001-1	FL48018	BRN	26	11.5
2	-2	FL48017	BLU	26	7.0
3	-3	FL48016	ORN/WHT	11	11.0
4	-4	FL48007	YEL/WHT	11	4.5
5	-5	GL48001	BLK	7	7.5
6	-6	FL48001	GRN	7	7.0
7	-7	FL48003	RED	11	4.5
8	-8	FL48012	VIO	16	6.0
9	-9	FL48009	GRA	26	5.7
10	-10	FL48014	WHT	26	7.5
11	-11	FL48015	WHT/GRN	26	7.5
12	-12	FL48013	WHT/RED	26	8.0
13	-13				
14	-14	N/C			
15	P47001-15	GL48002	BLK	26	4.5

LINE NO	FROM	TO	COLOR	AWG	LG
16	FL48002	FL48004	RED	26	2.0
17	FL48003	FL48004	RED	26	2.0
18	FL48004	FL48008	RED	26	2.8
19	FL48008	FL48006	RED	26	2.5
20	FL48009	FL48011	GRA	26	1.9
21	FL48005	GL48001	BLK	7	7.5
22	FL48005	J25006	CTR (700)		
23	GL48001	J25006	SHIELD		



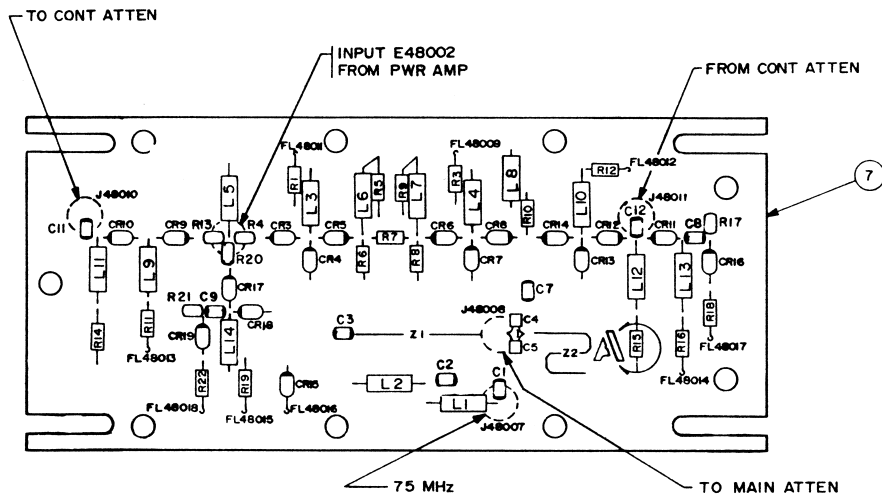
ASS'Y SHOWN WITH COVERS REMOVED FOR CLARITY

- NOTES:**
- ALL REF NO'S CARRY AN ASSIGNED DESIGNATOR SERIES. THIS DWG CARRIES SERIES 48XXX (eg. FL1 IS FL48001)
  - REF SCHEMATIC INTERCONNECT 0000-4912-900
  - LAST ITEM NO USED: 22
  - ITEM NO'S NOT USED: 5
  - LAST REF DES NO USED: 612, E4, R1, C11, J1, FL18
  - REF DES NOT USED: J3, J5, J6, J9, FL10
  - CONNECTION TO J25006 OCCURS AT COMPOSITE LEVEL.

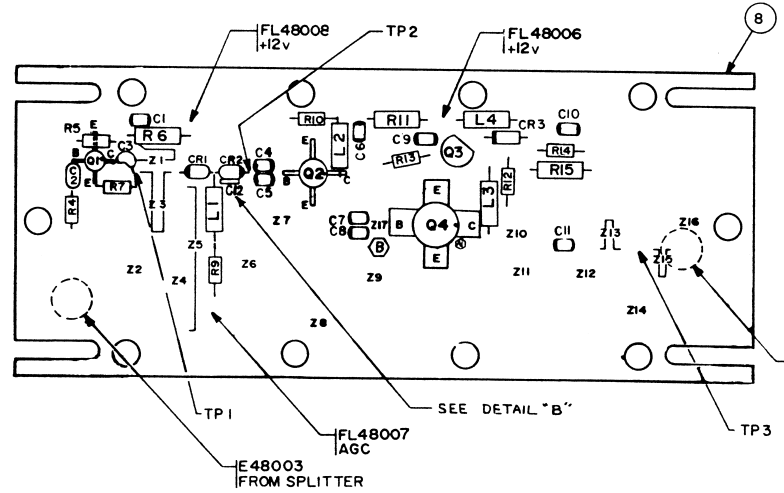
**ASSEMBLY INSTRUCTIONS**

- INSTALL FEEDTHRU'S, RF CONNS, & COAX ASS'YS (ITEM 3 & 4) ON C-BORE SIDE OF VCO CORE BLOCK (ITEM 1).
- POSITION VCO CORE BLOCK WITH FEEDTHRU COMPONENTS FACE DOWN. ALIGN PC BD'S (ITEMS 6, 7 & 8) ON TOP OF CORE BLOCK SO THAT FEEDTHRU COMPONENT LEADS CAN ENTER THE PC BD'S AT THE PROPER POINTS AS SHOWN ON THIS DWG.
- USE LAYOUT TEMPLATES TO POSITION & SECURE PC BD'S IN PROPER POSITION AS FOLLOWS:  
 0900-4955-200 TEMPLATE WITH ITEM 7  
 0900-4955-300 TEMPLATE WITH ITEM 6  
 0900-4955-700 TEMPLATE WITH ITEM 8  
 INSERT SCREWS (ITEM 9) & TIGHTEN TO SPECS.
- SOLDER ALL FEEDTHRU COMPONENTS.
- INSTALL COMPONENTS, FOUND ON SHEET 2, ONTO PC BD'S (NOT ALL COMPONENTS CAN BE INSTALLED AT THIS TIME).
- REMOVE LAYOUT TEMPLATES & INSTALL REMAINING COMPONENTS ONTO PC BD'S.
- SUBMERSE AND BRUSH CLEAN IN CONTAMINATED SOLVENT. DO NOT USE VAPOR-KLEEN MACHINE.
- INSTALL COVERS (ITEMS 10 + 11) AND SECURE THEM IN PLACE WITH ITEM 9 (SCREWS).
- ASSEMBLE COMPLETED CORE BLOCK INTO VCO NO. 2 MECH ASS'Y.

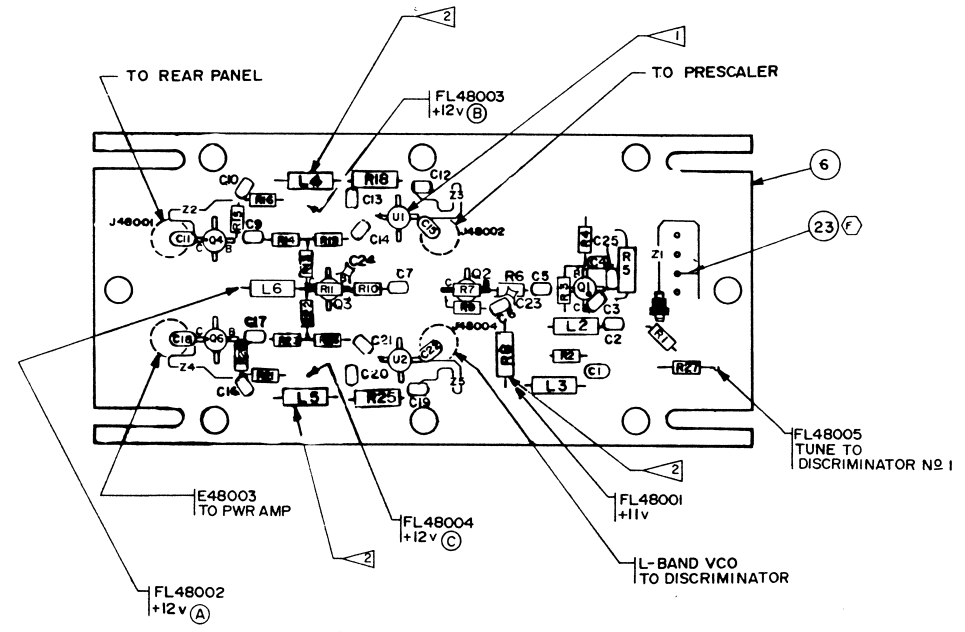
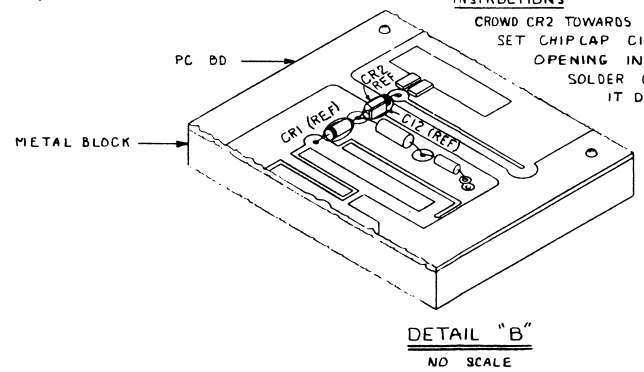
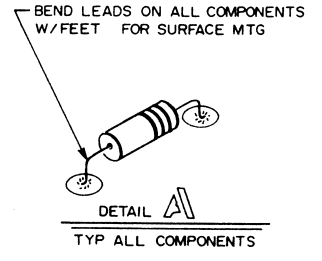
DATE	TITLE	ISSUED BY	CHKD BY
J SIGLER 12/24/64	MECH ASS'Y VCO NO 2		
REV	NO	DATE	BY
1	1		
APPLICATION			
- IFR INC -			
RD-301 (49-424)			
7005-4942-400			



**CONTOUR DIODE SW/DIPLEXER**  
REF DES SERIES 44XXX  
REF SCHEMATIC 0000-4912-400



**PWR AMP**  
REF DES SERIES 45XXX  
REF SCHEMATIC 0000-4912-400



**VCO/SPLITTER**  
REF DES SERIES 46XXX  
REF SCHEMATIC 0000-4912-400

- ASSEMBLY NOTES**
- 1 NOTE POSITION OF SLANTED LEAD FOR U1 & U2.
  - 2 L4, L5 & R8 MUST BE INSTALLED AFTER FIXTURE (TEMPLATE) IS REMOVED.

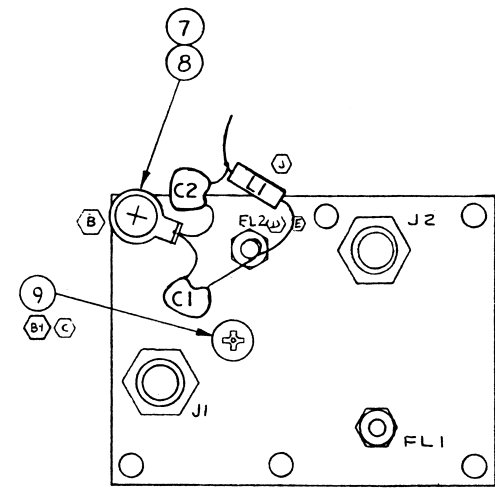
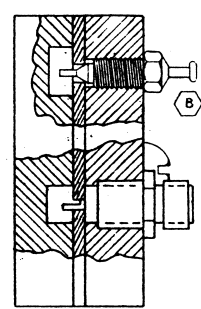
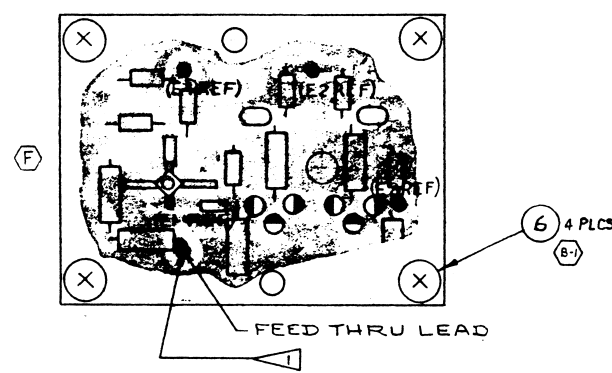
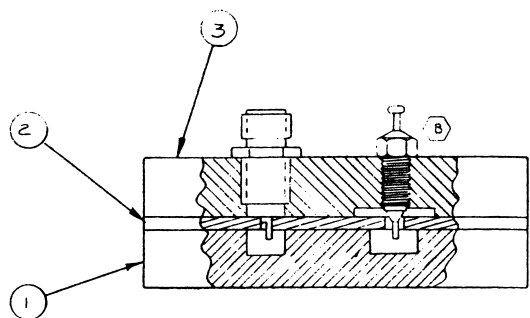
SEE SHT 1 FOR NOTES AND SPECIFICATIONS

DASH NO	REF DES SERIES	NEXT ASSY	MODEL	FINISH
	7005-4941-300	RD-301		
APPLICATION				
- IFR INC -				
DRAWN	DATE	TITLE	1000 West York Street Wichita, Kansas 67210	
J. SIGLER	12/9/85	MECHANICAL ASS'Y	VCO NO 2	
CHANGED	DATE	RD-301	(49-424)	REV
	12-23-85			G
APPROVED	DATE	SCALE	WEIGHT	SHEET 2 OF 2
	12-24-85	2:1	0.1180	

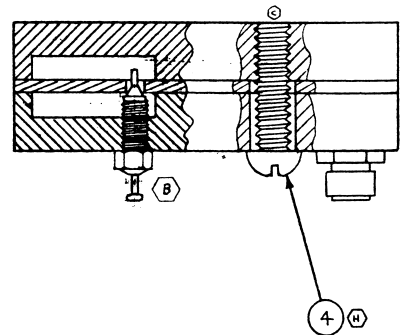
A B C D E F G H

DATE	REV	CHANGE	APPROV
10-11-84	B	REVISED FEEDTHR 4 ADD LUG 4	VH
10-11-84	B	PRODUCTION RELEASE ECN#6678	VH
10-11-84	B-1	INC RC 6704 M K M	VH
10-11-84	C	INC ECN #6678 MTH	VH
10-11-84	D	INC RC 7744 SLR	VH
10-25-84	E	INC RL 7831 LAM	VLM
11-18-84	F	INC RC 8134 DAH	OJ
11-18-84	G	INC RC 8498 AO	VLM
11-18-84	H	INC RC 9266 "CHIPS"	VLM
11-18-84	J	INC ECN 10457 RB	VLM

1  
2  
3  
4  
5  
6



NOTES:  
 1. SOLDER ONE LEAD OF R5 DIRECTLY TO THE FEED THRU LEAD.  
 \* ASSEMBLY NOTE:  
 MAKE SURE R5 IS IN A POSITION THAT WILL ALLOW THE ENCLOSURE TO SCREW TOGETHER.



UNLESS OTHERWISE SPECIFIED: TOLERANCES: DIMENSIONS APPLY AFTER FINISH DECIMALS: .001 FRACTIONS: 1/32 SURFACE FINISH: REMOVE ALL BURRS DO NOT SCALE THIS DRAWING			
MATERIAL			
FINISH			
(H) D	-900	37000	7005-4940-300 RD-301
DASH NO	REF DES SERIES	NEXT ASSY	MODEL
APPLICATION			
<b>- IFR INC -</b> 10000 West York Street Wichita, Kansas 67216			
DRAWN AL	DATE 10-11-84	TITLE MECH ASSY- MAIN DIODE SWITCH 49-409	
CHECKED Jm. Campbell	DATE 10-25-84	SIZE C	DRWG. NO. 7005-4940-900
APPROVED Bill Young	DATE 12-6-84	SCALE 2:1	CODE IDENT. S1180
		WEIGHT	SHEET 1 OF 1

## SECTION 5 - PC BOARD DRAWINGS

### 5-1 GENERAL

This section includes component layout drawings for all printed circuit boards and modules with components mounted directly in blocks for the RD-301. Drawing titles are arranged in alphabetical order while figure numbers are assigned generally in the sequence where first used in the procedures.

If a PC board has components located on both sides of the board, both top and bottom views of that PC board are shown. Otherwise, only the side with components is shown.

The drawings in this section are not intended for use in ordering spare or replacement parts. Refer to the Bills of Material corresponding with the PC boards in Section 7 for part numbers.

#### NOTE:

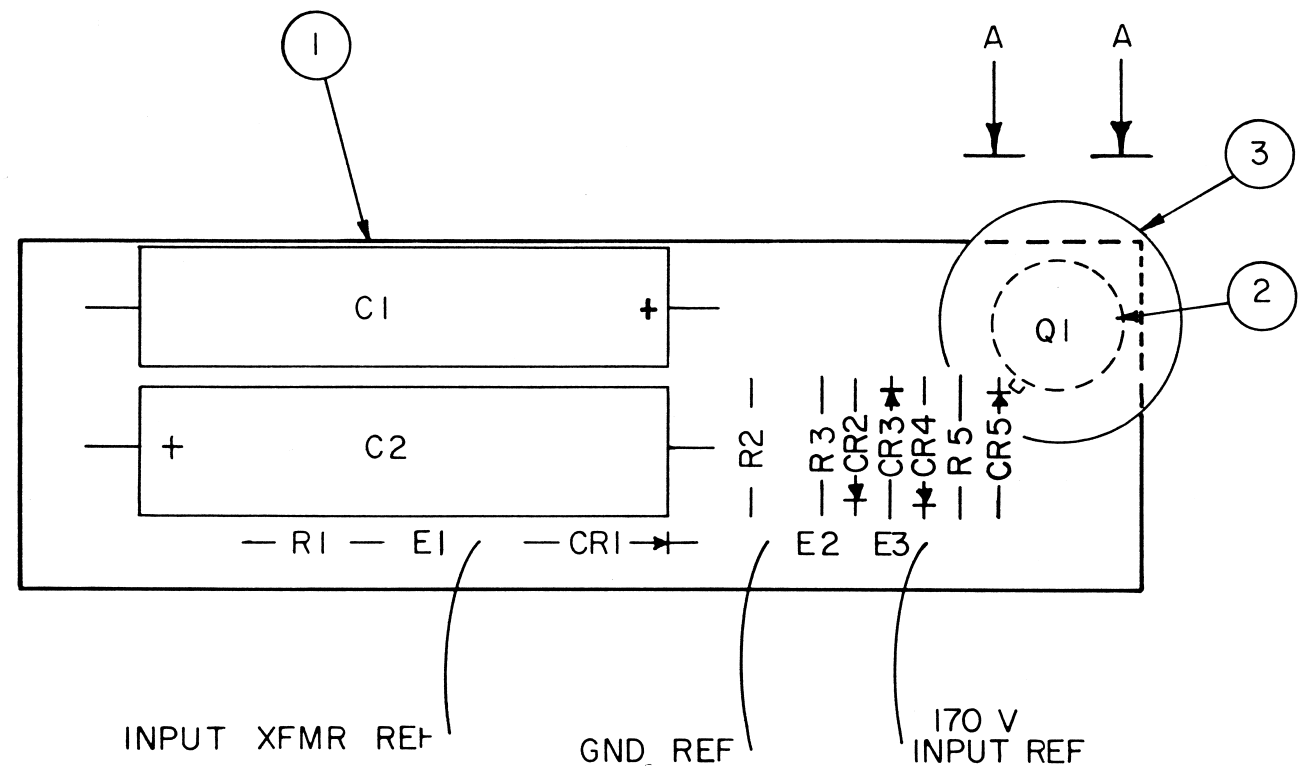
Series Reference Designator numbers are not included with these drawings. Series Reference Designators are indicated with Schematic Drawings corresponding with each PC board in Section 6.

