TM 11-6625-2917-24&P-5

TECHNICAL MANUAL

ORGANIZATIONAL, DIRECT SUPPORT, AND GENERAL SUPPORT MAINTENANCE MANUAL, INCLUDING REPAIR PARTS AND SPECIAL TOOLS LISTS

FOR

IF/BB RECEIVER R-2049(V)1/U (HEWLETT-PACKARD) MODEL 3702B (NSN 6625-00-520-5023)

PART OF

MICROWAVE LINK ANALYZER

HEADQUARTERS, DEPARTMENT OF THE ARMY

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TECHNICAL MANUAL
No. TM 11-6625-2917-24&P-5

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REPORTING OF ERRORS

You can improve this manual by recommending improvements using DA Form 2028-2 located in the back of the manual. Simply tear out the self-addressed form, fill it out as shown on the sample, fold it where shown, and drop it in the mail.

If there are no blank DA Forms 2028-2 in the back of your manual, use the standard DA Form 2028 (Recommended Changes to Publications and Blank Forms) and forward to the Commander, US Army Communications and Electronics Materiel Readiness Command, ATTN: DRSEL-ME-MQ, Fort Monmouth, NJ 07703.

In either case a reply will be furnished direct to you.

This manual is an authentication of the manufacturer's commercial literature which, through usage, has been found to cover the data required to operate and maintain this equipment. The manual was not prepared in accordance with military specifications; therefore, the format has not been structured to consider categories of maintenance.

FOREWORD

The 3702B IF/BB Receiver is the receive and display unit of the Hewlett-Packard Microwave Link Analyzer (MLA). This manual contains information only for the IF/BB Receiver. Separate service manuals are supplied with the other units of the MLA, and a SYSTEM SERVICE MANUAL and SYSTEM OPERATING INSTRUCTIONS can also be obtained.

SERIAL NUMBERS

This manual applies directly to instruments with serial numbers prefixed 1424U.

For instruments with serial prefixes other than this refer to the Manual Change Sheets.

For additional information about serial numbers, see Section I.

MANUAL CONTENT

Section I contains an introduction to the manual. Included are general details of the 3702B, a table of specifications, unpacking and installation information, and a list of recommended test equipment.

Section II contains information on performance checks.

Section III details the adjustments necessary for calibrating the 3702B.

Section IV contains a replaceable parts list for the 3702B plus a list of abbreviations and reference designators used in the parts list and schematics.

Section V contains service information, including theory of operation, troubleshooting, circuit description, component location information and schematic diagrams of the 3702B.

Section VI contains manual backdating information.

TABLE OF CONTENTS

SECTION O INSTRUCTIONS

SECTION I INTRODUCTION

SECTION II. PERFORMANCE CHECKS

SECTION III. ADJUSTMENT PROCEDURES

SECTION IV. REPLACEABLE PARTS

SECTION VI. MANUAL CHANGES

APPENDIXES

LIST OF TABLES

LIST OF FIGURES

LIST OF FIGURES (Continued)

LIST OF FIGURES (Continued)

SECTION 0
INSTRUCTIONS

0-1. SCOPE

This manual describes IF/BB Receiver R-2049(V)1/U (HP 3702B) (fig. 1-1) and provides maintenance instructions. Throughout this manual, the R-2049 (V)1/U is referred to as the Hewlett-Packard (HP) 3702B.

0-2. INDEXES OF PUBLICATIONS

a. DA Pam 310-4. Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to this equipment.

b. DA Pam 310-7. Refer to DA Pam 310-7 to determine whether there are modification work orders (MWO's) pertaining to this equipment.

0-3. FORMS AND RECORDS

a. Reports of Maintenance and Unsatisfactory Equipment. Maintenance forms, records, and reports which are to be used by maintenance personnel at all levels of maintenance are listed in and prescribed by TM 38-750.

b. Report of Packaging and Handling Deficiencies. Fill out and forward DD Form 6 (Packaging Improvement Report) as prescribed in AR 700-58/NAVSUPINST 4030.29/AFR 71-13/MCO P4030.29A and DLAR 4145.8.

c. Discrepancy in Shipment Report (DISREP) (SF 361). Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38/NAVSUPINST 4610.33B/AFR 75-18/MCO P4610.19C and DLAR 4500.15.

0-4. REPORTING OF EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR)

EIR's will be prepared using DA Form 2407, Maintenance Request. Instructions for preparing EIR's are provided in TM 38-750, The Army Maintenance Management System. EIR's should be mailed directly to Commander, US Army Communications and Electronics Materiel Readiness Command, ATTN: DRSEL-ME-MQ, Fort Monmouth, New Jersey 07703. A reply will be mailed directly to you.

0-5. ADMINISTRATIVE STORAGE

Administrative storage of equipment issued to and used by Army activities shall be in accordance with TM 740-90-1.

0-6. DESTRUCTION OF ARMY ELECTRONICS MATERIAL

Destruction of Army electronics materiel to prevent enemy use shall be in accordance with TM 750-244-2.

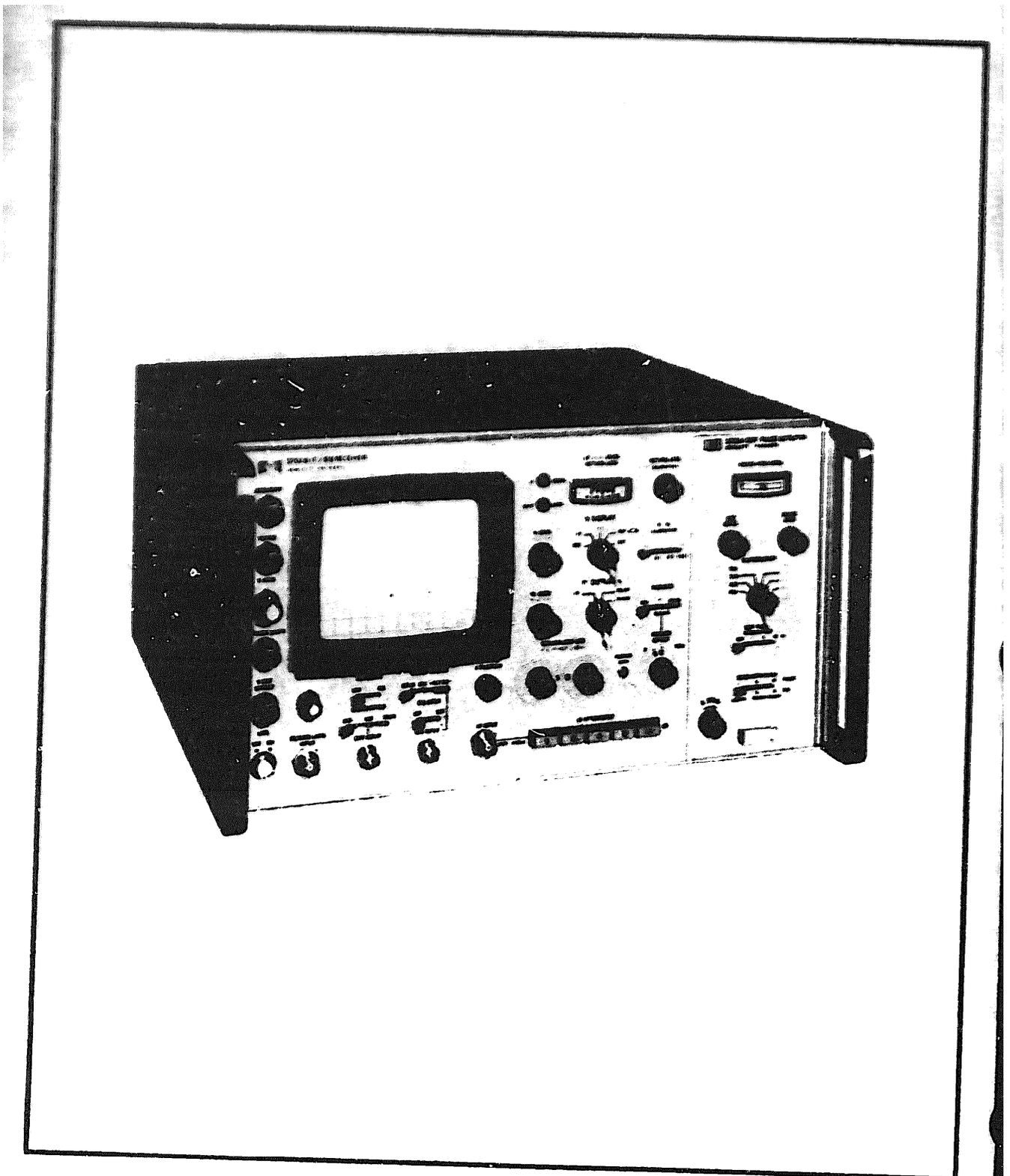


Figure 1-1. hp 3702B IF/BB Receiver

SECTION I

INTRODUCTION

1-1 GENERAL

1-2 The hp 3702B IF/BB Receiver is the receive and display instrument of the Microwave Link Analyzer (MLA), which processes Baseband (BB) and swept Intermediate Frequency (IF) signals to display such characteristics as IF flatness and BB linearity. A complete MLA consists of an *hp* 3702B IF/BB Receiver with a Group Delay Detector plug-in, and an *hp* 3710A IF/BB Transmitter with a BB Transmitter plug-in.

1-3 Group Delay Detector Plug-in

1-4 The hp 3703B Group Delay Detector plug-in is used in the measurement of group delay at BB frequencies below 2.4MHz, and is compatible with the *hp* 3715A and the *hp* 3716A BB Transmitter plug-ins.

1-5 The hp 3705A Differential Phase Detector plug-in is used in the measurement of group delay at BB frequencies below 2.4MHz, and of differential phase at BB frequencies of 2.4MHz and above. The 3705A is compatible with the *hp* 3716A BB Transmitter plug-in.

1-6 FEATURES

1-7 The main features of the IF/BB Receiver are:

a. Dual display, enabling two simultaneous measurements to be presented.

b. Automatic Gain control (AGC) providing a constant X-axis display independent of sweep Width changes.

C. AFC LOCK lamp indicating that the internal local oscillator is locked to the incoming IF signal, provided that this signal is centred on 70MHz and is swept within the range 45 to 95MHz.

d. Frequency calibration by sliding and/or comb markers derived from the swept IF input signal. The sliding markers consist of one centre frequency marker at 70MHz, and two continuously variable markers symmetrical about 70MHz with an offset variable from 0 to 26MHz. The marker comb has a 2MHz spacing.

e. Wideband, linear response discriminator enabling demodulation up to 5.6MHz.

f. Split-trace amplitude calibration providing maximum sensitivity of 0.1dB/cm for IF display, and 0.25%/cm for BB displays.

g. High sensitivity return loss channel (0 to -50dBm) measuring and displaying return loss from 45 to 95MHz.

h. SPECTRUM facility with an accurate 70MHz marker,

i. Automatic Phase Control which compensates for phase differences introduced between horizontal and vertical axes by the recovered sweep.

j. Slave operation, requiring two MLA's, permits a remote measurement to be displayed locally.

k. SWEEP SOURCE switch enables the sweep, applied to the CRT, to be selected from a Swept IF, a BB+ Sweep, or an Ext Sweep input.

l. In the EXT mode the EXT INPUT accepts signals, for display, in the range dc to 12kHz. The sweep signal is derived from either the IF INPUT, the BB INPUT, or the EXT SWEEP INPUT. A split trace calibration of 50mV or 10% of input is available.

m. IF UNCAL lamp indicating whether the IF INPUT is within the calibration limits when measuring parameters derived from the IF signal.

1-8 OPTIONS

1-9. There are four options available for the 3702B.

1-10 OPTION 002 substitutes Siemens type 2.5 mm connectors for the standard BNC front and rear panel connectors.

1-11 OPTION 003 substitutes Siemens type 1.6 mm connectors for the standard BNC front and rear panel connectors.

1-12 OPTION 004 incorporates a 124 Ohm balanced BB INPUT, and substitutes a commercial equivalent of WECO 477B connectors for the standard BNC front panel connectors.

1-13 OPTION 017. The IF LEVEL is Voltage instead of Power referenced. A switch is added to the rear panel to allow the Y1 and Y2 displays to be inverted.

1-14 IDENTIFICATION

1-15 Hewlett-Packard instruments have a two section, ten character serial number plate attached to the rear panel. Figure 1-2 gives a breakdown of this number.

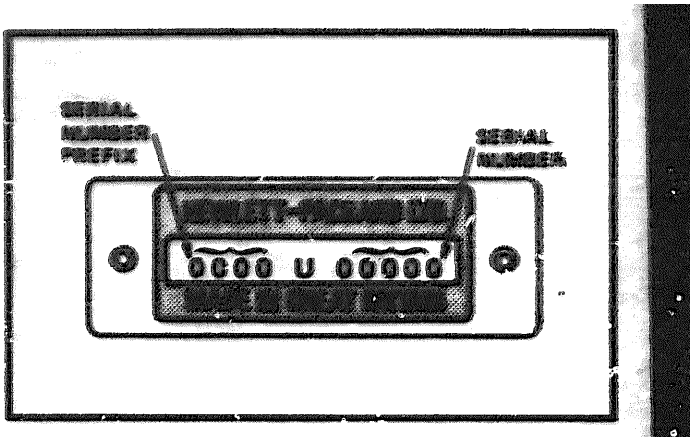


Figure 1-2. Instrument Identification

1-16. FAN MAINTENANCE

1-17 The fan fitted to the rear panel should be lubricated at regular intervals. These intervals may vary from 3000 to 6000 hours depending on the environment. The fan is lubricated by inserting a hypodermic syringe needle through the rubber plug in the centre of the fan name plate and inserting a small quantity of *hp* lubricant, *hp* part number 6040-0220 or Shell Tellus 33. The air filter should be removed and cleaned periodically. The filter is removed by unscrewing the four screws on the filter cover. Wash the filter mesh in clean soapy water, rinse thoroughly and dry before refitting.

Table 1-1. hp 3702B IF/BB Receiver Specifications

Y1 DISPLAY

Switch	Meter	Calibration
REF	IF	None
IF*	IF	0.1, 0.3 or 1.0dB
BB*	BB*	1, 3 or 10%
RET LOSS*	RET LOSS*	Uses Return Loss attenuator
EXT*	—	50mV or 10% of input

*Not with Y2 DISPLAY in SPECTRUM

Y2 DISPLAY

Switch	Calibration
SPECTRUM	None
IF	0.1, 0.3 or 1.0dB
DELAY	From 3703B/3705A
SLAVE	Adopts remote display calibration

IF CHARACTERISTICS

IF INPUT
Frequency Range: 70 ±25MHz.
AFC Capture Range: 70 ±3MHz.
AFC Hold-In Range: 70 ±25MHz
Input Power Range: +21dBm to -10dBm. 31dB IF LEVEL attenuator compensates for power levels greater than -10dBm.
Power Measurement Accuracy: ±0.5dB.
Input Impedance: 75 ohm.
Return Loss: >30dB (55 to 85MHz, >28dB (45 to 95MHz)
Calibration Magnitudes: 0.1, 0.3, 1.0dB ±10%.
Flatness: ±0.05dB up to +5dBm;
±0.1dB from +5 to +21dBm back-to-back
System check, 45 to 95MHz.

Frequency Markers
Centre Marker: 70MHz ±100kHz.
Sliding Markers: 0 to 25MHz, offset.
Offset Dial Accuracy: ±1MHz.
Marker Comb: 2MHz ±100kHz.

Demodulator
Frequency Range: 80kHz to 5.6MHz.
Deviation Range: 10 to 500kHz rms.

Spectrum
Use IF INPUT, AFC inoperative.
Centre Frequency: 70MHz.
Scan Width: ±0.5 to ±9MHz
Crystal Marker: 70MHz ±5kHz.
Nulling Sensitivity: Detects ±0.1dB change in modulation index at a Bessel Zero.

Return Loss
NOTE: Return Loss requires frequency replica at IF INPUT to lock AFC.
Input Power Range: -22dBm to -50dBm.
Flatness: 1dB 70 ±25MHz.
Input Impedance: 75 ohm.
Return Loss: >28dB.

BB CHARACTERISTICS

BB INPUT 75 ohm (OPT 004: addition of 124 ohm bal)
Frequency Range: 80kHz to 10MHz. Sweep 18 to 100Hz.
Input Range: BB Power -49 to -10dBm. Sweep Voltage 600mV to 10V pk-pk, for a 10cm ±5mm trace deflection.
Measurement Accuracy: BB Power ±0.5dB.
Input Impedance: 75 ohm unbalanced Return Loss >28dB. (124 ohm bal for OPT 004).

Calibration
Calibration Magnitudes: 1, 3, 10%.
Accuracy: ±10%.
Display Bandwidth: 1, 5kHz.

DISPLAY CHARACTERISTICS

CRT
Post accelerator, 6kV accelerating potential; aluminized P2 phosphor; safety glass faceplate. 8 x 10 div parallax free internal graticule.

Horizontal Deflection

Sweep Source
INT IF: Recovered from swept IF INPUT.
EXT: From EXT SWEEP INPUT.
EXT BB+: Recovered from BB INPUT if signal also includes sweep.
EXT BB-: Same as EXT BB+ but reversed sweep direction.

Ext Sweep Input
Amplitude: 600mV to 10V pk-pk maximum.
Frequency Range: 18 to 100Hz sinusoidal.
Input Impedance: 5k ohm nominal.

AGC
Diplayed sweep width remains constant to within 5mm for 3 to 50MHz IF Sweep Width and 600mV to 10V pk-pk applied to BB INPUT or EXT SWEEP INPUT.

Vertical Deflection
Y1 and Y2 controlled by respective DISPLAY switches (see Y1 DISPLAY and Y2 DISPLAY specifications).

Ext Input (Y1)
Function: Operates as a conventional oscilloscope input.
Frequency Range: dc to 12kHz (3dB).
Maximum Input: 0.5V pk-pk
DC Offset Range: ±2V maximum.
Calibration: 50mV ±5%.
10% ± 1% of input.
Input impedance: 10k ohm nominal.
Sensitivity: 0.5mV/cm.

Slave
Permits the measurement made by a remote 3702B to be reproduced locally with virtual immunity from the link return path characteristics.

Slave Output
Level: 50 ±10mV/cm of Y1 or Y2 trace with frequency markers added.
Output Impedance: 2k ohm nominal.

Table 1-1. hp 3702B IF/BB Receiver Specifications (Continued)

GENERAL

Power Supply

Voltage: 100, 120, 220 or 240V; +5%, -10%.
Frequency: 48 to 66Hz.
Power: 150VA maximum.

Temperature
Operating: 0° to 55°C (32° to 122°F)
Storage: -40° to 65°C (-40° to 149°F)

Weights
Net: 46lb (21kg)
Shipping: 80lb (36kg) (with plug-ins).

Dimensions
Width: 16.75in (425mm)
Height: 8.5in (216mm)
Depth: 18in (457mm)

Table 1-2. Test Equipment

Instrument	Specification	Recommended Type	Qty
Oscilloscope and 10:1 Probe	Dual Trace Bandwidth: dc to 50MHz	hp 180A/1801A/1821A hp 10004A	1 1
Digital Voltmeter	Range: 0 to 100V Accuracy: 0.01V	hp 3440A/3443A	1
Sweep Generator	Range: 100kHz to 10MHz	hp 8601A	1
Electronic Counter	Range: 50kHz to 10MHz Accuracy: ±1Hz	hp 5245L	1
Spectrum Analyzer	Range: 1kHz to 100MHz	hp 140T/8553B/8552A	1
IF/BB Transmitter		hp 3710A/3716A	1
IF Switch		hp 3740A	1
Power Meter and Thermistor Mount	Accuracy: 1%	hp 432A hp 478A	1 1
Accessory Kit		hp 15550A	1
Attenuator	Range: 0 to 1dB in 0.1dB steps Frequency: 0 to 95MHz	Texscan RA-73	1
RMS Voltmeter	Range: 1mV to 300V	hp 3400A	1
75/50 ohm Matching Pad	Range: 0 to 500MHz Flatness: ±0.03dB	Greenpar or Rohde & Schwarz	1
RF Millivoltmeter and Probe	Range: 0 to 500MHz Sensitivity: 40dBm	hp 411A hp 11025A	1 1
*Test Oscillator	Range: 10Hz to 10MHz	hp 654A	1
Cables	75 ohm BNC to 75 ohm CONHEX	hp 15539A	2
Capacitor	0.01 uF ,5%	hp 0150-0093	1

*Option 004 only.

SECTION II

PERFORMANCE CHECKS

2-1. General

2-2. The performance of the hp 3702B IF/BB Receiver is checked while the unit is installed in a complete Microwave Link Analyzer (MLA). These performance checks can be found in the MLA System Service Manual under two headings; Back-to-Back Performance Checks and Performance Checks. The Back-to-Back Performance Checks have MLA system troubleshooting procedures associated with them, while the Performance Checks verify the individual performance standards of the IF/BB Receiver and the IF/BB Transmitter separately.

2-3. The performance standards contained in Table 1-1 of this manual should be met by the 3702B and any discrepancy means that further investigation is necessary. If a circuit malfunction is suspected the Back-to-Back Performance Checks and Troubleshooting should be used to indicate the General Service Sheet applicable. The troubleshooting contained in this General Service Sheet will then indicate the faulty board(s). If no circuit malfunction is suspected reference should be made to the adjustment procedures contained in Section III of this manual.

SECTION III

ADJUSTMENT PROCEDURES

3-1. INTRODUCTION

3-2. This section provides information for adjusting the Hp 3702B IF/BB Receiver. The procedures detailed in the following paragraphs outline the adjustments necessary to enable the 3702B to meet the specifications in Table 1-1. Adjustments should only be made when it is determined that the 3702B is out of calibration. To avoid any interaction between adjustments, the procedures in this section should be performed in the order given. The necessary test equipment is listed in Table 1-2.

3-3. ADJUSTMENT PROCEDURES

3-4 Preliminary Procedure

1. Check that the line module, on the rear of the 3702B, is set for the correct line voltage.
2. Remove the top cover from the 3702B.
3. Connect the 3702B to the line supply.
4. Switch on and allow a ½hour warm-up period before performing any adjustments.

3-5. Power Supplies

1. Set the 3702B controls:

INTENSITY ..... counterclockwise
LINE .. .. OFF
Y2 DISPLAY .. . . . . IF

2. Remove assembly A1 from the instrument and refit on an extender card. Set the LINE switch to ON.
3. Monitor the dc level at A1 Pin 9 with a DVM and check for +100V ±5V.
4. Monitor the dc level at A1 Pin 1 with the DVM and check for +15V±0.1V. If necessary adjust A1R13 for +15V ±10mV.
5. Monitor the dc level at A1 Pin 22 with the DVM and check for -15V ±0.1V. If necessary adjust A1R23 for -15V ±10mV.
6. Monitor the dc level at A1 Pin 19 and check for +30V ±2V.
7. Using an Oscilloscope check that the ripple at A1 Pin 9 and 19 is not greater than 50mV pk-pk and at A1 Pin 1 and 22 not greater than 5mV pk-pk.
8. Set the LINE switch to OFF. Remove assembly A1 from the extender card and replace Assembly A1 in the instrument.

3-6. Deflection

1. Set the 3702B controls:

Y1 DISPLAY .. .. REF
Y2 DISPLAY .. .. SLAVE
Y1 POSITION .. .. mid-travel
Y2 POSITION .. .. mid-travel
Y1 GAIN .. .. counterclockwise
Y2 GAIN . . . . . counterclockwise
SWEEP SOURCE . . . . . EXT
BLANKING OFF
EXT INPUT CALIBRATION .. .. OFF
INTENSITY . . . . . counterclockwise
LINE. . . . . OFF

2. Remove Assembly A3 and fit it into the 3702B on the extender card. Set the LINE switch to ON.
3. Connect the Oscilloscope probe to A3CR5 cathode and adjust the Y1 POSITION control for a square wave of less than 100mV pk-pk. Check that the frequency is 100kHz ±10kHz
4. Connect the Oscilloscope probe to A3CR3 cathode and adjust the Y2 POSITION control for a square. wave of less than 100mV pk-pk.

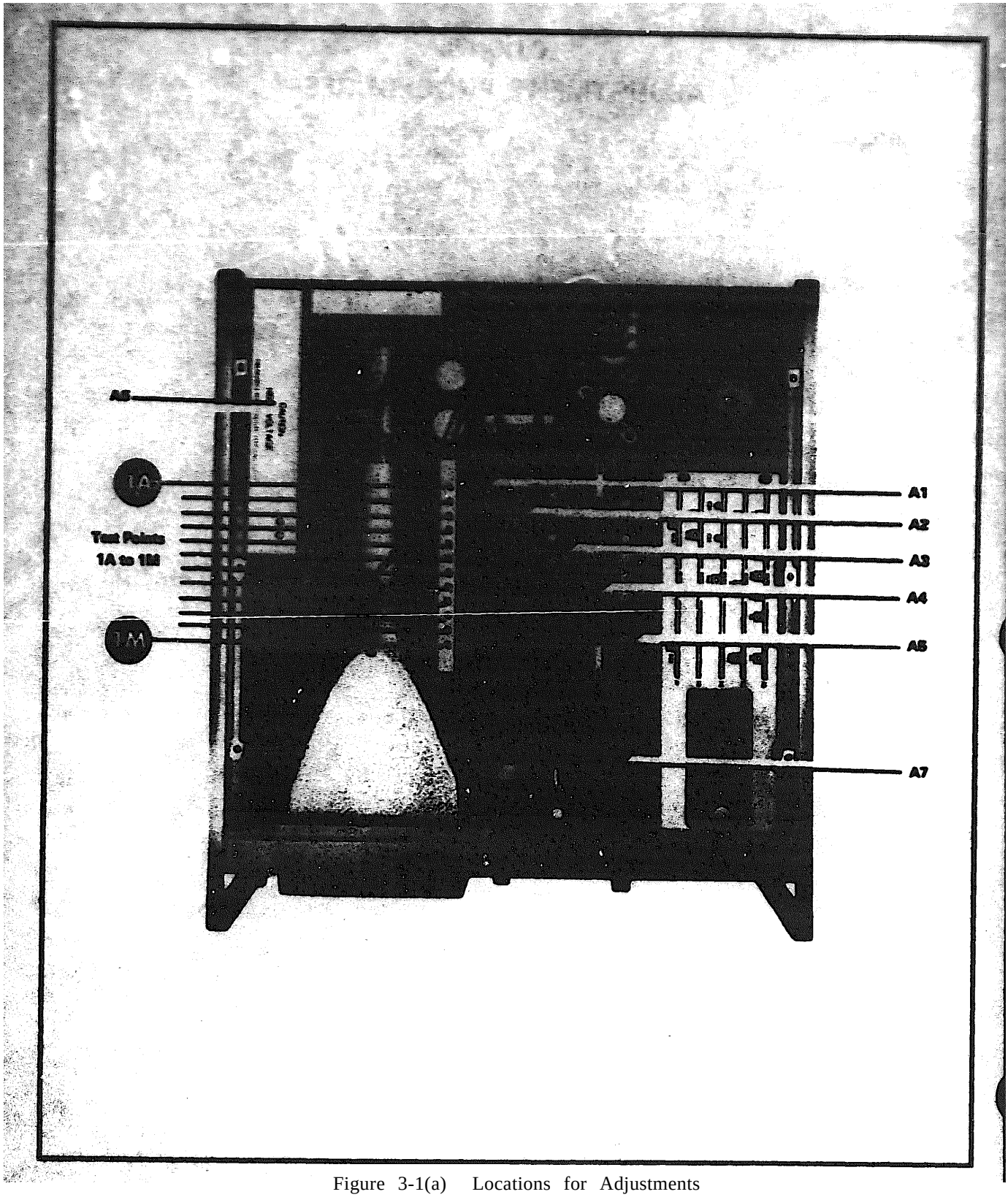


Figure 3-1(a) Locations for Adjustments

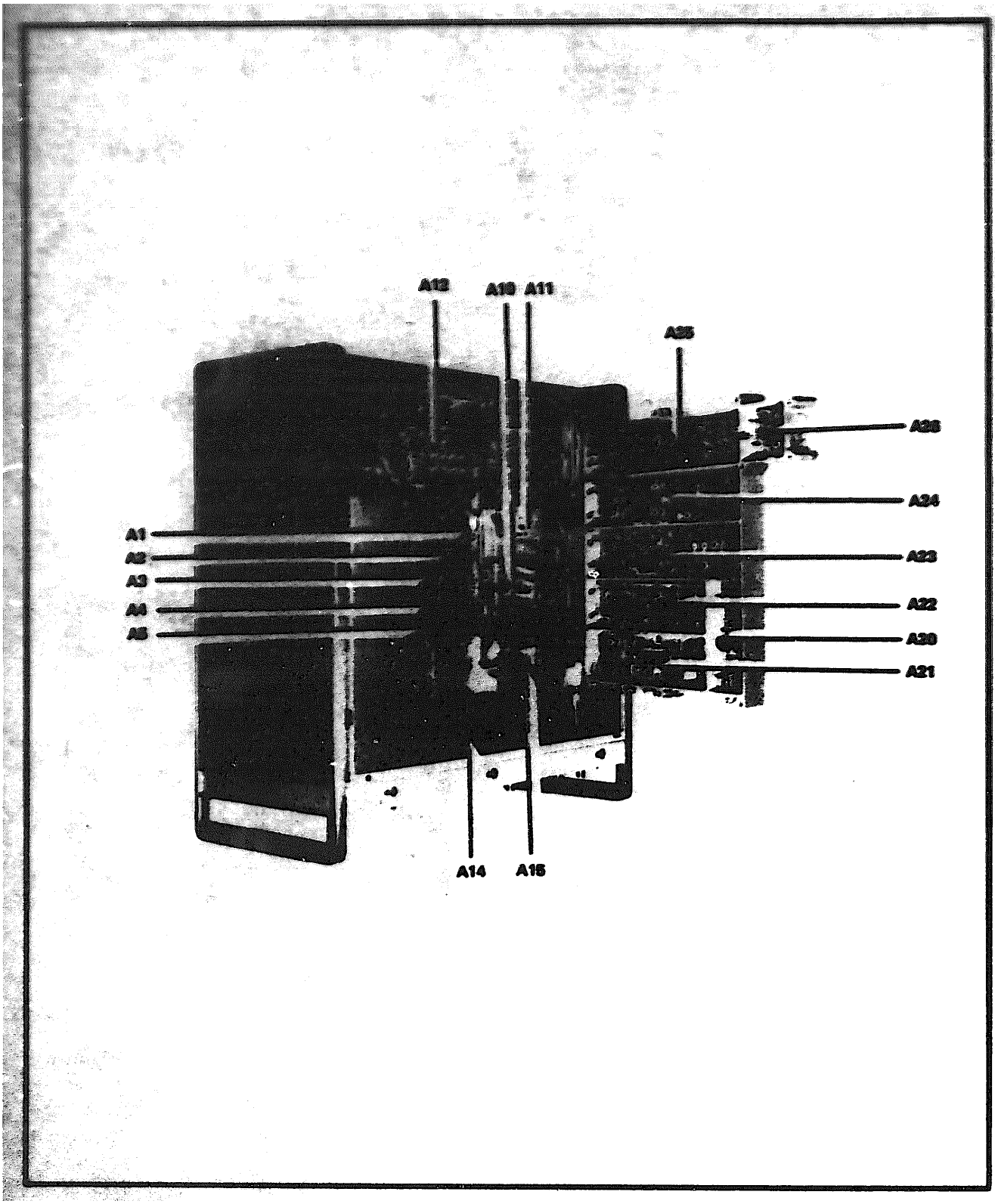


Figure 3-1(b) Locations for Adjustments.