### 5-2 ALPHABETICAL INDEX OF PC BOARDS

TITLE	DRAWING NO.	PAGE
AGC Board .....	7010-4932-700 ..	5-10
Counter Display .....	7010-2517-800 ..	5-13
Counter Gating .....	7010-2518-000 ..	5-14
Details		
Counter Logic .....	7010-4931-600 ..	5-15
Detector Buffer .....	7010-4930-100 ..	5-4
Power Circuit, Pulse Distributor		
Discriminator Bd. ...	7010-4932-800 ..	5-20, 5-21
#1	(2 Sheets)	
Discriminator Bd. ...	7010-4931-300 ..	5-25
#2		
Filter, 475 MHz .....	7010-4931-200 ..	5-22
Filter, 570-800MHz ..	7010-4931-100 ..	5-23, 5-24
(2 Sheets)		
IF Generator Power ..	7010-4931-500 ..	5-17
Amp		
IF and Marker .....	7010-4931-400 ..	5-7
Oscillators		
Main Diode Switch ...	7010-4930-000 ..	5-12
Modulation Mode .....	7010-4931-700 ..	5-11
Switch		

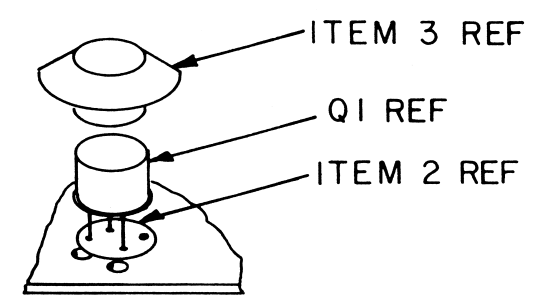
<u>TITLE</u>	<u>DRAWING NO.</u>	<u>PAGE</u>
Power Supply, ..... 170 VDC	7010-0016-000 ..	5-3
Prescaler .....	7010-4930-500 ..	5-16
Range Bd. #1 .....	7010-4930-300 ..	5-5
Range Bd. #2 .....	7010-4931-000 ..	5-18
Range Digitizer .....	7010-4930-800 ..	5-6
Switch		
Range Discrete .....	7010-4930-900 ..	5-19
Assembly		
RF Mode Switch .....	7010-4930-700 ..	5-8, 5-9
	(2 Sheets)	

DATE	REV	CHANGE	APVD
10/16/86	D	REDRAWN PER RC 9010	DAH
4-13-87	E	INC RC 9744	RB
			VLH



NOTES:

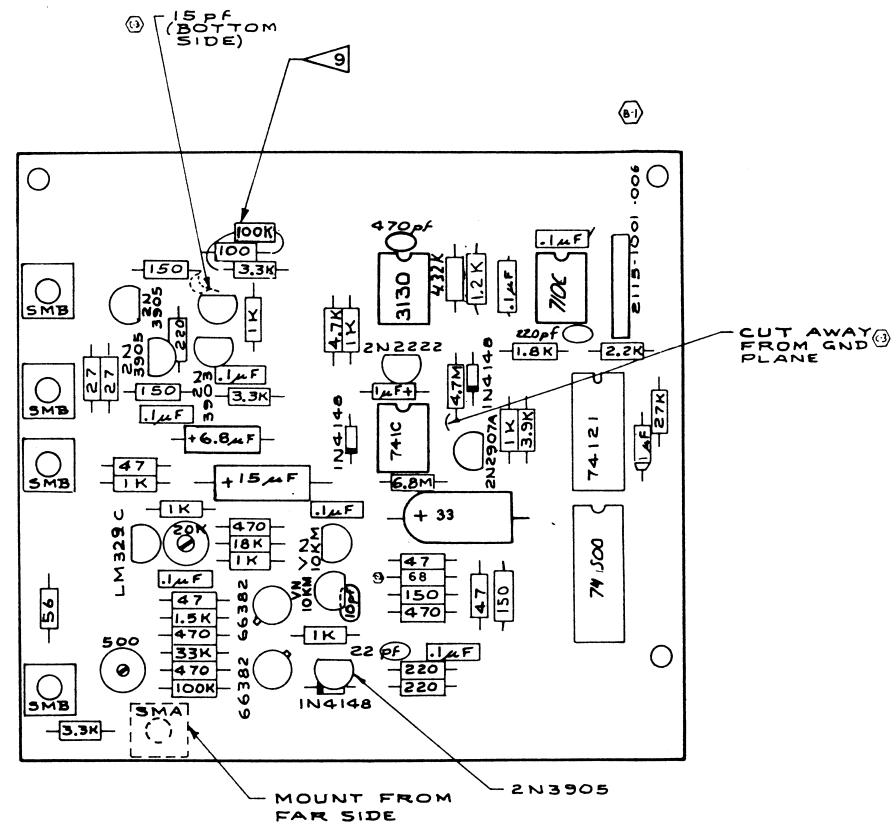
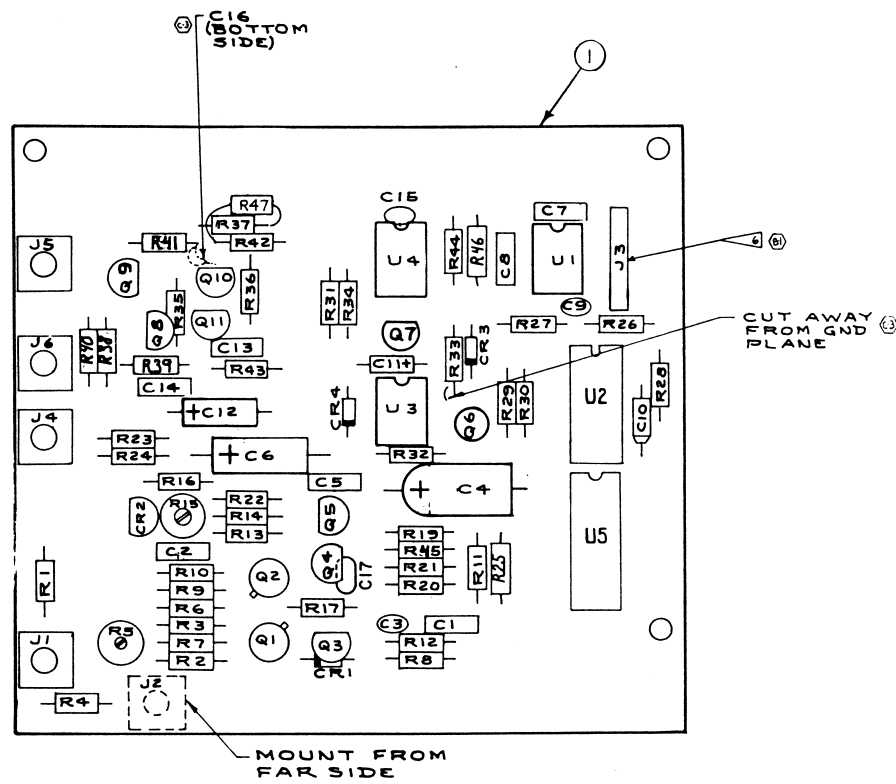
- 1 COMPONENT LEADS MAY EXTEND .04 TO .06 BEYOND THE BOTTOM OF THE BOARD AFTER SOLDERING.
- 2 MAXIMUM HEIGHT OF COMPONENTS TO BE .35 FROM COMPONENT SIDE OF BOARD.
- 3 MOUNT Q1 ON MOUNTING PAD (ITEM 2) AND COVER WITH CAP (ITEM 3).
- 4 PC BOARD IS PLATED ON ONE SIDE ONLY & COMPONENTS ARE MOUNTED ON THE NON-PLATED SIDE ONLY.



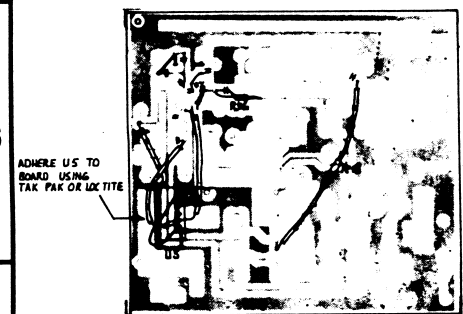
VIEW A-A  
NO SCALE

TOLERANCES: (UNLESS OTHERWISE SPECIFIED)		MATERIAL	
ALL DIMENSIONS APPLY AFTER FINISH		FINISH	
TOLERANCES: DECIMALS: .xx = ± .xxx ± .xxx ANGLES: ± SURFACE FINISH: REMOVE ALL BURRS			
		<b>IFR SYSTEMS INC</b> 10200 West York St., Wichita, Kansas 67215	
DRAWN JNV DATE 2/2/77	TITLE PC BOARD ASS'Y 170 VDC POWER SUPPLY		
CHECKED RKK DATE 2/8/77	SIZE B	DWG. NO. 7010-0016-000	REV E
APPROVED MD DATE 2/10/77	SCALE: OR AS NOTED 2:1	DO NOT SCALE THIS DRAWING	FSCM CODE 51180 SHEET   OF

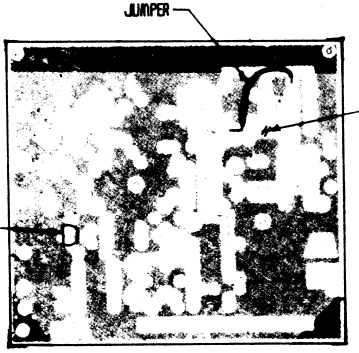
DATE	REV	CHANGE	APPROV
	A	PROTOTYPE RELEASE	
10/16/54	B	U3, PIN 3 TO GND. J6 FROM 5 PIN TO 6 PIN CONN., C4 PAD SPACING TOO SHORT, Q4 & Q5 NOT CONN. RIGHT ON PC BD, C4 CHANGED TO 33 $\mu$ f	
11/11/54	B	PRODUCTION RELEASE ECN 6190	VH
2/1/55	B-1	INC RC 4707 M.K.M.	VH
4/14/55	C	INC ECN 6752 MTR	ATH
7/17/55	C-1	INC ECN 6792 REVISE MTH	VLH
8/20/55	C-2	INC ECN 7520 AD	VLH
10/20/55	C-3	INC ECN 7897 AD	VLH
1/14/56	C-4	INC RC 8097 & RC 8210 DAH	JS
11-20-56	C-5	INC ECN 9157 JS	VLH
12-19-56	C-6	INC ECN 9336 JM	VLH



VIEW SHOWING COMPONENT PART NUMBERS OR VALUES



REVISION B SCALE 1:1 BOTTOM



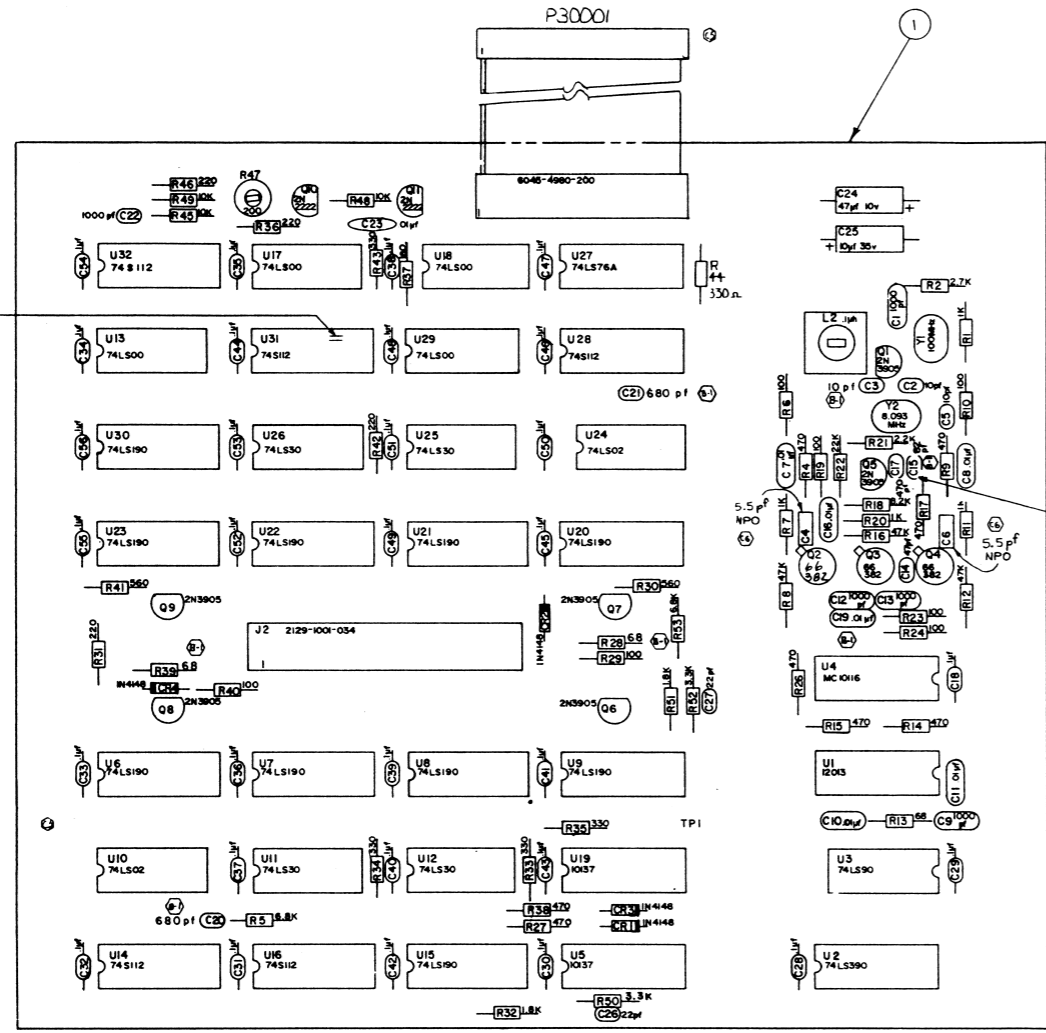
REVISION "B" SCALE 1:1 TOP

- NOTES
- ALL REF. NOS CARRY AN ASSIGNED DESIGNATOR SERIES. THIS ASSY CARRIES SERIES 17XXX. (e. g., R1 IS R17001)
  - ALL RESISTORS ARE 1/4 W, 10%.
  - ALL RESISTANCE IS EXPRESSED IN OHMS.
  - ALL CAPACITANCE IS EXPRESSED IN MICROFARADS.
  - LAST REF NO USED:
 

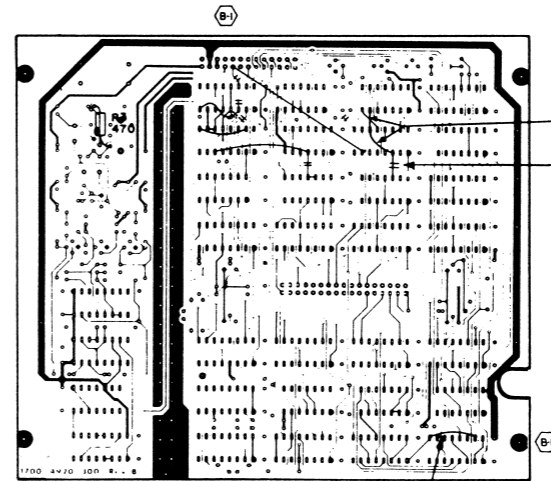
C16	Q11
CR4	R47
J6	U5
- ⑥ J3-4 IS REMOVED FOR KEY PIN
7. REF NO. NOT USED: R18
8. LAST ITEM NO USED: 1
- ⑨ R47 IS S.A.T. (SELECT AT TEST). NOMINAL VALUE: 100K  
RANGE VALUE: 82K TO 150K

DASH NO		17000	7005-4940-300	RD-301
REF DES	SERIES	NEXT ASSY	MODEL	FINISH
APPLICATION				
- IFR INC -				
16000 West York Street Wichita, Kansas 67206				
DESIGN	DATE	BY	CHKD	APP'D
A. O'BRYEN	8-20-54			
CHG'D	DATE	BY	CHKD	APP'D
HS	10-29-54			
APPROVED	DATE	BY	CHKD	APP'D
Ed. Young	10-29-54			
SCALE		CODE	WEIGHT	SHEET
2:1		8180		1 OF 1

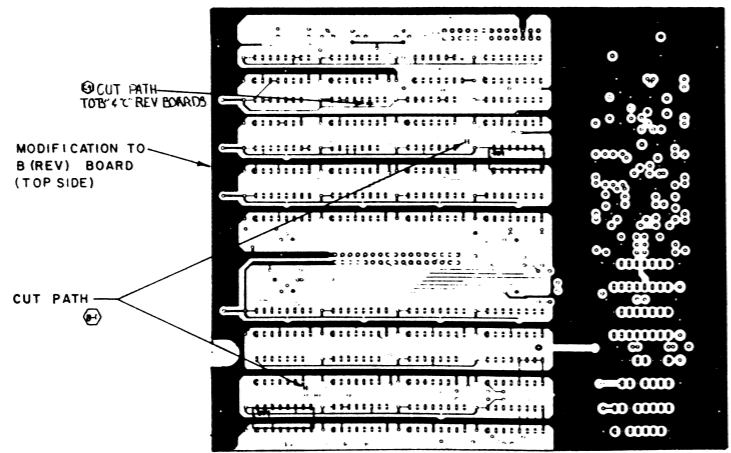
DATE	REV	CHANGE	APPROV
5-78	A	PROTOTYPE RELEASE	VLH
7-81	B	PRODUCTION RELEASE ECN 640	VLH
1-81	C	INC ECN #6838 R.W.	VLH
1-81		INC RC #6835 R.W.	VLH
1-81	C-1	INC ECN 7241	AD
1-81	C-2	INC RC 7695	SLR
1-81	C-3	INC RC 7797	JS
1-81	C-4	INC RC 8127	DAH
1-81	C-5	INC RC 8097	DAH
1-81	C-6	INC ECN 7631	JS
1-81	C-7	INC ECN 9461	DAH
1-81	D	INC RC 10864	no



- NOTE:**
- ALL REF. NO.'S CARRY AN ASSIGNED DESIGNATOR SERIES. THIS DRAWING CARRIES SERIES 19XXX. (I.E. R1 & R1000)
  - ALL RESISTORS ARE 1/4w, 5%, UNLESS OTHERWISE SPECIFIED.
  - ALL RESISTANCE IS EXPRESSED IN OHMS.
  - REFERENCE SCHEMATIC DRAWING NO. 0000-4910-300



// \* CUT PATH (C)  
 MODIFICATION TO B (REV) BOARD  
**JUMPER WIRE LOCATION DETAIL**  
 (ALL JUMPERS TO BE OF 26 GA BUSS WIRE)  
 DPN 1050-0000-075 WITH SLEEVING, 26 GA TFE TUBING  
 DPN 6011-0018-001  
 (BOTTOM SIDE)



DASH NO	REF DES	SERIES	NEXT ASSY	MODEL
-300	19000	7005-4940-600	RD 301	

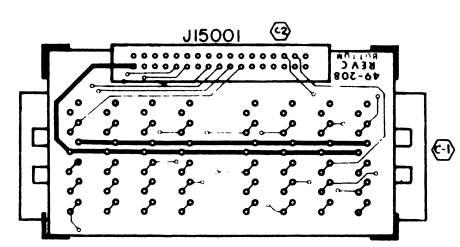
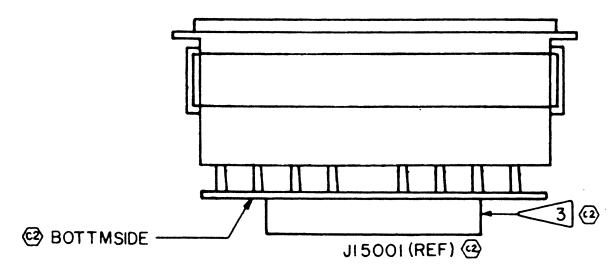
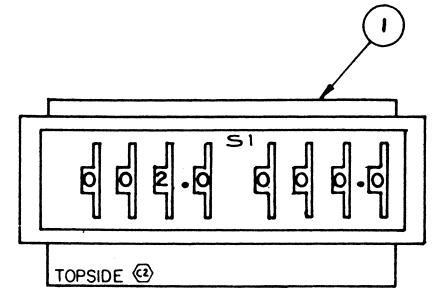
  

DATE	TITLE	APP. NO.	REV.
15 Dec 84	P.C. BOARD ASSY RANGE BOARD #1	7010-4930-300	D



DATE	REV	CHANGE	APVD
	A	PROTOTYPE RELEASE	
	B	REVISED & REDRAWN	
10/24/84	C	ADD NEW ARTWORK	VH
10-30-84	C	PRODUCTION RELEASE ECN 6490	VH
4-15-85	C-1	INC RC 6879 RW	VLH
2/26/86	C-2	INC RC 9078	DAH VLH