5. Connect one vertical input of the Oscilloscope to A3Q10 collector and the other input to A3Q11 collector. DC couple the two Oscilloscope inputs.

6. Adjust A3R63 to give the same dc voltage at A3Q10 and A3Q11 collectors. The voltage should be +50V ±10V.

7. Adjust the Y1 POSITION control to give a 10V pk-pk square wave at A3Q10 and A3Q11 collectors.

8. Adjust A3C23 and A3C24 to give square waves having rise and fall times of not greater than 200nS with no overshoot or undershoot.

9. Disconnect the Oscilloscope probes from A3Q10 and A3Q11.

10. Set the LINE switch to OFF Remove extender card and replace A3 in the instrument and set the LINE switch to ON.

11. Turn INTENSITY control clockwise to display a spot on the CRT.

12. Adjust the FOCUS control and the ASTIGMATISM (rear panel) for best spot definition.

13. Set the 3710A SWEEP switch to INT.

14. Monitor the 3710A SWEEP OUTPUT with the Oscilloscope and adjust the SWEEP LEVEL control to give 10V pk-pk.

15. Disconnect the Oscilloscope and connect the 3710A SWEEP OUTPUT to the 3702B EXT SWEEP INPUT (rear panel).

16. Adjust the X-GAIN control to give a 10cm horizontal display on the CRT. If necessary adjust the TRACE ALIGN control on the rear panel to bring the traces parallel to the horizontal CRT lines.

17. Adjust the Y1 POSITION control to bring the trace to the centre line of the CRT.

18. Set the Y1 DISPLAY switch to EXT and the Y1 GAIN control fully clockwise.

19. Adjust the Y EXT OFFSET to bring the Y1 trace to the centre line of the CRT ±1cm. Reset the Y1 GAIN counterclockwise.

20. Set the 3716A BB FREQUENCY switch to OFF. Monitor the BB + SWEEP OUTPUT and adjust the SWEEP CAL control for 1V pk-pk.

21. Connect the 3716A BB + SWEEP OUTPUT to the 3702B EXT INPUT.

22. Adjust the Y1 GAIN control to give a vertical deflection of 8cm.

23. Adjust the X PHASE SHIFT to display a Lissajous Figure approximately "circular".

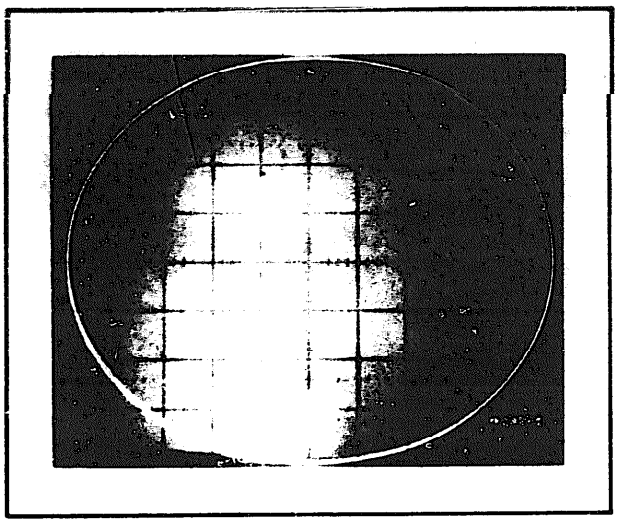


Figure 3-2 Lissajous Figure

24. Set the BLANKING switch to ON. Turn the INTENSITY control fully clockwiseand adjust R14, the SET INTENSITY control on the main deck, for maximum brilliance without visible flyback.

25. Turn the INTENSITY control counterclockwise until the trace is just visible.

26. Set the BLANKING switch to OFF and adjust A2R73 for the same trace brilliance as in step 25.

27. Set the INTENSITY control to a normal working level and adjust the FOCUS and ASTIGMATISM (rear panel) controls for optimum trace definition.

28. Vary the X PHASE SHIFT control over its full range and examine the display for ghosts, line definition and geometry. Adjust A3C23 and C24 to correct for ghosts and line definition, and A2R37 for geometry.

3-7 Baseband

1. Set the instrument controls as follows:

3710A

SWEEP WIDTH	50MHz
SWEEP	OFF
LINE	ON

3716A

BB FREQUENCY	500kHz
BB POWER	-10dBm
BB + SWEEP VERNIER	CAL
SWEEP CAL	counterclockwise

3702B

Y1 DISPLAY	BB
Y2 DISPLAY	IF
Y1 GAIN	counterclockwise
Y1 POSITION	mid-travel
Y2 GAIN	counterclockwise
Y2 POSITION	mid-travel
Y1/Y2 CALIBRATION	OFF
BB POWER	-10dB
BB INPUT	EXT
SWEEP SOURCE	EXT BB+
INTENSITY	counterclockwise
LINE	ON

3705A

BB FREQUENCY	500kHz

2. Connect the 3716A BB + SWEEP OUTPUT to an RMS Voltmeter terminated in 75Ω and adjust the VERNIER control for 86mV. (The BB POWER Attenuator may have to be adjusted by 1dB).

3. Disconnect the RMS Voltmeter and connect the 3716A BB + SWEEP OUTPUT to the 3702B BB INPUT. Adjust A5R60 for a zero reading on the IF/BB LEVEL meter.

4. Adjust the 3716A VERNIER control, and the BB POWER by 1dB if necessary, for an IF/BB LEVEL meter reading of +0.5dB.

5. Insert 1dB in the 3716A BB POWER Attenuator and adjust A5R3 for an IF/BB LEVEL meter reading of -0.5dB.

6. Repeat steps 2 through 5, halving the error each time, until no further adjustment is necessary.

7. Repeat steps 2 and 3.

8. Remove the 3705A plug-in from the 3702B and check that the meter does not vary by more than 0.5dB.

9. Remove the cable from the 3716A BB + SWEEP OUTPUT and connect it to a Sweep Generator RF OUTPUT.

10. Remove the 3702B bottom cover, and place the instrument on the side closest to the CRT. Lower the casting and remove the casting cover.

11. Set the Sweep Generator controls as follows:

SWEEP	CW
FREQUENCY	1MHz
CRYSTAL CAL	OFF
1 kHz MOD	OFF

12. Adjust the Sweep Generator OUTPUT LEVEL control to give a 3702B meter reading of 0.

13. Set the Sweep Generator FREQUENCY to 10MHz and adjust A21C12 for a 3702B meter reading of 0±0.25dB.

14. Set the Sweep Generator FREQUENCY to 15MHz and the 3702B BB POWER controls to -11dBm.

15. Adjust A21L2 for a meter reading of 0 ±1dB.

16. Reset the 3702B BB POWER controls to -10dBm and disconnect the Sweep Generator. Replace the 3705A in the 3702B.

17. Reconnect the 3716A BB + SWEEP OUTPUT to the 3702B BB INPUT.

18. Adjust the INTENSITY control to display a spot on the CRT and adjust the X-POSITION control to place the spot in the centre of the screen.

19. Set the 3710A SWEEP switch to INT and set the 3716A SWEEP CAL control half clockwise.

20. Set the 3702B X-GAIN control to give a sweep width of 10cm.

21. Set the SWEEP SOURCE switch to EXT BB- and check for a 10cm sweep width.

22. Connect the Oscilloscope to TP1A and check that the weep signal changes phase by 180 when the SWEEP SOURCE switch is reset to EXT BB+. Trigger the Oscilloscope externally from the 3710A SWEEP OUTPUT.

    Note: The following are level adjustments for the higher baseband frequencies and are located on the 3705A.

23. Set the 3716A and 3705A BB FREQUENCY switches to 8.2MHz. Set the 3716A BB POWER to -10dBm and the VERNIER to CAL. Set the 3705A SET LEVEL control fully clockwise and adjust the PHASE LOCK control for a steady 3705A meter reading. Adjust the SET LEVEL control to bring the meter reading to the green band.

24. Adjust A2R35 on the 3705A for a 0 meter reading on the 3702B.

25. Repeat steps 23 and 24 with the 3716A and 3705A BB FREQUENCY switch set to 5.6MHz, 4.43MHz and 2.4MHz adjusting 3705A A2R44, R45 and R46 respectively.

3-8. Impedance Converter (Option 004 only)

1. Connect the Test Oscillator 75Ω output to the RMS Voltmeter terminated in 75Ω.

2. Set the Test Oscillator frequency to 80kHz and adjust the output level for a reading of 0.086V on the RMS Voltmeter.

3. Disconnect the RMS Voltmeter and connect the Test Oscillator output to 3710A (Opt 004) 75Ω UNBAL input.

4. Connect the 3710A (Opt. 004) 124Ω BAL output to the 3702B (Opt. 004) 124Ω BAL input.

5. Disconnect the BROWN/GREY coded cable from A8J3.

6. Connect the RMS Voltmeter, terminated in 75 Ohms, to A8J3 and check for 0.086V ±0.002V. Resistor A8R19 may be selected within the range 42.2 Ohms to 68.1 Ohms to achieve this. (Nominal value 52.3 Ohms).

7. Vary the Test Oscillator frequency up to 10MHz and check that the RMS Voltmeter reading does not vary by more than ±0.002V. Capacitor A8C16 may be selected within the range 56pF to 100pF to achieve this. (Nominal value 75pF).

3-9. IF Meter

1. Set the instrument controls as follows:

3710A
SWEEP WIDTH 20MHz
SWEEP .... OFF
IF FREQUENCY :: :: :: :: :: :: :: 70MHz
IF VERNIER 0
IF ATTENUATOR 0
LINE ..... ON

3702B

Y1 DISPLAY	IF
Y2 DISPLAY	IF
Y1/Y2 CALIBRATION	OFF
Y1 GAIN	CCW
Y1 POSITION	MID
Y2 GAIN	CCW
Y2 POSITION	MID
MARKERS	SLIDING
MARKER OFFSET	±5MHz
IF ATTENUATOR	20dB
SWEEP SOURCE	INT IF
INTENSITY	CCW
LINE	ON

2. Connect the 3710A IF OUTPUT to a Power Meter via a 75/50Ω Matching Pad and Thermistor Mount. Adjust the 3710A IF VERNIER for an IF output of +10dBm. (Opt. 017: 1V rms).

   Note: Loss through 75/50Ω Matching Pad:

Rhode & Schwarz	6dB
Greenpar	8.2dB

3. Disconnect the 3710A IF OUTPUT from the Power Meter and connect it to the 3702B IF INPUT.

4. Adjust A5R57 for an IF LEVEL meter reading of 0.

5. Set the 3710A IF VERNIER control to give a meter reading of +0.5dB. Insert 1dB in the 3710A IF ATTENUATOR and adjust A5R3 for a meter reading of -0.5dB.

6. Reset the 3710A IF ATTENUATOR to 0dB and the IF VERNIER to 0 and repeat steps 2 through 5 until no further adjustment is necessary.

3-10. IF Calibration

(This adjustment should be continued directly from Paragraph 3-9 IF METER adjustment).

1. Check that the AFC LOCK lamp is lit and the IF UNCAL lamp extinguished.

   Note: If the AFC LOCK lamp is not lit, and does not light when the 3710A SWEEP control is set to INT, disconnect the IF INPUT and then reconnect it. If the AFC LOCK is still extinguished, perform the DEMODULATOR adjustments before proceeding.

2. Adjust the INTENSITY control to display a spot on the CRT and set the spot to the screen centre with the X-POSITION control.

3. Set the 3710A SWEEP to INT and adjust the X-GAIN control to give a 10cm horizontal display. If necessary adjust the X-POSITION for a symmetrical sweep about the centre line.

4. Set the BLANKING to OFF and adjust the X-PHASE SHIFT control to superimpose the markers on the forward and return traces. Set the BLANKING switch to ON.

5. Connect the equipment as in Figure 3-3 with the IF Switch Output connected, to the 3702B IF INPUT.

6. Set the IF Switch FUNCTION, control to A and adjust the 3710A IF ATTENUATOR and IF VERNIER for a zero reading on the 3702B IF LEVEL meter.

7. Disconnect the IF Switch from the 3702B and connect it, via the 75/50 Ohm Matching Pad and Thermistor' Mount, to the Power Meter. Note the reading on the Power Meter:

8. Set the IF Switch FUNCTION control to B and set the Texscan Attenuator such that the Power Meter reads a value approaching but not exceeding, 1dB less than the reading obtained in step 7.

9. Calculate and note the difference in readings between step 7 and step 8.

10. Disconnect the IF Switch from the 75/50Ω .

Matching pad and connect it to the 3702B IF INPUT.

11. Set the IF Switch FUNCTION control to INT and adjust the Y1 GAIN to obtain a split trace of 8cm amplitude.

12. Set the IF Switch FUNCTION control to A and set the Y1/Y2 CALIBRATION to 1.0dB. Adjust A4R25 for a split trace of amplitude x cm, where x is determined by:

$$\frac{X}{8} = \text{value noted in step 9.}$$

13. Disconnect the equipment.

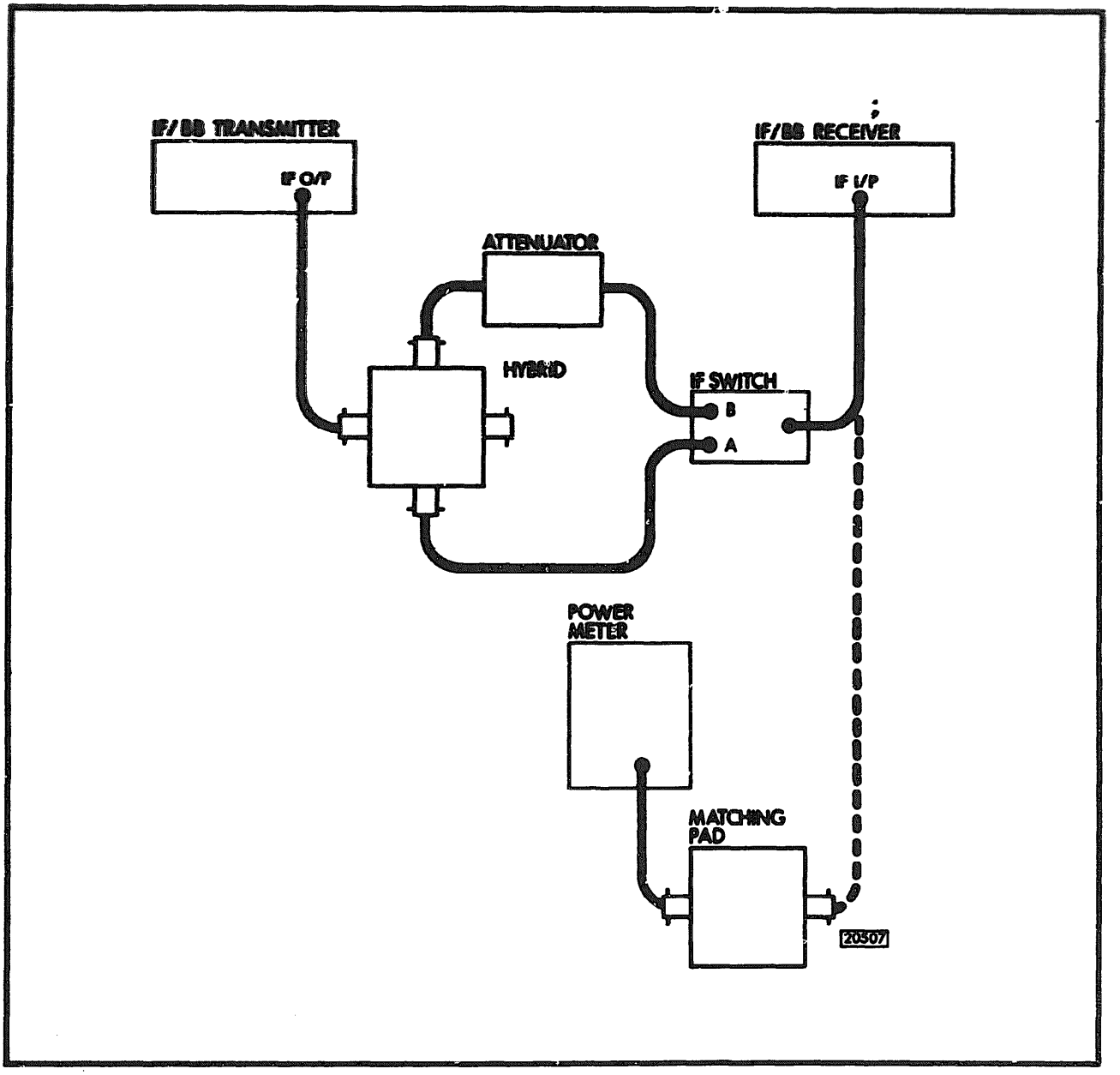


Figure 3-3. IF Calibration Adjustment

3-11. Demodulator

A. BANDPASS FILTER A23

Note: Adjust only on replacement of parts.

1. Disconnect the BROWN/BLUE coded cable from A23J4 and the RED/RED coded cable from A23J5.

2. Connect a shorting link between A23TP2 and A23TP3.

3. Set the Sweep Generator FREQUENCY control to 17.4MHz CW and set the crystal CAL and MOD controls OFF.

4. Connect the Sweep Generator OUTPUT to A23J4 and the RF Millivoltmeter terminated in 75Ω to A23J5.

5. Adjust the Sweep Generator OUTPUT LEVEL to give 300mV rms on the RF Millivoltmeter.

6. Adjust L10 for minimum inductance.

7. Vary the Sweep Generator FREQUENCY over the range 11.3MHz to 23.5MHz and check that the RF Millivoltmeter reading does not vary by more than 1dB, and the level falls off sharply below 11.3MHz and above 23.5MHz. If necessary adjust L3, L4, L5, L6 and L7.

8. Adjust L10 until a change in response at 23.5MHz just becomes noticeable.

9. Disconnect the Sweep Generator from A23J4 and the RF Millivoltmeter from A23J5. Disconnect the shorting link from A23TP2 and TP3.

10. Reconnect the BROWN/BLUE coded cable to A23J4 and the RED/RED coded cable to A23J5.

Note: L8 forms part of an equalizer for the filter. It is preset during production and should not be adjusted outside the factory.

B. LOW PASS FILTER A24 [L4, L5]

Note: Adjust only on replacement of parts.

1. Connect the Sweep Generator RF OUTPUT via a coaxial cable and a 0.01uF capacitor to A24TP1, and earth the coaxial cable screen at A24TP2.

2. Set the Sweep Generator FREQUENCY to 1MHz and the output level to give 300mV pk-pk to TP1.

3. Set the 3702B BB INPUT switch to INT and monitor the level at A24J2. It should be between 280 and 320mV pk-pk.

4. Vary the Sweep Generator FREQUENCY up to 6MHz and check for a gradual rise in level to between 330 and 380mV up to 6MHz. Increase the frequency beyond 6MHz and check for a fall off in level to between 280 and 300mV at 6.5MHz and a sharp drop in level beyond 6.5MHz. If necessary adjust A24L4 and L5.

5. Disconnect the Sweep Generator from TP1 and TP2.

C. LOW PASS FILTER A24 [L6, L7]

Note: Adjust only on replacement of parts.

1. Disconnect the RED/RED coded cable from A24J3.

2. Connect the Sweep Generator RF OUTPUT to A24J3.

3. Set the Sweep Generator FREQUENCY control for 30MHz CW at an OUTPUT LEVEL of -5dBm.

4. Monitor the signal level at A24C1 with the Oscilloscope and adjust A24L6 and L7 for maximum signal level.

5. Disconnect the Sweep Generator and reconnect the RED/RED coded cable to A24J3.

D. DISCRIMINATOR A24

1. Disconnect the RED/RED coded cable from A24J3.

2. Using the DVM monitor the dc level at A24TP1 and adjust A24R53 for as close to zero as possible.

3. Set the Sweep Generator, FREQUENCY control for 17.4MHz CW, and the CRYSTAL CAL and MOD controls to OFF.

4. Connect the Sweep Generator RF OUTPUT to A24J3 and adjust the output level to give 0.4V pk-pk at J3.

5. Connect a 0.01uF capacitor between A24TP1 and TP2. Connect the Oscilloscope to A24TP1 and the earth to A24TP2.

6. Set the Sweep Generator SWEEP Switch to VIDEO and the FREQUENCY control to 35MHz.

7. Sweep the Oscilloscope externally from the Sweep Generator SWEEP OUTPUT. DC couple the Oscilloscope input.

8. The discriminator response will be displayed on the Oscilloscope. Adjust A24R38 and R43 to give a straight line between peaks about ground. (This is a preliminary adjustment).

9. Set the Sweep Generator SWEEP control to CW and connect the Electronic Counter to its auxiliary output. Set the frequency of the Sweep Generator to 25MHz ±0.1MHz. Note: Sweep Generator AUX OUTPUT is RF OUTPUT +10.

10. Adjust A24L3 for maximum deflection of the spot on the CRT.

11. Set the Sweep Generator FREQUENCY to 9.5 ±0.1MHz and adjust A24L2 for maximum deflection of the spot on the CRT.

12. Reset the Sweep Generator SWEEP switch to VIDEO and the FREQUENCY control to 35MHz.

13. Adjust A24R38 and A24L1 for a straight line response between peaks.

14. Set the Sweep Generator switch to CW and the FREQUENCY to 17.4MHz ±500Hz. Adjust A24R43 for 0V deflection of the spot (use Oscilloscope at maximum sensitivity).

15. Check that the spot deflects by between 200 and 250mV for a 1MHz change in Sweep Generator FREQUENCY.

16. Disconnect the Sweep Generator, the Oscilloscope and the 0.01μF capacitor and reconnect the RED/RED coded cable to A24J3.

E. LOCAL OSCILLATOR AND AFC

1. Ensure that the Y2 DISPLAY switch is no? set to SPECTRUM.

2. Connect the oscilloscope dc coupled to A23TP1 and adjust A23R9 for -3V dc.

3. Set the 3710A controls as follows:

SWEEP WIDTH 50MHz
SWEEP INT
IF FREQUENCY :: :: :: :: :: :: :: :: :: -70MHz
IF UNCAL . . . . . 70MHz XTAL
IF VERNIER 0
IF ATTENUATOR 10dB
LINE . . . . . ON

4. Insert 10dB in the 3702B IF ATTENUATOR and connect the 3710A IF OUTPUT to the 3702B IF INPUT.

5. Monitor the signal at A24J3 and adjust A23R41 for 400mV pk-pk, where A23 part number is 03702-70002. Check that the AFC LOCK lamp is lit. (Adjust A23R46 where A23 part number is 03702-7170).

6. Connect the Oscilloscope to A23TP1 and adjust A23L1 for the best sinewave (recovered sweep). The sweep level should be approximately 8V pk-pk where A23 part number is 03702-70002 (12V pk-pk where A23 part number is 03702-7170).

7. Disconnect the cable from the 3710A IF OUTPUT and connect it to the AUX OUTPUT.

8. Check that the AFC LOCK lamp is lit and note the dc level at A23TP1.

9. Disconnect the IF INPUT and adjust A23R9 for the same dc level at A23TP1 as noted in step 8.

10. Reconnect the 3710A IF OUTPUT to the IF INPUT. Set the 3710A SWEEP WIDTH control to 25MHz and the SWEEP switch to LINE.

11. Monitor the signal at A24J3 on the Spectrum Analyzer via a 10:1 Oscilloscope probe. Set the Spectrum Analyzer controls as follows:

FREQUENCY 17.4MHz
BANDWIDTH 3kHz
SCAN WIDTH . . . . . 5kHz per DIVISION
INPUT ATTENUATION 0
SCAN TIME. 0.2 Sec per DIVISION
SCAN MODE. . . . . INT
SCAN TRIGGER . . . . . AUTO
VIDEO FILTER . . . . . OFF

Adjust the LOG REFERENCE LEVEL and FREQUENCY if necessary for a display as in Figure 3-4.

12. Adjust A24R67 for a residual sweep of 5kHz for 50Hz line frequency and 4.5kHz for 60Hz line frequency.

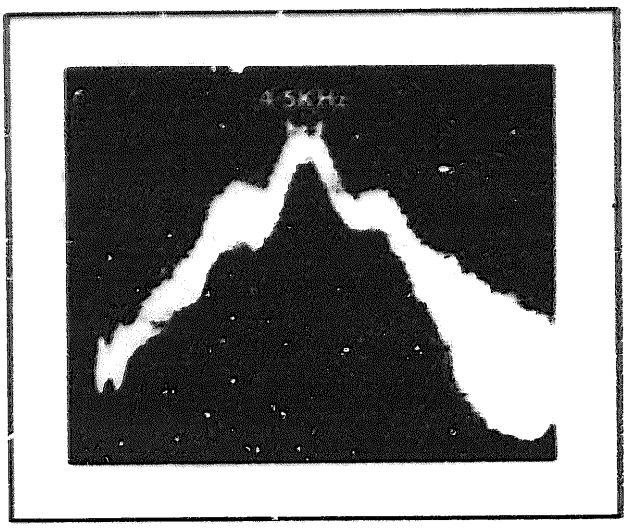


Figure 3-4. Local Oscillator Adjustment

13. Disconnect the Spectrum Analyzer

14. Set the controls as follows:

3710A
SWEEP WIDTH 50MHz
SWEEP INT
DEVIATION 200
IF FREQUENCY. 70MHz
IF ATTENUATOR 4dB
IF VERNIER 0

3716A
BB FREQUENCY . . . . . 500kHz (Opt. 555 delta)

3702B
Y1 DISPLAY . . . . . BB
Y2 DISPLAY . . . . . DELAY
Y1 GAIN counterclockwise
Y1 POSITION . . . . . mid-travel
Y2 GAIN . . . . . counterclockwise
Y2 POSITION . . . . . mid-travel
Y1 Y2 CALIBRATION . . . . . OFF
MARKERS . . . . . SLIDING
MARKER OFFSET . . . . . ±10MHz
SWEEP SOURCE . . . . . INT IF
BLANKING . . . . . OFF
BB INPUT . . . . . INT
IF ATTENUATOR 4dB

3705A/3703B

BB FREQUENCY ... 500kHz (Opt. 555A)
DIFF PHASE CALIBRATION ... OFF
DISPLAY BANDWIDTH ... 1kHz

15. Disconnect the BROWN/BLUE coded cable from A23J4 and the RED/WHITE coded cable from A22J2. Connect the RED/WHITE coded cable to A23J4.

16. Disconnect the IF INPUT and set the INTENSITY to display a spot on the CRT.

17. Reconnect the IF INPUT and adjust the X-GAIN control for 10cm sweep on the CRT and adjust the X POSITION for symmetry around the centre line.

18. Monitor the signal at A24J3 with the oscilloscope and adjust the 3710A IF VERNIER for 400mV pk-pk. The 3702B IF ATTENUATOR may have to be adjusted by 1dB. Check that the AFC LOCK lamp is lit. The IF UNCAL lamp will be also lit.

19. Adjust the 3702B BB POWER to bring the meter on scale. The setting should be -30dBm ±2dB.

20. Adjust the X PHASE SHIFT control to superimpose the markers on the forward and return traces.

21. Set the Y1 Y2 CALIBRATION switch to 1% and adjust the Y1 GAIN for a split trace of 4cm. Set the Y1 Y2 CALIBRATION switch to OFF.

22. Adjust the 3703B/3705A SET LEVEL control to bring the meter reading within the green band. (Option: If necessary adjust the 3703B/3705A PHASE LOCK control for a steady meter reading).

23. Set the GROUP DELAY/DIFF PHASE CALIBRATION switch to 1ns and adjust the Y2 GAIN control for a 3cm calibration. Set the CALIBRATION switch to OFF.

24. Check for coincidence of the forward and return traces on both Y1 and Y2 displays. A24L1 and A24R38 may need slight adjustments to achieve this.

25. Monitor the frequency at A24Q2 emitter on on board 03702-70003 (A24Q5 on board 03702-7171) and check for 17.4 ±0.1MHz. A24R43 may need slight adjustment to achieve this.

Equalization

26. Set the BLANKING switch to ON and check the slope of the Y1 trace is not greater than 0.5cm and the slope on the Y2 trace is not greater than 1.5cm. If the slope is excessive, this is due to the 3710A, proceed to step 27 if a 3705A fitted, and to step 29 if a 3703B is fitted.

27. Set the 3716A BB FREQUENCY switch to 5.6MHz and the 3710A DEVIATION control to 500kHz. Set the 3705A BB FREQUENCY switch to 5.6MHz and adjust the PHASE LOCK control for a steady meter reading. Adjust the SET LEVEL control for a meter reading in the green band. Adjust the 3702B POWER control for an on-scale reading of the BB LEVEL meter.

28. Set the DIFF PHASE CALIBRATION switch to 1o and adjust the Y2 GAIN control for a calibration of 1o over 2cm. Set the DIFF PHASE CALIBRATION switch to OFF.

29. Check for a slope on the Y2 trace not exceeding 1cm and on the Y1 trace not exceeding 1.5cm.

NOTE: If the slope is excessive in step 16 or step 29 adjust A7C4, T1, L3, C6 in the 3710A. The setting of the A7 controls may have to be compromised to bring all parameters within specification.

30. Disconnect the RED/WHITE coded cable from A23J4 and reconnect it to A22J2. Reconnect the BROWN/BLUE coded cable to A23J4. Set the 3710A and 3702B IF ATTENUATORS to 10dB.

31. Adjust A22L4, L5 and C27 for flattest Y1 and Y2 displays within the limits in Step 29.

32. Set the 3716A BB FREQUENCY switch to 500kHz and the 3710A DEVIATION control to 200kHz. Set the 3705A BB FREQUENCY switch to 500kHz and adjust the SET LEVEL control for a meter reading in the green band. Adjust the 3702B BB POWER controls for an on-scale reading of the BB LEVEL meter.

33. Set the DELAY CALIBRATION to 1ns and adjust the Y2 GAIN control for a calibration of 1n over 3cm. Check that the Y1 and Y2 slope is within the limits in Step 26. Compromise adjustment of A22L4, L5 and C7 for best results in steps 31 and 32.

34. Repeat steps 27 and 28 with the 3716A and 3705A BB FREQUENCY switches set to 4.43MHz and 2.4MHz. On board 03702-7170 only, examine the traces for spurious signals and adjust A23R32 for minimum spurious.

3-12. AM to PM Conversion

1. Connect the equipment as in Figure 3-5.

2. Set the controls as follows:

3710A

SWEEP WIDTH	50MHz
SWEEP	INT
DEVIATION	500kHz
IF FREQUENCY	70MHz
IF ATTENUATOR	10dB
VERNIER	0
BB FREQUENCY	5.6MHz

3702B

Y1 DISPLAY	IF
Y2 DISPLAY	DELAY
Y1 GAIN	counterclockwise
Y1 POSITION	mid-pos
Y2 GAIN	counterclockwise
Y2 POSITION	mid-pos
Y1 Y2 CALIBRATION	OFF
MARKERS	SLIDING
MARKER OFFSET	±2MHz
SWEEP SOURCE	INT IF
BLANKING	OFF
BB INPUT	INT
IF ATTENUATOR	0

3705A

BB FREQUENCY	5.6MHz
DIFF. PHASE CALIBRATION	OFF
BANDWIDTH	5kHz

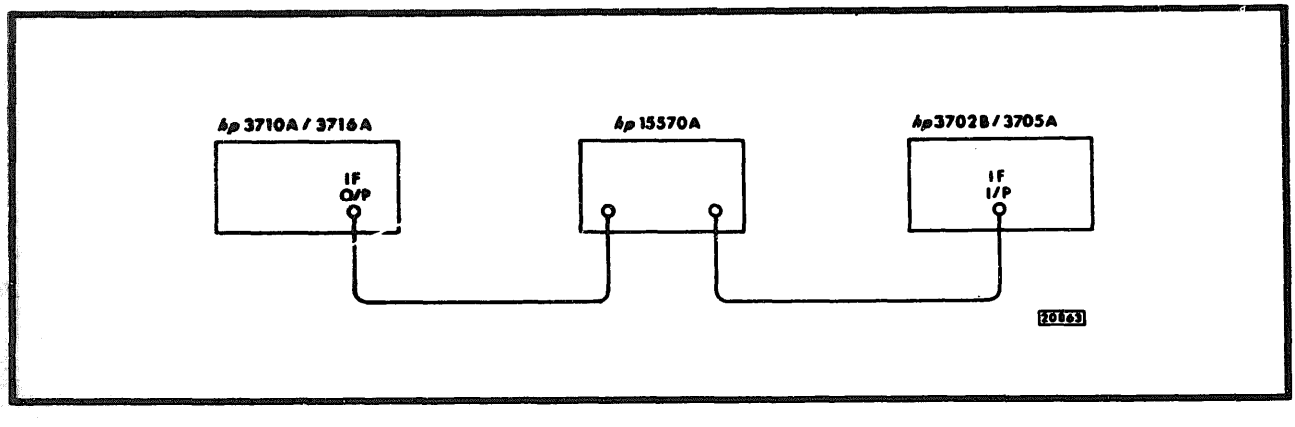


Figure 3-5. AM to PM Conversion Set-up

3. Adjust the 3702B IF ATTENUATOR for an on-scale reading of the IF/BB LEVEL meter.

4. Set the Y1 DISPLAY switch to BB and adjust the BB POWER for an on-scale reading of the IF/BB LEVEL meter.

5. Adjust the X-PHASE SHIFT control to superimpose the markers on the forward and return traces. Set the BLANKING to ON.

6. Set the Y1 Y2 CALIBRATION to 1% and adjust the Y1 GAIN for a split trace of 2cm. Set the Y1 Y2 CALIBRATION to OFF.

7. Adjust A24C20 to obtain a trace as in Figure 3-6. (Note: A24R41 must be set fully clockwise).

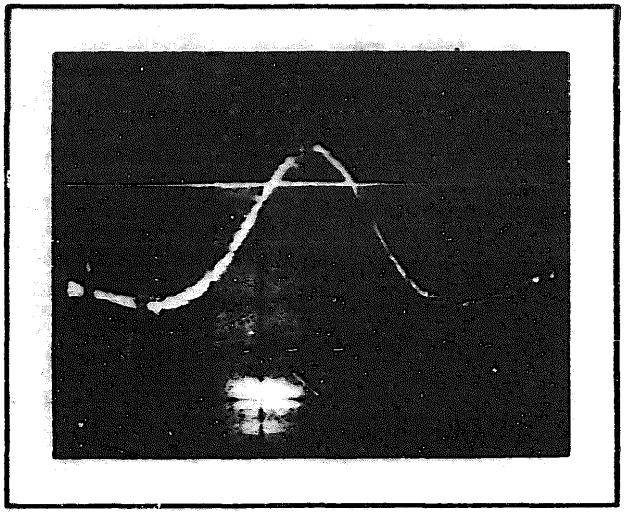


Figure 3-6 AM to PM Conversion

3-13 IF Markers

1. Set the instrument controls as follows:

3710A
SWEEP WIDTH 5OMHz
SWEEP .. . INT
IF FREQUENCY 70MHZ
IF VERNIER 0
IF ATTENUATOR 10dB
LINE ..... ON

3710A
BB FREQUENCY ..... OFF

3702B
Y1 DISPLAY ..... REF
Y2 DISPLAY ..... IF
Y1 GAIN ..... counterclockwise
Y2 GAIN ..... counterclockwise
Y1 POSITION ..... mid-travel
Y2 POSITION ..... mid-travel
MARKERS ..... SLIDING
MARKER OFFSET 10
SWEEP SOURCE ..... INT IF
IF ATTENUATOR 10
LINE ..... ON

2. **Disconnect the RED/ORANGE coded cable from A26J1. Connect the 75Ω terminated 411A RF M**illivoltmeter to A26J1 and adjust A26L1 for just below maximum output, 1V RMS ±0.3V.

3. Disconnect the RF **M**illivoltmeter and reconnect the RED/ORANGE coded cable to A26J1.

4. Connect the 3710A IF OUTPUT to the 3702B IF INPUT and check that the AFC LOCK lamp is lit.

5. Adjust the INTENSITY control for normal trace brilliance.

6. Adjust the X GAIN control for a 10cm horizontal display and the X POSITION for symmetry about the centre line.

7. Set the BLANKING switch to OFF and adjust the X PHASE SHIFT control to superimpose the markers on the forward and return traces. Set the BLANKING switch to ON.

8. Set the MARKERS switch to COMB and monitor the frequency of the signal at A25J1. Adjust A11C1 if necessary for 2MHz ±5kHz.

9. Set the MARKERS switch to SLIDING and the MARKER OFFSET control to 0.

10. Adjust the MARKER ZERO control to superimpose all three markers in the centre. Adjustment should be such that the sliding markers move from the centre before the MARKER OFFSET control reaches 0.5MHz.

11. Set the MARKERS switch to SLIDING + COMB and check the MARKER OFFSET calibration against the comb markers, check for ±0.5MHz accuracy.

12. If adjustment is necessary set the MARKER OFFSET control to ±20MHz and adjust A5R54 for sliding marker coincidence with the 20MHz crystal comb marker and recheck full range of the MARKER OFFSET.

13. If further adjustment is necessary adjust A25L1 slightly, reset the MARKER ZERO as in 10 and A5R54 as in 12, and recheck full range of the MARKER OFFSET control.

14. Set the MARKERS switch to SLIDING and vary the MARKER OFFSET control over its full range. Adjust A5R15 for best marker display over the full sweep range. A25L4 may also be adjusted.

15. Select A25C29 as necessary within the range 0 to 12pF to make the centre marker the same size as the sliding markers.

16. Set the Y2 DISPLAY switch to SPECTRUM and the SPECTRUM WIDTH control to mid-travel. Set the BLANKING switch to OFF.

17. Adjust the SPECTRUM CENTRE control if necessary to display the spectrum marker and the X-PHASE SHIFT control to superimpose the markers on the forward and return traces.

18. Adjust the SPECTRUM CENTRE control to bring the marker to the centre of the trace. Set the BLANKING switch to ON.

19. Adjust the SPECTRUM WIDTH control for a marker approximately 2cm wide.

20. Adjust A25L11 for the widest marker display.

3-14 Return Loss

1. Set the instrument controls as follows:

3710A
SWEEP WIDTH 50MHz
SWEEP ..... INT
IF FREQUENCY 70MHz
AUX OUTPUT ..... IF UNCAL
IF ATTENUATOR 50dB
IF VERNIER 0
LINE ..... ON

3716A
BB FREQUENCY ..... OFF

3702B
Y1 DISPLAY ..... IF
Y2 DISPLAY ..... IF
Y1 GAIN ..... Counterclockwise
Y2 GAIN ..... Counterclockwise
Y1 POSITION ..... mid-travel
Y2 POSITION ..... mid-travel
MARKERS ..... SLIDING
MARKER OFFSET 10
IF ATTENUATOR 0
SWEEP SOURCE ..... INT IF
LINE ..... ON

2. Connect the 3710A AUX OUTPUT to the 3702B IF INPUT and adjust the IF ATTENUATOR for an on-scale reading of the IF LEVEL meter. Check that the AFC LOCK lamp is lit.

3. Adjust the INTENSITY control for normal brilliance and adjust the X-GAIN and X-POSITION controls for a 10cm sweep symmetrical about the centre.

4. Set the BLANKING switch to OFF and adjust the X-PHASE SHIFT control to superimpose the markers on the forward and return traces.

5. Set the BLANKING switch to ON.

6. Set the Y1 DISPLAY switch to RET LOSS and the RETURN LOSS attenuator to 18dB.

7. Connect the 3710A IF OUTPUT to the 3702B RETURN LOSS INPUT.

8. Adjust the RETURN LOSS CALIBRATION control for a meter reading of 0.

9. Set the Y1 Y2 CALIBRATION switch to 1dB and adjust the Y1 GAIN control for a split trace of 1cm. Set the Y1 Y2 CALIBRATION switch to OFF.

10. Adjust A20C3 for the flattest response over the swept range which should be not greater than 1cm.

3-15 Return Loss

Method 1

1. Using the IF RETURN LOSS MEASUREMENT detailed in the MLA Operating Instructions publication, adjust A22L1 to give a Return Loss as follows:

   >30dB (55 to 85MHz)
   >28dB (45 to 95MHz)

Method 2

1 Using the method detailed in Section IV of the MLA SYSTEM SERVICE MANUAL, adjust A22L1 to give a Return Loss as follows:

   >30dB (55 to 85MHz)
   >28dB (45 to 95MHz)

SECTION IV

REPLACEABLE PARTS

4-1 INTRODUCTION

4-2 This section contains information for ordering replacement parts. Table 4-1 lists parts in alphanumerical order of their reference designators and gives the following information for each part:

a. Hewlett-Packard part number.
b. Description (abbreviations are listed later in this section).
c. Total quantities of each part used in the instrument (TQ column).

Table 4-1, section 2 is a part number national stock number cross reference index. The items on this cross reference index are source coded PAHZZ. Items that do not appear on this cross reference index shall be procured using the FSCM and part number at the nearest wholesale level.

4-3 ORDERING INFORMATION

4-4 To order a replacement part, address the order or enquiry to your local Hewlett Packard Service Office. These are listed at the back of this manual

4-5 Specify the following for each part:

a. Model and full serial number of instrument.

b. Hewlett-Packard part number.

c. Circuit reference designator.

d. Description.

4-6 To order a part not listed in the tables, give a complete description of the part, including its function and location in the instrument.

4-7 REFERENCE DESIGNATORS

A	=	assembly
B	=	motor
C	=	capacitor
CR	=	diode
DL	=	delay line
DS	=	lamp
E	=	miscellaneous electrical part
F	=	fuse
IC	=	integrated circuit
J	=	connector
K	=	relay
L	=	inductor
M	=	meter
MC	=	micro circuit
MP	=	miscellaneous mechanical part
P	=	plug (male)
Q	=	transistor
R	=	resistor
S	=	switch
SR	=	shift register
T	=	transformer
TP	=	test point
V	=	vacuum tube
W	=	cable
XA	=	printed circuit board edge connector
XF	=	fuse holder
x v	=	CRT connector
Y	=	crystal
Z	=	attenuator
z z	=	packaging material

4-8 COLOUR ABBREVIATIONS

BLK	=	black (0)
BRN	=	brown (1)
R E D	=	red (2)
ORN	=	orange (3)
YEL	=	yellow (4)
GRN	=	green (5)
BLU	=	blue (6)
VIO	=	violet (7)
GRY	=	grey (8)
WHT	=	white (9)
SILV	=	silver

4-9 STANDARD ABBREVIATIONS USED IN REPLACEABLE PARTS LIST

A	=	ampere
AC	=	alternating current
AFC	=	automatic frequency control
AL	=	aluminium
ALC	=	automatic level control
AM	=	amplitude modulation
AMPL	=	amplifier
ATTEN	=	attenuator
ASSY	=	assembly
AT	=	ampere (timed)
BAL	=	balanced
BB	=	baseband
BD	=	board
BHD	=	bulkhead
BKDN	=	breakdown
BKT	=	bracket
BNC	=	connector type
C	=	capacitor
CAL	=	calibrated
CBL	=	cable
COAX	=	coaxial
COMP	=	compensated
CONCEN	=	concentric
CONHEX	=	hexagonal connector
CONN	=	connector
CONST	=	constant
CONT	=	controlled
CONV	=	converter
CRT	=	cathode ray tube
DB	=	decibel
DBM	=	decibel (ref. 1MW)
DC	=	direct current
DEG	=	degree
DEV	=	deviation
DIA	=	diameter
DIFF	=	differential
DIO	=	diode
DLY	=	delay
DPDT	=	double pole, double throw
DPST	=	double pole, single throw
D/A	=	digital to analog
EHT	=	extra high tension
EXT	=	external
FET	=	field effect transistor
FM	=	frequency modulation
FREQ	=	frequency
FXD	=	fixed
GD	=	group delay
GE	=	germanium
GHZ	=	gigahertz ($1C^9$ Hz)
H	=	henry
HEL	=	helical
HORIZ	=	horizontal
HS	=	high speed
HV	=	high voltage
HZ	=	hertz
IC	=	integrated circuit
IF	=	intermediate frequen
INCD	=	incandescent
IND		
INT	=	internal
INV	=	inverter
I/P	=	input
J-K	=	flip-flop type
K	=	kilo (10^3)
KHZ	=	kilohertz (10^3 Hz)
LIN	=	linear
LOG	=	logarithmic
LP	=	low pass
LPPM	=	low parts per million

LVR	=	lever
M	=	mega (10^6)
MA	=	milliampere (10^{-3} A)
MAT	=	milliampere (timed)
MECH	=	mechanism
MED	=	medium
MHZ	=	megahertz (10^6 Hz)
MIN	=	miniature
MOD	=	modulated
MT	=	mount
MTG	=	mounting
MTR	=	meter
MW	=	milliwatt (10^{-3}W)
NAND	=	not and
NOM	=	nominal
NSR	=	not separately replaceable
OBD	=	order by description
OPER	=	operational
OSC	=	oscillator
O/P	=	output
P	=	pole
PB	=	pushbutton
PC	=	printed circuit
PF	=	pica farad (10^{-12} F)
PIN	=	positive intrinsic-negative
PIV	=	peak inverse volts
PM	=	phase modulation
PNL	=	panel
PPM	=	parts per million
PPM/C	=	parts per million per degree Celsius
PWR	=	power
QUAD	=	quadruple
R	=	resistor
REC	=	rectifier
REF	=	reference
RF	=	radio frequency
RLY	=	relay
RMS	=	root mean square
RND	=	round
RTRY	=	rotary
RVT	=	rivet
S	=	second (time)
SCR	=	screw
SI	=	silicon
SKT	=	socket
SMA	=	connector type
SPDT	=	single pole, double throw
ST	=	selected on test
SW	=	switch
S/R	=	semi-rigid
T	=	throw (position)
TEMP	=	temperature
TERM	=	terminal
TGL	=	toggle
TQ	=	total quantity
TUN	=	tunnel (diode)
TVSC	=	television sub-carrier (colour)
UF	=	microfarad (10^{-6} F)
UH	=	microhenry (10^{-6} H)
UNBAL	=	unbalanced
V	=	volt
VAL	=	value
VAR	=	variable
VERT	=	vertical
W	=	watt
WVDC	=	working volts direct current
XFMR	=	transformer
XR	=	expander
XSTR	=	transistor
XTAL	=	crystal
YIG	=	yttrium iron garnet

Table 4-1 Replaceable Parts

Ref Desig	HP Part No	TQ	Description
	03702-90011	1	3702B SERVICE MANUAL
	5060-4403	1	EXTENDER ASSY 30
	5060-0762	1	RACK MTG KIT
	15520-90001	1	OPERATING NOTE
	15521-90001	1	OPERATING NOTE
	15522-90001	1	OPERATING NOTE
	15550-90006	1	OPERATING NOTE
	15550A	1	ACCESSORY KIT (COMPRISING)
	15520A	1	HYBRID 4-PORT BNC 75 OHM CONN
	15521A	1	MISMATCH 1TOB BNC 75 OHM CONN
	15522A	2	TERMINATION BNC 75 OHM CONN
	15522A		TERMINATION BNC 75 OHM CONN
	15525A	3	ACCESSORY CBL BNC-BNC
	15525A		ACCESSORY CBL BNC-BNC
	15525A		ACCESSORY CBL BNC-BNC
	9211-0362	1	STORAGE BOX PLASTIC
	7124-2339	1	LABEL
B1	3160-0209	1	FAN TUBEAXIAL
	03710-10090	1	FAN FILTER ASSY
	5000-4461	1	MESH
	5000-4491	1	FILTER PLATE
C1	0180-0398	2	C FXD 150UF +50-10% 200VDC
	1520-0002	2	MOUNT C
C2	0180-0625	2	C FXD 750UF +50-10% 50VDC
	0180-0626	2	CLAMP C
C3	0180-0625		C FXD 750UF +50-10% 50VDC
	0180-0626		CLAMP C
C4	0180-0398		C FXD 150UF +50-10% 200VDC
	1520-0002		MOUNT C
C5			NOT ASSIGNED
C6	0160-0663	21	C FXD 1000PF (FEEDTHRU)
C7	0160-0663		C FXD 1000PF (FEEDTHRU)
C8	0160-0663		C FXD 1000PF (FEEDTHRU)
C9	0160-0663		C FXD 1000PF (FEEDTHRU)
C10	0160-0663		C FXD 1000PF (FEEDTHRU)
C11	0160-0663		C FXD 1000PF (FEEDTHRU)
C12	0160-0663		C FXD 1000PF (FEEDTHRU)
C13	0160-0663		C FXD 1000PF (FEEDTHRU)
C14	0160-0663		C FXD 1000PF (FEEDTHRU)
C15	0160-0663		C FXD 1000PF (FEEDTHRU)
C16	0160-0663		C FXD 1000PF (FEEDTHRU)
C17	0160-0663		C FXD 1000PF (FEEDTHRU)
C18	0160-0663		C FXD 1000PF (FEEDTHRU)
C19	0160-0663		C FXD 1000PF (FEEDTHRU)
C20	0160-0663		C FXD 1000PF (FEEDTHRU)
C21	0160-0663		C FXD 1000PF (FEEDTHRU)
C22	0160-0663		C FXD 1000PF (FEEDTHRU)
C23	0160-0663		C FXD 1000PF (FEEDTHRU)
C24	0160-0663		C FXD 1000PF (FEEDTHRU)
C25			NOT ASSIGNED
C26	0160-3562	1	C FXD 24100PF +100-0% 250VDC
C27	0180-0229	1	C FXD 33UF 10% 10VDC
C28			NOT ASSIGNED
C29			NOT ASSIGNED
C30			NOT ASSIGNED
C31	0180-0089	2	C FXD 10UF 150VDC
CR1	1901-0040	11	DIO SI
DS1			NOT ASSIGNED
DS2	2140-0328	2	LAMP INCD 10V 27MA
	1450-0153	2	LAMPHOLDER
	1450-0371	1	LAMP LENS
	5040-0275	1	LAMP INSULATOR
DS3	2140-0328		LAMP INCD 10V 27MA
	1450-0153		LAMPHOLDER
	1450-0370	1	LAMP LENS GREEN
E1	5060-9240	1	CONNECTOR MAINS SOCKET
	03702-20001	1	COVER CONNECTOR MAINS SOCKET
F1	2110-0231	1	FUSE SLOW BLOW 1AT 250V
	2110-0006	1	FUSE SLOW BLOW 2AT 125V
F2	2110-0027	1	FUSE 125MA 250V
F3	2110-0043	2	FUSE 1.5A 250V
F4	2110-0043		FUSE 1.5A 250V
F5	2110-0004	1	FUSE 250MA 250V
	1400-0094	1	FUSEHOLDER 4-WAY
J1			NOT ASSIGNED
J2	1250-0608		CONN COAX BHD MTG BNC 75 OHM
J3	1250-0608		CONN COAX BHD MTG BNC 75 OHM
J4			NOT ASSIGNED
J5	1250-0608		CONN COAX BHD MTG BNC 75 OHM
J6	1250-0608		CONN COAX BHD MTG BNC 75 OHM
J7			J 007 TO J 010 NOT ASSIGNED
J11	1251-0007	1	CONN MULTI BHD MTG 16-WAY
K1	0490-1061	1	RLY CHANGEOVER 3P
M1	1120-0614	1	MTR 0-1MA DC
	5000-4470	1	METER BEZEL MINT GREY
MP1	03702-184	1	PANEL FRONT
MP1	10178A	1	LIGHT SCREEN
	5040-0508	1	LIGHT SHIELD BLACK
	7120-1254	1	PLATE TRADEMARK
MP2	03702-355	1	FRONT PANEL EXTRUSION UPPER
MP3	03702-356	1	FRONT PANEL EXTRUSICN LOWER
MP4	5060-0736	2	FRAME ASSY SIDE
	5000-0727	2	SIDE COVER
	5060-0222	2	HANDLE ASSY SIDE
	5060-0735	2	RETAINER HANDLE ASSY
	5000-0053	2	PLATE FLUTED AL
	03702-364	1	STRIP FACING SIDEFRAME

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	HP Part No	TQ	Description
	03702-362	2	STAND OFF
	03702-362		STAND OFF
	03702-1002	2	STAND OFF
	03702-1002		STAND OFF
	5000-0910	2	CLAMP PANEL TRIM
MP5	5060-0736		FRAME ASSY SIDE
	5000-4727		SIDE COVER
	5060-0222		HANDLE ASSY SIDE
	5060-0735		RETAINER HANDLE ASSY
	5000-0053		PLATE FLUTED AL
	5100-0913		CLAMP PANEL TRIM
MP6	03702-191	1	TOP COVER
MP7	03702-7291	1	BOTTOM COVER ASSEMBLY
	03702-192	1	BOTTOM COVER
	5060-0767	6	FOOT ASSY
	5060-0767		FOOT ASSY
	5060-0767		FOOT ASSY
	5060-0767		FOOT ASSY
	5060-0767		FOOT ASSY
	5060-0747		FOOT ASSY
MP8	03702-10040	1	PANEL REAR
	03702-175	1	CRT COVER PLATE
	03702-176	1	CRT SUPPORT REAR
	1200-0468	1	COVER SOCKET
	7120-0607	1	PLATE SERIAL
	03702-338	1	RAIL GUIDE
	03702-145	1	COVER XSTR
	0380-0093	2	STANDOFF TAPPED
	0380-0093		STANDOFF TAPPED
	03702-7295	1	CONNECTOR MAINS SOCKET SUPPORT
MP9			NOT ASSIGNED
MP10	03702-10025	1	DECK MAIN
	03702-180	1	BRACKET SWITCH
	03702-182	1	BRACKET POTENTIOMETER
	03702-181	1	FAN DUCT
	03702-178	1	BRACKET CASTING SUPPORT
	03702-197	1	BRACKET SECURING
	03702-352	1	PLATE SECURING CASTING
	0510-0776	2	RETAINER PC BD
	0510-0776		RETAINER PC BD
	03702-108	1	SCREEN FHT
	5020-4127	3	BLOCK GUIDE
	175A-91	3	CONTACT CRT
	03702-10012	2	BRACKET SUPPORT IF ATTEN
	03702-10012		BRACKET SUPPORT IF ATTEN
	03702-333	1	PILLAR CASTING SUPPORT
	5020-4127		BLOCK GUIDE
	5020-4127		BLOCK GUIDE
	03702-10019	1	COVER SCREENING INPUT AMPLIFIER
	03702-10021	1	COVER SCREENING COMB GENERATOR
	5060-4406	1	HOUSING ATTEN