1  
2  
3  
4  
5  
6



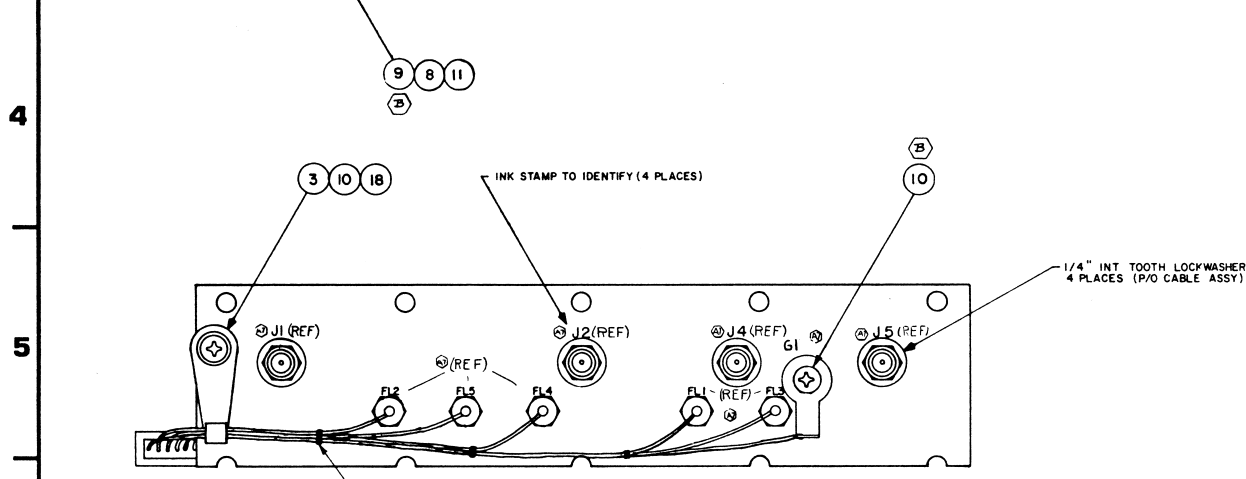
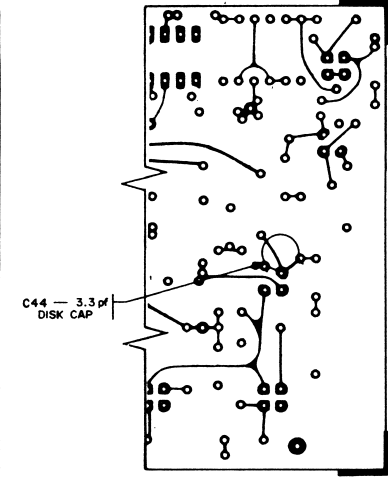
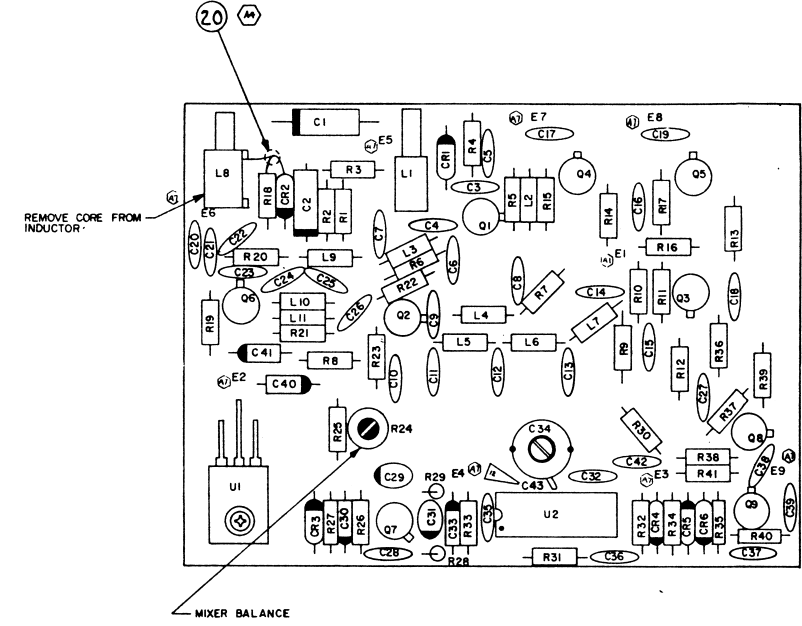
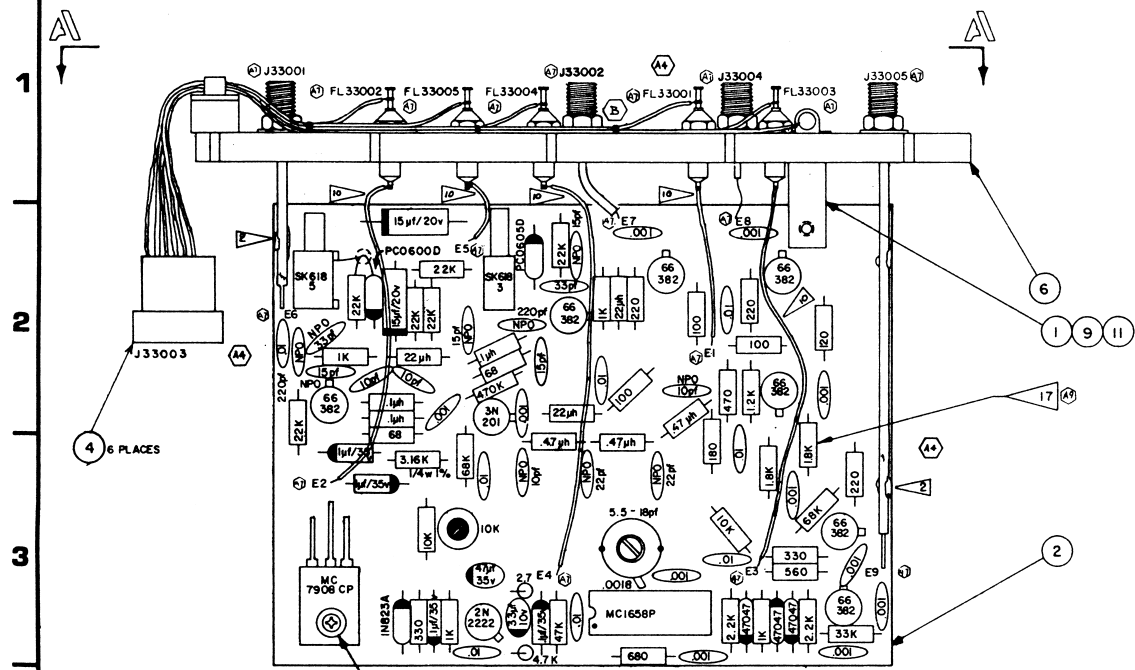
NOTES

- ALL REF NO'S CARRY AN ASSIGNED DESIGNATOR SERIES. THIS ASSY CARRIES SERIES 15XXX. (e.g., R1 IS R15001)
- LAST REF NO USED  
J1 S1

③ 3 ▽ PIN 1 IS INDICATED BY SQUARE PAD.

				UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS APPLY AFTER FINISH	
				TOLERANCES: DECIMALS: .001 FRACTIONS: 1/16 ANGLES: 1 SURFACE FINISH: REMOVE ALL BURRS DO NOT SCALE THIS DRAWING	
				MATERIAL: ~	
				FINISH: ~	
DASH NO	REF DES SERIES	NEXT ASSY	MODEL		
10XXX	7005-4940-100		RD-301		
APPLICATION					
- IFR INC - 10800 West York Street Wichita, Kansas 67218					
DRAWN	DATE	TITLE			
OSBURN	9-7-84	PC BOARD ASSY - RANGE DIGIT SW BD			
CHECKED	DATE	DWG. NO.			
WP	10/22/84	C 7010-4930-800			
APPROVED	DATE	SIZE	DWG. NO.	REV	
Bill Jones	10-30-84	C	7010-4930-800	C-2	
SCALE		CODE IDENT.	WEIGHT	SHEET   OF	
1:1		51180	~	1 OF 1	

DATE	REV	CHANGE	APVD
	3	PRODUCTION RELEASE ECN 6490	VH
10/8	1	INC RC 6825	RW
11/8	2	INC RC 7007	MH
11/8	3	INC RC 7507	AO
11/8	4	INC RC 7656	BA
11/8	5	INC RC 7656	VH
11/8	6	INC RC 7656	VH
11/8	7	INC RC 8047	DAH
11/8	8	INC RC 8464	DAH
11/8	9	INC RC 8464	RH
11/8	10	INC RC 8464	VH
11/8	11	INC RC 8464	VH
11/8	12	INC RC 10890	AO
11/8	13	INC RC 10890	VH



- NOTE:**
- REFER TO ASSY PROCEDURE # 1-34-0100-2 FOR PROPER RIGID COAX ASSY INSTRUCTIONS. INSPECT PER CHECKOUT PROCEDURE LISTED BELOW.
  - ATTACH RIGID COAX ASSY'S TO PC BD AS FOLLOWS:
    - LIGHTLY SAND OUTER JACKET OF COAX WITH 400 GRIT SANDPAPER TO REMOVE OXIDATION AND OTHER CONTAMINATES.
    - SOLDER COAX JACKET TO PC BD USING NO MORE THAN ABOUT A 40w SOLDERING IRON AND HEAT COAX FOR AS SHORT A PERIOD OF TIME AS POSSIBLE. LIQUID FLUX MAY BE USED IF NECESSARY. (DO NOT USE SOLDERING PASTE)
  - ALL RESISTORS ARE 1/4w, 5% TOL., UNLESS OTHERWISE SPECIFIED.
  - ALL CAPACITORS ARE IN  $\mu$ F UNLESS OTHERWISE SPECIFIED.
  - COMPONENT LEADS MAY EXTEND .04 - .06 BEYOND BOTTOM OF BOARD AFTER SOLDERING.
  - MAX HT OF COMPONENTS TO BE .60 FROM COMPONENT SIDE OF BOARD.
  - SCHEMATIC DWG # 0000-4911-400
  - P.C. BOARD P/N 1700-2507-100.
  - REFERENCE DESIGNATOR SERIES FOR COMPONENTS ON THIS DWG IS 33XXX (i.e. R11=R3301; CR2=CR33002; etc.)
  - ALL ANNOTATED WIRE LENGTHS TO BE 26awg (6003-0000-010).
  - ALL ANNOTATED WIRE LENGTHS TO BE 26 awg TEFLON COVERED WIRE
  - C43 CONNECTS FROM PIN 13 OF U2 TO GND.
  - LAST REF NOS USED: R36, C44, U2, L11, CR6, R41, Q5, FL5, G1

**CHECKOUT PROCEDURES**

- CHECK FOR PROPER COAX CONTINUITY AFTER COMPLETION OF THE BOARD AS FOLLOWS:
- USE A "MIDLAND" VOM MODEL 23-107 OR EQUIVALENT.
  - SELECT THE "R x I" SCALE SETTING ON THE METER & CHECK TO SEE THAT THE METER IS PROPERLY ZEROED AT BOTH ENDS OF THE SCALE.
  - PLACE THE POSITIVE (RED) LEAD ON THE CENTER CONDUCTOR OF THE CONNECTOR & THE COMMON (BLACK) LEAD ON THE CENTER CONDUCTOR OF THE BOARD. THIS SHOULD OBTAIN A READING OF  $\infty$  OHMS ON BOTH COAX CABLES.
  - PLACE THE POSITIVE (RED) LEAD ON THE CENTER CONDUCTOR OF THE CONNECTOR & THE COMMON (BLACK) LEAD ON THE LARGE COPPER AREA ON TOP OF THE BOARD (GROUND). THIS SHOULD OBTAIN NO READING AT ALL ON BOTH COAX CABLES.

- NOTE: (cont.)**
- R36 IS SELECTED AT TEST (S.A.T.) COMPONENT. NOMINAL VALUE: 8.2K, RANGE VALUE: 4.7K-12K

**WIRING LIST**

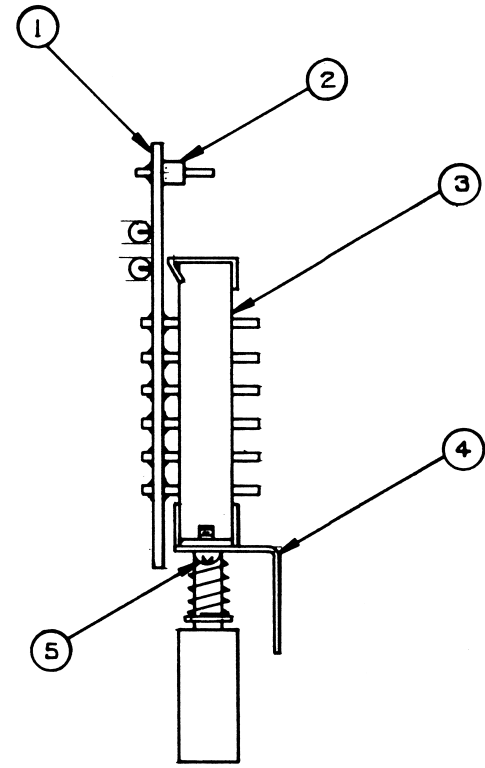
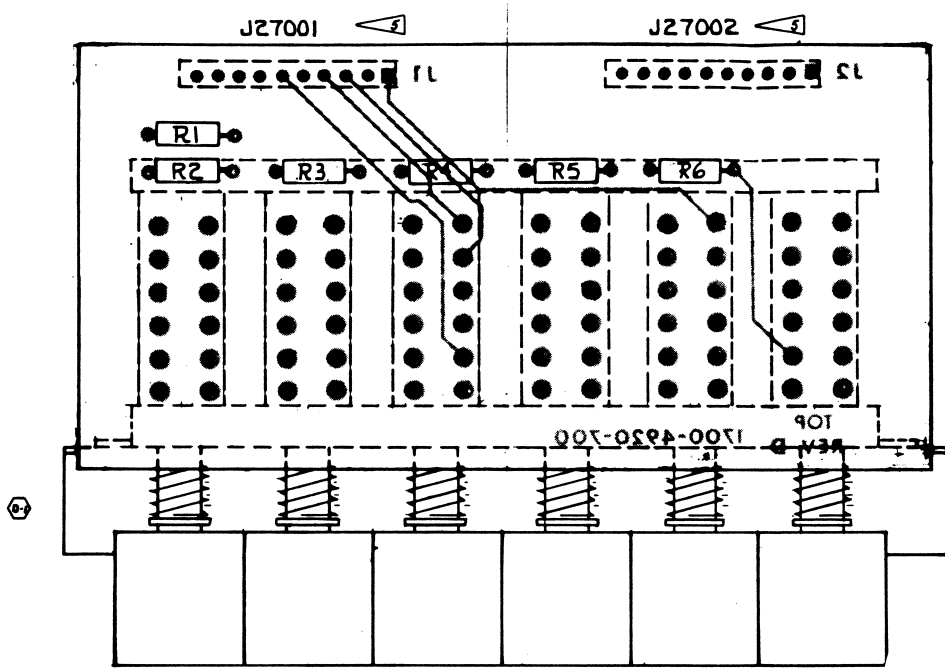
FROM	TO	COLOR	SIZE	LENGTH
J3-1	FL1	RED	11	5.5
J3-2	FL2	YELLOW	11	3.5
J3-3	FL5	WHITE	11	4
J3-4	FL4	BLUE	11	4.5
J3-5	FL3	GRAY	11	6
J3-6	gnd lug	BLACK	11	6.5

DATE	33000	7003-4940-000	RD 301 (A)
DASH NO	REF DES	MODEL	APPLICATOR
<b>- IFR INC -</b>			
DRAWN	DATE	TITLE	PC BOARD ASSEMBLY
L. A. Meis, Jr	30 NOV 84	IF MARKER/OSCILLATOR	
CHECKED	DATE	RD 301	
W.B.	1-11-85		
APPROVED	DATE	SIZE	DWG NO.
	1-24-84	D	7010-4931-400
SCALE	CODE IDENT	WEIGHT	SHEET OF 1
2:1	8110		

A B C D E F G H

DATE	REV	CHANGE	APVD
	C		
1/7/84	D	REVISED & ADD NEW ARTWORK	
2/2/84	D	PRODUCTION RELEASE ECH/490	VH
2/1/85	D-1	INC RC 6705 M K M	VH

1  
2  
3  
4  
5  
6



- NOTES:
1. ALL REF NO'S CARRY AN ASSIGNED DESIGNATOR SERIES. THIS ASSY CARRIES 27XXX. (e.g., R1 IS R27001)
  2. ALL RESISTORS ARE 1/4W, 10%.
  3. ALL RESISTANCE IS EXPRESSED IN OHMS.
  4. LAST REF NO. USED:  
R6 J2

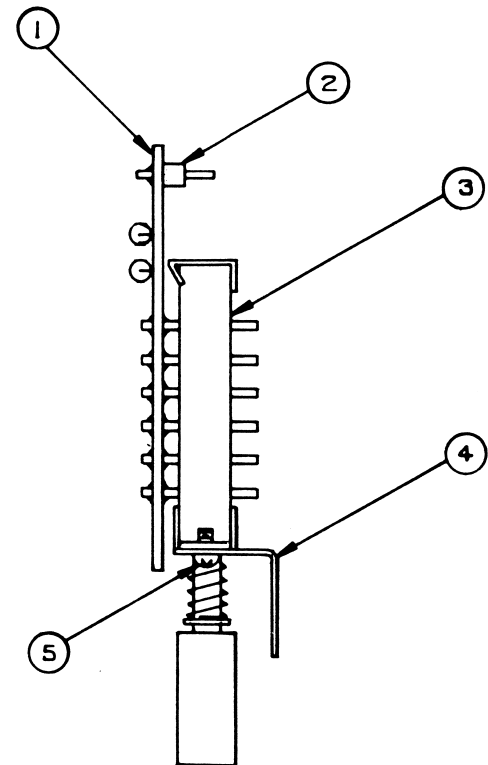
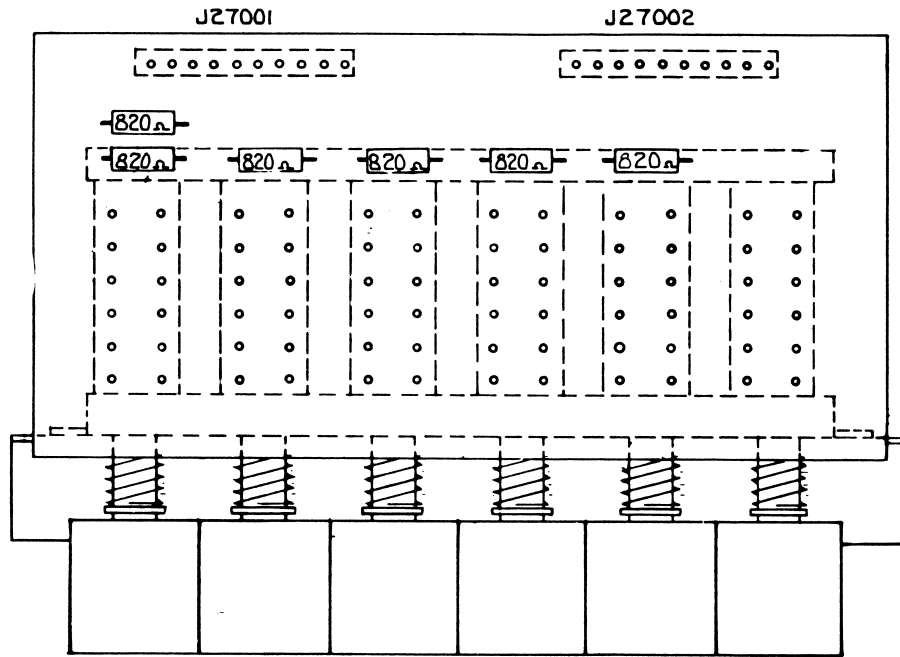
② PINS REMOVED FROM J1-2 & J2-3 FOR KEYING PURPOSES

UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS APPLY AFTER FINISH			
TOLERANCES: DECIMALS: .015 ± .001 ±			
FRACTIONS: 1/16 ± .001 ±			
ANGLES: 1/2			
SURFACE FINISH: REMOVE ALL BURRS DO NOT SCALE THIS DRAWING			
MATERIAL			
FINISH			
DASH NO	REF DES SERIES	NEXT ASSY	MODEL
10XXX	7005-4940-100	RD-301	
APPLICATION			
DRAWN: C. LYDAY 10-12-84			
CHECKED: 10-12-84			
APPROVED: Bill Young 10-19-84			
TITLE		- IFR INC - 10000 West York Street Wichita, Kansas 67210	
PCB ASSY			
R.F. MODE SWITCH		(49-307)	
SIZE	DWG. NO.	REV	
C	7010-4930-700	D-1	
SCALE	CODE IDENT.	WEIGHT	SHEET   OF 2
2:1	B180		

A B C D E F G H

DATE	REV	CHANGE	APPROV
	C		
	D	REMOVE JUMPER & ADD REV. ARTWORK	
12/14/84	D	PRODUCTION RELEASE ECN 6490 VH	
		SEE SHEET 1	

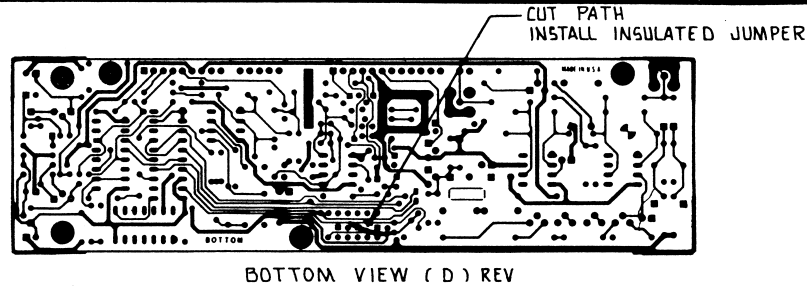
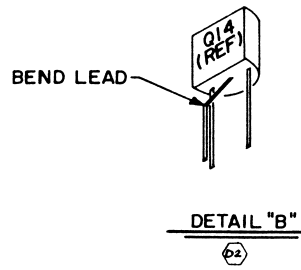
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2  
3  
4  
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6