Ref Desig	HP Part No	TQ	Description
	03702-10020	1	COVER SCREENING [illegible] SPLITTER
MP11	03702-183	1	HOUSING PLUG-IN
	03702-100	1	BRACKET SUPPORT
	03702-109	1	WALL SCREEN
	03702-353	4	BAR SPACING
	03702-353		BAR SPACING
	03702-353		BAR SPACING
	03702-353		BAR SPACING
	03702-354	1	PANEL TRIM
MP12	03702-185	1	SWITCH SUB-PANEL LEFT
MP13	03702-187	1	SUPPORT PLATE ATTEN
	03702-336	2	PIN DOWEL
	03702-336		PIN DOWEL
MP14	03702-184	1	SWITCH SUB-PANEL RIGHT
MP15	03702-315	1	BOX SCREENING
	03702-10046	1	LID SCREENING CASTING
	03702-117	1	BRACKET HINGE FRONT
	03702-118	1	BRACKET HINGE REAR
	03702-335	2	SCR CAPTIVE
	03702-335		SCR CAPTIVE
	03702-120	1	STAY
	03702-337	1	ROLLER
	0340-0024	2	SPACER BUSH
	0340-0024		SPACER BUSH
MP16	03702-10029	1	CRT SHIELD
	01200-64001	1	COIL TRACE ALIGN
	01200-44703	1	CRT SHIELD SUPPORT
	01200-44761	1	CRT CLAMP REAR
	0460-0114	1	FOAM STRIP
	175A-91		CONTACT CRT
	175A-91		CONTACT CRT
MP17	03702-177	1	SCREEN PLATE
	03702-195	1	SCREEN PC SUPPORT FRONT
	03702-196	1	SCREEN PC SUPPORT REAR
	0403-0133	4	GUIDE PC BOARD-BRN
	0403-0133		GUIDE PC BOARD-BRN
	0403-0133		GUIDE PC BOARD-BRN
	0403-0133		GUIDE PC BOARD-BRN
	0403-0134	4	GUIDE PC BOARD-RED
	0403-0134		GUIDE PC BOARD-RED
	0403-0134		GUIDE PC BOARD-RED
	0403-0134		GUIDE PC BOARD-RED
	0403-0135	4	GUIDE PC BOARD-ORN
	0403-0135		GUIDE PC BOARD-ORN
	0403-0135		GUIDE PC BOARD-ORN
	0403-0135		GUIDE PC BOARD-ORN
	0403-0136	4	GUIDE PC BOARD-YEL
	0403-0136		GUIDE PC BOARD-YEL
	0403-0136		GUIDE PC BOARD-YEL
	0403-0136		GUIDE PC BOARD-YEL
	0403-0137	4	GUIDE PC BOARD-GRN

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	MP Part No	TQ	Description
	0403-0137		GUIDE PC 6040D-GRN
	0403-0137		GUIDE PC 6040D-GRN
	0403-0137		GUIDE PC 6040D-GRN
XV	1854-0079	2	XSTR SI NPN
	1200-0143	2	MOUNTING BASE XSTR
	0340-0142	2	INSULATOR XSTR
XV	1854-0083	2	XSTR SI NPN
	1200-0041	2	MOUNTING BASE XSTR
	1200-0043	2	INSULATOR XSTR
XV	1854-0083		XSTR SI NPN
	1200-0041		MOUNTING BASE XSTR
	1200-0043		INSULATOR XSTR
XV	1854-0079		XSTR SI NPN
	1200-0140		MOUNTING BASE XSTR
	0340-0142		INSULATOR XSTR
R1	2100-0908	1	R VAR 500K OHM 10% 1/2W LIN
	0370-1099	2	KNOB
R2	2100-3150	1	R VAR 1.2M OHM 20% 2W FOCUS
	0370-1099		KNOB FOCUS
	1410-0032	1	BUSHING POTENTIOMETER
R3	2100-3298	1	R VAR 50K-50K DUP LIN CONCEN X-GAIN
	0370-1100	3	KNOB CONCEN OUTER X GAIN
	0370-1126	1	KNOB CONCEN INNER SPECTRUM WIDTH
R4	2100-0320	2	R VAR 50K OHM 3% 1OTURN X PHASE SHIFT
	0370-1091	2	KNOB X PHASE SHIFT
R5	2100-0320		R VAR 50K OHM 3% 1OTURN Y FST OFFSET
	0370-1091		KNOB Y FST OFFSET
R6	2100-3100	2	R VAR 10K OHM 10% LIN 1/2WSPECTRUM CENTRE
	2950-0072	2	NUT HEX 3/8-32
	1250-0814	2	PLAIN WASHER
	2190-0804	2	WASHER LOCK
R7	2100-3109		R VAR 50K OHM 10% 1/2W X POSITION
	2950-0072		NUT HEX 3/8-32
	1250-0814		PLAIN WASHER
	2190-0804		WASHER LOCK
R8	2100-3110	2	R VAR 10K LOG 10% LIN V1GAIN/POSITION
	0370-1100		KNOB CONCEN OUTER V1 GAIN
	0370-1011	2	KNOB CONCEN INNER V1 POSITION
R9	2100-3110		R VAR 10K LOG 10% LIN V2GAIN/POSITION
	0370-1100		KNOB CONCEN OUTER V2 GAIN
	0370-1011		KNOB CONCEN INNER V2 POSITION
R10	2100-1490	1	R VAR 1K OHM 10% MARKER ZERO
	0590-0043	1	NUT HEX
	1490-0048	1	BUSHING POTENTIOMETER
R11	2100-3347	1	R VAR 2.5K OHM+SWITCH MARKER OFFSET
	03702-301	1	KNOB DIAL MARKER OFFSET
R12	2100-0150	1	R VAR 10K OHM 20% 1/4W LIN
R13	2100-0629	1	R VAR 1M OHM 30% 1/2W LIN ASTIGMATISM
R14	2100-3103	1	R VAR 10K OHM 10% 2W SET INTENSITY
R15			NOT ASSIGNED

Ref Desig	MP Part No	TQ	Description
R16			NOT ASSIGNED
R17			NOT ASSIGNED
R18			NOT ASSIGNED
R19			NOT ASSIGNED
R20			NOT ASSIGNED
R21	0757-0427	15	R FXD 1.5K OHM 1% 1/8W
R22	0698-3229	1	R FXD 3.83K OHM 1% 1/8W
*R23	0757-0440	9	R FXD 20K OHM 1% 1/8W
S1	3101-1295	1	SW LINE 4P4T
S2	3100-0041	2	SW LVR SPDT BLANKING
	0370-0429	6	KNOB LEVER SW JADE GREY
S3	3100-0680	1	SW LVR 4P2T CALIBRATION
	0370-0429		KNOB LEVER SW JADE GREY
S4	3100-0679	1	SW LVR 2P3T SWEEP SOURCE
	0370-0429		KNOB LEVER SW JADE GREY
S5	3100-0041		SW LVR SPDT AB INPUT
	0370-0429		KNOB LEVER SW JADE GREY
S6	3100-0672	1	SW ROTY PRINT 6P6T V1 DISPLAY
	0370-1107	1	KNOB V1 DISPLAY
	03702-3101	1	SHAFT EXTENDER V1 DISPLAY
	03702-363	1	SHAFT COUPLER
S7	3100-0673	1	SW ROTY PRINT 4P5T V2 DISPLAY
	0370-1014	1	KNOB V2 DISPLAY
S8	3100-0650	1	SW LVR ACTUATED ROTRY 4P6T V1V2 CALIB
	0370-0429		KNOB LEVER SW JADE GREY
S9	3100-0681	1	SW LVR 2P3T MARKER COND
	0370-0429		KNOB LEVER SW JADE GREY
S10			SW PART OFF MARKER OFFSET
S11	3101-0957	1	SW TGL DPDT SLAVE
S12			NOT ASSIGNED
S13	3101-0070	1	SW SLIDE DPDT 80 BAND/19TH
	03702-127	1	SPACER
S14	3101-0180	1	SW PUSHBUTTON SPDT
T1	9100-0631	1	TRANSFORMER MAINS
V1	5083-2322	1	CRT P2 PHOSPHOR
W1	8120-1351	1	ASSY CBL AC PWR (STANDARD)
	8120-1348	1	ASSY CBL AC PWR (US & CANADA)
	8120-1349	1	ASSY CBL AC PWR (SCANDINAVIA)
W2	03702-7204	1	ASSY CABLE LINE ON/OFF
W3	00140-01606	1	LEAD EMI
W4			NOT ASSIGNED
W5	03702-7324.	2	DEFLECTION CABLE ASSY
W6	03702-7324		DEFLECTION CABLE ASSY
W100	03702-7107	1	CABLE HARNESS MAIN SIGNAL
W101	03702-7302	1	ASSY CCAX CBL RED/WHT
	1250-0610	2	CONN COAX BNC RTG BNC 75 OHM
W102	03702-7237	1	ASSY COAX CBL RED
	1250-0931	91	CONN COAX CBL RTG CONHEX
W103	03702-7216	1	ASSY COAX CBL ORN
	1250-0931		CONN COAX CBL RTG CONHEX

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	MP Part No	TQ	Description
W104	03702-7241	1	ASSY COAX CBL YEL
	1250-0931		CONN COAX CBL RTG CONNEX
	1250-0931		CONN COAX CBL RTG CONNEX
W105	03702-7243	1	ASSY COAX CBL GRN
	1250-0931		CONN COAX CBL RTG CONNEX
	1250-0931		CONN COAX CBL RTG CONNEX
W106	03702-7244	1	ASSY COAX CBL BLU
	1250-0931		CONN COAX CBL RTG CONNEX
	1250-0931		CONN COAX CBL RTG CONNEX
W107	03702-7227	1	ASSY COAX CBL VIO
	1250-0931		CONN COAX CBL RTG CONNEX
W108	03702-7234	1	ASSY COAX CBL GRY
	1250-0931		CONN COAX CBL RTG CONNEX
W109	03702-7219	1	ASSY COAX CBL WHT
	1250-0931		CONN COAX CBL RTG CONNEX
W110	03702-7216	1	ASSY COAX CBL BRN/BLK
W111			NOT ASSIGNED
W112			NOT ASSIGNED
W113			NOT ASSIGNED
W114			NOT ASSIGNED
W115			NOT ASSIGNED
W116			NOT ASSIGNED
W117	03702-7236	1	ASSY COAX CBL BRN/VIO
	1250-0931		CONN COAX CBL RTG CONNEX
W118	03702-7255	1	ASSY COAX CBL BRN/GRY
	1250-0931		CONN COAX CBL RTG CONNEX
W119	03702-7245	1	ASSY COAX CBL BRN/WHT
	1250-0931		CONN COAX CBL RTG CONNEX
W120	03702-7257	1	ASSY COAX CBL RED/BLK
	1250-0931		CONN COAX CBL RTG CONNEX
W121	03702-7217	1	ASSY COAX CBL RED/BRN
W122			NOT ASSIGNED
W123			NOT ASSIGNED
W124			NOT ASSIGNED
W125			NOT ASSIGNED
W126	03702-7231	1	ASSY COAX CBL RED/BLU
W127	03702-7230	1	ASSY COAX CBL RED/VIO
	1250-0931		CONN COAX CBL RTG CONNEX
W128	03702-7219	1	ASSY COAX CBL RED/GRY
W129			NOT ASSIGNED
W130	03702-7223	1	ASSY COAX CBL BRN/BLK
W131	03702-7224	1	ASSY COAX CBL BRN/BRN
W132	03702-7220	1	ASSY COAX CBL BRN/RED
W134	03702-7225	1	ASSY COAX CBL BRN/YEL
W135	03702-7226	1	ASSY COAX CBL BRN/GRN
W136	03702-7221	1	ASSY COAX CBL BRN/BLU
W137	03702-7230	1	ASSY COAX CBL BRN/VIO
	1250-0931		CONN COAX CBL RTG CONNEX
W138	03702-7215	1	ASSY COAX CBL BRN/GRY
W139			NOT ASSIGNED
W140	03702-7222	1	ASSY COAX CBL YEL/BLK

Ref Desig	MP Part No	TQ	Description
W141	03702-7220	1	ASSY COAX CBL YEL/BRN
W142	03702-7230	1	ASSY COAX CBL YEL/RED
W143			NOT ASSIGNED
W144			NOT ASSIGNED
W145	03702-7232	1	ASSY COAX CBL YEL/BRN
W146			NOT ASSIGNED
W147			NOT ASSIGNED
W148	03702-7235	1	ASSY COAX CBL YEL/GRY
W149			NOT ASSIGNED
W150	03702-7240	1	ASSY COAX CBL GRN/BLK
W151	03702-7244	1	ASSY COAX CBL GRN/BRN
	1250-0931		CONN COAX CBL RTG CONNEX
W152	03702-7247	1	ASSY COAX CBL GRN/RED
	1250-0931		CONN COAX CBL RTG CONNEX
W153			NOT ASSIGNED
W154			NOT ASSIGNED
W155			NOT ASSIGNED
W156	03702-7240	1	ASSY COAX CBL GRN/BLU
	1250-0931		CONN COAX CBL RTG CONNEX
W157	03702-7249	1	ASSY COAX CBL GRN/VIO
	1250-0931		CONN COAX CBL RTG CONNEX
W158	03702-7251	1	ASSY COAX CBL GRN/GRY
W159			NOT ASSIGNED
W160	03702-7253	2	ASSY COAX CBL BLU/BLK
W160	03702-7253		ASSY COAX CBL BLU/BLK
W161	03702-7254	1	ASSY COAX CBL BLU/BRN
W162			NOT ASSIGNED
W163			NOT ASSIGNED
W164			NOT ASSIGNED
W165			NOT ASSIGNED
W166			NOT ASSIGNED
W167	03702-7228	1	ASSY COAX CBL BLU/VIO
W168	03702-7252	1	ASSY COAX CBL BLU/GRY
W169			NOT ASSIGNED
W170	03702-7305	1	ASSY COAX CBL VIO/BLK
W171	W171 TO W192 NOT ASSIGNED		
W193	03702-7218	1	ASSY COAX CBL WHT/BRN
W194			NOT ASSIGNED
W195			NOT ASSIGNED
W196			NOT ASSIGNED
W197			NOT ASSIGNED
W198	03702-7250	1	ASSY COAX CBL WHT/GRY
W199			NOT ASSIGNED
W200	03702-7194	1	CABLE HARNESS CRT
	1200-0037	1	SOCKET CRT TUBE
W300	03702-7192	1	CABLE HARNESS POWER SUPPLY PRIMARY
W400	03702-7205	1	CABLE HARNESS POWER SUPPLY SECONDARY
W500	03702-7304	1	ASSY TROUBLESHOOT HARNESS
W502	03702-7336	1	ASSY COAX CBL WHT/RED
W916	03702-765	1	ASSY COAX CBL BRN/BLU
	1250-0931		CONN COAX CBL RTG CONNEX

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	HP Part No	TQ	Description
	1250-0931		CONN COAX CBL MTG CONNEX
W22	03702-766	1	ASSY COAX CBL [illegible]
	1250-0931		CONN COAX CBL MTG CONNEX
	1250-0931		CONN COAX CBL MTG CONNEX
W23	03702-767	1	ASSY COAX CBL [illegible]
	1250-0931		CONN COAX CBL MTG CONNEX
	1250-0931		CONN COAX CBL MTG CONNEX
W24	03702-768	1	ASSY COAX CBL [illegible]
	1250-0931		CONN COAX CBL MTG CONNEX
	1250-0931		CONN COAX CBL MTG CONNEX
W25	03702-7306	1	ASSY COAX CBL [illegible]
	1250-0931		CONN COAX CBL MTG CONNEX
	1250-0931		CONN COAX CBL MTG CONNEX
XA9	1251-0172	5	CONN MULTI BKD MTG 22-WAY
XA10	1251-0172		CONN MULTI BKD MTG 22-WAY
XA11	1251-0172		CONN MULTI BKD MTG 22-WAY
XA12			NOT ASSIGNED
XA13	1251-0172		CONN MULTI BKD MTG 22-WAY
XA14	1251-0172		CONN MULTI BKD MTG 22-WAY
ZZ1	9211-1356	1	CARTON CORRUGATED (OUTER)
ZZ1	9211-0601	1	CARTON CORRUGATED
	9220-1951	1	CARTON FLOATER
	9220-1547	1	PAD CORRUGATED BOTTOM
	9220-1546	1	PAD CORRUGATED FRONT
	9220-1549	1	PAD CORRUGATED DOUBLE CELL
	9222-0303	1	BAG POLYTHENE
A1	03702-7203	1	ASSY LOW VOLTAGE POWER SUPPLY
	03702-3203	1	PC BD BLANK
	4040-0749	2	EXTRACTOR PC BD BRN
	4040-0749		EXTRACTOR PC BD BRN
A1C1	0180-0089		C FXD 10UF +50-10% 150WVDC
A1C2			NOT ASSIGNED
A1C3	0150-0075	2	C FXD 4700PF +100-20% 500WVDC
A1C4	0180-0228	4	C FXD 22UF 10% 15WVDC
A1C5	0180-0097	4	C FXD 47UF 10% 35WVDC
A1C6	0160-0174	17	C FXD 0.47UF +80-20% 25WVDC
A1C7	0150-0075		C FXD 4700PF +100-20% 500WVDC
A1C8	0180-0228		C FXD 22UF 10% 15WVDC
A1C9	0180-0097		C FXD 47UF 10% 35WVDC
A1C10	0160-0174		C FXD 0.47UF +80-20% 25WVDC
A1C11	0180-0136	1	C FXD 10UF +100-10% 50WVDC
A1CR1	1902-0175	1	DIO BKDN 100V 5% 1W
A1CR2			NOT ASSIGNED
A1CR3			NOT ASSIGNED
A1CR4	1902-3097	2	DIO BKDN 5.23V 2% 400MW
A1CR5	1902-3224	2	DIO BKDN 17.8V 5% 400MV
A1CR6	1884-0012	2	DIO SCR
A1CR7	1902-3097		DIO BKDN 5.23V 2% 400MW
A1CR9	1902-3224		DIO BKDN 17.8V 5% 400MV
A1CR8	1884-0012		DIO SCR
A1CR10	1902-0244	1	DIO BKDN 30.1V 5% 1W
A1Q1	1854-0039	3	XSTR SI NPN
	1205-0011	2	HEAT DISSIPATOR XSTR
A1Q2	1854-0071	41	XSTR SI NPN
A1Q3	1854-0014	2	XSTR SI NPN DUAL
A1Q4	1854-0039		XSTR SI NPN
	1205-0011		HEAT DISSIPATOR XSTR
A1Q5	1854-0071		XSTR SI NPN
A1Q6	1854-0014		XSTR SI NPN DUAL
A1R1	0698-3401	1	R FXD FLM 215 OHM 1% 1/2W
A1R2	0757-0340	1	R FXD FLM 10K OHM 1% 1/4W
A1R3			NOT ASSIGNED
A1R4	0698-3599	2	R FXD FLM 2.15K OHM 1% 1/4W
A1R5	0757-0845	2	R FXD 18.2K OHM 1% 1/2W
A1R6	0698-0084	17	R FXD 2.15K OHM 1% 1/8W
A1R7	0757-0421	3	R FXD 825 OHM 1% 1/8W
A1R8	0757-0442	46	R FXD 10K OHM 1% 1/8W
A1R9	0698-4037	23	R FXD 46.4 OHM 1% 1/8W
A1R10	0757-0439	8	R FXD 6.81K OHM 1% 1/8W
A1R11	0698-4037		R FXD 46.4 OHM 1% 1/8W
A1R12	0757-0440	10	R FXD 7.5K OHM 1% 1/8W
A1R13	2100-2633	3	R VAR 1K 10% 1/2W LIN
A1R14	0698-3153	3	R FXD 3.83K OHM 1% 1/8W
A1R15	0757-0280	36	R FXD 1K OHM 1% 1/8W
A1R16	0698-3599		R FXD FLM 2.15K OHM 1% 1/4W
A1R17	0757-0845		R FXD 18.2K OHM 1% 1/2W
A1R18	0698-0084		R FXD 2.15K OHM 1% 1/8W
A1R19	0757-0421		R FXD 825 OHM 1% 1/8W
A1R20	0757-0444	2	R FXD 12.1K OHM 1% 1/8W
A1R21	0757-0439		R FXD 6.81K OHM 1% 1/8W
A1R22	0698-3153		R FXD 3.83K OHM 1% 1/8W
A1R23	2100-2633		R VAR 1K 10% 1/2W LIN
A1R24	0757-0440		R FXD 7.5K OHM 1% 1/8W
A1R25	0757-0280		R FXD 1K OHM 1% 1/8W
A1R26	0758-0001	1	R FXD 3.3K OHM 5% 1/2W
A2	03702-7321	1	ASSY HORIZONTAL DEFLECTION
	03702-3321	1	PC BD BLANK
	4040-0750	2	EXTRACTOR PC BD RED
	4040-0750		EXTRACTOR PC BD RED
A2C1	0180-0228		C FXD 22UF 10% 15WVDC
A2C2			NOT ASSIGNED
A2C3	0160-3910	5	C FXD 0.1UF 5% 300WVDC
A2C4	0160-3910		C FXD 0.1UF 5% 300WVDC
A2C5	0160-3910		C FXD 0.1UF
A2C6	0160-3910		C FXD 0.1UF
A2C7	0160-0659	4	C FXD 30PF 5% 35WVDC
A2C8	0160-0624	3	C FXD 56PF 5% 300WVDC
A2C9	0160-3136	3	C FXD 3.3PF 5% 30WVDC
A2C10	0150-0093	26	C FXD 0.01UF +80-10% 100WVDC

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	MP Part No	TQ	Description
A2C11	0160-2197	4	C FXD 10PF 5% 200VDC
A2C12	0160-0093	4	C FXD 100PF 5% 300VDC
A2C13	0160-0121	2	C FXD 0.1UF +80-20% 25VDC
A2C14	0180-0374	3	C FXD 10UF 10% 20VDC
A2C15	0160-0093		C FXD 100PF 5% 300VDC
A2C16	0180-0374		C FXD 10UF 10% 20VDC
A2C17	0160-0163	2	C FXD 100PF 5% 300VDC
A2C18	0160-2136		C FXD 3.3PF 5% 500VDC
A2C19	0180-1960	4	C FXD 330UF 10% 15VDC
A2C20	0160-0163		C FXD 100PF 5% 300VDC
A2C21	0160-2136		C FXD 3.3PF 5% 500VDC
A2C22	0160-2146	3	C FXD 0.022UF +80-20% 100VDC
A2C23	0160-2146		C FXD 0.022UF +80-20% 100VDC
A2C24	0180-1960		C FXD 330UF 10% 15VDC
A2C25	0160-2145	3	C FXD 1000PF +80-20% 100VDC
A2C26	0160-0198	2	C FXD 2000PF 5% 300VDC
A2C27			NOT ASSIGNED
A2C28	0180-0106	3	C FXD 68UF 20% 6VDC
A2C29	0160-0174		C FXD 0.47UF +80-20% 25VDC
A2C30	0180-0210	1	C FXD 0.15UF 10% 35VDC
A2C31	0180-1960		C FXD 330UF
A2C32	0180-0097		C FXD 47UF 10% 35VDC
A2C33	0160-2204	5	C FXD 100PF
A2C34	0160-2197		C FXD 10PF 5% 300VDC
A2C35	0150-0052	1	C FXD 0.05UF 20% 400VDC
A2C36	0180-0098		C FXD 100UF
A2C37	0160-0174		C FXD 0.47UF +80-20% 25VDC
A2C38	0180-0098		C FXD 100UF
A2C39	0160-0174		C FXD 0.47UF +80-20% 25VDC
A2C40	0180-0106		C FXD 68UF 20% 6VDC
A2C41	0160-0174		C FXD 0.47UF +80-20% 25VDC
A2C42	0180-1960		C FXD 330UF
A2C43	0160-0174		C FXD 0.47UF +80-20% 25VDC
A2C44	0180-0161	1	C FXD 3.3UF 20% 35VDC
A2C45	0160-0159		C FXD 30PF 5% 35VDC
A2C46	0180-1745	1	C FXD 1.5UF 10% 20VDC
A2C47			NOT ASSIGNED
A2C48			NOT ASSIGNED
A2C49	0180-0155	69	C FXD 2.2UF
A2CR1	1901-0040		DIO SI
A2CR2	1902-3002	1	DIO ZNDN 4.64V 5% 400MW
A2CR3	1901-0040		DIO SI
A2CR4	1901-0040		DIO SI
A2CR5	1902-3160	1	DIO ZNDN 11.9V 5% 400MW
A2CR6	1901-0040		DIO SI
A2CR7			NOT ASSIGNED
A2CR8	1902-3203	2	DIO ZNDN 14.7V 5% 400MW
A2CR9	1901-0040		DIO SI
A2CR10	1901-0040		DIO SI
A2CR11	1902-3234	1	DIO ZNDN 20V 5% 400MW
A2E1	1990-0336	4	VOLTAGE CONTROL RESISTOR
A2E2	1990-0336		VOLTAGE CONTROL RESISTOR
A2E3	1990-0336		VOLTAGE CONTROL RESISTOR
A2E4	1990-0336		VOLTAGE CONTROL RESISTOR
A2MC1	1820-0217	2	IC OPER AMPL
A2MC2	1820-0158	1	IC OPER AMPL
A2MC3	1820-0477	11	IC OPER AMPL
A2MC4	1820-0058	7	IC OPER AMPL
A2MC5	1820-0477		IC OPER AMPL
A2MC6	1820-0058		IC OPER AMPL
A2MC7	1820-0058		IC OPER AMPL
A2MC8	1820-0054	2	IC QUAD 2-I/P NAND GATE
A2MC9	1820-0058		IC OPER AMPL
A2MC10	1820-0217		IC OPER AMPL
A2MC11	1820-0058		IC OPER AMPL
A2MC12	1820-0477		IC OPER AMPL
A2Q1			NOT ASSIGNED
A2Q2	1854-0071		XSTR SI NPN
A2Q3	1854-0071		XSTR SI NPN
A2Q4	1854-0071		XSTR SI NPN
A2Q5	1854-0071		XSTR SI NPN
A2Q6	1855-0020	4	XSTR FET N-CHANNEL
A2Q7	1854-0071		XSTR SI NPN
A2Q8	1854-0071		XSTR SI NPN
A2Q9	1853-0015	1	XSTR SI PNP
A2Q10	1854-0232	4	XSTR SI NPN
A2Q11	1854-0071		XSTR SI NPN
A2Q12	1854-0232		XSTR SI NPN
A2Q13	1854-0071		XSTR SI NPN
A2Q14	1854-0071		XSTR SI NPN
A2Q15	1854-0071		XSTR SI NPN
A2Q16	1854-0071		XSTR SI NPN
A2Q17	1854-0071		XSTR SI NPN
A2Q18	1854-0071		XSTR SI NPN
A2Q19	1854-0232		XSTR SI NPN
A2Q20	1854-0232		XSTR SI NPN
A2Q21	1854-0071		XSTR SI NPN
A2Q22	1854-0071		XSTR SI NPN
A2R1	0757-0449		R FXD 20K OHM 1% 1/4W
A2R2	0757-0145	2	R FXD 750K OHM 1% 1/8W
A2R3	0757-0461	4	R FXD 68.1K OHM 1% 1/8W
A2R4	0757-0465	13	R FXD 100K OHM 1% 1/8W
A2R5	0757-0470	2	R FXD 162K OHM 1% 1/8W
A2R6	0698-0085	7	R FXD 2.61K OHM 1% 1/8W
A2R7	0698-0085		R FXD 2.61K OHM 1% 1/8W
A2R8	0698-0085		R FXD 2.61K OHM 1% 1/8W
A2R9	0698-0085		R FXD 2.61K OHM 1% 1/8W
A2R10	0698-3451	5	R FXD 133K OHM 1% 1/8W
A2R11	0757-0145		R FXD 750K OHM 1% 1/4W
A2R12	0757-0442		R FXD 10K OHM 1% 1/8W
A2R13	0757-0469	8	R FXD 150K OHM 1% 1/8W