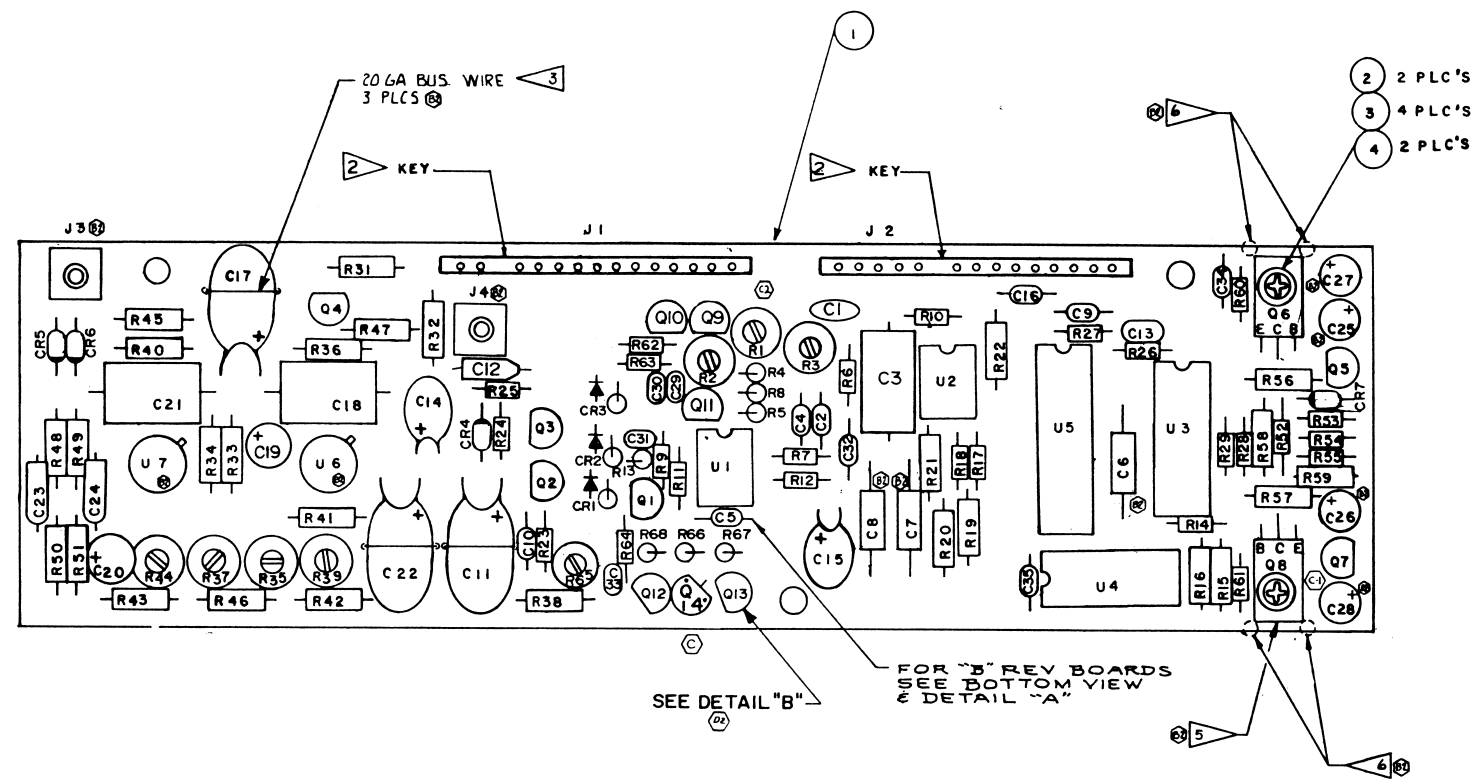
NOTES : SEE SHT 1 OF 2

DASH NO		10XXX	7005-4940-100	RD-301	FINISH	
REF DES		NEXT ASSY		MODEL	MATERIAL	
SERIES		APPLICATION			FINISH	
DRAWN		DATE	TITLE	- IFR INC -		
C. LYDAY		10-12-84	PCB ASSY	10200 West York Street		
CHECKED		DATE	R.F. MODE SWITCH	Wichita, Kansas 67216		
APPROVED		DATE	(49-307)			
Bill Gray		10-19-84	7010-4930-700	REV		
SCALE		CODE IDENT	WEIGHT	SHEET 2 OF 2		
2:1		8110		D-1		

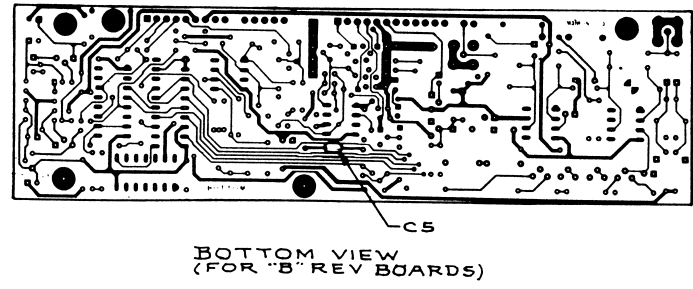
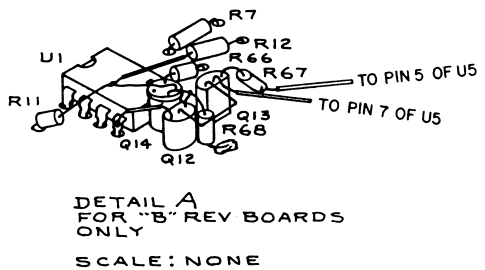
A B C D E F G H



DATE	REV	CHANGE	APPROV
17 DEC 1985	B	PRODUCT M RELEASE PER ECN 8052	JS
1/9/86	B-1	ADDITIONS PER 8184 RC	BJA
2/2/86	B-2	INC ECN 8052	JS
6-7-86	C	INC ECN 8500	JS
7-2-86	C-1	INC RC 8751	JS
9-19-86	C-2	INC ECN 8983	JS
11-1-86	C-3	INC ECN 8500B	NO
11-1-86	D	INC RC 9254	JM
1-2-87	D-1	INC ECN 9429	NO
2-11-87	D-2	INC ECN 9496	JS
7-6-87	D-3	INC RC 10283	KB
10-30-87	E	INC RC 10611	RB



- 6 AREA SHOULD BE FREE OF GND PLANE.
  - 5 MOUNT Q6 & Q8 WITH METAL PLATE TO THE BOARD.
  - 4. REF. SCHEMATIC 0000-4912-700
  - 3 ANCHOR CAPS TO BOARD USING 20GA. BUS WIRE DPN 1050-0000-072.
  - 2 REMOVE ENTIRE PIN FROM CONNECTOR FOR KEYING.
  - 1. ALL REFERENCE NUMBERS CARRY AN ASSIGNED DESIGNATOR SERIES. THIS DRAWING CARRIES SERIES 47000 (eg. R1 IS R47001).
- NOTES:



DASH NO		7005-4942-400		RD-301	
REF DES SERIES		NEXT ASSY		MODEL	
APPLICATION					
- IFR INC -					
DRAWN		DATE		TITLE	
B. ARNETT		9/27/85		PCB ASSY., AGC BOARD (49-327)	
CHECKED		DATE		SCALE	
W. Wood		12-9-85		C	
APPROVED		DATE		DWN. NO.	
[Signature]		12/11/85		7010-4932-700	
SCALE		CODE IDENT		WEIGHT	
2:1		S1180		-/-	
SHEET 1 OF 1					

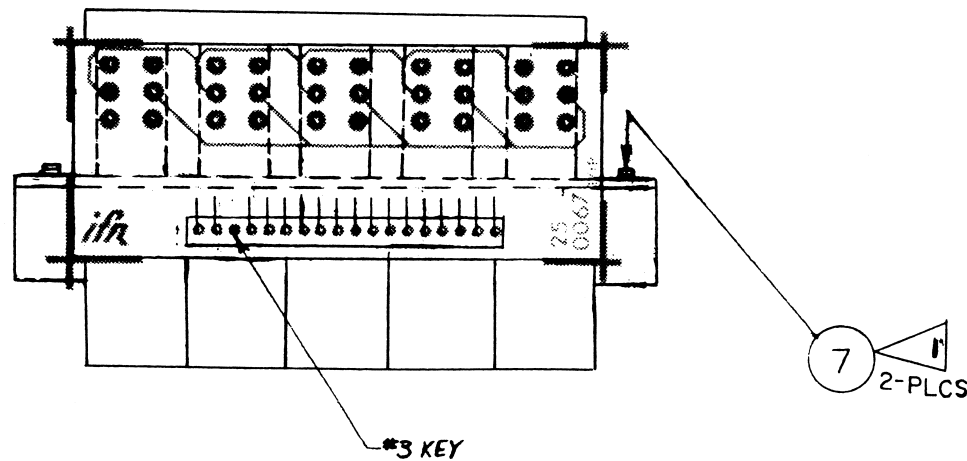
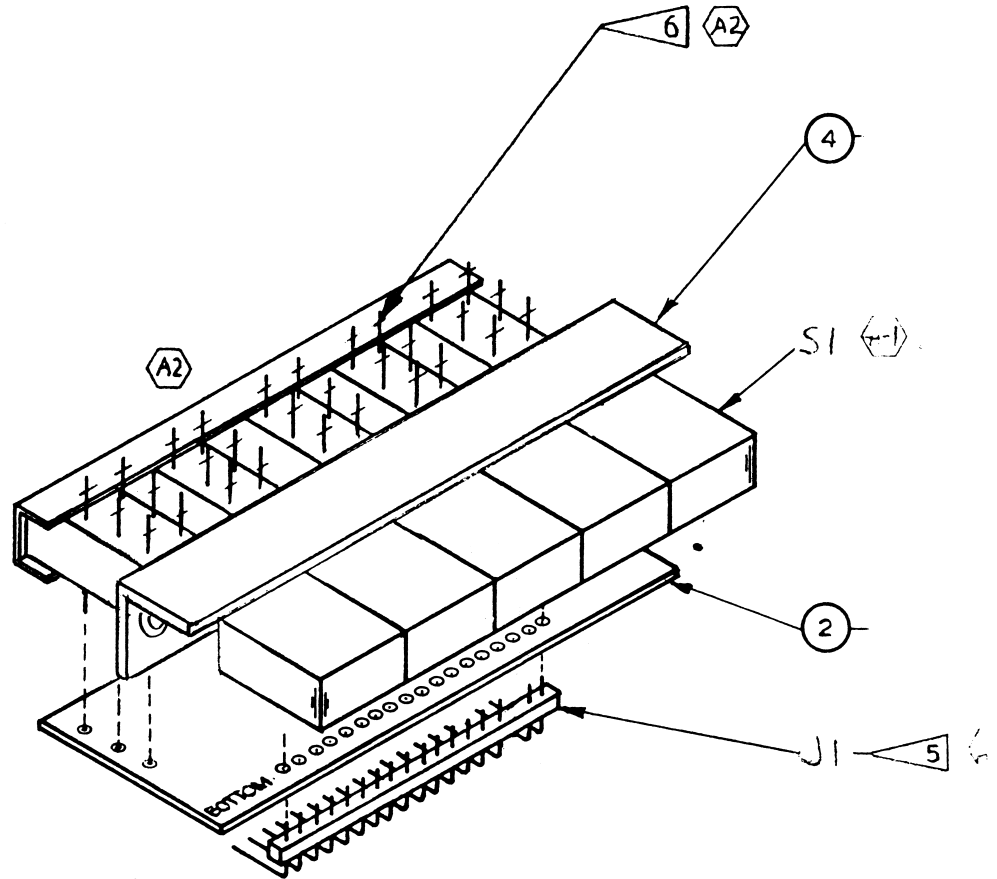
DATE	REV	CHANGE	APP'D
3/2/85	A	PROD. RELEASE ECN 6490	TL
7/2/85	A-1	INC RC 7678 SLR	VLH
6/17/86	A-2	INC RC 8696 WAW	VLH

NOTES:

- 1. TIGHTEN SCREWS TO  $\approx 5$  IN LBS. APPLY A SMALL DROP OF "LOCTITE" #290 (DPC1051-0100-200) AROUND THE HEAD OF EACH SCREW AFTER TIGHTENING.
- 2. SOLDER WITH "KESTER" 63/37 WIRE SOLDER WITH #25 PENCIL.
- 3. WASH WITH "ZEP" SOAP AND WATER.
- 4. DO NOT SUBMERGE SWITCH IN WATER.

5. PIN 3 REMOVED FOR KEYING PURPOSES

A2 6. AFTER ITEM (2) IS INSTALLED ON SWITCH, CLIP SWITCH PINS ON OPPOSITE SIDE OF SWITCH BY AT LEAST .125 IN (APPROX HALF OF PIN). REMAINING PINS SHOULD NOT EXCEED .15 IN.



NOTE:

- 1. REF SCHEMATIC DWG N<sup>o</sup> 0000-4911-700
- 2. REF DES SERIES ASSIGNED - 32XXX
- 3. ITEM N<sup>o</sup> NOT USED.....1,6
- (A-1) 4. LAST REF DES USED... S1, J1
- (A-1) 5. LAST ITEM N<sup>o</sup> USED... 7
- (A-1) 6. ITEM N<sup>o</sup> NOT USED... 1,3,5,6

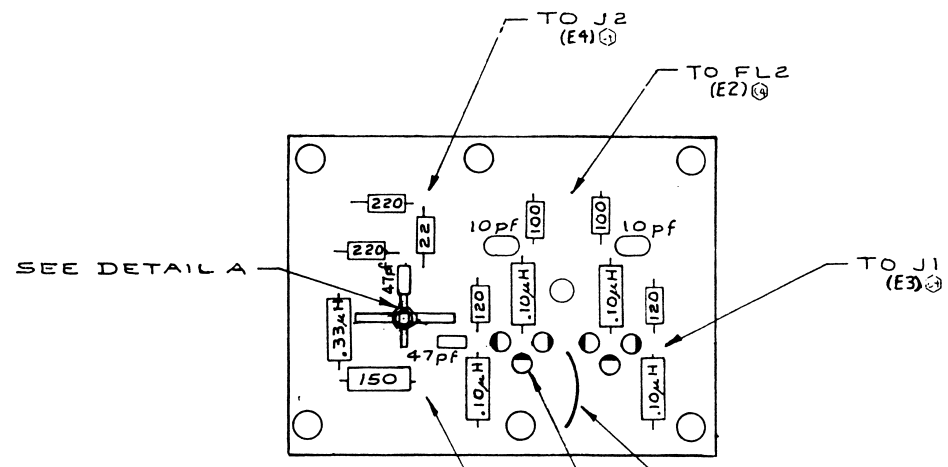
SEE SEPARATE B.O.M

QTY	DESCRIPTION
7	2 4.40x3/16 PBHMS
5	1 22-05-2181 MOLEX (18) PIN CONN.
4	1 49-816 MTG. BRKT.
3	1 PB1170 CENTRALAB (5) SECT. SWITCH
2	1 25-0067 P.C. BOARD
1	1 49-317 SWITCH ASS'Y. (MOD. MODE)

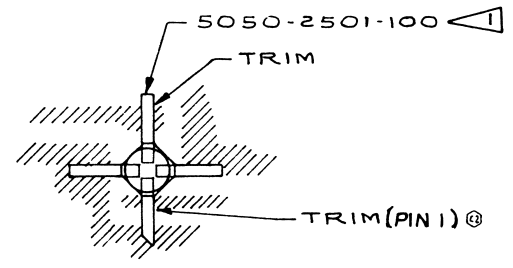
49-401	1	RD301	ITEM	REQ'D	PART NO.	DESCRIPTION
APPLICATION			LIST OF MATERIALS			
TOLERANCES UNLESS OTHERWISE SPECIFIED			DRAWN DATE		INSTRUMENT FLIGHT RESEARCH CORPORATION WICHITA, KANSAS	
ALL DIMENSIONS APPLY AFTER FINISH			12-24-85		TITLE	
DECIMALS: $\pm .005$			CHECKED DATE		MODULATION MODE SWITCH ASS'Y.	
ANGLES: $\pm 1/2^\circ$			2-11-85		49-317	
FRACTIONS: $\pm 1/64$			APPROVED DATE		PART NUMBER	
SURFACE ROUGHNESS 125			2/4/85		7010-4931-700	
REMOVE ALL BURRS					REV	
MATERIAL NOTED			SIZE		A-2	
TREATMENT			B		7010-4931-700	
FINISH			SCALE		WEIGHT	
			NONE			
			SHEET 1 OF 1			

A B C D E F G H

DATE	REV	CHANGE	APVD
10-24-84	B	PRODUCTION RELEASE-ECN6490	VH
8-8-85	C	INC ECN 6678	MTH VH
9-2-85	C-1	INC ECN 7289	MKM VLH
9-23-85	C-2	INC ECN 7703	VLH SCR
10-1-85	C-3	INC ECN 7744	SCR VLH
1-4-85	C-4	INC ECN 8134	DAH OJ
4-9-85	C-5	INC ECN 8498	AO VLH



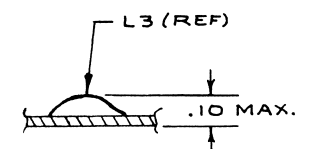
- NOTES:
- COMPONENTS TO BE ASSEMBLED WITH A MINIMAL AMOUNT OF APPLIED HEAT.
  - WARNING: THIS ASSY IS STATIC SENSITIVE AND SHOULD BE ASSEMBLED IN A STATIC-FREE WORK STATION.



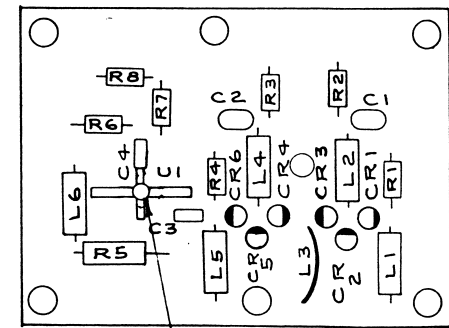
DETAIL A  
SCALE-NONE

ONE STRAND OF NO. 26 AWG WIRE .50 LONG BETWEEN SOLDER PADS (SEE DETAIL B)

5082-2215 (ALL DIODES)



DETAIL B  
(SIDE VIEW)  
NO SCALE



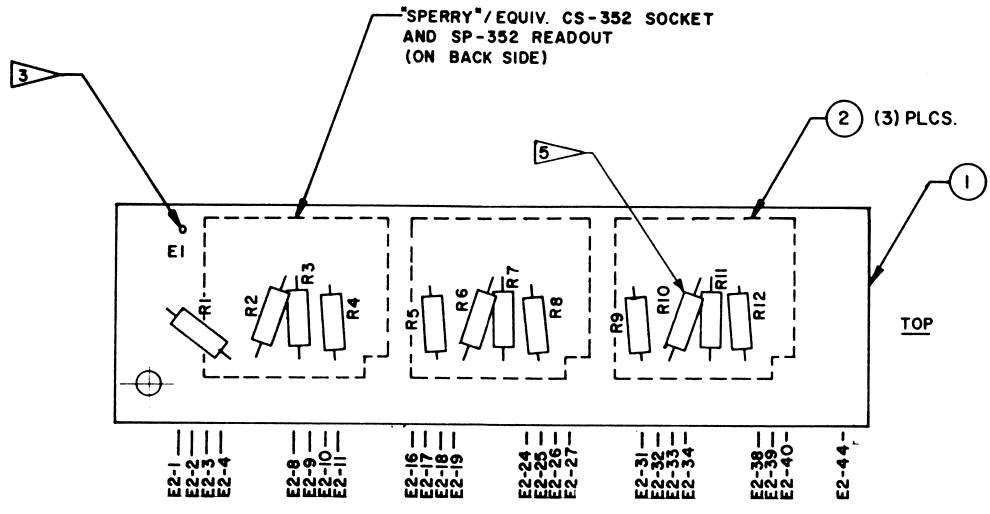
VIEW C-C



SOLDER ONE END OF R5 ONLY  
VIEW C-C  
SCALE NONE

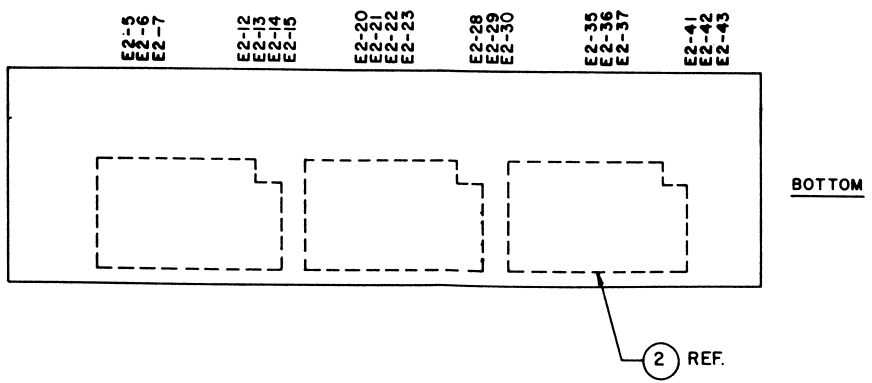
UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS APPLY AFTER FINISH			
TOLERANCES: DECIMALS .001 FRACTIONS 1/16 ANGLES 1 SURFACE FINISH: REMOVE ALL BURRS DO NOT SCALE THIS DRAWING			
MATERIAL			
FINISH			
DASH NO	REF DES SERIES	NEXT ASSY	MODEL
39000	7005-4940-900	RD-301	
APPLICATION			
<b>- IFR INC -</b> 10800 West York Street Wichita, Kansas 67215			
DRAWN A. OSBURN	DATE 10-10-84	TITLE PC BOARD ASSY. MAIN DIODE SWITCH	
CHECKED	DATE	49-300	
APPROVED Bill Young	DATE 10-18-84	SIZE C	DWG. NO. 7010-4930-000
SCALE 2:1	CODE IDENT 51180	WEIGHT	REV C5
			SHEET 1 OF 1