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	HP Part No	TQ	Description
A2R54	0757-0416	8	R FXD 511 OHM 1% 1/8W
A2R55	0757-0438	4	R FXD 5.11K OHM 1% 1/8W
A2R56	0757-0442		R FXD 10K OHM 1% 1/8W
A2R57	0757-0465		R FXD 100K OHM 1% 1/8W
A2R58	0698-3160	2	R FXD 31.6K OHM 1% 1/8W
A2R59	0698-3450	2	R FXD 42.2K OHM 1% 1/8W
A2R60	0757-0470		R FXD 162K OHM 1% 1/8W
A2R61	0757-0467	1	R FXD 121K OHM 1% 1/8W
A2R62	0757-0446	14	R FXD 15K OHM 1% 1/8W
A2R63	0698-3450		R FXD 42.2K OHM 1% 1/8W
A2R64	0757-0440		R FXD 7.5K OHM 1% 1/8W
A2R65	0757-0468	27	R FXD 75 OHM 1% 1/8W
A2R66	0757-0444		R FXD 12.1K OHM 1% 1/8W
A2R67	0757-0442		R FXD 10K OHM 1% 1/8W
A2R68	0757-0199	6	R FXD 21.5K OHM 1% 1/8W
A2R69	0757-0278	7	R FXD 1.78K OHM 1% 1/8W
A2R70	0757-0280		R FXD 1K OHM 1% 1/8W
A2R71	0757-0199		R FXD 21.5K OHM 1% 1/8W
A2R72	0757-0278		R FXD 1.78K OHM 1% 1/8W
A2R73	0757-0449		R FXD 20K OHM 1% 1/8W
A2R74	0757-0438	17	R FXD 5.11K OHM 1% 1/8W
A2R75	0757-0205	3	R FXD 9.63K OHM 1% 1/8W
A2R76	0698-0085		R FXD 2.61K OHM 1% 1/8W
A2R77	2100-2316	2	R VAR 100K OHM 1% 1/2W
A2R78	0757-0442		R FXD 10K OHM 1% 1/8W
A2R79	0757-0280		R FXD 1K OHM 1% 1/8W
A2R80	0698-3449	3	R FXD 20.7K OHM 1% 1/8W
A2R81	0698-3449		R FXD 20.7K OHM 1% 1/8W
A2R82	0757-0280		R FXD 1K OHM 1% 1/8W
A2R83	0757-0438		R FXD 5.11K OHM 1% 1/8W
A2R84	0757-0416		R FXD 511 OHM 1% 1/8W
A2R85	0757-0438		R FXD 5.11K OHM 1% 1/8W
A2R86	0757-0442		R FXD 10K OHM 1% 1/8W
A2R87	0757-0809	1	R FXD 332 OHM 1% 1/4W
A2R88	0757-0442		R FXD 10K OHM 1% 1/8W
A2R89	0757-0416		R FXD 511 OHM 1% 1/8W
A2R90	0757-0442		R FXD 10K OHM 1% 1/8W
A2R91	0698-3457	2	R FXD 316K OHM 1% 1/8W
A2R92	0757-0460	4	R FXD 61.9K OHM 1% 1/8W
A2R93	0757-0441	1	R FXD 8.25K OHM 1% 1/8W
A2R94	0757-0427		R FXD 1.5K OHM 1% 1/8W
A2R95	0757-0438		R FXD 5.11K OHM 1% 1/8W
A2R96			NOT ASSIGNED
A2R97	0757-0279	14	R FXD 3.16K OHM 1% 1/8W
A2R98	0757-0465		R FXD 100K OHM 1% 1/8W
A2R99	0698-3451		R FXD 133K OHM 1% 1/8W
A2R100	0698-3490	12	R FXD 2K OHM 1% 1/8W
A2R101	0757-0438		R FXD 5.11K OHM 1% 1/8W
A2R102	0757-0716	1	R FXD 162K OHM 1% 1/4W
A2R103	0757-0472	4	R FXD 200K OHM 1% 1/8W
A2R104	0757-0440		R FXD 7.5K OHM 1% 1/8W
A2R105	0757-0438		R FXD 5.11K OHM 1% 1/8W
A2R106	0757-0442		R FXD 10K OHM 1% 1/8W
A2R107	0757-0442		R FXD 10K OHM 1% 1/8W
A2R108			NOT ASSIGNED
A2R109	0757-0442		R FXD 10K OHM 1% 1/8W
A2R110	0757-0279	1	R FXD 3.16K OHM 1% 1/8W
A2R111	0698-3161	1	R FXD 32.5K OHM 1% 1/8W
A2R112	2100-2499	1	R VAR 5K OHM 1% 1/2W
A2R113	0698-3472		R FXD 2K OHM 1% 1/8W
A2R114	0698-3152	4	R FXD 3.48K OHM 1% 1/8W
A2R115	0757-0442		R FXD 10K OHM 1% 1/8W
A2R116			NOT ASSIGNED
A2R117	0698-3449		R FXD 20.7K OHM 1% 1/8W
A2R118	0698-3158	4	R FXD 29.7K OHM 1% 1/8W
A2R119	0757-0443	1	R FXD 11K OHM 1% 1/8W
A2R120	0757-0472		R FXD 200K OHM 1% 1/8W
A2R121	0757-0468	2	R FXD 909K OHM 1% 1/8W
A2R122			NOT ASSIGNED
A2R123	0698-3464	1	R FXD 90.9K OHM 1% 1/8W
A2R124	0757-0442		R FXD 10K OHM 1% 1/8W
A2R125	0757-0442		R FXD 10K OHM 1% 1/8W
A2R126	0757-0438		R FXD 5.11K OHM 1% 1/8W
A2R127	0698-3459	1	R FXD 383K OHM 1% 1/8W
A2R128	0698-3152		R FXD 3.48K OHM 1% 1/8W
A2R129	0757-0123	2	R FXD 34.8K OHM 1% 1/8W
A2R130	0757-0280		R FXD 1K OHM 1% 1/8W
A2R131	0757-0465		R FXD 100K OHM 1% 1/8W
A2R132	0757-0465		R FXD 100K OHM 1% 1/8W
A2R133	0757-0465		R FXD 100K OHM 1% 1/8W
A2R134	0757-0280		R FXD 1K OHM 1% 1/8W
A2R135	0757-0468		R FXD 909K OHM 1% 1/8W
A2R136			NOT ASSIGNED
A2R137	0698-5490		R FXD 2K OHM 1% 1/8W
A3	03702-7164	1	ASSY VERTICAL DEFLECTION
	03702-3164	1	PC BD BLANK
	4040-0751	2	EXTRACTOR PC BD ORN
	4040-0751		EXTRACTOR PC BD ORN
A3C1	0140-0210	2	C FXD 27CPF
A3C2	0160-2197		C FXD 10PF 5% 300WVDC
A3C3	0160-2204		C FXD 100PF 5% 300WVDC
A3C4			NOT ASSIGNED
A3C5	0140-0210		C FXD 270PF
A3C6	0160-2197		C FXD 10PF 5% 300WVDC
A3C7	0160-2204		C FXD 100PF 5% 300WVDC
A3C8	0160-2221	2	C FXD 1300PF 5% 300WVDC
A3C9	0160-2221		C FXD 1300PF 5% 300WVDC
A3C10	0160-0174		C FXD 0.47UF +80-20% 25WVDC
A3C11			NOT ASSIGNED
A3C12	0160-2199	8	C FXD 30PF 5% 300WVDC

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	HP Part No	TQ	Description
A3C13	0160-3849	2	C FXD 6.19pF ±0.1pF 100VDC
A3C14	0160-3841	2	C FXD 0.068uF ±0.1pF 100VDC
A3C15	0160-3887	1	C FXD 0.015uF 10% 250VDC
A3C16	0160-3880	1	C FXD 0.033uF 10% 400VDC
A3C17	0160-0168	1	C FXD 0.1uF 10% 200VDC
A3C18	0180-1746	6	C FXD 15uF 10% 20VDC
A3C19	0180-1746		C FXD 15uF 10% 20VDC
A3C20	0180-1746		C FXD 15uF 10% 20VDC
A3C21			NOT ASSIGNED
A3C22	0180-1746		C FXD 15uF 10% 20VDC
A3C23	0121-0189	2	C VAR 9-35pF
A3C24	0121-0189		C VAR 9-35pF
A3C25	0180-0186		C FXD 40uF 10% 6VDC
A3C26	0180-0195	1	C FXD 0.33uF 10% 35VDC
A3CR1	1901-0040		DIO SI
A3CR2	1901-0040		DIO SI
A3CR3	1902-3066	4	DIO BRDG 4.02V 5% 400MW
A3CR4	1902-3066		DIO BRDG 4.02V 5% 400MW
A3CR5	1902-3066		DIO BRDG 4.02V 5% 400MW
A3CR6	1902-3066		DIO BRDG 4.02V 5% 400MW
A3MC1	1820-0058		IC OPER AMPL
A3MC2	1820-0058		IC OPER AMPL
A3MC3	1820-0477		IC OPER AMPL
A3Q1	1853-0019	19	XSTR SI NPN
A3Q2	1854-0019		XSTR SI NPN
A3Q3	1855-0081	2	XSTR FET N-CHANNEL
A3Q4	1853-0036	12	XSTR SI PNP
A3Q5	1855-0020		XSTR FET N-CHANNEL
A3Q6	1855-0020		XSTR FET N-CHANNEL
A3Q7	1853-0036		XSTR SI PNP
A3Q8	1855-0081		XSTR FET N-CHANNEL
A3Q9	1854-0019		XSTR SI NPN
A3Q10	1854-0022	3	XSTR SI NPN
A3Q11	1854-0022		XSTR SI NPN
A3Q12	1854-0019		XSTR SI NPN
A3Q13	1854-0071		XSTR SI NPN
A3Q14	1853-0036		XSTR SI PNP
A3Q15	1854-0071		XSTR SI NPN
A3R1	0757-0442		R FXD 10K OHM 1% 1/8W
A3R2	0757-0449		R FXD 150K OHM 1% 1/8W
A3R3	0757-0465		R FXD 100K OHM 1% 1/8W
A3R4	0698-3132	4	R FXD 2.61 OHM 1% 1/8W
A3R5	0698-3451		R FXD 133K OHM 1% 1/8W
A3R6	0757-0442		R FXD 10K OHM 1% 1/8W
A3R7	0757-0472		R FXD 200K OHM 1% 1/8W
A3R8	0757-0427		R FXD 1.5K OHM 1% 1/8W
A3R9	0757-0739	3	R FXD 2K OHM 1% 1/4W
A3R10	0757-0442		R FXD 10K OHM 1% 1/8W
A3R11	0757-0482	3	R FXD 511K OHM 1% 1/8W
A3R12	0757-0442		R FXD 10K OHM 1% 1/8W
A3R13	0757-0442		R FXD 10K OHM 1% 1/8W
A3R14	0757-0442		R FXD 10K OHM 1% 1/8W
A3R15	0757-0449		R FXD 150K OHM 1% 1/8W
A3R16	0757-0442		R FXD 10K OHM 1% 1/8W
A3R17	0698-3132		R FXD 2.61 OHM 1% 1/8W
A3R18	0698-3451		R FXD 133K OHM 1% 1/8W
A3R19	0757-0442		R FXD 10K OHM 1% 1/8W
A3R20	0757-0472		R FXD 200K OHM 1% 1/8W
A3R21	0757-0427		R FXD 1.5K OHM 1% 1/8W
A3R22	0757-0739		R FXD 2K OHM 1% 1/4W
A3R23	0757-0442		R FXD 10K OHM 1% 1/8W
A3R24	0757-0482		R FXD 511K OHM 1% 1/8W
A3R25	0757-0442		R FXD 10K OHM 1% 1/8W
A3R26	0757-0442		R FXD 10K OHM 1% 1/8W
A3R27	0757-0419	9	R FXD 681 OHM 1% 1/8W
A3R28	0698-3444	9	R FXD 316 OHM 1% 1/8W
A3R29	0757-0446		R FXD 15K OHM 1% 1/8W
A3R30	0757-0446		R FXD 15K OHM 1% 1/8W
A3R31	0757-0419		R FXD 681 OHM 1% 1/8W
A3R32	0698-3444		R FXD 316 OHM 1% 1/8W
A3R33	0698-3243	3	R FXD 178K OHM 1% 1/8W
A3R34	0698-3499		R FXD 2K OHM 1% 1/8W
A3R35	0761-0038	2	R FXD 5.62K OHM 5% 1W
A3R36	0698-3134	1	R FXD 1.33K OHM 1% 1/4W
A3R37	0698-0084		R FXD 2.15K OHM 1% 1/8W
A3R38	0761-0038		R FXD 5.62K OHM 5% 1W
A3R39	0698-3490		R FXD 2K OHM 1% 1/8W
A3R40	0757-0449		R FXD 20K OHM 1% 1/8W
A3R41	0757-0439		R FXD 6.81K OHM 1% 1/8W
A3R42			NOT ASSIGNED
A3R43	0698-3158		R FXD 23.7K OHM 1% 1/8W
A3R44	0698-3243		R FXD 178K OHM 1% 1/8W
A3R45	0757-0449		R FXD 20K OHM 1% 1/8W
A3R46	0698-3457		R FXD 316K OHM 1% 1/8W
A3R47	0757-0465		R FXD 100K OHM 1% 1/8W
A3R48	0757-0442		R FXD 10K OHM 1% 1/8W
A3R49			NOT ASSIGNED
A3R50	0698-0084		R FXD 2.15K OHM 1% 1/8W
A3R51	0757-0424	3	R FXD 1.1K OHM 1% 1/8W
A3R52	0757-0438		R FXD 5.11K OHM 1% 1/8W
A3R53	0698-0083	1	R FXD 1.96K OHM 1% 1/8W
A3R54	0757-0280		R FXD 1K OHM 1% 1/8W
A3R55	0757-0438		R FXD 5.11K OHM 1% 1/8W
A3R56	0698-3442	2	R FXD 237 OHM 1% 1/8W
A3R57	0757-0180	13	R FXD 31.6 OHM 1% 1/8W
A3R58	0757-0403	5	R FXD 121 OHM 1% 1/8W
A3R59	0757-0180		R FXD 31.6 OHM 1% 1/8W
A3R60			NOT ASSIGNED
A3R61	0757-0276	2	R FXD 61.9 OHM 1% 1/8W
A3R62	0698-3243		R FXD 178K OHM 1% 1/8W

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	HP Part No	TQ	Description
A3R63	2100-2584		R VAR 1.00K OHM 1% 1/2W
A3R64	0757-0465		R FXD 10K OHM 1% 1/8W
A3R65	0757-0419		R FXD 681 OHM 1% 1/8W
A3R66	0757-0280		R FXD 1K OHM 1% 1/8W
A3R67	0757-0440		R FXD 25K OHM 1% 1/8W
A4	03702-70001	1	ASSY IF CALIBRATOR
	03702-30001	1	PC BD BLANK
	4040-0752	2	EXTRACTOR PC BD YEL
	4040-0752		EXTRACTOR PC BD YEL
A4C1	0160-0127	5	C FXD 1UF
A4C2	0160-0127		C FXD 1UF
A4C3	0180-0098		C FXD 150UF
A4C4	0160-2199		C FXD 300PF
A4C5	0180-0159	2	C FXD 220UF
A4C6	0160-0127	2	C FXD 1UF
A4C7	0160-3740	5	C FXD 0.22UF
A4C8	0160-2199		C FXD 300PF
A4C9	0180-1719	1	C FXD 22UF 10% 25WVDC
A4C10	0160-2199		C FXD 300PF
A4C11	0160-3458	2	C FXD 0.1UF
A4C12	0180-0159		C FXD 220UF
A4C13	0160-3458		C FXD 0.1UF
A4C14	0180-0155		C FXD 2.2UF
A4C15	0180-1746		C FXD 15UF
A4C16	0180-1746		C FXD 15UF
A4C17	0180-0155		C FXD 2.2UF
A4CR1	1902-3139	2	DIO BKDN 8.25V 5% 400MW
A4CR2	1901-0025	3	DIO SI
A4CR3	1902-3094	1	DIO BKDN 9.11V
A4CR4	1902-3172	1	DIO BKDN 11.2V
A4L1	9140-0131	1	IND FXD 10UH
A4L2	9100-1673	1	IND FXD 6.8UH
A4MC1	1820-0477		IC OPER AMPL
A4MC2	1820-0477		IC OPER AMPL
A4MC3	1820-0054		IC DIGITAL
A4MC4	1820-0304	1	IC DIGITAL
A4MC5	1820-0477		IC OPER AMPL
A4Q1	1854-0071		XSTR SI NPN
A4Q2	1854-0071		XSTR SI NPN
A4Q3	1854-0071		XSTR SI NPN
A4Q4	1854-0071		XSTR SI NPN
A4Q5	1854-0071		XSTR SI NPN
A4Q6	1854-0071		XSTR SI NPN
A4R1	0698-3150	6	R FXD 2.37K OHM 1% .1/8W
A4R2	0698-3150		R FXD 2.37K OHM 1% 1/8W
A4R3	0757-0417	3	R FXD 562 OHM 1% 1/8W
A4R4	0757-0274	9	R FXD 1.21K OHM 1% 1/8W
A4R5	0698-3150		R FXD 2.37K OHM 1% 1/8W
A4R6	0698-3150		R FXD 2.37K OHM 1% 1/8W
A4R7	0757-0274		R FXD 1.21K OHM 1% 1/8W
A4R8	0757-0438		R FXD 5.11K OHM 1% 1/8W
A4R9	0757-0465		R FXD 10K OHM 1% 1/8W
A4R10	0757-0484	1	R FXD 619K OHM 1% 1/8W
A4R11	0757-0465		R FXD 10K OHM 1% 1/8W
A4R12	0757-0462	2	R FXD 7.5K OHM 1% 1/8W
A4R13	0757-0462		R FXD 7.5K OHM 1% 1/8W
A4R14	0698-3152		R FXD 9.40K OHM 1% 1/8W
A4R15	0757-0458		R FXD 51.1K OHM 1% 1/8W
A4R16	0757-0458		R FXD 51.1K OHM 1% 1/8W
A4R17	0757-0288	1	R FXD 9.09K OHM 1% 1/8W
A4R18	0698-5490		R FXD 2K OHM 1% 1/8W
A4R19	0698-3155	21	R FXD 4.64K OHM 1% 1/8W
A4R20	0757-0280		R FXD 1K OHM 1% 1/8W
A4R21	0698-3443	9	R FXD 267 OHM 1% 1/8W
A4R22	0698-5490		R FXD 2K OHM 1% 1/8W
A4R23	0698-0084		R FXD 2.15K OHM 1% 1/8W
A4R24	0698-3155		R FXD 4.64K OHM 1% 1/8W
A4R25	2100-2644	1	R VAR 500K OHM 1% 1/8W
A4R26	0757-0438		R FXD 5.11K OHM 1% 1/8W
A4R27	0757-0458		R FXD 51.1K OHM 1% 1/8W
A4R28	0757-0424		R FXD 1.1K OHM 1% 1/8W
A4R29	0757-0420	7	R FXD 750 OHM 1% 1/8W
A4R30	0698-3156	2	R FXD 14.7K OHM 1% 1/8W
A4R31	0757-0446		R FXD 15K OHM 1% 1/8W
A4R32	0698-3446	3	R FXD 383 OHM 1% 1/8W
A4R33	0757-0438	1	R FXD 2.21K OHM 1% 1/8W
A4R34	0698-3443		R FXD 267 OHM 1% 1/8W
A4R35	0757-0420		R FXD 750 OHM 1% 1/8W
A4R36	0698-3156		R FXD 14.7K OHM 1% 1/8W
A4R37	0757-0199		R FXD 21.5K OHM 1% 1/8W
A4R38	0757-0401	20	R FXD 100 OHM 1% 1/8W
A4R39	0698-4307	1	R FXD 14.3K OHM 1% 1/8W
A4R40	0757-0398		R FXD 75 OHM 1% 1/8W
A4R41	0698-3155		R FXD 4.64K OHM 1% 1/8W
A4R42	0757-0401		R FXD 100 OHM 1% 1/8W
A4R43	0757-0180		R FXD 31.6 OHM 1% 1/8W
A4R44	0698-3402	1	R FXD 316 OHM 1% 1/8W
A4R45	0757-0401		R FXD 100 OHM 1% 1/8W
A4R46	0757-0180		R FXD 31.6 OHM 1% 1/8W
A4R47	0757-0461		R FXD 68.1K OHM 1% 1/8W
A4R48			NOT ASSIGNED
A4R49			NOT ASSIGNED
A4R50			NOT ASSIGNED
A4R51			NOT ASSIGNED
A4R52			NOT ASSIGNED
A4R53	2100-2574	2	R VAR 500 OHM 10% 1W
A5	03702-7174	1	ASSY METER CONTROL & MARKER PROCESSOR
	03702-3174	1	PC BD BLANK
	4040-0753	2	EXTRACTOR PC BD GRN
	4040-0753		EXTRACTOR PC BD GRN

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	HP Part No	TQ	Description
A5C1	0160-0174		C FXD 0.47UF +80-20% 25VDC
A5C2	0160-0121		C FXD 0.1UF +80-20% 50VDC
A5C3	0160-0093		C FXD 0.01UF +80-10% 100VDC
A5C4	0160-0093		C FXD 0.01UF +80-10% 100VDC
A5C5			NOT ASSIGNED
A5C6	0160-2145		C FXD 5700PF +80-20% 100VDC
A5C7	0160-4001	7	C FXD 0.047UF 5% 63VDC
A5C8	0160-0050	42	C FXD 1000PF +80 -20% 1000VDC
A5C9	0160-4001		C FXD 0.047UF 5% 63VDC
A5C10	0160-0050		C FXD 1000PF +80 -20% 1000VDC
A5C11	0160-4001		C FXD 0.047UF 5% 63VDC
A5C12			NOT ASSIGNED
A5C13	0160-0093		C FXD 0.01UF +80-10% 100VDC
A5C14	0160-0093		C FXD 0.01UF +80-10% 100VDC
A5C15	0160-0627		C FXD 1UF 10% 100VDC
A5C16	0160-0627		C FXD 1UF 10% 100VDC
A5C17	0160-1849		C FXD 0.15UF 5% 100VDC
A5C18	0160-2199		C FXD 30PF 5% 300VDC
A5C19			NOT ASSIGNED
A5C20	0150-0050		C FXD 1000PF
A5C21	0160-2145		C FXD 0.005UF
A5CR1	1902-3182	3	DIO BKDN 12.1V 5% 400MW
A5CR2	1902-0044	1	DIO BKDN 6.19V 400MW
A5CR3	1910-0030	2	DIO GE
A5CR4	1910-0030		DIO GE
A5CR5	1902-0071	2	DIO BKDN 9.0V 5%
A5CR6	1902-0071		DIO BKDN 9.0V 5%
A5MC1	1820-0201	1	IC OPER AMPL
A5MC2	1820-0125	1	IC DUAL COMPARITOR
A5MC3	1820-0478	1	IC OPER AMPL
A5Q1	1854-0071		XSTR SI NPN
A5Q2			NOT ASSIGNED
A5Q3			NOT ASSIGNED
A5Q4	1854-0071		XSTR SI NPN
A5Q5	1853-0036		XSTR SI PNP
A5Q6	1854-0071		XSTR SI NPN
A5Q7	1854-0071		XSTR SI NPN
A5Q8	1854-0071		XSTR SI NPN
A5Q9	1854-0071		XSTR SI NPN
A5Q10	1853-0036		XSTR SI PNP
A5Q11	1853-0036		XSTR SI PNP
A5Q12	1853-0036		XSTR SI PNP
A5Q13	1853-0036		XSTR SI PNP
A5Q14	1854-0071		XSTR SI NPN
A5Q15	1853-0036		XSTR SI PNP
A5Q16	1854-0071		XSTR SI NPN
A5Q17	1854-0071		XSTR SI NPN
A5Q18	1853-0036		XSTR SI PNP
A5R1	2100-2522	3	R VAR 10K OHM 10% 1/2W LIN

Ref Desig	HP Part No	TQ	Description
A5R2	0757-0438		R FXD 5.11K OHM 1% 1/8W
A5R3	2100-2522		R VAR 10K OHM 10% 1/2W LIN
A5R4	0757-0280		R FXD 1K OHM 1% 1/8W
A5R5	0757-0442		R FXD 10K OHM 1% 1/8W
A5R6	0698-3260	1	R FXD 464K OHM 1% 1/8W
A5R7	0698-3158		R FXD 23.7K OHM 1% 1/8W
A5R8	0698-3158		R FXD 23.7K OHM 1% 1/8W
A5R9	0757-0442		R FXD 10K OHM 1% 1/8W
A5R10	0698-3451		R FXD 133K OHM 1% 1/8W
A5R11	0757-0420		R FXD 750 OHM 1% 1/8W
A5R12	0757-0280		R FXD 1K OHM 1% 1/8W
A5R13	0757-0439		R FXD 6.81K OHM 1% 1/8W
A5R14	0757-0280		R FXD 1K OHM 1% 1/8W
A5R15	2100-2633		R VAR 1K 10% 1/2W LIN
A5R16	0698-3155		R FXD 4.64K OHM 1% 1/8W
A5R17	0757-0280		R FXD 1K OHM 1% 1/8W
A5R18	0757-0420		R FXD 750 OHM 1% 1/8W
A5R19	0698-3155		R FXD 4.64K OHM 1% 1/8W
A5R20	0757-0440		R FXD 7.5K OHM 1% 1/8W
A5R21	0698-3155		R FXD 4.64K OHM 1% 1/8W
A5R22	0757-0279		R FXD 3.16K OHM 1% 1/8W
A5R23	0757-0398		R FXD 75 OHM 1% 1/8W
A5R24	0698-3155		R FXD 4.64K OHM 1% 1/8W
A5R25	0757-0440		R FXD 7.5K OHM 1% 1/8W
A5R26	0698-5490		R FXD 2K OHM 1% 1/8W
A5R27	0757-0279		R FXD 3.16K OHM 1% 1/8W
A5R28	0757-0280		R FXD 1K OHM 1% 1/8W
A5R29	0757-0395	9	R FXD 56.2 OHM 1% 1/8W
A5R30	0698-3155		R FXD 4.64K OHM 1% 1/8W
A5R31	0757-0395		R FXD 56.2 OHM 1% 1/8W
A5R32	0757-0280		R FXD 1K OHM 1% 1/8W
A5R33	0698-3155		R FXD 4.64K OHM 1% 1/8W
A5R34	0698-3155		R FXD 4.64K OHM 1% 1/8W
A5R35	0757-0449		R FXD 20K OHM 1% 1/8W
A5R36			NOT ASSIGNED
A5R37	0757-0438		R FXD 5.11K OHM 1% 1/8W
A5R38	0757-0449		R FXD 150K OHM 1% 1/8W
A5R39	0757-0123		R FXD 34.8K OHM 1% 1/8W
A5R40	0698-3445	3	R FXD 348 OHM 1% 1/8W
A5R41	0757-0416		R FXD 511 OHM 1% 1/8W
A5R42	0698-3150		R FXD 2.37K OHM 1% 1/8W
A5R43	0757-0397	10	R FXD 68.1 OHM 1% 1/8W
A5R44	0757-0279		R FXD 3.16K OHM 1% 1/8W
A5R45	0757-0427		R FXD 1.5K OHM 1% 1/8W
A5R46	0757-0278		R FXD 1.78K OHM 1% 1/8W
A5R47	0757-0278		R FXD 1.78K OHM 1% 1/8W
A5R48	0757-0200		R FXD 9.62K OHM 1% 1/8W
A5R49	0757-0397		R FXD 68.1 OHM 1% 1/8W
A5R50	0757-0397		R FXD 68.1 OHM 1% 1/8W
A5R51	0698-5490		R FXD 2K OHM 1% 1/8W
A5R52	0757-0442		R FXD 10K OHM 1% 1/8W

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	HP Part No	TQ	Description
A5R13	0698-0084		R FXD 2.15K OHM 1% 1/8W
A5R14	2100-3521	1	R VAR 2K OHM 10% 1/2W LIN
A5R15	0757-0427		R FXD 1.5K OHM 1% 1/8W
A5R16	0757-0442		R FXD 10K OHM 1% 1/8W
A5R17	2100-3522		R VAR 10K OHM 10% 1/2W LIN
A5R18	0757-0427	7	R FXD 200 OHM 1% 1/8W
A5R19	0698-0083	1	R FXD 9.25K OHM 1% 1/8W
A5R20	2100-2574		R VAR 500 OHM 10% 1W
A5R21	0757-0420		R FXD 750 OHM 1% 1/8W
A5R22	0757-0465		R FXD 100K OHM 1% 1/8W
A5R23	0757-0442		R FXD 10.1K OHM 1% 1/8W
A5R24	0698-3266	1	R FXD 237K OHM 1% 1/8W
A5R25	0757-0446		R FXD 15K OHM 1% 1/8W
A5R26	0698-3434	3	R FXD 14.3 OHM 1% 1/8W
A5R27	0698-3434		R FXD 14.3 OHM 1% 1/8W
A5R28	0757-0446		R FXD 15K OHM 1% 1/8W
A5R29	0757-0280		R FXD 1K OHM 1% 1/8W
A5R30	0698-3445		R FXD 340 OHM 1% 1/8W
A5R31	0757-0438		R FXD 5.11K OHM 1% 1/8W
A5R32	0761-0021	1	R FXD 1K OHM 5% 1W
A5R33	0698-3155		R FXD 4.64K OHM 1% 1/8W
A6	03702-70006	1	ASSY EXT POWER SUPPLY
	03702-3154	1	PC BD GLASS
	03702-10016	1	LABEL
A6C1	0180-0090		C FXD 100UF 20% 20VDC
A6C2			NOT ASSIGNED
A6C3	0160-0807	2	C FXD 0.01UF
	5040-0401	3	SUPPORT C
A6C4	0160-3907	2	C FXD 0.02UF 10% 3000VDC
A6C5	0160-0151	1	C FXD 470PF
	5040-0401		SUPPORT C
A6C6	0150-0036	2	C FXD 470PF
	5040-0401		SUPPORT C
A6C7	5040-0401		SUPPORT C
A6C7	0150-0036		C FXD 470PF
A6C8	0160-3907		C FXD 0.02UF 10% 3000VDC
A6C9			NOT ASSIGNED
A6C10			NOT ASSIGNED
A6C11	0160-0807		C FXD 0.01UF
A6C11	5040-0401		SUPPORT C
A6CR1	1901-0142	4	DIO SI 75VOPIV 50MA
A6CR2	1901-0142		DIO SI 75VOPIV 50MA
A6CR3	1901-0142		DIO SI 75VOPIV 50MA
A6CR4	1901-0142		DIO SI 75VOPIV 50MA
A6L1	9140-0051	1	IND FXD 400UH 5%
A6MP1	2360-0214	1	SCREW MACH 6-32X1.250 CSH
A6MP2	2420-0003	1	NUT HEX 6-32
A6MP3	3050-0016	1	WASHER FLAT NO 6
A6MP4	2260-0001	1	NUT HEX 4-40
A6MP5	2190-0004	1	WASHER LOCK HEL NO 4
A6MP6	2190-0015	1	WASHER FLAT NO 4
A6MP7	0360-0042	1	TERMINAL LUG
A6MP8	0380-0003	1	SPACER (QTY 4)
A6MP9	2360-0121	1	SCREW NO 6
A6Q1	1854-0040	2	XSTR SI NPN
A6Q2	1854-0040		XSTR SI NPN
A6R1	0698-0084	1	R FXD 100 OHM 1% 1/8W
A6R2	0698-0017	1	R FXD 1.5K OHM 5% 1/4W
A6R3	0698-0114	1	R FXD 475K OHM 1% 1/8W
A6R4	0698-0084	1	R FXD 2.15K OHM 1% 1/8W
A6R5	0698-0090	1	R FXD 1M OHM 1% 1/8W
A6R6	0698-1095	4	R FXD 1.6M OHM 5% 1W
A6R7	0698-1095		R FXD 1.6M OHM 5% 1W
A6R8	0698-1095		R FXD 1.6M OHM 5% 1W
A6R9	0698-1095		R FXD 1.6M OHM 5% 1W
A6R10	0698-0049	1	R FXD 15K OHM 5% 1/4W
A6R11	0698-0245	1	R FXD 825K OHM 5% 1/8W
A6R12	0698-0102	1	R FXD 27K OHM 5% 1/4W
A6T1	03702-7121	1	XFMR
A7	03702-7261	1	ASSY CAL RETURN LOSS
A7C1	0160-0163		C FXD 100PPF (FEEDTHRU)
A7C2	0160-0163		C FXD 100PPF (FEEDTHRU)
A7MP1	03702-331	1	60H SCREENING
A7MP2	2950-0001	1	NUT HEX 5/8-32
A7MP3	2520-0002	1	NUT HEX 10-32
A7MP4	2190-0011	1	WASHER LOCK INT NO 10
A7P1	2100-0796	1	R VAR 250 OHM 20% 1/2W LIN MET 1955 C
A7A1	03702-7260	1	ASSY RETURN LOSS AMPLIFIER
	03702-3200	1	PC BD GLASS
A7A1C1	0150-0093		C FXD 0.01UF +80-10% 100VDC
A7A1C2	0180-0155		C FXD 2.2UF 20% 20VDC
A7A1C3	0180-0155		C FXD 2.2UF 20% 20VDC
A7A1C4	0150-0093		C FXD 0.01UF +80-10% 100VDC
A7A1C5	0180-0155		C FXD 2.2UF 20% 20VDC
A7A1C6	0180-0155		C FXD 2.2UF 20% 20VDC
A7A1C7	0180-0155		C FXD 2.2UF 20% 20VDC
A7A1C8	0180-0155		C FXD 2.2UF 20% 20VDC
A7A1C9	0180-0155		C FXD 2.2UF 20% 20VDC
A7A1J1	1250-0932	33	CONN COAX PC BD PTG CONNEX
A7A1J2	1250-0932		CONN COAX PC BD PTG CONNEX
A7A1Q1	1854-0092	20	XSTR SI NPN
A7A1Q2	1854-0092		XSTR SI NPN
A7A1Q3	1854-0092		XSTR SI NPN
A7A1Q4	1854-0092		XSTR SI NPN
A7A1Q5	1854-0092		XSTR SI NPN

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	HP Part No	TQ	Description
A7A1R1	0757-0400	1	R FXD 90.9 OHM 1% 1/8W
A7A1R2	0698-3442		R FXD 237 OHM 1% 1/8W
A7A1R3	0757-0274		R FXD 1.21K OHM 1% 1/8W
A7A1R4	0698-0084		R FXD 2.15K OHM 1% 1/8W
A7A1R5	0698-3155		R FXD 4.64K OHM 1% 1/8W
A7A1R6	0698-0085		R FXD 2.61K OHM 1% 1/8W
A7A1R7	0757-0438		R FXD 6.81K OHM 1% 1/8W
A7A1R8	0698-3447	2	R FXD 422 OHM 1% 1/8W
A7A1R9	0698-0084		R FXD 2.15K OHM 1% 1/8W
A7A1R10	0698-0084		R FXD 2.15K OHM 1% 1/8W
A7A1R11	0698-3155		R FXD 4.64K OHM 1% 1/8W
A7A1R12	0757-0278		R FXD 1.78K OHM 1% 1/8W
A7A1R13	0757-0397		R FXD 68.1 OHM 1% 1/8W
A7A1R14	0698-4037		R FXD 46.4 OHM 1% 1/8W
A7A1R15	0698-4037		R FXD 46.4 OHM 1% 1/8W
A7A1R16	0698-4037		R FXD 46.4 OHM 1% 1/8W
A7A1R17	0698-4037		R FXD 46.4 OHM 1% 1/8W
A7A1R18	0698-4037		R FXD 46.4 OHM 1% 1/8W
A1C	03702-7163	1	ASSY EXTERNAL INPUT AMPLIFIER
	03702-3163	1	PC BD BLANK
A1CC1	0160-0128	2	C FXD 2.2UF
A1CC2	0180-0155		C FXD 2.2UF 20% 20WVDC
A1CR1	1901-0040		DIO SI
A1CJ1	1250-0932		CONN COAX PC BD MTG CONNEX
A1CJ2	1250-0932		CONN COAX PC BD MTG CONNEX
A1CJ3	1250-0932		CONN COAX PC BD MTG CONNEX
A1CR1	1826-0082	1	IC OPER AMPL
A1CQ1	1855-0062	1	XSTR FET N-CHANNEL
A1CR1	0757-0283	3	R FXD 2K OHM 1% 1/8W
A1CR2	0757-0461		R FXD 68.1K OHM 1% 1/8W
A1CR3	0757-0442		R FXD 10K OHM 1% 1/8W
A1CR4	0757-0443	2	R FXD 16.2K OHM 1% 1/8W
A1CR5	0698-3152		R FXD 3.44K OHM 1% 1/8W
A1CR6	0757-0465		R FXD 100K OHM 1% 1/8W
A1CR7	0757-0449		R FXD 20K OHM 1% 1/8W
A11	03702-7177	1	ASSY MARKER COMB GENERATOR
	03702-3177	1	PC BD BLANK
A11C1	0121-0046	2	C VAR 9-35PF
A11C2	0140-0198		C FXD 200PF 5% 300WVDC
A11C3	0160-0640	4	C FXD 10PF 5% 300VDC
A11C4	0140-0192	2	C FXD 68PF 5% 300WVDC
A11C5	0180-0155		C FXD 2.2UF 10% 35WVDC
A11C6	0180-0155		C FXD 2.2UF 10% 35WVDC
A11C7	0180-0155		C FXD 2.2UF 10% 35WVDC
A11C8	0180-0155		C FXD 2.2UF 10% 35WVDC
A11J1	1250-0932		CONN COAX PC BD MTG CONNEX

Ref Desig	HP Part No	TQ	Description
A11J1	9100-1641	2	IND FXD 240UH
A11J2	9100-1641		IND FXD 240UH
A11Q1	1854-0019		XSTR SI NPN
A11Q2	1854-0019		XSTR SI NPN
A11Q3	1853-0034	5	XSTR SI PNP
A11Q4	1854-0019		XSTR SI NPN
A11R1	0757-0278		R FXD 1.78K OHM 1% 1/8W
A11R2	0698-3150		R FXD 2.37K OHM 1% 1/8W
A11R3	0757-0280		R FXD 1K OHM 1% 1/8W
A11R4	0698-3443		R FXD 287 OHM 1% 1/8W
A11R5	0757-0279		R FXD 2.16K OHM 1% 1/8W
A11R6	0757-0442		R FXD 10K OHM 1% 1/8W
A11R7	0698-3443		R FXD 287 OHM 1% 1/8W
A11R8	0698-3443		R FXD 287 OHM 1% 1/8W
A11R9	0698-3443		R FXD 287 OHM 1% 1/8W
A11R10			NOT ASSIGNED
A11R11			NOT ASSIGNED
A11R12	0757-0394	3	R FXD 51.1 OHM 1% 1/8W
A11R13	0757-0180		R FXD 31.6 OHM 1% 1/8W
A11Y1	0410-0409	1	XTAL QUARTZ 2MHZ
	1200-0444	1	XTAL HOLDER HORIZONTAL
A12	03702-7210	1	ASSY POWER SUPPLY RECTIFIERS
	03701-3210	1	PC BD BLANK
A12CR1	1901-0494	1	DIO SI
A12CR2	1901-0416	12	DIO SI 200PIV 3A
A12CR3	1901-0416		DIO SI 200PIV 3A
A12CR4	1901-0416		DIO SI 200PIV 3A
A12CR5	1901-0416		DIO SI 200PIV 3A
A12CR6	1901-0416		DIO SI 200PIV 3A
A12CR7	1901-0416		DIO SI 200PIV 3A
A12CR8	1901-0416		DIO SI 200PIV 3A
A12CR9	1901-0416		DIO SI 200PIV 3A
A12CR10	1901-0416		DIO SI 200PIV 3A
A12CR11	1901-0416		DIO SI 200PIV 3A
A12CR12	1901-0416		DIO SI 200PIV 3A
A12CR13	1901-0416		DIO SI 200PIV 3A
A12R1	0757-0853	1	R FXD 51.1K OHM 1% 1/8W
A12R2	0757-0446		R FXD 15K OHM 1% 1/8W
A12R3	0757-0446		R FXD 15K OHM 1% 1/8W
A12R4	0698-3687	1	R FXD 16 OHM 5% 1W
A12R5	0698-3160		R FXD 31.6K OHM 1% 1/8W
A12R6	0812-0018	1	R FXD 100 OHM 5% 5W
A13	03702-7191	1	ASSY 9B ATTENUATOR
	03702-3191	1	PC BD BLANK
A13A1J1	1250-0932		CONN COAX PC BD MTG CONNEX
A13A1J2	1250-0932		CONN COAX PC BD MTG CONNEX

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	HP Part No	TQ	Description
A13A1S1	3101-0679	1	SW ASSY PRINT 2P3T
	03702-329	1	KNOB DIAL VOLTS DB ATTENUATOR
A13A1S2	3101-0676	1	SW ASSY PRINT 2P4T
	03716-10021	1	KNOB DIAL UNITS DB ATTENUATOR
A13A1Z1	0960-0119	1	ATTEN PAD 10DB 0.25W
A13A1Z2	0960-0120	1	ATTEN PAD 20DB 0.25W
A13A1Z3	0960-0121	1	ATTEN PAD 30DB 0.25W
A13A1Z4	0960-0122	1	ATTEN PAD 40DB 0.25W
A13A1Z5	0960-0123	1	ATTEN PAD 50DB 0.25W
A13A1Z6	0960-0124	1	ATTEN PAD 60DB 0.25W
A13A1Z7	0960-0125	1	ATTEN PAD 70DB 0.25W
A13A1Z8	0960-0126	1	ATTEN PAD 80DB 0.25W
A13A1Z9	0960-0127	1	ATTEN PAD 90DB 0.25W
A13A1Z10	0960-0128	1	ATTEN PAD 100DB 0.25W
A13A1Z11			NOT ASSIGNED
A13A1Z12	0960-0129	1	ATTEN PAD 200DB 0.25W
A13A1Z13	0960-0130	1	ATTEN PAD 300DB 0.250W
	03716-10016	2	SHIELD
	03716-10016		SHIELD
A14	03702-7314	1	ASSY IF ATTENUATOR
	03702-10092	1	LABEL
A14MP1			NOT ASSIGNED
A14MP2			NOT ASSIGNED
A14MP3	03702-3201	1	BOX SCREENING
A14MP4	03702-329	2	SPACER CAPTIVE
	03702-329		SPACER CAPTIVE
A14MP5	2200-0048	1	SCR 4-40NI1/2 W/LOCK (QTY=2)
A14MP6	0520-0017	1	SCR 2.56X3/16 (QTY 4)
A14MP7	2190-0112	1	WASHER LOCK (QTY 4)
A14MP8	5040-3008	1	KNOB PUSH 4-GREY NUMERAL 1
A14MP9	5040-3009	1	KNOB PUSH 4-GREY NUMERAL 2
A14MP10	5040-3011	1	KNOB PUSH 4-GREY NUMERAL 4
A14MP11	5040-3013	1	KNOB PUSH 4-GREY NUMERAL 8
A14MP12	5040-3015	1	KNOB PUSH 4-GREY NUMERAL 16
A14R1	03704-7317	1	ASSY RESISTOR
	03730-30008	1	PC BD BLANK
A14A1R1	0698-7017	2	R FXD 1.305K OHM 0.5% 1/4W
A14A1R2	0698-7028	1	R FXD 8.6 OHM 0.5% 1/4W
A14A1R3	0698-7017		R FXD 1.305K 0.5% 1/4W
A14A1R4	0698-7015	2	R FXD 654 OHM 0.5% 1/4W
A14A1R5	0698-7002	1	R FXD 17.4 OHM 0.5% 1/4W
A14A1R6	0698-7015		R FXD 654 OHM 0.5% 1/4W
A14A1R7	0698-7445	2	R FXD 332 OHM 0.5% 1/4W
A14A1R8	0698-7434	1	R FXD 26 OHM 0.5% 1/4W
A14A1R9	0698-7445		R FXD 332 OHM 0.5% 1/4W
A14A1R10	0698-7441	2	R FXD 174 OHM 0.5% 1/4W
A14A1R11	0698-7438	1	R FXD 79.3 OHM 0.5% 1/4W
A14A1R12	0698-7441		R FXD 174 OHM 0.5% 1/4W
A14A1R13	0698-7468	2	R FXD 103.1 OHM 0.5% 1/4W

Ref Desig	HP Part No	TQ	Description
A14A1R14	0698-7479	1	R FXD 238.6 OHM 0.5% 1/4W
A14A1R15	0698-7468		R FXD 103.1 OHM 0.5% 1/4W
A14A1S1	3101-0609	1	SW ASSY 5 INDEPENDENT PUSHBUTTON
A14A1W929	03702-701	1	ASSY COAX CBL RED/WHT
	1250-1407	1	CONN COAX CBL MTG CONNEX
	1250-0077	1	CONN
A14A1W930	03702-7263	1	ASSY COAX CBL GRA/BLK
	1250-0610		CONN COAX GND MTG BNC 75 OHM
	03702-343	1	CONN
A15	03702-7204	1	ASSY RB+SWEEP SPLITTER
	03702-3204	1	PC BD BLANK
A15C1	0160-3740		C FXD 0.22UF 5% 100WVDC
A15C2	0160-3740		C FXD 0.22UF 5% 100WVDC
A15C3	0180-0155		C FXD 2.2UF 10% 35WVDC
A15C4	0180-0155		C FXD 2.2UF 10% 35WVDC
A15C5	0160-0127		C FXD 1UF 20% 25WVDC
A15C6	0180-0228		C FXD 22UF 10% 15WVDC
A15C7	0160-0174		C FXD 0.47UF +80-20% 25WVDC
A15C8	0160-0174		C FXD 0.47UF +80-20% 25WVDC
A15C9	0180-0155		C FXD 2.2UF
A15C10	0180-0155		C FXD 2.2UF
A15CR1			NOT ASSIGNED
A15CR2			NOT ASSIGNED
A15J1	1250-0932		CONN COAX PC BD MTG CONNFX
A15J2	1250-0932		CONN COAX PC BD MTG CONNEX
A15J3	1250-0932		CONN COAX PC BD MTG CONNEX
A15L1	9100-1650	1	IND FXD 680UH 5%
A15L2	03710-7042	1	IND FXD 2MH 5%
A15Q1	1854-0019		XSTR SI NPN
A15Q2	1854-0071		XSTR SI NPN
A15Q3	1854-0071		XSTR SI NPN
A15Q4	1855-0020		XSTR FET N-CHANNEL
A15R1	0757-0398		R FXD 75 OHM 1% 1/8W
A15R2	0757-0398		R FXD 75 OHM 1% 1/8W
A15R3	0757-0416		R FXD 511 OHM 1% 1/8W
A15R4	0698-3434		R FXD 34.8 OHM 1% 1/8W
A15R5	0698-3429	1	R FXD 19.6 OHM 1% 1/8W
A15R6	0698-3432	1	R FXD 26.1 OHM 1% 1/8W
A15R7	0757-0442		R FXD 10K OHM 1% 1/8W
A15R8	0757-0274		R FXD 1.21K OHM 1% 1/8W
A15R9	0757-0274		R FXD 1.21K OHM 1% 1/8W
A15R10	0757-0439		R FXD 6.81K OHM 1% 1/8W
A15R11	0757-0440		R FXD 7.5K OHM 1% 1/8W
A15R12	0757-0482		R FXD 511K OHM 1% 1/8W
A15R13	0757-0403		R FXD 121 OHM 1% 1/8W
A15R14	0757-0403		R FXD 121 OHM 1% 1/8W
A20	03702-7175	1	ASSY RETURN LOSS MIXER

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	HP Part No	TQ	Description
	03702-3175	1	PC BD BLANK
A20C1	0150-0049		C FXD 1000PF +80 -20% 100WVDC
A20C2	0150-0050		C FXD 1000PF +80 -20% 100WVDC
A20C3	0121-0047	2	C VAR 1.4-9PF 50WVDC
A20C4	0150-0050		C FXD 1000PF +80 -20% 100WVDC
A20C5	0150-0050		C FXD 1000PF +80 -20% 100WVDC
A20C6	0160-2209	3	C FXD 43PF 5% 300WVDC
A20C7	0160-2259	2	C FXD 12PF 5% 500WVDC
A20C8	0160-2253	2	C FXD 6.8PF 5% 500WVDC
A20C9	0160-2209		C FXD 43PF 5% 300WVDC
A20C10	0160-2253		C FXD 6.8PF 5% 500WVDC
A20C11	0160-2259		C FXD 12PF 5% 500WVDC
A20C12	0160-2209		C FXD 43PF 5% 300WVDC
A20C13	0160-0155		C FXD 2.2UF 20% 20WVDC
A20C14	0160-0155		C FXD 2.2UF 20% 20WVDC
A20C15	0160-0155		C FXD 2.2UF 20% 20WVDC
A20C16	0160-0155		C FXD 2.2UF 20% 20WVDC
A20CR1	1901-0347	23	DIO HOT CARRIER
A20CR2	1901-0347		DIO HOT CARRIER
A20CR3	1901-0347		DIO HOT CARRIER
A20CR4	1901-0347		DIO HOT CARRIER
A20J1	1250-0932		CONN COAX PC RD PTG CONNEX
A20J2	1250-0932		CONN COAX PC RD PTG CONNEX
A20J3	1250-0932		CONN COAX PC RD PTG CONNEX
A20L1	03702-737	3	IND VAR
A20L2	03702-737		IND VAR
A20L3	03702-737		IND VAR
A20Q1	1854-0092		XSTR SI NPN
A20Q2	1854-0092		XSTR SI NPN
A20Q3	1854-0092		XSTR SI NPN
A20Q4	1854-0092		XSTR SI NPN
A20R1	0757-0180		R FXD 31.6 OHM 1% 1/8W
A20R2	0757-0397		R FXD 68.1 OHM 1% 1/8W
A20R3	0757-0401		R FXD 100 OHM 1% 1/8W
A20R4	0757-0274		R FXD 1.21K OHM 1% 1/8W
A20R5	0698-0084		R FXD 2.15K OHM 1% 1/8W
A20R6	0757-0417		R FXD 562 OHM 1% 1/8W
A20R7	0698-3155		R FXD 4.64K OHM 1% 1/8W
A20R8	0698-0085		R FXD 2.61K OHM 1% 1/8W
A20R9	0757-0398		R FXD 75 OHM 1% 1/8W
A20R10	0757-0442		R FXD 10K OHM 1% 1/8W
A20R11	0757-0398		R FXD 75 OHM 1% 1/8W
A20R12	0698-3439	4	R FXD 178 OHM 1% 1/8W
A20R13	0757-0274		R FXD 1.21K OHM 1% 1/8W
A20R14	0698-0084		R FXD 2.15K OHM 1% 1/8W
A20R15	0698-3155		R FXD 4.64K OHM 1% 1/8W
A20R16	0757-0279		R FXD 3.16K OHM 1% 1/8W
A20R17	0757-0397		R FXD 68.1 OHM 1% 1/8W
A20R18	0698-4037		R FXD 46.4 OHM 1% 1/8W
A20R19	0698-4037		R FXD 46.4 OHM 1% 1/8W
A20R20	0698-4037		R FXD 46.4 OHM 1% 1/8W
A20R21	0698-4037		R FXD 46.4 OHM 1% 1/8W
A20T1	03702-736	3	XFMR
A20T2	03702-736		XFMR

Ref Desig	HP Part No	TQ	Description
A21	03702-7172	1	ASSY 8B AMPLIFIER
	03702-3172	1	PC BD BLANK
A21C1	0160-3735	2	C FXD 0.33UF 5% 50WVDC
A21C2	0160-3735		C FXD 0.33UF 5% 50WVDC
A21C3	0140-C196	3	C FXD 150PF 5% 300WVDC
A21C4	0140-0196		C FXD 150PF 5% 300WVDC
A21C5	0160-2144		C FXD 0.02UF +80-20% 100WVDC
A21C6	0180-0374		C FXD 10UF 10% 20WVDC
A21C7	0180-0155		C FXD 2.2UF 20% 20WVDC
A21C8	0160-0174		C FXD 0.47UF +80-20% 25WVDC
A21C9	0160-4001		C FXD 0.047UF
A21C10	0180-0155		C FXD 2.2UF 20% 20WVDC
A21C11	0150-0121		C FXD 0.1UF +80-20% 50WVDC
A21C12	0121-0046		C VAR 4-35PF
A21C13	0160-4001		C FXD 0.047UF
A21C14	0180-1735	1	C FXD 0.22UF
A21C15	0150-0049		C FXD C.01UF +80-10% 100WVDC
A21C16	0180-0376	1	C FXD 0.47UF 10% 35WVDC
A21C17	0160-4001		C FXD 0.047UF
A21C18	0180-0155		C FXD 2.2UF 20% 20WVDC
A21C19	0180-0155		C FXD 2.2UF 20% 20WVDC
A21C20	0180-0155		C FXD 2.2UF 20% 20WVDC
A21C21	0160-4001		C FXD 0.047UF
A21C22	0180-0155		C FXD 2.2UF 20% 20WVDC
A21C23	0180-0155		C FXD 2.2UF 20% 20WVDC
A21C24	0180-0155		C FXD 2.2UF 20% 20WVDC
A21C25	0180-0155		C FXD 2.2UF
A21C26	0160-0128		C FXD 2.2UF
A21C27	0160-0155		C FXD 2.2UF 20% 20WVDC
A21C28	0180-0155		C FXD 2.2UF 20% 20WVDC
A21C29	0180-0155		C FXD 2.2UF 20% 20WVDC
A21C30	0160-2241	1	C FXD 2.2PF
A21CR1	1901-0047	6	DIO SI
A21CR2	1901-0047		DIO SI
A21CR3	1901-0047		DIO SI
A21CR4	1901-0047		DIO SI
A21CR5	1901-0047		DIO SI
A21CR6	1901-0047		DIO SI
A21CR7	1902-3139		DIO BKDN 8.25V 5% 4OMW
A21CR8	1902-3102		DIO BKDN 12.1V 5% 4OOMW
A21CR9	1902-3102		DIO BKDN 12.1V 5% 4OOMW
A21CR10	1902-0626	1	DIO BKDN 13V 5% 4OOMW
A21J1	1250-0932		CONN COAX PC RD PTG CONNEX
A21J2	1250-0932		CONN COAX PC RD PTG CONNEX

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	HP Part No	TQ	Description
A21L1	9100-1652	1	IND FXD 820UH 5%
A21L2	03702-7401	1	IND VAR
A21L3	9140-0137	1	IND FXD 1MH 5%
A21Q1	1854-0819		XSTR SI NPN
A21Q2	1854-0092		XSTR SI NPN
A21Q3	1854-0092		XSTR SI NPN
A21Q4	1854-0092		XSTR SI NPN
A21Q5	1854-0092		XSTR SI NPN
A21Q6	1854-0092		XSTR SI NPN
A21Q7	1854-0092		XSTR SI NPN
A21Q8	1854-0071		XSTR SI NPN
A21Q9	1854-0071		XSTR SI NPN
A21Q10	1953-0034		XSTR SI PNP
A21Q11	1854-0022		XSTR SI NPN
A21R1	0757-0381	2	R FXD 15 OHM 1% 1/8W
A21R2	0698-3439		R FXD 178 OHM 1% 1/8W
A21R3	0757-0381		R FXD 15 OHM 1% 1/8W
A21R4	0757-0398		R FXD 75 OHM 1% 1/8W
A21R5	0757-0279		R FXD 3.16K OHM 1% 1/8W
A21R6	0757-0344		R FXD 51.1 OHM 1% 1/8W
A21R7	0757-0439		R FXD 6.81K OHM 1% 1/8W
A21R8	0757-0200		R FXD 5.62K OHM 1% 1/8W
A21R9	0757-0274		R FXD 1.21K OHM 1% 1/8W
A21R10	0757-0279		R FXD 3.16K OHM 1% 1/8W
A21R11	0757-0279		R FXD 3.16K OHM 1% 1/8W
A21R12	0757-0407		R FXD 200 OHM 1% 1/8W
A21R13	0757-0407		R FXD 200 OHM 1% 1/8W
A21R14	0698-0084		R FXD 2.15K OHM 1% 1/8W
A21R15	0698-3154	1	R FXD 4.22K OHM 1% 1/8W
A21R16	0698-3155		R FXD 4.64K OHM 1% 1/8W
A21R17	0757-0278		R FXD 1.78K OHM 1% 1/8W
A21R18	0757-0240		R FXD 1K OHM 1% 1/8W
A21R19	0698-3444		R FXD 316 OHM 1% 1/8W
A21R20	0757-0290	7	R FXD 6.19K OHM 1% 1/8W
A21R21	0757-0274		R FXD 1.21K OHM 1% 1/8W
A21R22	0757-0279		R FXD 3.16K OHM 1% 1/8W
A21R23	0757-0280		R FXD 1K OHM 1% 1/8W
A21R24	0757-0427		R FXD 1.5K OHM 1% 1/8W
A21R25	0757-0290		R FXD 1K OHM 1% 1/8W
A21R26	0757-0419		R FXD 681 OHM 1% 1/8W
A21R27	0757-0199		R FXD 21.5K OHM 1% 1/8W
A21R28	0757-0290		R FXD 6.19K OHM 1% 1/8W
A21R29	0757-0199		R FXD 21.5K OHM 1% 1/8W
A21R30	0698-0082	2	R FXD 464 OHM 1% 1/8W
A21R31	0757-0732	2	R FXD 909 OHM 1% 1/4W
A21R32	0757-0732		R FXD 909 OHM 1% 1/4W
A21R33	0698-3445		R FXD 348 OHM 1% 1/8W
A21R34	0757-0279		R FXD 3.16K OHM 1% 1/8W
A21R35	0757-0405	1	R FXD 162 OHM 1% 1/8W
A21R36	0757-0728	2	R FXD 619 OHM 1% 1/4W
A21R37	0698-3443		R FXD 287 OHM 1% 1/8W
A21R38	0698-3439		R FXD 178 OHM 1% 1/8W
A21R39	0757-0728		R FXD 619 OHM 1% 1/4W
A21R40	0698-0082		R FXD 464 OHM 1% 1/8W
A21R41	0698-5490		R FXD 2K OHM 1% 1/8W
A21R42	0698-3155		R FXD 4.64K OHM 1% 1/8W
A21R43			NOT ASSIGNED
A21R44	0698-4037		R FXD 46.4 OHM 1% 1/8W
A21R45	0698-4037		R FXD 46.4 OHM 1% 1/8W
A21R46	0698-4037		R FXD 46.4 OHM 1% 1/8W
A21R47	0698-4037		R FXD 46.4 OHM 1% 1/8W
A21R48	0698-4037		R FXD 46.4 OHM 1% 1/8W
A21R49	0698-4037		R FXD 46.4 OHM 1% 1/8W
A21R50	0698-4037		R FXD 46.4 OHM 1% 1/8W
A21R51	0698-3155		R FXD 4.64K OHM 1% 1/8W
A22	03702-7212	1	ASSY IF AMPLIFIER & DETECTOR
	03702-3212	1	PC BD BLANK
A22C1	0150-0050		C FXD 1000PF
A22C2	0160-0662	4	C FXD 51PF 5% 30WVDC
A22C3	0150-0050		C FXD 1000PF +80 -20% 1000WVDC
A22C4	0180-0155		C FXD 2.2UF 20% 20WVDC
A22C5	0180-1940		C FXD 330UF 10% 15WVDC
A22C6	0180-0155		C FXD 2.2UF 20% 20WVDC
A22C7	0160-0662		C FXD 51PF 5% 30WVDC
A22C8	0150-0050		C FXD 1000PF +80 -20% 1000WVDC
A22C9	0150-0093		C FXD 0.01UF
A22C10	0150-0050		C FXD 1000PF +80 -20% 1000WVDC
A22C11	0150-0050		C FXD 1000PF +80 -20% 1000WVDC
A22C12	0180-0155		C FXD 2.2UF 20% 20WVDC
A22C13	0150-0050		C FXD 1000PF +80 -20% 1000WVDC
A22C14	0150-0050		C FXD 1000PF +80 -20% 1000WVDC
A22C15	0180-0155		C FXD 2.2UF 20% 20WVDC
A22C16	0150-0050		C FXD 1000PF +80 -20% 1000WVDC
A22C17	0150-0050		C FXD 1000PF +80 -20% 1000WVDC
A22C18	0180-0155		C FXD 2.2UF 20% 20WVDC
A22C19	0150-0050		C FXD 1000PF +80 -20% 1000WVDC
A22C20	0150-0093		C FXD 0.01UF
A22C21	0180-0155		C FXD 2.2UF 20% 20WVDC
A22C22	0150-0050		C FXD 1000PF +80 -20% 1000WVDC
A22C23	0150-0050		C FXD 1000PF +80 -20% 1000WVDC
A22C24	0150-0050		C FXD 1000PF +80 -20% 1000WVDC
A22C25	0150-0050		C FXD 1000PF +80 -20% 1000WVDC
A22C26	0150-0093		C FXD 0.01UF +80-10% 100WVDC
A22C27	0121-0602		C VAR 1.4-9PF 50WVDC
A22C28	0160-0643	1	C FXD 68PF 5% 30WVDC
A22C29	0180-0155		C FXD 2.2UF 20% 20WVDC
A22C30	0180-0155		C FXD 2.2UF 20% 20WVDC
A22C31	0180-0155		C FXD 2.2UF 20% 20WVDC
A22C32	0180-0155		C FXD 2.2UF 20% 20WVDC
A22C33	0180-0155		C FXD 2.2UF 20% 20WVDC