DATE	REV	CHANGE	APPROV
11-17-77	B-3	INC RC, REDRAWN, 9315	JM
11-17-77	C	INC ECN 9381	ML
11-17-77	C-1	INC RC10497	ML



- NOTES:
- ALL RESISTORS ARE 1/4 W 10% UNLESS OTHERWISE SPECIFIED.
  - LEADS MAY EXTEND ONLY .01-.02 BEYOND BOTTOM OF BOARD AFTER SOLDERING.
  - 200V FROM P14001-18 (E26001 FOR RD-301)
  - REF. DESIGNATOR SERIES FOR THIS PC BOARD ASSY FOR RD-301 IS 26000 (I.E. R1 IS R26001)
- (C-1) 5 CLEARANCE BETWEEN RESISTOR BODY AND SOCKET LEADS SHOULD BE NO LESS THAN 0.10"

E1  
E2-1  
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E2-6  
E2-7  
E2-8  
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E2-43

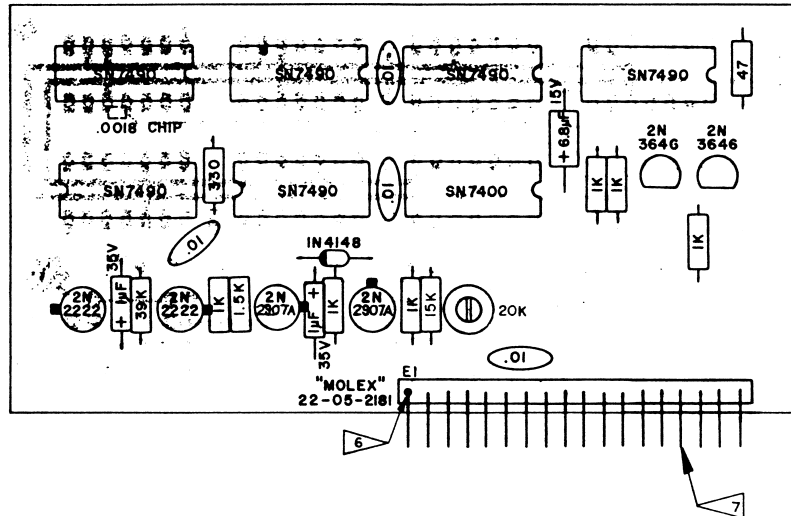


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E2-43

TOLERANCES: (UNLESS OTHERWISE SPECIFIED)		MATERIAL	
ALL DIMENSIONS APPLY AFTER FINISH		FINISH	
TOLERANCES: DECIMALS: .0001 INCHES: .0001			
ANGLES: 1°			
SURFACE FINISH: BONDING ALL SURFACES			
		IFR SYSTEMS INC 19200 West York St., Wichita, Kansas 67218	
DRAWN JNV 1/31/77	DATE	TITLE COUNTER DISPLAY PC BOARD ASSEMBLY RD-300 25-178	REV C-1
CHECKED RKK 2/8/77	DATE	SIZE C	DWG. NO. 7010-2517-800
APPROVED ML 2/10/77	DATE	SCALE: 2:1	DO NOT SCALE FROM THIS DRAWING CODE 87100 SHEET 01



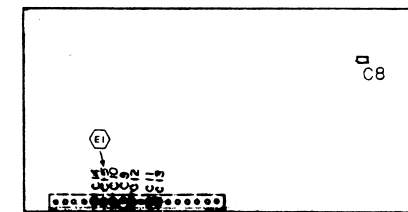
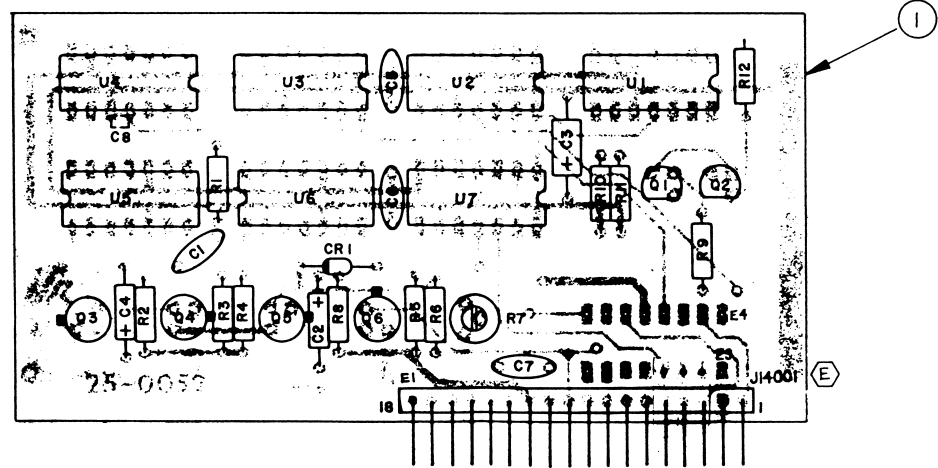
DATE	REV	CHANGE	APP'D
7/24/77	B	INC. RP. ECN # 2245 LR	WJ
2/21/77	B	INC. ECN 2787 TJS	WJ
1/24/77	C	INC. ECN # 3410 RLD	WJ
1/24/77	D	QUOTED REV. LETTER 351R	WJ
1/13/77	E	INC. RC 8170 SJA	WJ
2/11/77	E	INC. PC 8221 JS	WJ
11/30/77	E	INC. ECN 10475 AF	WJ



SCHEMATIC NO. 3-25-0102

NOTES:

1. ALL RESISTORS ARE 1/4 W, 10% TOLERANCE EXCEPT AS NOTED.
  2. ALL CAPACITOR VALUES ARE IN  $\mu$ F EXCEPT AS NOTED.
  3. COMPONENT LEADS MAY EXTEND .04 TO .06 BEYOND BOTTOM OF BOARD AFTER SOLDERING.
  4. MAXIMUM HEIGHT OF COMPONENTS TO BE .35 FROM COMPONENT SIDE OF BOARD.
  5. PLACE CHIP CAPACITORS ON BACK SIDE OF BOARD.
  6. 200V TO COUNTER DISPLAY BD. VIA AWG# 26 ORG/WHT WIRE SOLDERED TO THE BOTTOM SIDE OF PIN 18, (E1)
  7. REMOVE PIN 4 FOR KEYING PURPOSES (E)
8. REFERENCE DESIGNATOR SERIES FOR THIS PC BOARD ASS'Y IS 31001 (I.E. R1 IS R31001) (E)



ITEM	REQ'D	PART NO.	DESCRIPTION
1	1	25-0180	PC BOARD ASS'Y

LIST OF MATERIALS			
7-3540-400	1	RD-300	RD-300
25-0177	1	MODEL	MODEL

DATE	DATE	TITLE
1-29-77	1-29-77	COUNTER GATING PC BOARD ASSEMBLY DETAILS
1-29-77	1-29-77	RD-300 25-190

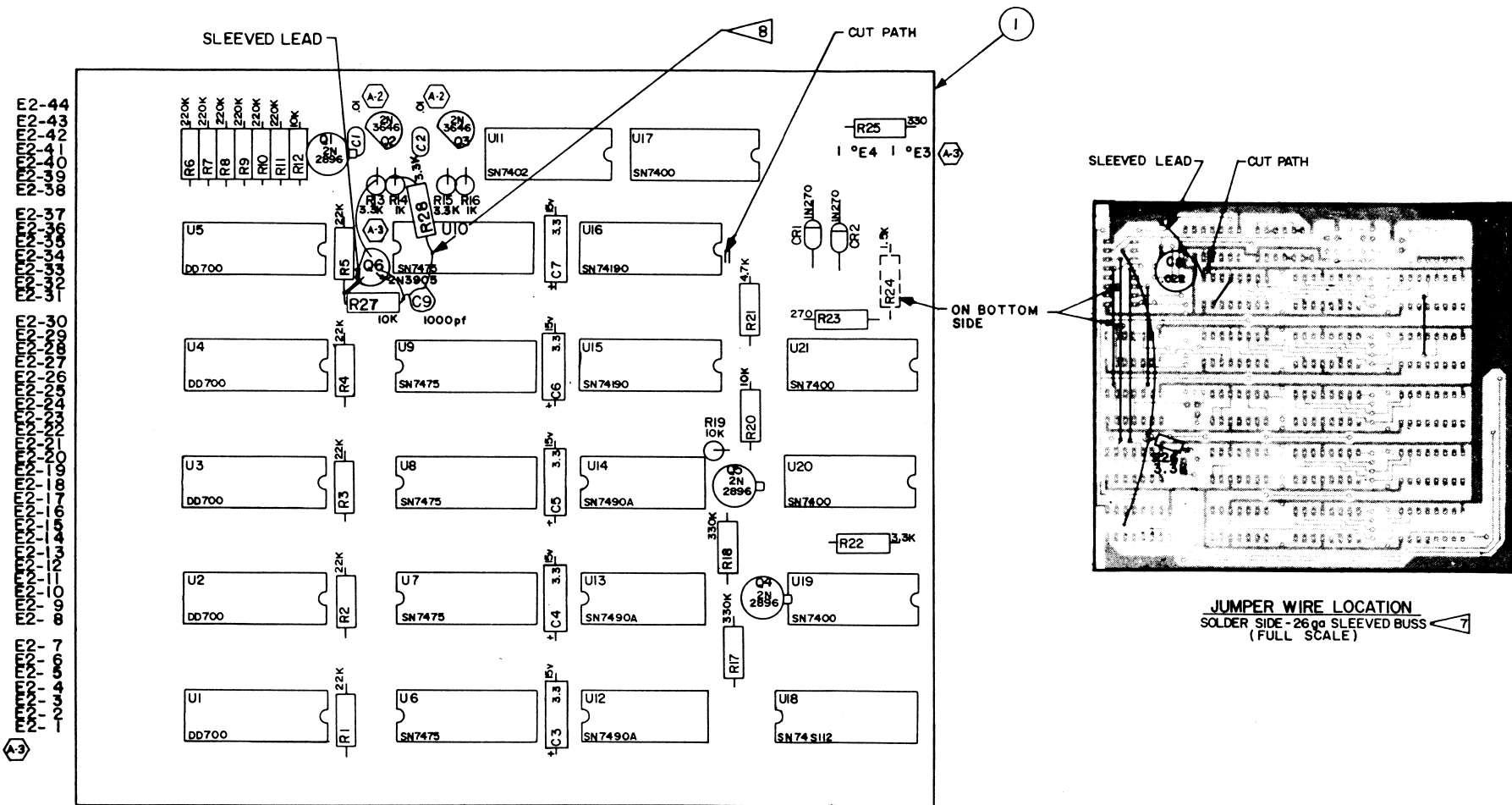
  

MATERIAL	SIZE	PART NUMBER	REV
---	C	7010-2518-000	E2

FINISH	SCALE	WEIGHT	SHEET	OF
---	2X	---	1	1

DATE	REV	CHARGE	APPROV
4/65	A	PRD. RELEASE ECN 649D	TS
8/85	A-1	INC ECN 7240	TS
9-4/85	A-2	INC RC 7565	MKN VLH
11/86	A-3	INC RC 8170	SJA



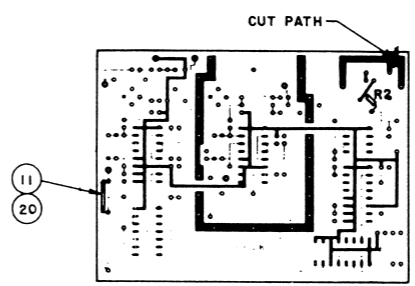
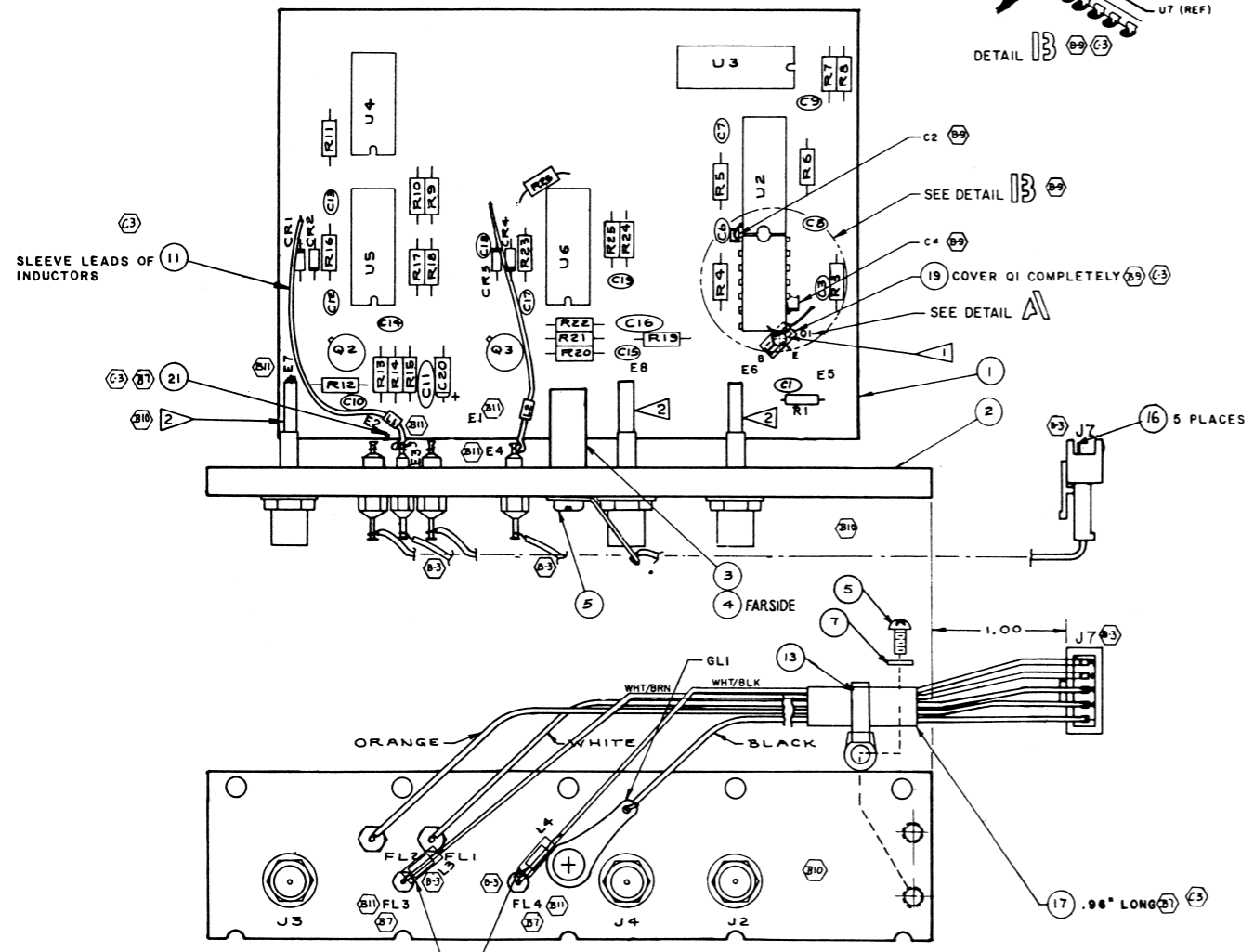
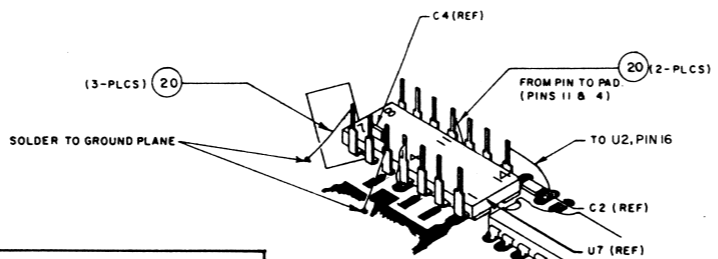
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 1-10045900-47  
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 1-10045900-50

- NOTE**
- ALL RESISTORS ARE 1/4w, 5% TOL, UNLESS OTHERWISE SPECIFIED.
  - ALL CAPACITORS ARE  $\mu$ F IN VALUE UNLESS OTHERWISE SPECIFIED.
  - LEADS TO EXTEND .040-.060 BEYOND BTM OF BD AFTER SOLDERING.
  - MAX HT OF COMPONENTS TO BE .35 FROM COMPONENT SIDE OF BD, EXCEPT C8 (.022), TO BE PLACED VERTICALLY & AS CLOSE TO THE BD AS POSSIBLE.
  - PLACE JUMPERS PER LOCATION DETAIL ABOVE & CUT PATHS WHERE SHOWN.
  - ALL COMPONENTS ARE OF REF. DES. SERIES 21XXX. (i.e. C2=C21002, R20=R21020, etc.)
- 7 6011-0018-001 SLEEVING, 1050-0000-075 BUSS WIRE.  
 B MID-AIR CONNECTION A-3

UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS APPLY AFTER FINISH			
TOLERANCES: DECIMALS: .01 .005 FRACTIONS: 1/16 ANGLES: 1/2 SURFACE FINISH: REMOVE ALL BURRS DO NOT SCALE THIS DRAWING			
MATERIAL			
FINISH			
DASH NO	REF DES SERIES	NEXT ASSY	MODEL
-600	21000	7005-4940-400	RD 301
APPLICATION			
- IFR INC - 10800 West York Street Wichita, Kansas 67210			
DRAWN	DATE	TITLE	
L. A. Meis, Jr.	21 Jan 1985	PC BOARD ASSY COUNTER LOGIC RD 301 (49-316)	
CHECKED	DATE	REV	
WFB	1-22-85	A-3	
APPROVED	DATE	SIZE	DWG. NO.
Greenbank	1-25-85	C	7010-4931-600
SCALE	CODE IDENT.	WEIGHT	SHEET   OF
2:1	SI180		1 OF 1

A B C D E F G H J K L

DATE	REV	CHANGE	BY
	A	FORMAL DRAWING	
	B	REVISED & REDRAWN	
1/28/68	B-1	PRODUCTION RELEASE, ECN 6459	VH
2/28/68	B-2	INC RC 7677 MTH	VH
3/28/68	B-3	INC ECN# 6820 R.W	VH
4/28/68	B-4	INC RC 6848	VH
5/28/68	B-5	INC ECU G934 R.W	VH
6/28/68	B-6	INC RL 7076 MTH	VH
7/28/68	B-7	INC RC 7694 SCL	VH
8/28/68	B-8	INC RC 7585 JS	VH
9/28/68	B-9	INC ECN 7922 JS	VH
10/28/68	B-10	INC ECN 8052 JS	VH
11/28/68	B-11	INC RC 8097 DAH	VH
12/28/68	C	INC ECN 7691 JS	VH
1/28/69	C-1	INC ADDENDUM #22	VH
2/28/69	C-2	INC ECN 8052 ADDENDUM "C.A.P."	VH
3/28/69	C-3	INC RC 9615, UPDATED DWG	VH
4/28/69	C-4	INC ECN 10168	VH



BOTTOM VIEW (C3)  
SCALE 1:1

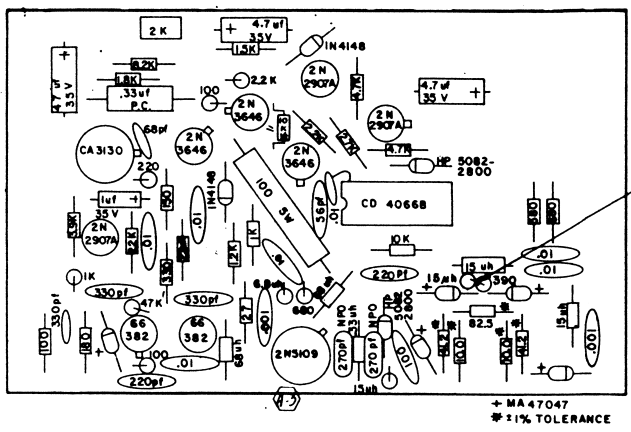
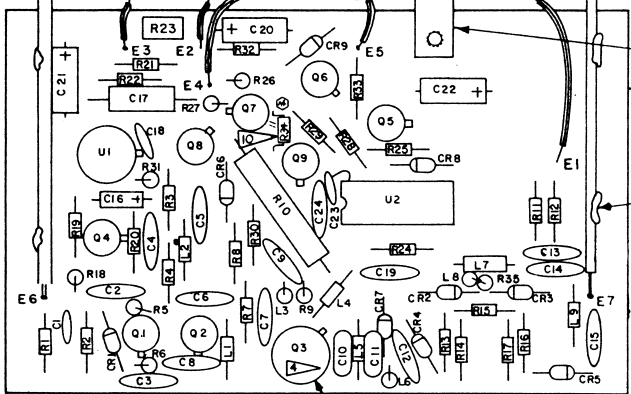
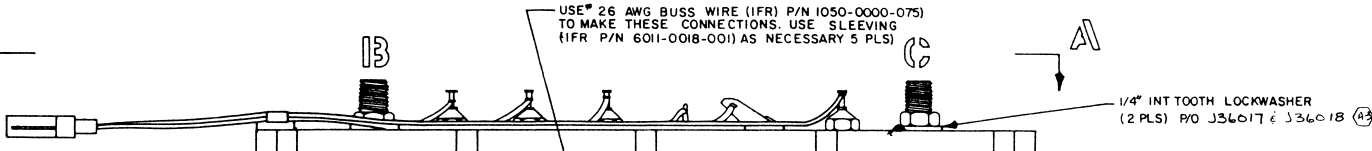
NOTES

- 1. COMPONENT R2, 15K ON BOTTOM SIDE.
- 2. TACK SOLDER COAX TO BOARD (21)
- 3. IDENTIFY J2-J4 ON PC BOARD BY USING B-500 WIRE MARKER.
- 4. ALL REF NUMBERS CARRY AN ASSIGNED DES. SERIES. THIS DWG CARRIES SERIES 23XXX (e.g. R1 IS R23001).
- 5. LAST REF NUMBER USED: C20, FL4, J7, CR4, L4, Q3, R26, U7, E8.
- 6. REF NUMBERS NOT USED: J5, J6, U1, C5, J1, C21, C22, C23, C24.
- 7. LAST ITEM NUMBER USED: 21.
- 8. ITEM NUMBERS NOT USED: 6, 8, 9, 10, 11, 12, 14, 15.