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	HP Part No	TQ	Description
A22C36	0180-0155		C FXD 2.2UF
A22C37	1901-1147		DIO MBT CARRIER
A22C38	1901-0040		DIO SI
A22C39	1901-0147		DIO MBT CARRIER
A22C40	1902-1244	1	DIO SCHOTTKY 10V 5% 4000MA
A22J1	1250-0912		CONN COAX PC RT ANG CONNEC
A22J2	1250-0912		CONN COAX PC RT ANG CONNEC
A22J3	1250-0912		CONN COAX PC RT ANG CONNEC
A22L1	9170-726	3	IND VAR
A22L2	9140-0144	3	IND FXD 4.7UH 10%
A22L3	9140-0144		IND FXD 4.7UH 10%
A22L4	03702-725	1	IND VAR
A22L5	13701-730	1	IND VAR
A22Q1	1854-0071		XSTR SI NPN
A22Q2	1854-0071		XSTR SI NPN
A22Q3	1854-0325	1	XSTR SI NPN
A22Q4	1854-0233	6	XSTR SI NPN
	1205-0002	4	HEAT DISSIPATOR XSTR
A22Q5	1854-0233		XSTR SI NPN
	1205-0002		HEAT DISSIPATOR XSTR
A22Q6	1854-0233		XSTR SI NPN
	1205-0002		HEAT DISSIPATOR XSTR
A22Q7	1854-0215		XSTR SI NPN
	1205-0002		HEAT DISSIPATOR XSTR
A22Q8	1854-0092		XSTR SI NPN
A22R1	0698-0084		R FXD 2.14K OHM 1% 1/8W
A22R2	0757-0442		R FXD 10K OHM 1% 1/8W
A22R3	0757-0442		R FXD 10K OHM 1% 1/8W
A22R4	0757-0469		R FXD 150K OHM 1% 1/8W
A22R5	0757-0469		R FXD 150K OHM 1% 1/8W
A22R6	0757-0279		R FXD 3.16K OHM 1% 1/8W
A22R7	0757-0279		R FXD 3.16K OHM 1% 1/8W
A22R8	0698-3444		R FXD 316 OHM 1% 1/8W
A22R9	0698-3444		R FXD 316 OHM 1% 1/8W
A22R10	0757-0289	1	R FXD 13.3K OHM 1% 1/8W
A22R11	0757-0469		R FXD 150K OHM 1% 1/8W
A22R12	0757-0469		R FXD 150K OHM 1% 1/8W
A22R13	0757-0442		R FXD 10K OHM 1% 1/8W
A22R14	0757-0442		R FXD 10K OHM 1% 1/8W
A22R15	0757-0398		R FXD 75 OHM 1% 1/8W
A22R16	0757-0280		R FXD 1K OHM 1% 1/8W
A22R17	0757-0424		R FXD 1.1K OHM 1% 1/8W
A22R18	0757-0418	2	R FXD 619 OHM 1% 1/8W
A22R19	0698-3444		R FXD 316 OHM 1% 1/8W
A22R20	0757-0419		R FXD 681 OHM 1% 1/8W
A22R21	0698-3444		R FXD 316 OHM 1% 1/8W
A22R22	0698-3430	15	R FXD 71.5 OHM 1% 1/8W
A22R23	0757-0402	1	R FXD 110 OHM 1% 1/8W
A22R24	0757-0417		R FXD 562 OHM 1% 1/8W
A22R25	0698-3441	3	R FXD 215 OHM 1% 1/8W
A22R26	0698-3132		R FXD 261 OHM 1% 1/8W
A22R27	0757-0423		R FXD 121 OHM 1% 1/8W
A22R28	0698-3315	1	R FXD 330 OHM 5% 1W
A22R29	0698-3430		R FXD 71.5 OHM 1% 1/8W
A22R30	0698-3204	1	R FXD 174 OHM 1% 1/4W
A22R31	0757-0294	1	R FXD 150 OHM 1% 1/8W
A22R32	0698-2215	1	R FXD 220 OHM 5% 1W
A22R33	0698-3430		R FXD 71.5 OHM 1% 1/8W
A22R34	0757-0431	1	R FXD 150 OHM 1% 1/2W
A22R35	0698-3443		R FXD 287 OHM 1% 1/8W
A22R36	0757-0199		R FXD 21.5K OHM 1% 1/8W
A22R37	0757-0280		R FXD 1K OHM 1% 1/8W
A22R38	0757-0282	1	R FXD 221 OHM 1% 1/8W
A22R39	0757-0180		R FXD 31.6 OHM 1% 1/8W
A22R40	0757-0347		R FXD 68.1 OHM 1% 1/8W
A22R41	0757-0180		R FXD 31.6 OHM 1% 1/8W
A22R42	0698-3430		R FXD 71.5 OHM 1% 1/8W
A22R43	0698-3430		R FXD 71.5 OHM 1% 1/8W
A22R44	0757-0180		R FXD 31.6 OHM 1% 1/8W
A22R45	0698-3430		R FXD 71.5 OHM 1% 1/8W
A22R46	0698-3441		R FXD 215 OHM 1% 1/8W
A22T1	03701-735	6	XFMR
A22T2	03701-735		XFMR
A22T3	03701-735		XFMR
A22T4	03701-735		XFMR
A22T5	03701-735		XFMR
A22T6	03701-735		XFMR
A23	03702-70002	1	ASSY IF MIXER & LOCAL OSCILLATOR
	03702-30002	1	PC BD BLANK
A23C1	0140-0195	2	C FXD 130PF 5% 300WVDC
A23C2	0140-0195		C FXD 130PF 5% 300WVDC
A23C3	0140-0197	1	C FXD 180PF
A23C4	0160-0174		C FXD 0.047UF
A23C5	0160-2199		C FXD 3CPF
A23C6	0180-0097		C FXD 47UF
A23C7	0150-0050		C FXD 1000PF
A23C8	0150-0093		C FXD 0.01UF
A23C9	0150-0093		C FXD 0.01UF
A23C10	0150-0050		C FXD 1000PF
A23C11	0150-0050		C FXD 1000PF
A23C12	0150-0050		C FXD 1000PF
A23C13	0150-0050		C FXD 1000PF
A23C14	0150-0050		C FXD 1000PF
A23C15	0150-0050		C FXD 1000PF
A23C16	0150-0050		C FXD 1000PF
A23C17	0150-0050		C FXD 1000PF
A23C18	0150-0050		C FXD 1000PF
A23C19	0160-C627		C FXD 1UF
A23C20	0160-3534	2	C FXD 510PF
A23C21	0160-2206	3	C FXD 160PF

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	MFR Part No.	TQ	Description
A23C22	0160-2204		C FXD 100PF
A23C23	0160-2204		C FXD 100PF
A23C24	0160-3934		C FXD 910PF
A23C25			NOT ASSIGNED
A23C26			NOT ASSIGNED
A23C27	0160-2204		C FXD 100PF
A23C28	0160-2204		C FXD 100PF
A23C29	0150-0193	3	C FXD 0.01UF
A23C30	0150-0093		C FXD 0.01UF
A23C31	0150-0193		C FXD 0.01UF
A23C32	0140-0193	4	C FXD 82PF
A23C33	0140-0195		C FXD 82PF
A23C34	0150-0050		C FXD 1000PF
A23C35	0180-0155		C FXD 2.2UF
A23C36	0180-0155		C FXD 2.2UF
A23C81	1901-0518	2	DIO HOT CARRIER
A23C82	1901-0518		DIO HOT CARRIER
A23C83	0127-0602	1	C VOLT VAR
A23C84	1902-0041	1	DIO BRDG 5.11V
A23C85	1901-0545	1	DIO SI SCHOTTKY BARRIER PATCHED QUAD
A23J1	1250-0932		CONN COAX PC RE PTG CONNEX
A23J2	1250-0932		CONN COAX PC RE PTG CONNEX
A23J3	1250-0932		CONN COAX PC RE PTG CONNEX
A23J4	1250-0932		CONN COAX PC RE PTG CONNEX
A23J5	1250-0932		CONN COAX PC RE PTG CONNEX
A23J6	125C-0932		CONN COAX PC RE PTG CONNEX
A23L1	03701-739	1	IND VAR
A23L2	9100-1651	1	IND FXD 750UH
A23L3	03702-7328	2	IND VAR
A23L4	03702-7329	3	IND VAR
A23L5	03702-7329		IND VAR
A23L6	03702-7329		IND VAR
A23L7	03702-7328		IND VAR
A23L9	03702-7330	1	IND VAR
A23L9	03702-7331	1	IND VAR
A23L10	03702-7300	1	IND VAR
A23MC1	1820-0477		IC OPER AMPL
A23MC2	1820-1051	1	IC OPER AMPL
A23Q1	1854-0071		XSTR SI NPN
A23Q2	1854-0073	6	XSTR SI NPN
A23Q3	1854-0073		XSTR SI NPN
A23Q4	1854-0293		XSTR SI NPN
A23Q5	1854-0215		XSTR SI NPN
A23Q6	1854-0073		XSTR SI NPN
A23Q7	1854-0073		XSTR SI NPN
A23Q8	1854-0073		XSTR SI NPN
A23R1	0757-0442		R FXD 10K OHM 1% 1/8W
A23R2	0757-0446		R FXD 15K OHM 1% 1/8W
A23R3	0757-0446		R FXD 15K OHM 1% 1/8W

Ref Desig	MFR Part No.	TQ	Description
A23R4	0698-4477	1	R FXD 10.5K OHM 1% 1/8W
A23R5	0757-0439		R FXD 6.81K OHM 1% 1/8W
A23R6	2100-2991	1	R VAR 25K OHM 10% 1/2W
A23R7	0757-0739		R FXD 2K OHM 1% 1/8W
A23R8	0757-0449		R FXD 20K OHM 1% 1/8W
A23R9	2100-2407	1	R VAR 2K OHM 1% 1/8W
A23R10	0757-0442		R FXD 10K OHM 1% 1/8W
A23R11	0757-0280		R FXD 1K OHM 1% 1/8W
A23R12	0698-4250	1	R FXD 2.5K OHM 1% 1/4W
A23R13	0757-0442		R FXD 10K OHM 1% 1/8W
A23R14	0757-0419		R FXD 681 OHM 1% 1/8W
A23R15	0698-4579	1	R FXD 261 OHM 1% 1/8W
A23R16	0757-0401		R FXD 100 OHM 1% 1/8W
A23R17	0757-0398		R FXD 75 OHM 1% 1/8W
A23R18	0698-3430		R FXD 21.5 OHM 1% 1/8W
A23R19	0698-3444		R FXD 316 OHM 1% 1/8W
A23R20	0757-0401		R FXD 100 OHM 1% 1/8W
A23R21	0757-0398		R FXD 75 OHM 1% 1/8W
A23R22	0698-3430		R FXD 21.5 OHM 1% 1/8W
A23R23	0698-3444		R FXD 316 OHM 1% 1/8W
A23R24	0757-0401		R FXD 100 OHM 1% 1/8W
A23R25	0698-3439		R FXD 178 OHM 1% 1/8W
A23R26	0757-0276		R FXD 46.4 OHM 1% 1/8W
A23R27	0698-3430		R FXD 21.5 OHM 1% 1/8W
A23R28	0757-0403		R FXD 121 OHM 1% 1/8W
A23R29	0757-0346	4	R FXD 10 OHM 1% 1/8W
A23R30	0698-4497		R FXD 46.4 OHM 1% 1/8W
A23R31	0757-0346		R FXD 10 OHM 1% 1/8W
A23R32	0698-3446		R FXD 383 OHM 1% 1/8W
A23R33	0757-0180		R FXD 31.6 OHM 1% 1/8W
A23R34	0757-0180		R FXD 31.6 OHM 1% 1/8W
A23R35	0757-0397		R FXD 68.1 OHM 1% 1/8W
A23R36	0757-0180		R FXD 31.6 OHM 1% 1/8W
A23R37	0757-0397		R FXD 68.1 OHM 1% 1/8W
A23R38	0757-0180		R FXD 31.6 OHM 1% 1/8W
A23R39	0757-0398		R FXD 75 OHM 1% 1/8W
A23R40	0757-0427		R FXD 1.5K OHM 1% 1/8W
A23R41	2100-1984	1	R VAR 100 OHM
A23R42	0757-0346		R FXD 10 OHM 1% 1/8W
A23R43	0757-0279		R FXD 3.16K OHM 1% 1/8W
A23R44	0757-0401		R FXD 100 OHM 1% 1/8W
A23R45	0757-0427		R FXD 1.5K OHM 1% 1/8W
A23R46	0698-0084		R FXD 2.15K OHM 1% 1/8W
A23R47	0757-0280		R FXD 1K OHM 1% 1/8W
A23R48	0757-0346		R FXD 10 OHM 1% 1/8W
A23R49	0757-0398		R FXD 75 OHM 1% 1/8W
A23R50	0698-3430		R FXD 21.5 OHM 1% 1/8W
A23R51	0698-3430		R FXD 21.5 OHM 1% 1/8W
A23R52	0698-3430		R FXD 21.5 OHM 1% 1/8W
A23T1	03710-70023	2	XFMR

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	HP Part No	TQ	Description
A2332	03710-70024	2	XSTR
A2333	03710-70024		XSTR
A2334	03710-70023		XSTR
A24	03702-70003	1	ASSY IF DISCRIMINATOR
	03702-3172	1	PC BD BLANK
A24C1	0150-0093		C FXD 0.01UF
A24C2	0150-0093		C FXD 0.01UF
A24C3	0150-0093		C FXD 0.01UF
A24C4	0160-0192		C FXD 68PF
A24C5	0180-0159		C FXD 2.2UF
A24C6	0160-2150	2	C FXD 33PF
A24C7	0160-2254	3	C FXD 7.5PF
A24C8	0180-0155		C FXD 2.2UF
A24C9	0180-0155		C FXD 2.2UF
A24C10	0150-0193		C FXD 0.01UF
A24C11	0160-2199		C FXD 33PF
A24C12	0150-0120	1	C FXD 0.1UF
A24C13	0160-0174		C FXD 0.47UF
A24C14	0160-0200	2	C FXD 390PF
A24C15	0160-2214	1	C FXD 680PF
A24C16	0160-0200		C FXD 390PF
A24C17	0150-0093		C FXD 0.01UF
A24C18	0150-0093		C FXD 0.01UF
A24C19	0150-0093		C FXD 0.01UF
A24C20	0121-0602	1	C VAR 1.4-9PF
A24C21	0150-0093		C FXD 0.01UF
A24C22	0150-0093		C FXD 0.01UF
A24C23	0150-0093		C FXD 0.01UF
A24C24	0180-0174		C FXD 0.47UF
A24C25	0150-0093		C FXD 0.01UF
A24C26	0150-0050		C FXD 1000PF
A24C27	0160-2251	1	C FXD 5.6PF
A24C28	0160-0300	2	C FXD 2700PF
A24C29	0160-3138	1	C FXD 18PF
A24C30	0160-0300		C FXD 2700PF
A24C31	0160-0155	1	C FXD 33000PF
A24C32	0160-0650		C FXD 30PF
A24C33	0180-0155		C FXD 2.2UF
A24C34	0180-0155		C FXD 2.2UF
A24C35	0180-0159		C FXD 2.2UF
A24C36	0180-0155		C FXD 2.2UF
A24C37	0180-0155		C FXD 2.2UF
A24C38	0180-0155		C FXD 2.2UF
A24C39	0150-0093		C FXD 0.01UF
A24C40	0150-0093		C FXD 0.01UF
A24C41	0150-0059	2	C FXD 3.3PF
A24C42	0150-0059		C FXD 3.3PF
A24C43	0140-0193		C FXD 82PF
A24C44	0140-0196		C FXD 150PF
A24C45	0140-0193		C FXD 82PF
A24C46	0180-0155		C FXD 2.2UF

Ref Desig	HP Part No	TQ	Description
A24CR1	1901-0347		DIO MBT CARRIER
A24CR2	1901-0347		DIO MBT CARRIER
A24CR3	1901-0539	1	DIO SIGN
A24CR4	1901-0050	2	DIO SI
A24CR5	1901-0050		DIO SI
A24CR6	1902-3024	1	DIO ZENR 2.67V
A24CR7	1901-0347		DIO MBT CARRIER
A24CR8	1901-0347		DIO MBT CARRIER
A24CR9	1901-0347		DIO MBT CARRIER
A24CR10	1901-0016	2	DIO GE
A24CR11	1901-0016		DIO GE
A24CR12	1902-3203		DIO ZENR 14.7V
A24J1	1250-0932		CONN COAX PC BD MTG CONNEX
A24J2	1250-0932		CONN COAX PC BD MTG CONNEX
A24J3	1250-0932		CONN COAX PC BD MTG CONNEX
A24L1	03702-7186	1	IND VAR
A24L2	03702-7184	1	IND VAR
A24L3	03702-7185	3	IND VAR
A24L4	03702-7185		IND VAR
A24L5	03702-7185		IND VAR
A24L6	03702-7333	2	IND VAR
A24L7	03702-7333		IND VAR
A24MC1	1820-0477		IC OPER AMPL
A24MC2	1820-0477		IC OPER AMPL
A24MC3	1820-0477		IC OPER AMPL
A24Q1	1854-0019		XSTR SI NPN
A24Q2	1854-0019		XSTR SI NPN
A24Q3	1854-0019		XSTR SI NPN
A24Q4	1854-0019		XSTR SI NPN
A24Q5	1853-0034		XSTR SI PNP
A24Q6	1853-0034		XSTR SI PNP
A24Q7	1854-0019		XSTR SI NPN
A24Q8	1853-0034		XSTR SI PNP
A24Q9	1854-0019		XSTR SI NPN
A24Q10	1854-0019		XSTR SI NPN
A24Q11	1854-0019		XSTR SI NPN
A24Q12	1854-0073		XSTR SI NPN
A24Q13	1854-0378	1	XSTR SI NPN
A24Q14	1853-0050	2	XSTR SI PNP
A24Q15	1853-0050		XSTR SI PNP
A24Q16	1854-0039		XSTR SI NPN
A24R1	0757-0398		R FXD 75 OHM 1% 1/8W
A24R2	0757-0428	1	R FXD 1.62K OHM 1% 1/8W
A24R3	0757-0416		R FXD 511 OHM 1% 1/8W
A24R4	0757-0420		R FXD 750 OHM 1% 1/8W
A24R5	0757-0401		R FXD 100 OHM 1% 1/8W
A24R6	0757-0427		R FXD 1.5K OHM 1% 1/8W
A24R7	0757-0280		R FXD 1K OHM 1% 1/8W

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	HP Part No	TQ	Description
A24808	0757-0418		R FXD 619 OHM 1% 1/8W
A24809	0757-0419		R FXD 681 OHM 1% 1/8W
A24810	0757-0280		R FXD 1K OHM 1% 1/8W
A24811	0698-3132		R FXD 261 OHM 1% 1/8W
A24812			NOT ASSIGNED
A24813	0698-3446		R FXD 383 OHM 1% 1/8W
A24814	0757-0427		R FXD 1.5K OHM 1% 1/8W
A24815	0757-0427		R FXD 1.5K OHM 1% 1/8W
A24816	0757-0398		R FXD 75 OHM 1% 1/8W
A24817	0757-0398		R FXD 75 OHM 1% 1/8W
A24818	0757-0422	2	R FXD 909 OHM 1% 1/8W
A24819	0757-0427		R FXD 1.5K OHM 1% 1/8W
A24820	0757-0419		R FXD 681 OHM 1% 1/8W
A24821	0757-0398		R FXD 75 OHM 1% 1/8W
A24822	0757-0419		R FXD 681 OHM 1% 1/8W
A24823	0757-0398		R FXD 75 OHM 1% 1/8W
A24824	0757-0446		R FXD 15K OHM 1% 1/8W
A24825	0757-0442		R FXD 10K OHM 1% 1/8W
A24826	0757-0401		R FXD 100 OHM 1% 1/8W
A24827	0757-0401		R FXD 100 OHM 1% 1/8W
A24828	0757-0416		R FXD 511 OHM 1% 1/8W
A24829	0698-0084		R FXD 2.15K OHM 1% 1/8W
A24830	0698-0084		R FXD 2.15K OHM 1% 1/8W
A24831	0757-0280		R FXD 1K OHM 1% 1/8W
A24832	0757-0421		R FXD 825 OHM 1% 1/8W
A24833	0757-0398		R FXD 75 OHM 1% 1/8W
A24834	0757-0316	2	R FXD 42.2 OHM 1% 1/8W
A24835	0757-0316		R FXD 42.2 OHM 1% 1/8W
A24836	0757-0283		R FXD 2K OHM 1% 1/8W
A24837	0757-0416		R FXD 511 OHM 1% 1/8W
A24838	2100-2861	1	R VAR 200 OHM 10% 1/2W
A24839	0757-0401		R FXD 100 OHM 1% 1/8W
A24840	0757-0280		R FXD 1K OHM 1% 1/8W
A24841	2100-2038	2	R VAR 20K OHM 1% 1/8W
A24842	0757-0290		R FXD 6.19K OHM 1% 1/8W
A24843	2100-1788	2	R VAR 500 OHM 10% 1/2W LIN
A24844			NOT ASSIGNED
A24845	0757-0290		R FXD 6.19K OHM 1% 1/8W
A24846	0757-0290		R FXD 6.19K OHM 1% 1/8W
A24847	0757-0398		R FXD 75 OHM 1% 1/8W
A24848	0757-0438		R FXD 5.11K OHM 1% 1/8W
A24849	0757-0338	1	R FXD 1K OHM 1% 1/8W
A24850	0757-0446		R FXD 15K OHM 1% 1/8W
A24851	0757-0446		R FXD 15K OHM 1% 1/8W
A24852	0757-0440		R FXD 7.5K OHM 1% 1/8W
A24853	2100-1788		R VAR 500 OHM 10% 1/2W LIN
A24854	0757-0460		R FXD 61.9K OHM 1% 1/8W
A24855	0757-0442		R FXD 10K OHM 1% 1/8W
A24856	0757-0283		R FXD 2K OHM 1% 1/8W
A24857	0757-0159	1	R FXD 1K OHM 1% 1/8W
A24858	0698-3136	1	R FXD 17.8K OHM 1% 1/8W

Ref Desig	HP Part No	TQ	Description
A24859	0757-0447		R FXD 16.2K OHM 1% 1/8W
A24860	0757-0440		R FXD 7.5K OHM 1% 1/8W
A24861	0757-0486	2	R FXD 750K OHM 1% 1/8W
A24862	0757-0460		R FXD 61.9K OHM 1% 1/8W
A24863	0757-0405	1	R FXD 681K OHM 1% 1/8W
A24864	0757-0438		R FXD 5.11K OHM 1% 1/8W
A24865	0757-0460		R FXD 61.9K OHM 1% 1/8W
A24866	0757-0486		R FXD 750K OHM 1% 1/8W
A24867	2100-2038		R VAR 20K OHM 10% 1/2W
A24868	0757-0401		R FXD 100 OHM 1% 1/8W
A24869	0757-0401		R FXD 100 OHM 1% 1/8W
A24870	0698-3430		R FXD 21.5 OHM 1% 1/8W
A24871	0757-0401		R FXD 100 OHM 1% 1/8W
A24872	0757-0401		R FXD 100 OHM 1% 1/8W
A24873	0698-3430		R FXD 21.5 OHM 1% 1/8W
A24874	0757-0398		R FXD 75 OHM 1% 1/8W
A24875	0698-3430		R FXD 21.5 OHM 1% 1/8W
A24T1	09702-7332	1	XFMR
A25	09702-7168	1	ASSY MARKER GENERATOR
	09702-3168	1	PC BD BLANK
A25C1	0160-0644	1	C FXD 100PF
A25C2	0180-0193		C FXD 2.2UF 20% 20VVDC
A25C3	0150-0050		C FXD 1000PF +80 -20% 1000VVDC
A25C4	0150-0050		C FXD 1000PF +80 -20% 1000VVDC
A25C5	0140-0091	2	C FXD 1.5PF
A25C6	0140-0091		C FXD 1.5PF
A25C7	0150-0050		C FXD 1000PF +80 -20% 1000VVDC
A25C8	0160-0640		C FXD 10PF 5% 30WVDC
A25C9	0150-0050		C FXD 1000PF +80 -20% 1000VVDC
A25C10	0150-0050		C FXD 1000PF +80 -20% 1000VVDC
A25C11	0150-0050		C FXD 1000PF +80 -20% 1000VVDC
A25C12	0160-2254		C FXD 7.5PF 0.25PF 500VVDC
A25C13	0160-2254		C FXD 7.5PF 0.25PF 500VVDC
A25C14	0160-0624		C FXD 56PF 5% 30WVDC
A25C15	0160-0174		C FXD 0.47UF +80-20% 25WVDC
A25C16	0180-0155		C FXD 2.2UF 20% 20VVDC
A25C17	0160-0174		C FXD 0.47UF +80-20% 25WVDC
A25C18	0180-0155		C FXD 2.2UF 20% 20WVDC
A25C19	0160-0641	2	C FXD 22PF 5% 30WVDC
A25C20	0160-0624		C FXD 56PF 5% 30WVDC
A25C21	0160-0640		C FXD 10PF 5% 30WVDC
A25C22	0160-2261	2	C FXD 15PF 5% 500WVDC
A25C23	0160-2261		C FXD 15PF 5% 500WVDC
A25C24	0180-0155		C FXD 2.2UF 20% 20WVDC
A25C25	0180-0155		C FXD 2.2UF 20% 20WVDC
A25C26	0180-0155		C FXD 2.2UF 20% 20WVDC
A25C27	0180-0155		C FXD 2.2UF 20% 20WVDC
A25C28	0180-0155		C FXD 2.2UF 20% 20WVDC
A25C29	0150-0050		C FXD 1000PF +80-20% 1000WVDC
A25C30	0160-0662		C FXD 51PF