WIRE RUNNING LIST				
FROM	TO	WIRE SPECS	COLOR	
GL23001	J23007-1	26 GA. x 4' LG TFE	BLACK	
FL23002	J23007-2	26 GA. x 6 7/16" LG TFE	ORN	
FL23001	J23007-3	26 GA. x 6" LG TFE	WHT	
FL23003	J23007-4	26 GA. x 5 7/16" LG TFE	WHT/BRN	
FL23004	J23007-5	26 GA. x 4 9/16" LG TFE	WHT/BLK	

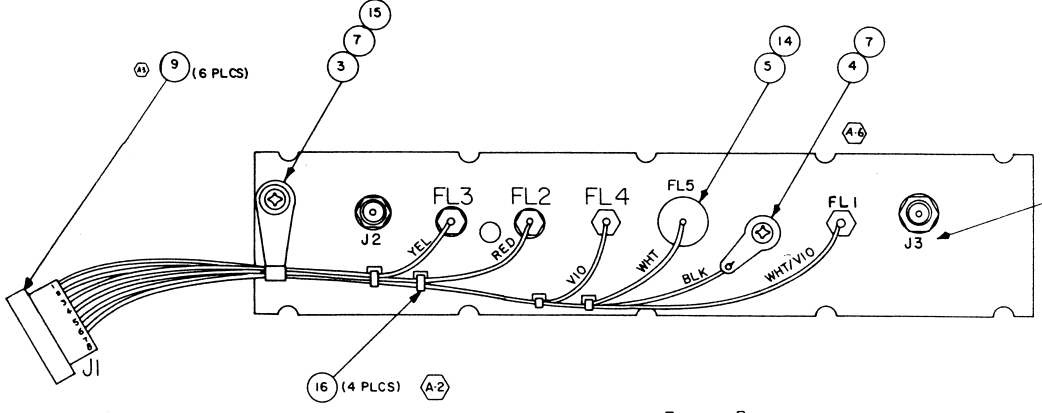
DASH NO		REF DES	REV	DATE	BY	CHKD	DATE	BY	APP
500		23000	7003-4940-000	RD 301					
DASH NO		REF DES	REV	DATE	BY	CHKD	DATE	BY	APP
500		23000	7003-4940-000	RD 301					
APPLICATION									
-IFR INC - 1988 West York Street, White, Kansas 67199									
PC BOARD ASSY PRESCALER 49-305									
D 7010-4930-500									
SCALE: 2:1									

DATE	REV	CHANGE	APPRO
2/28/85	A	PRODUCTION RELEASE ECN 6490	VH
3/2/85	A	REDRAWN NO CHANGE	VH
3/2/85	A-1	INC RC 6825 RW	VH
3/2/85	A-2	INC RC 7308 M M M	VH
3/2/85	A-3	INC RC 7701 SLP	VH
3/2/85	A-4	INC RC 8097 RC 8220 DAH	JS
3/2/85	A-5	INC ECN 9450 AO	VH
3/2/85	A-6	INC ECN 9616 AO	VH



TACK SOLDER COAX ASSY TO PC BD @ BOTH ENDS. SEE NOTE 2.

MID AIR CONNECTION (A-5)



NOTES:

- REFER TO ASSY PROCEDURE N#1-34-0100-2 FOR PROPER RIGID COAX ASSY INSTRUCTIONS. INSPECT PER CHECKOUT PROCEDURE LISTED ELSEWHERE ON THIS DWG.
- ATTACH RIGID COAX ASSY'S TO PC BD AS FOLLOWS:
  - LIGHTLY SAND OUTER JACKET OF COAX w/ 400 GRIT SANDPAPER TO REMOVE OXIDATION & OTHER CONTAMINATES.
  - SOLDER COAX JACKET TO PC BOARD USING NO MORE THAN ABOUT A 40w SOLDERING IRON & HEAT COAX FOR AS SHORT A PERIOD OF TIME AS POSSIBLE. LIQUID FLUX MAY BE USED IF NECESSARY DO NOT USE SOLDERING PASTE!
- DELETED
- ANNOTATED PART TO HAVE HEAT SINK (ITEM 13).
- REF DESIGNATOR SERIES FOR COMPONENTS LISTED ON THIS DWG IS 36XXX. (i.e. R11 = R36011 CR9 = CR36009, etc.)
- ALL RESISTORS ARE 1/4w, 5% TOL UNLESS OTHERWISE SPECIFIED.
- ALL CAPACITOR VALUES ARE IN uF UNLESS OTHERWISE SPECIFIED.
- LEADS TO EXTEND .040-.060 BEYOND BTM OF BD AFTER SOLDERING
- MAX HT OF COMPONENTS TO BE .375 FROM COMPONENT SIDE OF BD.
- CUT PATH THEN ADD R34.10K.16W TO PATH.

CHECKOUT PROCEDURE

- CHECK FOR PROPER COAX CONTINUITY AFTER COMPLETION OF THE BOARD AS FOLLOWS:
- USE A "MIDLAND" VOM MODEL 23-107 OR SIMILAR.
  - SELECT THE "RXI" SETTING ON THE METER & CHECK TO SEE THAT THE METER IS PROPERLY ZEROED ON BOTH ENDS OF THE SCALE.
  - PLACE THE + (RED) LEAD ON THE CENTER CONDUCTOR OF THE CONNECTOR & THE COMMON (BLACK) LEAD ON THE COAX CENTER CONDUCTOR WHERE IT ENTERS THE PC BD. THIS SHOULD OBTAIN A READING OF 0 Ω w/ BOTH COAX CABLES.
  - PLACE THE + (RED) LEAD ON THE CENTER CONDUCTOR OF THE CONNECTOR & THE COMMON (BLACK) LEAD ON THE LARGE COPPER AREA ON TOP OF THE BD (GND). WITH COAX "B", THIS SHOULD OBTAIN A READING OF 85-115 Ω. WITH COAX "C", THIS SHOULD OBTAIN NO READING AT ALL.

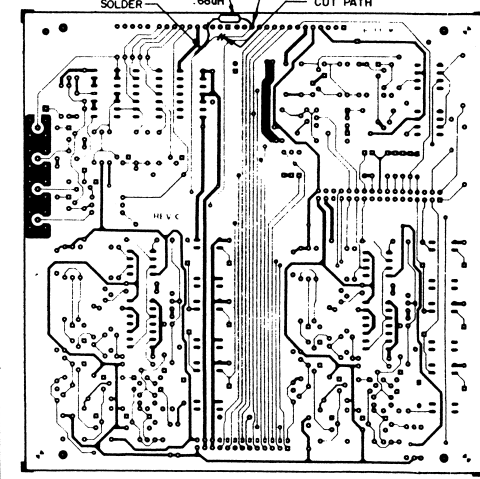
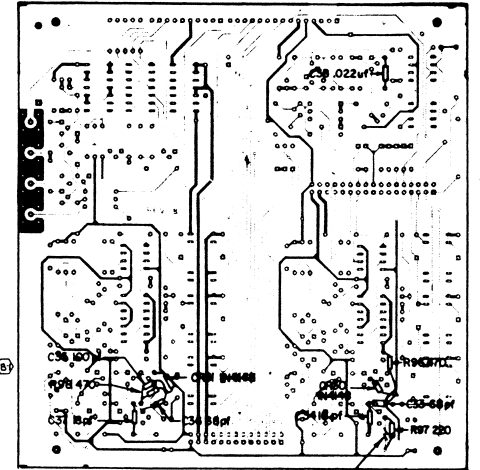
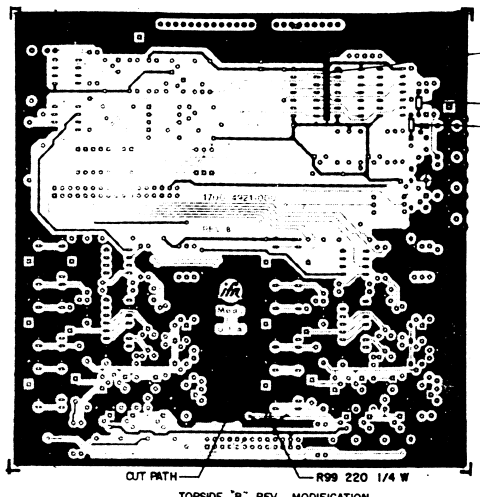
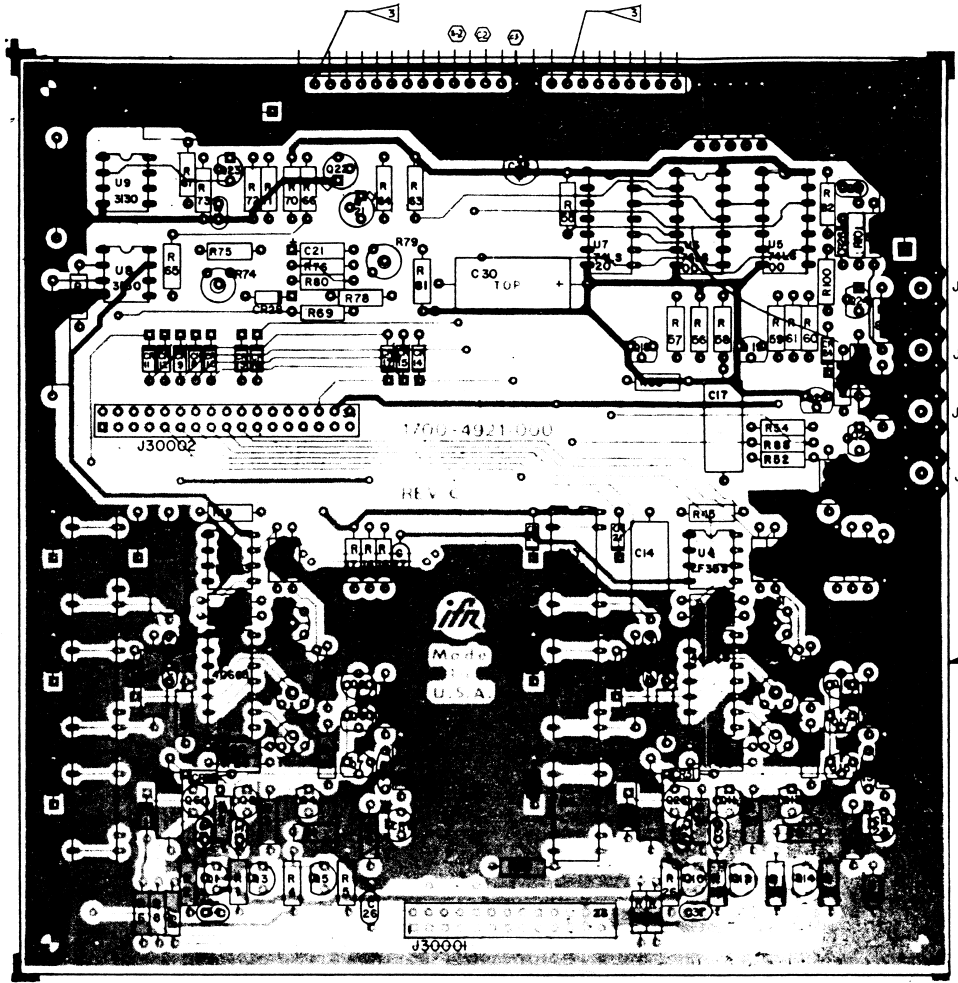
FROM	TO	COLOR	SIZE	LG
J1-1	GND/LUG	BLACK	26	5 1/2
J1-2	FL-4	VIOLET	26	4 1/2
J1-3	FL-3	YELLOW	26	3 1/2
J1-4	FL-2	RED	26	4
J1-5		WHITE	26	5
J1-6	FL-1	WHITE/VIO	26	6
J1-7	NC			
J1-8	NC			

VIEW A-A

DASH NO		36000	7003-4940-000	RD-301 (A-1)
REF DES	SERIES	NEXT ASSY	MODEL	
APPLICATION				
- IFR INC -				
DATE	3/25/85	TITLE	PC BOARD ASSEMBLY	REV
CHECKED	V.L.H.	DATE	3/25/85	A-6
APPROVED	T. L. H.	DATE	3/26/85	
SCALE	2:1	ORDER NO.	7010-4931-500	

A B C D E F G H J K L

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7



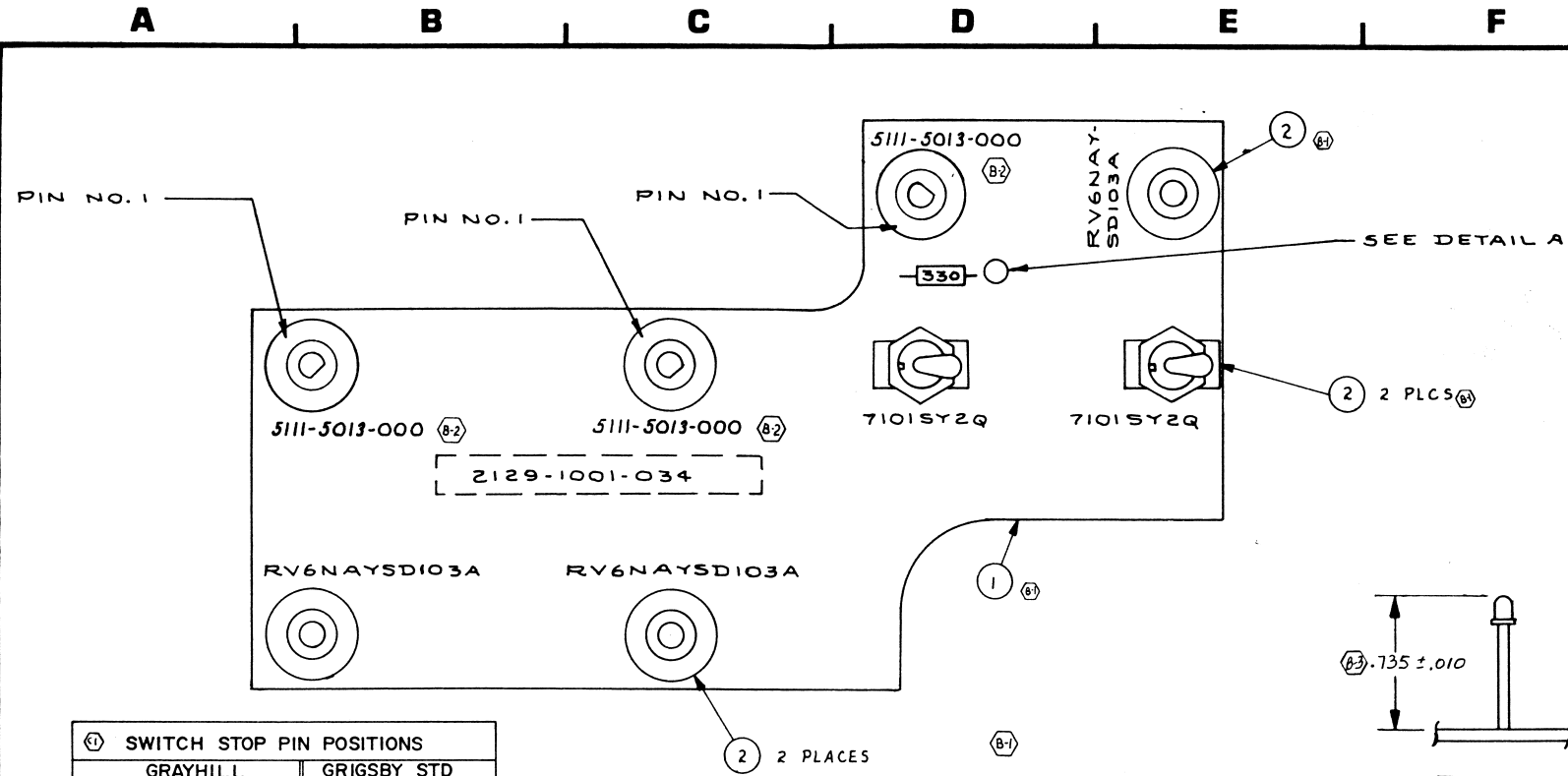
DATE	REV	CHANGE	APPROV
4/10/64	B	PROD. RELEASE PER ECM 6490	TC
5/17/64	B-1	INC RC 6746 MKM	VLH
8/5/64	B-2	INC RC 6833 RW	VLH
9/13/64	C	INC ECM 6871 MTH	VLH
9-20-64	C-1	INC RC 7700 SLP	VLH
10/1/64	C-2	INC RC 8097 DAH	JS
10/26/64	C-3	INC RC 9805 DAH	VLH
10/27/64	C-4	INC ECM 10457 RB	VLH

- NOTES:
- ALL REF. NOS. CARRY AN ASSIGNED DESIGNATOR SERIES. THIS DRAWING CARRIES SERIES 30000 (eg. R1 IS R30001).
  - ALL COMPONENTS TO BE MOUNTED TOPSIDE.
- ① J3 REMOVE PIN NO.2  
J6 REMOVE PIN NO.3

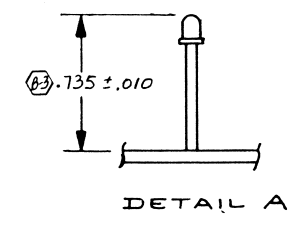
C1 .10uf	C11 .10uf	C21 6.5uf	C31 .97uf	C41 .10uf	C111 .10uf	C211 .10uf	C311 .10uf	C411 .10uf	C511 .10uf	C611 .10uf	C711 .10uf	C811 .10uf	C911 .10uf	C1011 .10uf	C1111 .10uf	C1211 .10uf	C1311 .10uf	C1411 .10uf	C1511 .10uf	C1611 .10uf	C1711 .10uf	C1811 .10uf	C1911 .10uf	C2011 .10uf	C2111 .10uf	C2211 .10uf	C2311 .10uf	C2411 .10uf	C2511 .10uf	C2611 .10uf	C2711 .10uf	C2811 .10uf	C2911 .10uf	C3011 .10uf	C3111 .10uf	C3211 .10uf	C3311 .10uf	C3411 .10uf	C3511 .10uf	C3611 .10uf	C3711 .10uf	C3811 .10uf	C3911 .10uf	C4011 .10uf	C4111 .10uf	C4211 .10uf	C4311 .10uf	C4411 .10uf	C4511 .10uf	C4611 .10uf	C4711 .10uf	C4811 .10uf	C4911 .10uf	C5011 .10uf	C5111 .10uf	C5211 .10uf	C5311 .10uf	C5411 .10uf	C5511 .10uf	C5611 .10uf	C5711 .10uf	C5811 .10uf	C5911 .10uf	C6011 .10uf	C6111 .10uf	C6211 .10uf	C6311 .10uf	C6411 .10uf	C6511 .10uf	C6611 .10uf	C6711 .10uf	C6811 .10uf	C6911 .10uf	C7011 .10uf	C7111 .10uf	C7211 .10uf	C7311 .10uf	C7411 .10uf	C7511 .10uf	C7611 .10uf	C7711 .10uf	C7811 .10uf	C7911 .10uf	C8011 .10uf	C8111 .10uf	C8211 .10uf	C8311 .10uf	C8411 .10uf	C8511 .10uf	C8611 .10uf	C8711 .10uf	C8811 .10uf	C8911 .10uf	C9011 .10uf	C9111 .10uf	C9211 .10uf	C9311 .10uf	C9411 .10uf	C9511 .10uf	C9611 .10uf	C9711 .10uf	C9811 .10uf	C9911 .10uf	C10011 .10uf
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DASH NO		7005-4940-600	RD-301
REF DES	7005-4940-600	RD-301	
SERIES			
APPLICATION			
- IFR INC -			
DATE	12/10/64	TITLE	PCB ASSY
DESIGNED			RANGE BOARD # 2
APPROVED		DRAWN	7010-4931-000
		SCALE	2:1
		CODE	5188
		WORK	
		SHEET	7 OF 7

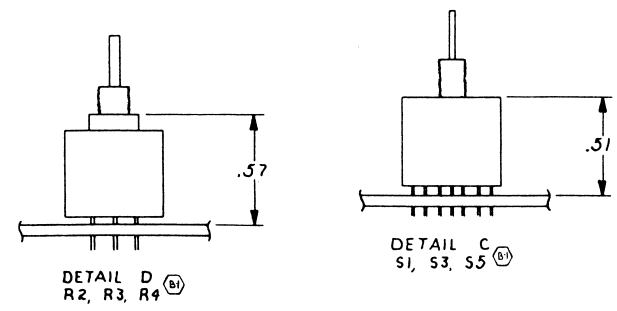
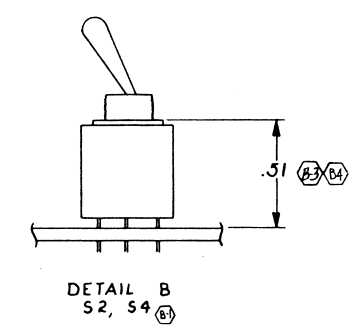
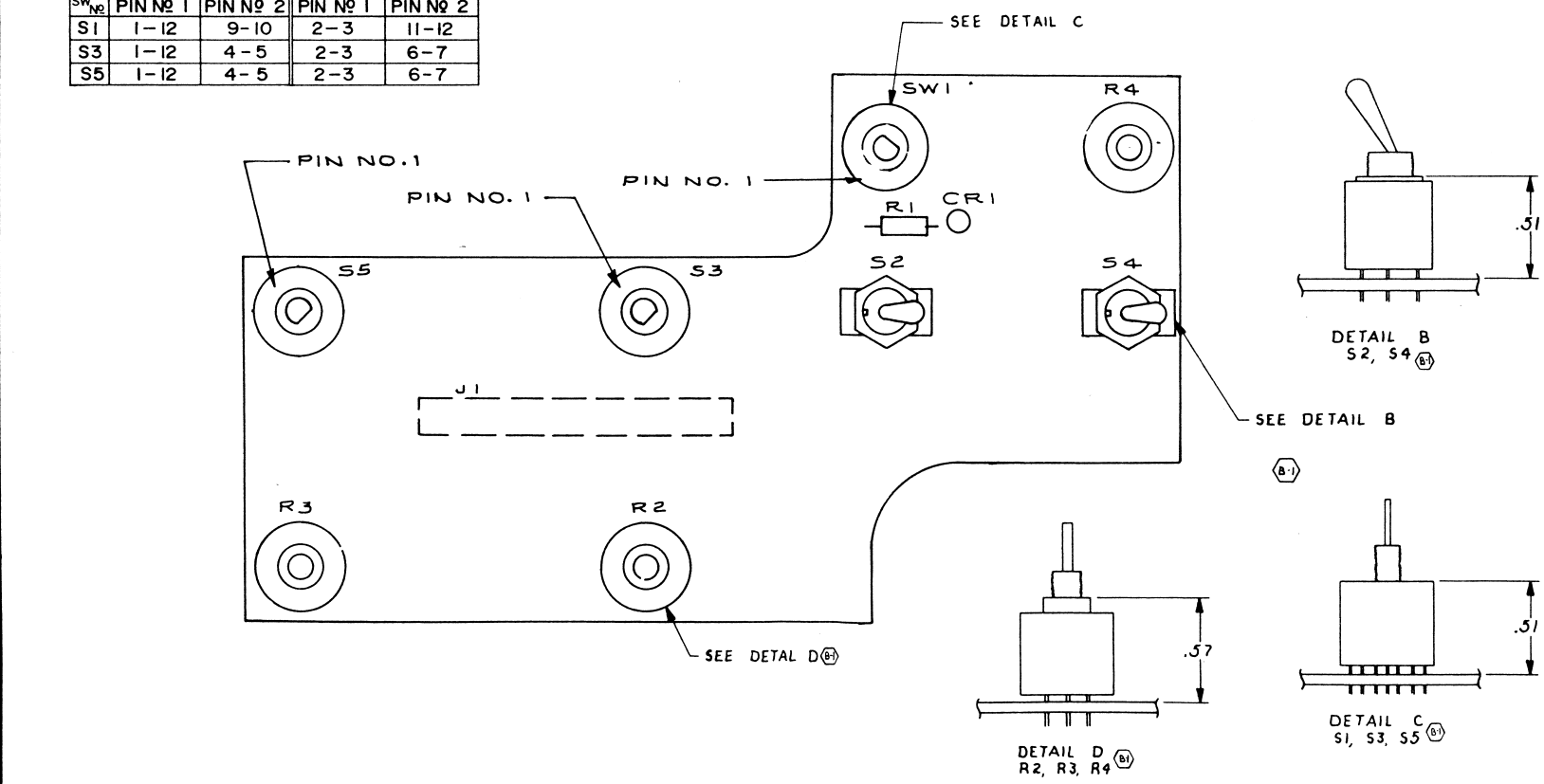
DATE	REV	CHANGE	APVD
10/24/84	A	PRODUCTION RELEASE	FIN/190
10/15/84	B	INC ECN #6589 NEW MKT	MTH
7/8/84	B-1	INC RC 6703	MKM
8/8/84	B-2	INC ECN 7503	MKM
9/29/84	B-3	INC RC 7719	SLR
9/30/84	B-4	INC RC 8652	RB
8/11/87	C	INC ECN 9513	AO
11/27/87	C-1	INC RC 10515	JS



SWITCH STOP PIN POSITIONS				
SW No	GRAYHILL SWITCH		GRIGSBY STD SWITCH	
	PIN NO 1	PIN NO 2	PIN NO 1	PIN NO 2
S1	1-12	9-10	2-3	11-12
S3	1-12	4-5	2-3	6-7
S5	1-12	4-5	2-3	6-7



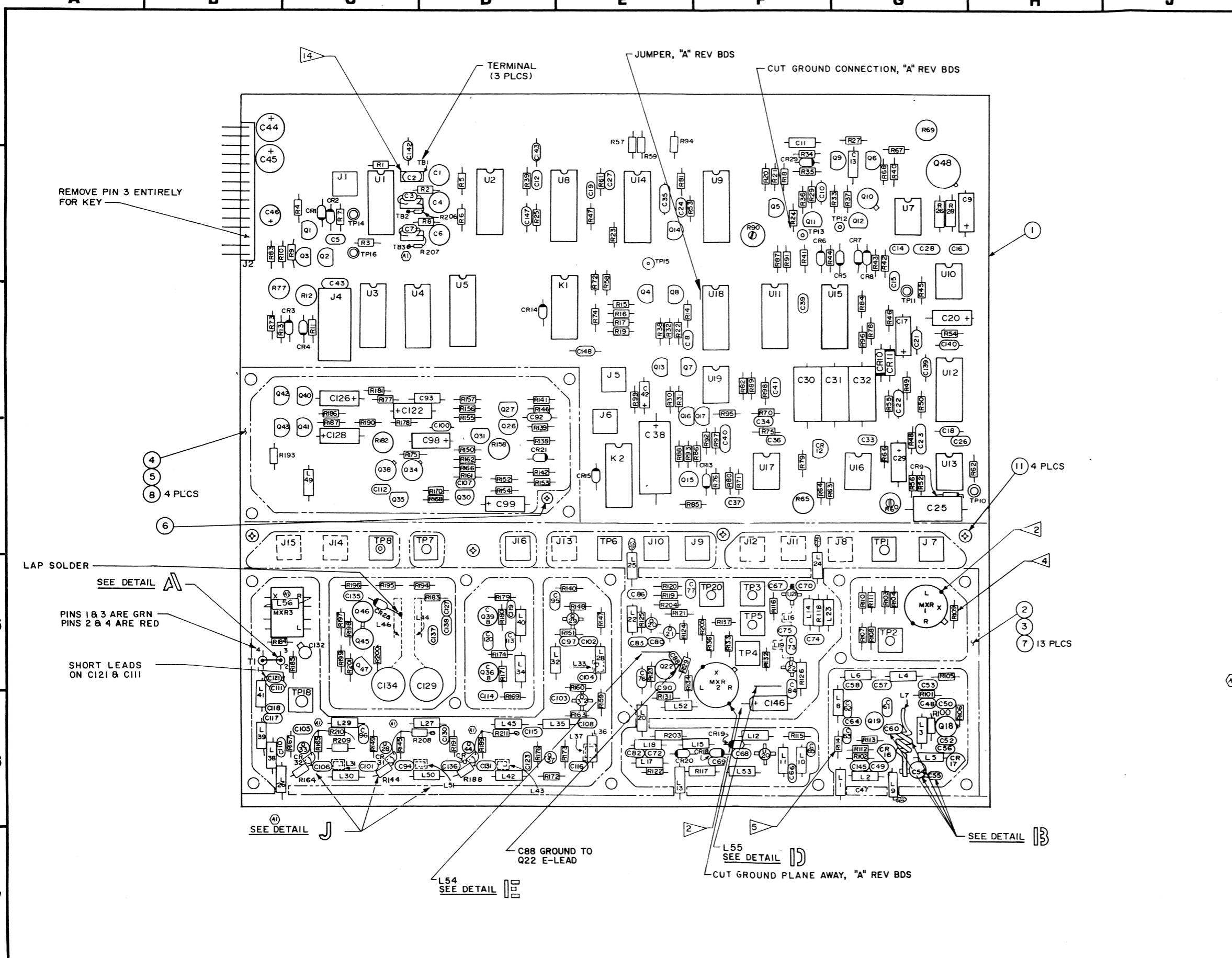
(B-1) NOTES:  
1. JIG IS USED TO BUILD BOARD



DETAIL D (B1)  
R2, R3, R4

UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS APPLY AFTER FINISH			
TOLERANCES: DIMENSIONS: .0015 FRACTIONS: 1/16 ANGLES: 1 SURFACE FINISH: REMOVE ALL BURRS DO NOT SCALE THIS DRAWING			
MATERIAL: ~			
FINISH: ~			
DASH NO	REF DES SERIES	NEXT ASSY	MODEL
10XXX	7005-4940-100	RD301	
APPLICATION			
- IFR INC - 10000 West York Street Wichita, Kansas 67216			
DRAWN A	DATE 9-18	TITLE PC BOARD ASSY RANGE DISCRETE	REV 49-309
CHECKED W.S.	DATE 10-12-84	SIZE C	DWG. NO. 7010-4930-900
APPROVED [Signature]	DATE 10-12-84	SCALE 2:1	CODE IDENT 51100
			WEIGHT ~
			SHEET 1 OF 1

DATE	REV	CHANGE	APPROV
	A	PRODUCTION RELEASE ECN 8053	V.L.H.
5-15-86	A-1	INC ECN 8521	JS



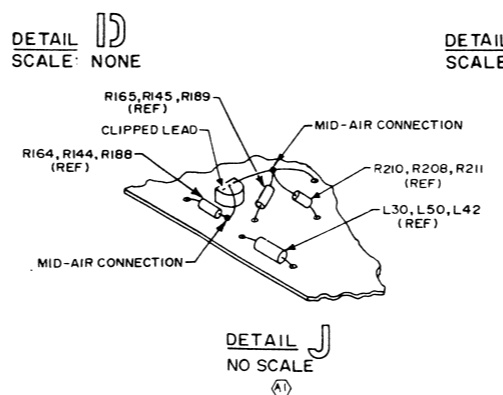
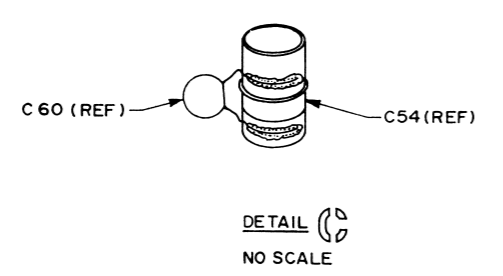
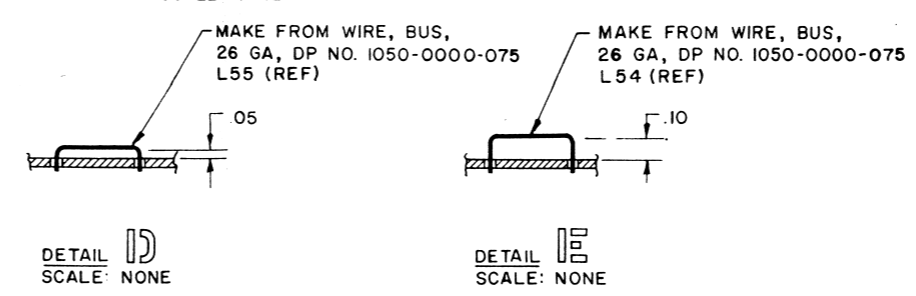
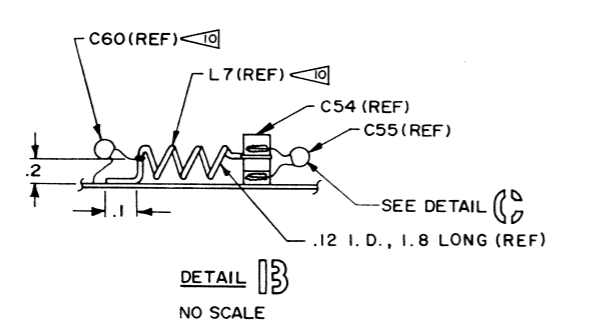
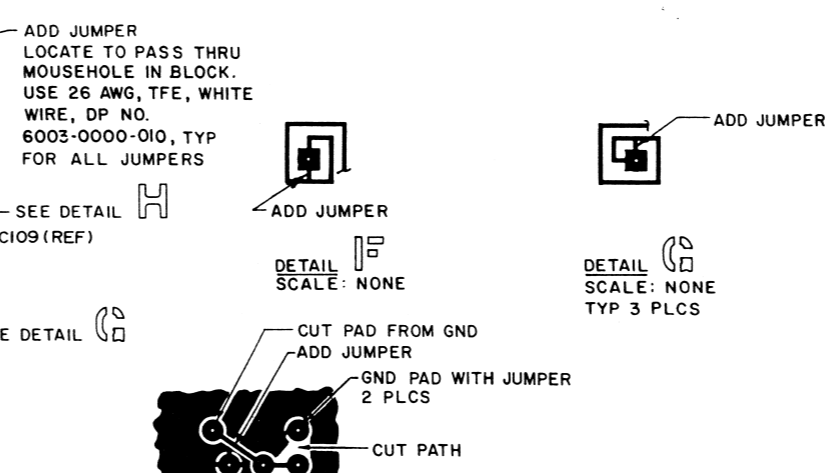
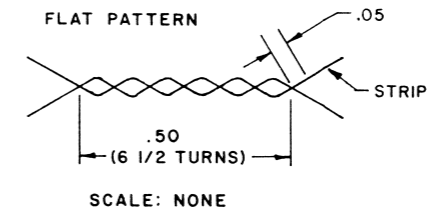
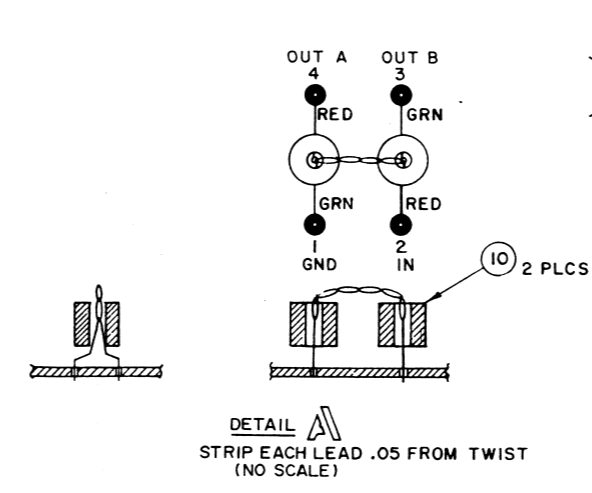
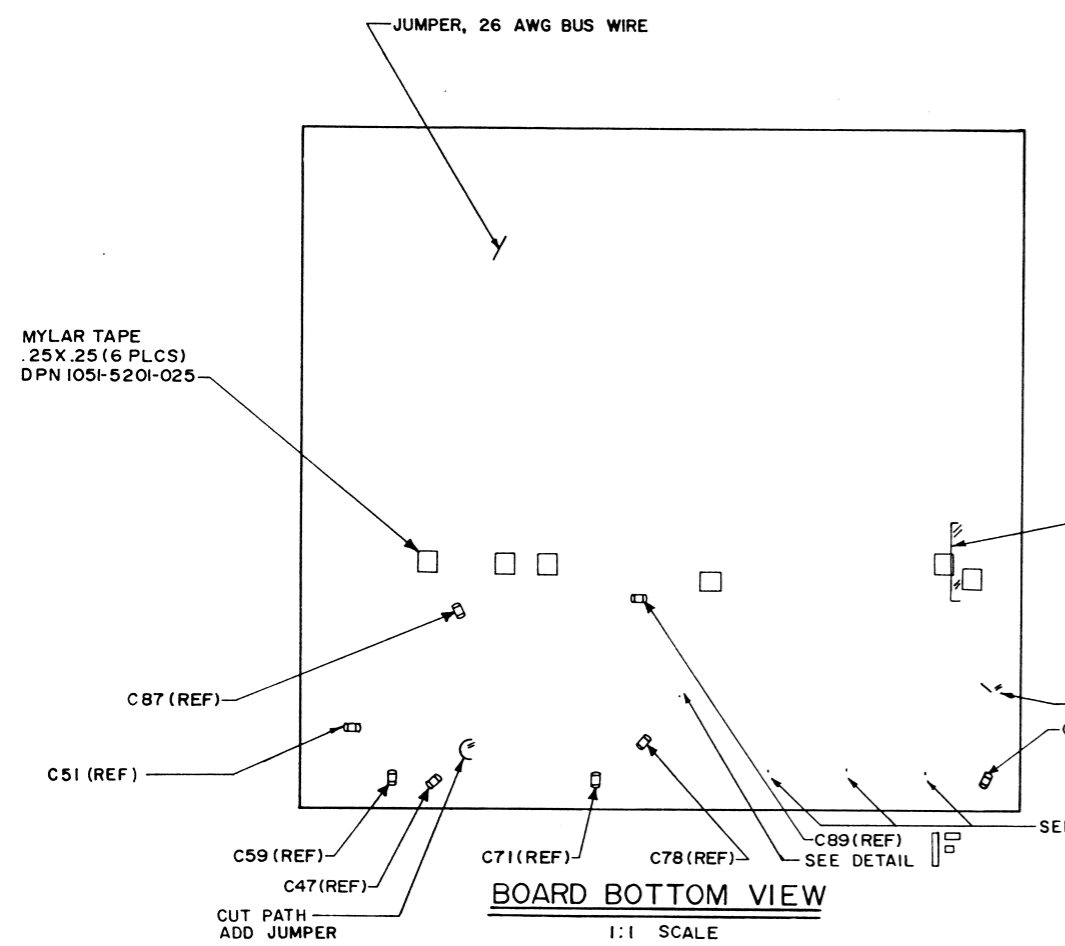
**NOTES:**

1. ALL REF NO'S CARRY AN ASSIGNED DESIGNATOR SERIES. THIS DWG CARRIES SERIES 50XXX (e.g., R1 IS R50001).
2. MOUNT MIXER 1 AND 2 FLAT AGAINST P.C. BOARD. TAC SOLDER CAN TO GRND PLANE.
3. REF SCHEMATIC DWG NO IS 0000-4912-800
4. R109 IS S.A.T. (SELECTED AT TEST) NOMINAL VALUE: 100 ohm, RANGE VALUE: 82-180 ohm.
5. R114 IS S.A.T. (SELECTED AT TEST) NOMINAL VALUE: 150 ohm, RANGE VALUE: 100-180 ohm.
6. LAST REF NO'S USED: C148, CR32, J16, K2, L56, MXR3, Q48, R211, TP20, U22, T1
7. REF NO'S NOT USED: C85, C144, J3, L21, L47, Q23, Q24, Q25, R192, TP9, TP17, C79, C81, C91, C124, C125, C133, L48, R51, R127, R128, R130, R135, R143, R202, T2, TP19, U6
8. LAST ITEM NO USED: 11
9. ITEM NO'S NOT USED: , 9
10. L7 IS CONSTRUCTED FROM AN 18 GA WIRE 1.8" LG. C60 IS ATTACHED .2" FROM GND PLANE
11. NOT USED
12. REMOVE OXIDE AND EXCESS SOLDER UNDER BLOCKS.
13. DO NOT TOP SOLDER COMPONENT LEADS. SOLDER FROM FAR SIDE ONLY. USE A HEAVY TIP TO FLOW SOLDER THROUGH PLATED HOLES WHICH ARE GROUNDED.
14. C2, C3 & C7 ARE S.A.T. (SELECT AT TEST) COMPONENTS. NOMINAL VALUE: 27 pf  
RANGE VALUE FOR: C2 .....15-100 pf  
C3 .....15-56 pf  
C7 .....15-82 pf

SEE SHT 2 FOR DETAILS

DASH NO	REF DES SERIES	NEXT ASSY	MODEL	FINISH
	7005-4940-600	RD-301		
APPLICATION				
<b>- IFR INC -</b>				
18000 Main York Street Wichita, Kansas 67209				
DRAWN BY	DATE	TITLE		
J. SIGLER		P.C. BD ASS'Y		
CHECKED BY	DATE	DISCRIMINATOR BD NO 1		
T. Groat	5/15/86	RD301	(49-328)	
APPROVED BY	DATE	SIZE	DWG. NO.	REV
		D	7010-4932-800	A-1
SCALE	CODE IDENT	WEIGHT	SHEET   OF 2	
2:1	5180			

DATE	REV	CHANGE	APPROV
		SEE SHT 1 FOR REVISIONS	



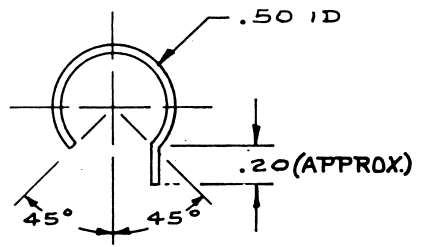
SEE SHT 1 FOR NOTES AND SPECS.

DASH NO	REF DES SERIES	7005-4940-600	RD-301	MODEL	APPLICATION
DRAWN: J. SIGLER CHECKED: [Signature] APPROVED: [Signature]					
TITLE: P.C. BD ASS'Y DISCRIMINATOR BD No 1 RD-301 (49-328)					
SIZE: D QWS NO: 7010-4932-800 SCALE: NOTED COOL IDENT: S1180 WEIGHT: [Signature] SHEET 2 OF 2					

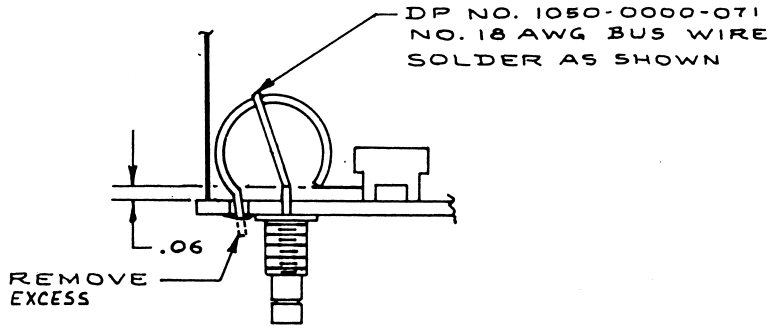


A B C D E F G H

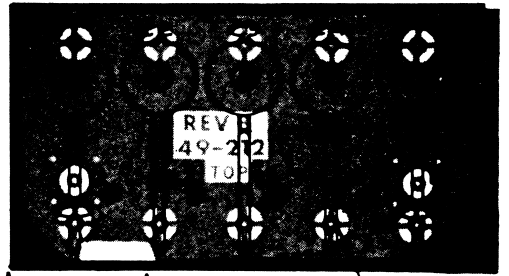
DATE	REV	CHANGE	APVD
7/1/84	B	REVISED & REDRAWN	JCH
10/22/84	B-1	INC ECN 6459 - PROD. REL.	NJP
2/7/85	B-2	INC RC 6702	MKM
9/1/85	B-3	INC RC 7743	VLH
10-16-85	B4	INC RC 7585	JS



DETAIL "A"  
 MATL:  
 DP NO. 1050-0000-071  
 NO. 18 AWG BUS WIRE  
 5 REQ

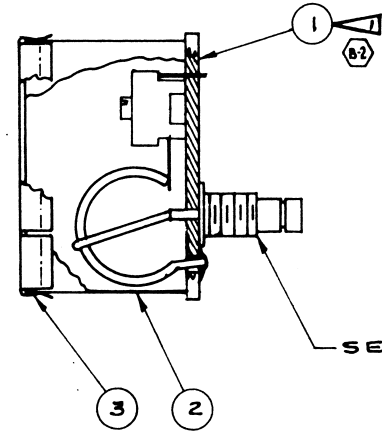


DETAIL "B"  
 1 PLACE AS SHOWN  
 1 PLACE OPPOSITE

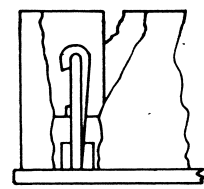
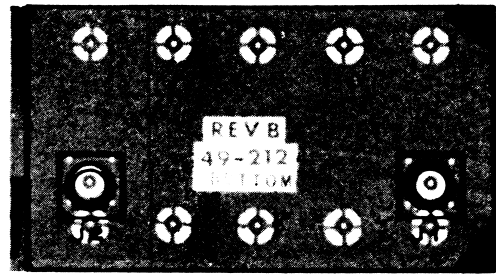


SEE  
 DETAIL "C"

SEE DETAIL "A"



SEE DETAIL "B"



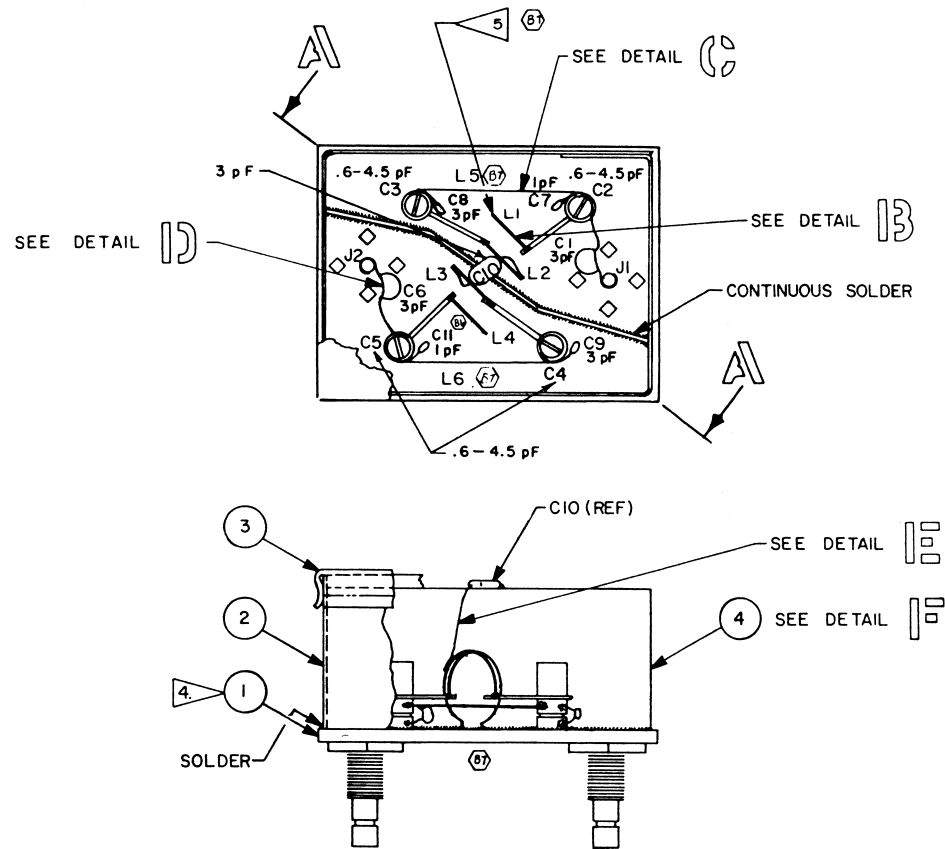
DETAIL "C"

NOTES:

▲ SOLDER ENCLOSURE ITEM (2) TO P.C. BD, ITEM (1) SHOULD BE FLUSH TO P.C. BD. WITH NO GAPS

UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS APPLY AFTER FINISH			
TOLERANCES: DIMENSIONS: .010, .015, .030			
FRACTIONS: 1/16, 1/8, 1/4, 1/2, 3/4, 1, 2, 3, 4, 5, 6, 8, 10, 12, 15, 20, 25, 30, 40, 50, 60, 70, 80, 100			
ANGLES: 5, 10, 15, 20, 25, 30, 45, 60, 75, 90, 120, 150, 180			
SURFACE FINISH: REMOVE ALL FINISH DO NOT SCALE THIS DRAWING			
MATERIAL			
FINISH			
DASH NO	REF DES SERIES	NEXT ASSY	MODEL
40000	7005-4940-600	RD-301	
APPLICATION			
- IFR INC - 1800 West York Street Wichita, Kansas 67210			
DRAWN OSBORN	DATE 8-23-84	TITLE PC BOARD ASSY 475 MHZ FILTER 49-312	
CHECKED WE	DATE 9-27-84	SIZE C	DWG NO. 7010-4931-200
APPROVED Bill Young	DATE 9-27-84	REV C	REV 8-4
SCALE 2:1	CODE IDENT. B180	WEIGHT	SHEET   OF

DATE	REV	CHANGE	APVD
4-19-85	B-3	REDRAWN WITH CHG'S INC ECN 6943	TE
5-8-85	B-4	INC RL 7004 MTH	VLH
5-15-85	B-5	INC RC 7649 BA	VLH
5-18-85	B-6	INC RC 7745 VLH	VLH
6-12-86	B-7	INC RC 8681 waw JS	JS
11-5-86	C	INC RC 9009 waw	WAW



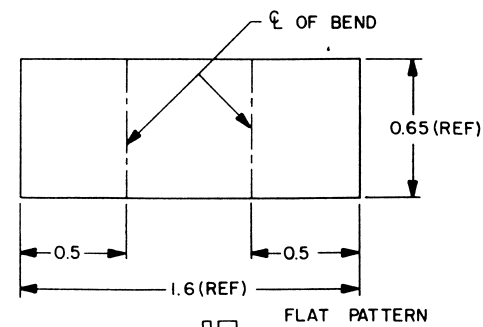
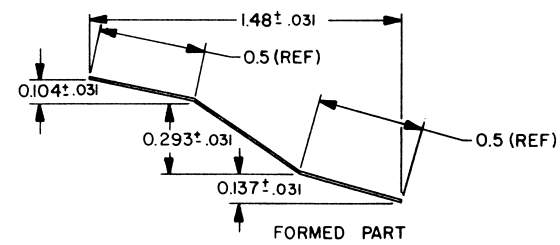
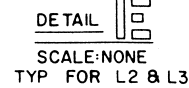
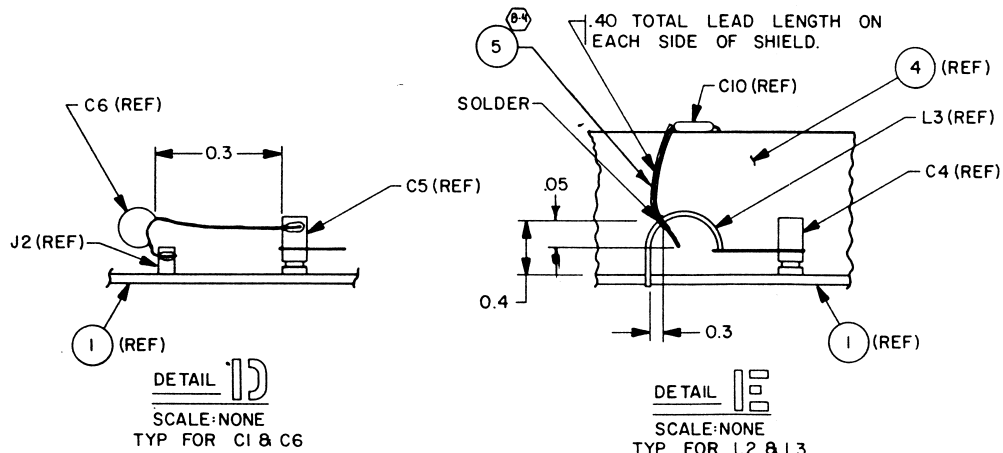
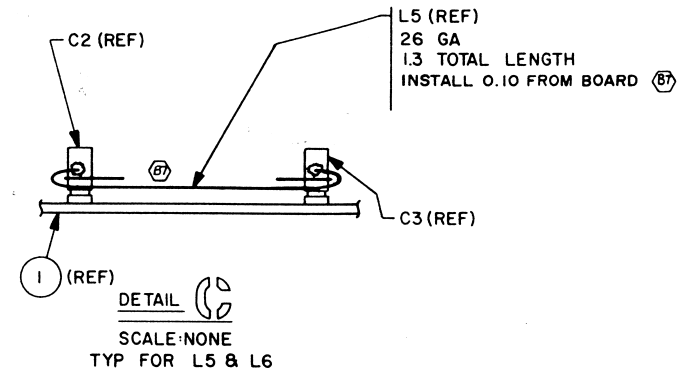
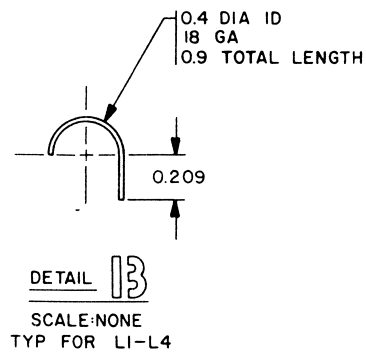
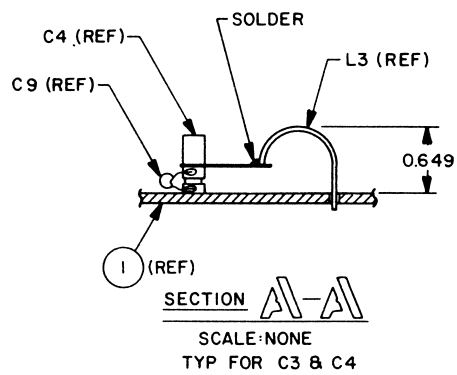
**NOTES:**

- ALL REF N<sup>o</sup>'S CARRY AN ASSIGNED DESIGNATOR SERIES. THIS DWG CARRIES SERIES 38XXX (e.g., C1 IS C38001).
- ALL CAPACITANCE IS EXPRESSED IN PICOFARADS, UNLESS OTHERWISE SPECIFIED.
- LAST REF N<sup>o</sup> USED:  
C11  
L6  
J2
- SOLDER (1) TO (2), SHOULD BE FLUSH WITH NO GAPS.
- L1 MUST BE PARALLEL TO L2, L4 MUST BE PARALLEL TO L3.

SEE SHEET 2 FOR DETAILS & SECTIONS

UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS APPLY AFTER FINISH			
TOLERANCES: DECIMALS: .01 .005 FRACTIONS: 1/16 1/32 ANGLES: 1 SURFACE FINISH: REMOVE ALL BURRS DO NOT SCALE THE DRAWING			
MATERIAL			
FINISH			
DASH NO	REF DES SERIES	NEXT ASSY	MODEL
38000	7005-4940-600	RD-301	
APPLICATION			
HAS BOM		-IFR INC- 10200 West York Street Wichita, Kansas 67218	
DRAWN	DATE	TITLE	
MKM	4-19-85	P.C BOARD ASS'Y	
CHECKED	DATE	570-800 MHz FILTER	
SMellon	4-22-85	RD-301	(49-311)
APPROVED	DATE	SIZE	DWG. NO.
Wawbank 4-22-85		C	7010-4931-100
SCALE		CODE IDENT.	WEIGHT
2:1		5180	
			SHEET 1 OF 2

DATE	REV	CHANGE	APVD
		SEE SHT 1 FOR REV	

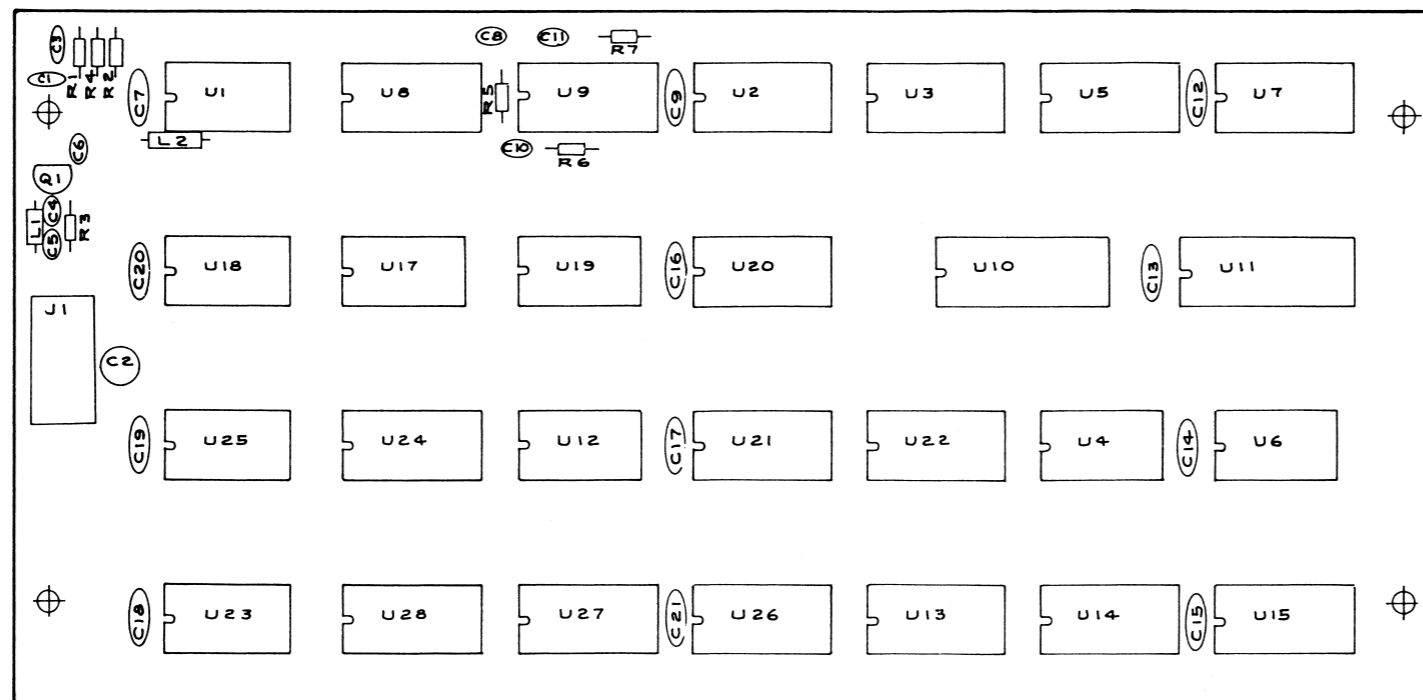


DETAIL F  
SCALE: 2:1  
DETAIL OF R.F. SHIELD  
D.P. No 2508-4954-400

SEE SHEET 1 FOR NOTES

UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS APPLY AFTER FINISH			
TOLERANCES: DECIMALS: ±.01 ±.005 FRACTIONS: 1 ANGLES: 1 SURFACE FINISH: REMOVE ALL BURRS DO NOT SCALE THIS DRAWING			
MATERIAL			
FINISH			
(B)	38000	7005-4940-600	RD-301
DASH NO	REF DES SERIES	NEXT ASSY	MODEL
APPLICATION			
HAS BOM		- IFR INC - 10800 West York Street Wichita, Kansas 67218	
DRAWN MKM	DATE 4-19-85	TITLE PC BOARD ASS'Y 570-800 MHz FILTER RD-301 (49-311)	REV C
CHECKED S. Millroy 4/22/85	DATE	SIZE C	DWG. NO. 7010-4931-100
APPROVED Garcubank 4/22/85	DATE	SCALE NOTED	CODE IDENT. 51180
		WEIGHT	SHEET 2 OF 2

DATE	REV	CHANGE	APPROV
7/17/68	B	Revised per markup	JK
1/25/68	B	PRODUCTION RELEASE FCN 149D	VH
8/5/67	B-1	INC RC 6878 RW	VH
1/18/68	B-2	INC RC 8077 DAH	JS



				UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS APPLY AFTER FINISH	
				TOLERANCES UNLESS OTHERWISE SPECIFIED	
				FRACTIONS 1/16" 1/32" 1/64"	
				DECIMALS .001" .002" .005" .010"	
				SURFACE FINISH REMOVE ALL BURRS	
				DO NOT SCALE THIS DRAWING	
MATERIAL					
FINISH					
DASH NO	REF DES	NEXT ASSY	MODEL		
-300	35000	7005-4940-600	RD-301		
APPLICATION					
- IFR INC - 10800 West York Street Wichita, Kansas 67215					
<b>IC BOARD ASSY DISCRIMINATOR BOARD NO. 2 (49-313)</b>					
DRAWN	DATE	CHECKED	DATE	SIZE	DWG NO
OSBURN	12-2-67	JK	12-2-67	D	7010-4931-300
APPROVED	DATE	SCALE	CODE IDENT	WEIGHT	SHEET
JK	12-2-67	2:1	SIBD		1 OF 1