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	HP Part No	TQ	Description
A25CR1	0122-0081	1	C VOLT VAR
A25CR2	1901-0047		DIO HOT CARRIER
A25CR3	1901-0047		DIO HOT CARRIER
A25CR4	1901-0047		DIO HOT CARRIER
A25CR5	1901-0047		DIO HOT CARRIER
A25CR6	1901-0047		DIO HOT CARRIER
A25CR7	1901-0047		DIO HOT CARRIER
A25CR8	1901-0047		DIO HOT CARRIER
A25CR9	1901-0047		DIO HOT CARRIER
A25CR10	1901-0047		DIO HOT CARRIER
A25CR11	1901-0047		DIO HOT CARRIER
A25CR12	1901-0047		DIO HOT CARRIER
A25CR13	1901-0047		DIO HOT CARRIER
A25J1	1250-0937		CONN COAX PC BD MTG CONHEX
A25J2	1250-0932		CONN COAX PC BD MTG CONHEX
A25J3	1250-0932		CONN COAX PC BD MTG CONHEX
A25J4	1250-0932		CONN COAX PC BD MTG CONHEX
A25L1	03701-791	2	IND VAR
A25L2	9140-0144		IND FXD 4.7UH 10%
A25L3	03701-726		IND VAR
A25L4	03701-791		IND VAR
A25L5	03701-726		IND VAR
A25L6	9140-0159	2	IND FXD 0.47UH 20%
A25L7	9140-0159		IND FXD 0.47UH 20%
A25L8	9100-2405	2	IND FXD 0.22UH 5%
A25L9	9100-2486	1	IND FXD 0.33UH 5%
A25L10	9100-2405		IND FXD 0.22UH 5%
A25L11	03702-738	1	IND VAR
A25Q1	1854-0323	1	XSTR SI NPN
A25Q2	1854-0219	1	XSTR SI NPN
A25Q3	1854-0092		XSTR SI NPN
A25Q4	1854-0092		XSTR SI NPN
A25Q5	1854-0092		XSTR SI NPN
A25Q6	1854-0092		XSTR SI NPN
A25Q7	1854-0019		XSTR SI NPN
A25R1	0757-0438		R FXD 5.11K OHM 1% 1/8W
A25R2	0757-0407		R FXD 200 OHM 1% 1/8W
A25R3	0698-3490		R FXD 2K OHM 1% 1/8W
A25R4	0698-3490		R FXD 2K OHM 1% 1/8W
A25R5	0698-3153		R FXD 3.83K OHM 1% 1/8W
A25R6	0698-3443		R FXD 287 OHM 1% 1/8W
A25R7	0698-0084		R FXD 2.15K OHM 1% 1/8W
A25R8	0757-0401		R FXD 100 OHM 1% 1/8W
A25R9	0698-3447		R FXD 422 OHM 1% 1/8W
A25R10	0757-0398		R FXD 75 OHM 1% 1/8W
A25R11	0698-3431	4	R FXD 23.7 OHM 1% 1/8W
A25R12	0757-0401		R FXD 100 OHM 1% 1/8W
A25R13	0698-3431		R FXD 23.7 OHM 1% 1/8W
A25R14	0698-3435	2	R FXD 38.3 OHM 1% 1/8W
A25R15	0757-0394		R FXD 51.1 OHM 1% 1/8W
A25R16	0698-3435		R FXD 38.3 OHM 1% 1/8W
A25R17	0757-0398		R FXD 75 OHM 1% 1/8W
A25R18	0757-0440		R FXD 7.5K OHM 1% 1/8W
A25R19	0757-0427		R FXD 1.5K OHM 1% 1/8W
A25R20	0698-3155		R FXD 4.64K OHM 1% 1/8W
A25R21	0757-0280		R FXD 1K OHM 1% 1/8W
A25R22	0698-3441		R FXD 215 OHM 1% 1/8W
A25R23	0757-0446		R FXD 15K OHM 1% 1/8W
A25R24	0757-0427		R FXD 1.5K OHM 1% 1/8W
A25R25	0698-3155		R FXD 4.64K OHM 1% 1/8W
A25R26	0757-0398		R FXD 75 OHM 1% 1/8W
A25R27	0757-0422		R FXD 909 OHM 1% 1/8W
A25R28	0757-0397		R FXD 68.1 OHM 1% 1/8W
A25R29	0757-0398		R FXD 75 OHM 1% 1/8W
A25R30	0757-0398		R FXD 75 OHM 1% 1/8W
A25R31	0757-0398		R FXD 75 OHM 1% 1/8W
A25R32	0757-0395		R FXD 56.2 OHM 1% 1/8W
A25R33	0757-0407		R FXD 200 OHM 1% 1/8W
A25R34	0757-0280		R FXD 1K OHM 1% 1/8W
A25R35	0757-0420		R FXD 750 OHM 1% 1/8W
A25R36	0757-C398		R FXD 75 OHM 1% 1/8W
A25R37	0698-3155		R FXD 4.64K OHM 1% 1/8W
A25R38	0698-3431		R FXD 23.7 OHM 1% 1/8W
A25R39	0757-0401		R FXD 100 OHM 1% 1/8W
A25R40	0698-3431		R FXD 23.7 OHM 1% 1/8W
A25R41	0698-4037		R FXD 46.4 OHM 1% 1/8W
A25R42	0698-4037		R FXD 46.4 OHM 1% 1/8W
A25R43	0757-0280		R FXD 1K OHM 1% 1/8W
A25R44	0698-4037		R FXD 46.4 OHM 1% 1/8W
A25R45	0698-4037		R FXD 46.4 OHM 1% 1/8W
A25R46	0757-0280		R FXD 1K OHM 1% 1/8W
A25T1	03702-736		XFMR
A25T2	03702-736		XFMR
A25T3	03701-738	1	XFMR
A25T4	03702-736		XFMR
A25T5	03702-736		XFMR
A25T6	03702-736		XFMR
A25T7	03702-736		XFMR
A25Y1	0410-0602	1	XTAL QUARTZ 70MHZ
A26	03702-7176	1	ASSY CENTRE MARKER GENERATOR
	03702-3176	1	PC BD BLANK
A26C1	0150-0050		C FXD 1000PF +80 -20% 1000WVDC
A26C2	0150-0050		C FXD 1000PF +80 -20% 1000WVDC
A26C3	0160-0641		C FXD 22PF 5% 30WVDC
A26C4	0160-0662		C FXD 51PF 5% 30WVDC
A26C5	0160-0640		C FXD 10PF 5% 30WVDC
A26C6	0180-0155		C FXD 2.2UF 20% 20WVDC
A26C7	0160-2199		C FXD 30PF 5% 300WVDC
A26C8	0160-2199		C FXD 30PF 5% 300WVDC

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	HP Part No.	TQ	Description
[illegible]	[illegible]		[illegible]
A26J1 (?)	1250-0932 (?)		CONN COAX PC BD MTG CONHEX (?)
A26L1	03702-730	1	IND VAR
A26L2	9100-2249	2	IND FXD 0.15UH 10%
A26L3	9100-0317	1	IND FXD 0.33UH 10%
A26L4	9100-2249		IND FXD 0.15UH 10%
A26Q1	1854-0019		XSTR SI NPN
	1205-0037	1	HEAT DISSIPATOR XSTR
A26R1	0757-0407		R FXD 200 OHM 1% 1/8W
A26R2	0757-0280		R FXD 1K OHM 1% 1/8W
A26R3	0757-0731	1	R FXD 825 OHM 1% 1/8W
A26R4	0757-0407		R FXD 200 OHM 1% 1/8W
A26R5	0757-0398		R FXD 75 OHM 1% 1/8W
A26Y1	0410-0428	1	XTAL 67.4MHZ
A27	03702-70004	1	ASSY EMT OSCILLATOR STIMULUS
	03702-30004	1	PC BD BLANK
A27C1	0160-3740		C FXD 0.22UF
A27C2	0160-3740		C FXD 0.22UF
A27C3	0160-3741		C FXD 0.068UF
A27C4	0160-3910		C FXD 0.1UF
A27CR1	1901-0025		DIO SI
A27CR2	1901-0025		DIO SI
A27Q1	1853-0036		XSTR SI PNP
A27Q2	1853-0036		XSTR SI PNP
A27R1	0757-0280		R FXD 1K OHM 1% 1/8W
A27R2	0757-0442		R FXD 10K OHM 1% 1/8W
A27R3	0757-0442		R FXD 10K OHM 1% 1/8W
A27R4	0757-0280		R FXD 1K OHM 1% 1/8W
A27R5	0757-0401		R FXD 100 OHM 1% 1/8W
	[illegible]	1	ASSY ACCESSORY KIT (REPLACES 15990A)
A1			OPTION 002 FRONT PANEL CONNECTORS LARGE SIEMENS USE STANDARD REPLACEABLE PARTS LIST WITH THE FOLLOWING ADDITIONS OR (REPLACEMENTS)
J2	1250-1081	4	CONN COAX BHD MTG LGE SIEMENS 75 OHM (REPLACES 1250-0608)
J3	1250-1081		CONN COAX BHD MTG LGE SIEMENS 75 OHM (REPLACES 1250-0608)
J5	1250-1081		CONN COAX BHD MTG LGE SIEMENS 75 OHM (REPLACES 1250-0608)
J6	1250-1081		CONN COAX BHD MTG LGE SIEMENS 75 OHM (REPLACES 1250-0608)
MP1	03702-10010	1	PANEL FRONT (REPLACES 03702-184)
MP9	03702-10042	1	PANEL REAR (REPLACES 03702-10040)
W101	03702-7292	1	ASSY COAX CBL BRN
	1250-0931	1	CONN COAX CBL MTG CONHEX
	1250-1083	2	CONN COAX BHD MTG
A14	03702-7317	1	ASSY IF ATTENUATOR (IDENTICAL TO 03702-7314 EXCEPT FOR THE FOLLOWING CABLE)
A14W903	03702-7296	1	ASSY COAX CBL ORN/BLK (REPLACES 03702-7263)
	1250-1083		CONN COAX BHD MTG (REPLACES 1250-0608)
	03702-348	1	CONN

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	HP Part No	TQ	Description
	15555AOP003	1	ASSY ACCESSORY KIT (REPLACES 15550A)
A1			OPTION 003 FRONT PANEL CONNECTORS SMALL SIEMENS USE STANDARD REPLACEABLE PARTS LIST WITH THE FOLLOWING ADDITIONS OR (REPLACEMENTS)
J2	1250-1070	4	CONN COAX BHD MTG SML SIEMENS 75 OHM (REPLACES 1250-0608)
J3	1250-1070		CONN COAX BHD MTG SML SIEMENS 75 OHM (REPLACES 1250-0608)
J5	1250-1070		CONN COAX BHD MTG SML SIEMENS 75 OHM (REPLACES 1250-0608)
J6	1250-1070		CONN COAX BHD MTG SML SIEMENS 75 OHM (REPLACES 1250-0608)
MP1	03702-10009	1	PANEL FRONT (REPLACES 03702-184)
MP9	03702-10043	1	PANEL REAR (REPLACES 03702-10040)
W101	03702-7293	1	ASSY COAX CBL BRN
	1250-0931	1	CONN COAX CBL MTG CONHEX
	1250-1077	2	CONN COAX BHD MTG
A14	03702-7314	1	ASSY IF ATTENUATOR (IDENTICAL TO 03702-7314 EXCEPT FOR THE FOLLOWING CABLE)
A14W903	03707-7297	1	ASSY COAX CBL ORN/BLK (REPLACES 03702-7263)
	1250-1077		CONN COAX BHD MTG (REPLACES 1250-0608)
	03702-348	1	CONN

Ref Desig	HP Part No	TQ	Description
	15555AOP004	1	ASSY ACCESSORY KIT (REPLACES 15550A)
A1			OPTION 004 FRONT PANEL CONNECTORS-WECO TYPE 477B AND 124/75 OHM IMPEDANCE CONVERTER USE STANDARD REPLACEABLE PARTS LIST WITH THE FOLLOWING ADDITIONS OR (REPLACEMENTS)
MP1	03702-10008	1	PANEL FRONT (REPLACES 03702-194)
MP14	03702-10003	1	PANEL SUB WECO (LEFT)
	03702-10030	1	PANEL SUB WECO (RIGHT) (REPLACES 03702-186 AND 187)
	03702-10004	1	BRACKET SUPPORT WECO
MP18	03702-10006	1	BRACKET BOX SUPPORT
W100	03702-7269	1	CABLE HARNESS MAIN SIGNAL (SAME AS 03702-7187 EXCEPT FOR THE FOLLOWING CABLES)
W101	03702-7279	1	ASSY COAX CBL BRN (REPLACES 03702-7242)
	1250-0852	6	CONN COAX PNL MTG WECO (REPLACES 1250-0610)
W102	03702-7272	1	ASSY COAX CBL RED (REPLACES 03702-7237)
W114	03702-7278	1	ASSY COAX CBL BRN/YEL
	1250-0852		CONN COAX PNL MTG WECO
W127	03702-7270	1	ASSY COAX CBL RED/VIO (REPLACES 03702-7238)
W129	03702-7302	1	ASSY COAX CBL RED/WHT
W137	03702-7271	1	ASSY COAX CBL ORN/VIO (REPLACES 03702-7239)
W169	03702-7303	1	ASSY COAX CBL BLU/WHT (REPLACES 03702-7249)
	1250-0931	5	CONN COAX CBL MTG
W915	03702-7277	1	ASSY COAX CBL BRN/GRN
	1250-0852		CONN COAX PNL MTG WECO
W917	03702-7273	1	ASSY COAX CBL BRN/VIO
	1250-0931		CONN COAX CBL MTG CONHEX
W918	03702-7274	1	ASSY COAX CBL BRN/GRY
	1250-0931		CONN COAX CBL MTG CONHEX
W978	03702-7276	1	ASSY COAX CBL VIO/GRY
	1250-0852		CONN COAX PNL MTG WECO
	1250-0931		CONN COAX CBL MTG CONHEX
W979	03702-7275	1	ASSY COAX CBL VIO/WHT
	1250-0852		CONN COAX PNL MTG WECO CONN COAX CBL MTG CONHEX
AR	03702-7313	1	ASSY BAL TO UNBAL CONVERTER

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	HP Part No	TQ	Description
	03702-3319	1	PC BD BLANK
	03702-7461	1	BOX SCREENING
A8C1	0160-3740	4	C FXD 0.22UF
A8C2	0160-3740		C FXD 0.22UF
A8C3	0160-3740		C FXD 0.22UF
A8C4	0160-3740		C FXD 0.22UF
A8C5	0160-2250	1	C FXD 9.1PF 0.25PF 500WVDC
A8C6			NOT ASSIGNED
A8C7			NOT ASSIGNED
A8C8	0180-0195	2	C FXD 2.2UF 20% 20WVDC
A8C9	0160-0127	3	C FXD 1UF 20% 25WVDC
A8C10	0160-0127		C FXD 1UF 20% 25WVDC
A8C11	0180-0228	1	C FXD 22UF 10% 15WVDC
A8C12	0180-2549	1	C FXD 100UF
A8C13	0180-0195		C FXD 2.2UF 20% 20WVDC
A8C14	0180-0097	1	C FXD 47UF 10% 35WVDC
A8C15	0160-0127		C FXD 1UF 20% 25WVDC
A8C16	0160-3143	1	C FXD 75PF 5% 300WVDC
A8CR1	1902-0626	1	DIO BKDN 13V 5% 400MW
A8CR2	1902-3191	1	DIO BKDN 13V
A8J1	1250-0932	4	CONN COAX PC BD RTG CONNEX
A8J2	1250-0932		CONN COAX PC BD RTG CONNEX
A8J3	1250-0932		CONN COAX PC BD RTG CONNEX
A8J4	1250-0932		CONN COAX PC BD RTG CONNEX
A8L1	9140-0137	1	IND FXD 1MH 5%
A8L2	9100-1662	2	IND FXD 2.4MH 5%
A8L3	9100-1662		IND FXD 2.4MH 5%
A8Q1	1854-0019	3	XSTR SI NPN
A8Q2	1854-0019		XSTR SI NPN
A8Q3	1854-0019		XSTR SI NPN
A8Q4	1954-0233	1	XSTR SI NPN
A8Q5	1853-0036	1	XSTR SI PNP
A8R1	0757-0416	2	R FXD 511 OHM 1% 1/8W
A8R2	0698-3441	2	R FXD 215 OHM 1% 1/8W
A8R3	0698-3430	2	R FXD 21.5 OHM 1% 1/8W
A8R4	0698-3430		R FXD 21.5 OHM 1% 1/8W
A8R5	0757-0416		R FXD 511 OHM 1% 1/8W
A8R6	0698-3441		R FXD 215 OHM 1% 1/8W
A8R7	0757-0397	4	R FXD 68.1 OHM 1% 1/8W
A8R8	0757-0397		R FXD 68.1 OHM 1% 1/8W
A8R9	0757-0418	5	R FXD 619 OHM 1% 1/8W
A8R10	0757-0407	2	R FXD 200 OHM 1% 1/8W
A8R11	0757-0394	3	R FXD 51.1 OHM 1% 1/8W
A8R12	0757-0419	1	R FXD 681 OHM 1% 1/8W
A8R13	0757-0407		R FXD 200 OHM 1% 1/8W
A8R14	0757-0394		R FXD 51.1 OHM 1% 1/8W
A8R15	0757-0418		R FXD 619 OHM 1% 1/8W
A8R16	0698-3153	2	R FXD 3.83K OHM 1% 1/8W
A8R17	0698-3153		R FXD 3.83K OHM 1% 1/8W

Ref Desig	HP Part No	TQ	Description
A8R18	0757-0398	2	R FXD 75 OHM 1% 1/8W
A8R19	0698-4382	1	R FXD 52.3 OHM 1% 1/8W
A8R20	0757-0397		R FXD 68.1 OHM 1% 1/8W
A8R21	0757-0397		R FXD 68.1 OHM 1% 1/8W
A8R22	0757-0418		R FXD 619 OHM 1% 1/8W
A8R23	0757-0418		R FXD 619 OHM 1% 1/8W
A8R24	0757-0398		R FXD 75 OHM 1% 1/8W
A8R25	0698-3446	1	R FXD 383 OHM 1% 1/8W
A8R26	0757-0418		R FXD 619 OHM 1% 1/8W
A8R27	0757-0317	1	R FXD 1.33K OHM 1% 1/8W
A8R28	0757-0346	1	R FXD 10 OHM 1% 1/8W
A8R29	0757-0394		R FXD 51.1 OHM 1% 1/8W
A8R30	0757-0395	1	R FXD 56.2 OHM 1% 1/8W
A9	03702-7268	1	ASSY 8B INPUT SWITCH
A9MP1	03702-360	1	CLAMP CBL
A9MP2	03702-10007	1	PLATE SUPPORT CBL
A9S1	3100-0650	1	SW LVR ACTUATED RTRY 2P3T (REPLACES 5S 3100-0651)
A14	03702-7319	1	ASSY IF ATTENUATOR (IDENTICAL TO 03702-7314 EXCEPT FOR THE FOLLOWING CABLE)
A14W929	03702-7280	1	ASSY COAX CBL ORN/BLK (REPLACES 03702-7263)
	1250-0852		CONN COAX PNL MTG WFCO (REPLACES 1250-0931)

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	HP Part No	TQ	Description
A1			OPTION 017 VOLTAGE REFERENCE INSTEAD OF POWER USE STANDARD REPLACEABLE PARTS LIST WITH THE FOLLOWING ADDITIONS OR (REPLACEMENTS)
MP1	03702-10034	1	PANEL FRONT (REPLACES 03702-184)
MP9	03702-10041	1	PANEL REAR (REPLACES 03702-10040)

Abbreviations are listed in the introduction to this section

Table 4-1. Section 2
PART NUMBER - NATIONAL STOCK NUMBER
CROSS REFERENCE INDEX

PART NUMBER	FSCM	NATIONAL STOCK NUMBER	PART NUMBER	FSCM	NATIONAL STOCK NUMBER
00140-61606	28480	6150-00942-4917	0160-2145	28480	5910-00-430-5637
01200-44703	28480	5999-00-195-6718	0160-2146	28480	5910-00-481-8507
01200-66001	28480	5950-00-001-3255	0160-2197	28480	5910-00-472-5027
0121-0046	28480	5910-00983-2624	0160-2199	28480	5910-00-244-7164
0121-0105	28480	5910-00-761-1216	0160-2200	28480	5910-00-195-4107
0122-0601	28480	5961-00-098-7893	0160-2202	28480	5910-00-719-9879
0140-0192	28480	5910-00-914-4730	0160-2204	28480	5910-00-463-5949
0140-0193	28480	5910-00-774-7319	0160-2214	28480	5910-00-430-5692
0140-0195	28480	5910-00-776-8913	0160-2221	28480	5910-00-480-9572
0140-0196	28480	5910-00-774-7294	0160-2254	28480	5910-00-043-1371
0140-0197	28480	5910-00-544-6742	0160-2259	28480	5910-00-917-9679
0140-0198	28480	5910-00-914-2605	0160-2261	28480	5910-00-430-5750
0140-0200	28480	5910-00-914-4732	0160-2264	28480	5910-00-318-8758
0140-0205	28480	5910-00-782-1853	0160-2265	28480	5910-00-444-6725
0150-0036	28480	5910-00-801-5646	0160-2307	28480	5910-00-406-9675
0150-0050	28480	5910-00-784-0927	0180-0089	28480	5910-00-823-1548
0150-0052	28480	5910-00-797-4909	0180-0097	28480	5910-00-255-3738
0150-0093	28480	5910-00-542-2010	0180-0098	28480	5910-00-430-5947
0150-0096	28480	5910-00-247-7226	0180-0106	28480	5910-00-127-1668
0150-0121	28480	5910-00-950-6822	0180-0134	28480	5910-00-909-2682
0160-0127	28480	5910-00-809-5484	0180-0136	28480	5910-00-275-0436
0160-0128	28480	5910-00-057-3934	0180-0159	28480	5910-00-719-9882
0160-0134	28480	5910-00-919-0166	0180-0195	28480	5910-00-444-6642
0160-0151	28480	5910-00-985-1261	0180-0218	28480	5910-00-255-3739
0160-0155	28480	5910-00-719-4370	0180-0228	28480	5910-00-719-9907
0160-0160	28480	5910-00-891-4207	0180-0229	28480	5910-00-403-2449
0160-0163	28480	5910-00-893-1261	0180-0291	28480	5910-00-931-7055
0160-0168	28480	5910-00-917-0668	0180-0374	28480	5910-00-931-7050
0160-0174	28480	5910-00-234-9817	0180-0376	28480	5910-00-444-6726
0160-0300	28480	5910-00-058-7916	0180-0398	28480	5910-00-078-7423
0160-0907	28480	5910-00-931-0029	0180-1735	28480	5910-00-430-6016

PART NUMBER - NATIONAL STOCK NUMBER CROSS REFERENCE INDEX

PART NUMBER	FSCM	NATIONAL STOCK NUMBER	PART NUMBER	FSCM	NATIONAL STOCK NUMBER
180-1746	28480	5910-00-430-6036	0698-3441	28480	5905-00-974-6076
180-1940	28480	5910-01-007-5661	0698-3442	28480	5905-00-489-6773
340-0162	28480	5970-00-485-9846	0698-3443	28480	5905-00-194-0341
698-0063	28480	5905-00-828-0409	0698-3444	28480	5905-00-974-6079
698-0082	28480	5905-00-974-6075	0598-3445	28480	5905-00-493-4289
698-0083	28480	5905-00-407-0052	0698-3446	28480	5905-00-974-6083
698-0084	28480	5905-00-974-6073	0698-3447	28480	5905-00-828-0404
698-0085	28480	5905-00-998-1814	0698-3449	28480	5905-00-828-0397
698-3132	28480	5905-00-828-0388	0698-3450	28480	5905-00-826-3262
698-3136	28480	5905-00-891-4247	0698-3451	28480	5905-00-405-3677
698-3150	28480	5905-00-481-1357	0698-3457	28480	5905-00-491-4586
698-3152	28480	5905-00-420-7130	0698-3459	28480	5905-00-891-4226
698-3153	28480	5905-00-974-6081	0698-4037	28480	5905-00-232-3122
698-3154	28480	5905-00-891-4215	0698-4307	28480	5905-00-891-4254
698-3155	28480	5905-00-976-3418	0698-4477	28480	5905-00-138-5059
698-3156	28480	5905-00-974-6084	0757-0059	28480	5905-00-830-6633
698-3158	28480	5905-00-858-8927	0757-0123	28480	5905-00-954-8684
698-3160	28480	5905-00-974-6078	0757-0159	28480	5905-00-830-6677
698-3161	28480	5905-00-974-6082	0757-0180	28480	5905-00-972-4907
698-3162	28480	5905-00-840-8162	0757-0199	28480	5905-00-981-7513
698-3243	28480	5905-00-891-4227	0757-0200	28480	5905-00-891-4224
698-3260	28480	5905-00-998-1809	0757-0269	28480	5905-00-858-6985
698-3266	28480	5905-00-469-2769	0757-0274	28480	5905-00-858-9105
698-3401	28480	5905-00-252-4219	0757-0276	28480	5905-00-479-4628
698-3429	28480	5905-00-407-0075	0757-0277	28480	5905-00-110-0850
698-3430	28480	5905-00-420-7136	0757-0278	28480	5905-00-110-0851
698-3431	28480	5905-00-402-7079	0757-0279	28480	5905-00-221-8310
698-3432	28480	5905-00-407-0105	0757-0280	28480	5905-00-853-8190
698-3434	28480	5905-00-997-4071	0757-0283	28480	5905-00-998-1909
698-3435	28480	5905-00-489-2046	0757-0284	28480	5905-00-917-0576
698-3439	28480	5905-00-407-0059	0757-0288	28480	5905-00-193-4318

PART NUMBER - NATIONAL STOCK NUMBER CROSS REFERENCE INDEX

PART NUMBER	FSCM	NATIONAL STOCK NUMBER	PART NUMBER	FSCM	NATIONAL STOCK NUMBER
0757-0289	28480	5905-00-998-1908	0757-0438	20480	5905-00-929-2529
0757-0290	28480	5905-00-858-8826	0757-0439	28480	5905-00-990-0303
0757-0316	28480	5905-00-981-7475	0757-0440	28480	5905-00-858-6795
0757-0317	28480	5905-00-244-7189	0757-0441	28480	5905-00-858-6799
0757-0338	28480	5905-00-974-6896	0757-0442	28480	5905-00-998-1792
0757-0340	28480	5905-00-931-1058	0757-0443	28480	5905-00-891-4252
0757-0346	28480	5905-00-998-1906	0757-0444	28480	5905-00-858-9132
0757-0374	28480	5905-00-994-8553	0757-0446	28480	5905-00-858-8895
0757-0381	28480	5905-00-998-1905	0757-0447	28480	5905-00-981-7530
0757-0394	28480	5905-00-412-4036	0757-0449	28480	5905-00-891-2809
0757-0395	28480	5905-00-981-4210	0757-0458	28480	5905-00-494-4628
0757-0397	28480	5905-00-232-3125	0757-0460	28480	5905-00-858-8959
0757-0398	28480	5905-00-788-0291	0757-0461	28480	5905-00-089-7577
0757-0399	28480	5905-00-929-7774	0757-0462	28480	5905-00-493-0783
0757-0400	28480	5905-00-998-1902	0757-0464	28480	5905-00-420-7155
0757-0401	28480	5905-00-981-7529	0757-0465	28480	5905-00-904-4412
0757-0402	28480	5905-00-405-8091	0757-0467	28480	5905-00-858-8868
0757-0403	28480	5905-00-412-4023	0757-0469	28480	5905-00-709-6996
0757-0405	28480	5905-00-493-0738	0757-0470	28480	5905-00-405-8092
0757-0407	28480	5905-00-998-1796	0757-0472	28480	5905-00-257-9210
0757-0416	28480	5905-000-998-1795	0757-0482	28480	5905-00-857-0060
0757-0417	28480	5905-00-858-9417	0757-0486	28480	5905-00-982-3777
0757-0418	28480	5905-00-412-4037	0757-0728	28480	5905-00-517-9213
0757-0419	28480	5905-00-891-4213	0757-0732	28480	5905-00-517-9214
0757-0420	28480	5905-00-493-5404	0757-0801	28480	5905-00-830-6669
0757-0421	28480	5905-00-891-4219	0757-0839	28480	5905-00-931-9909
0757-0422	28480	5905-00-728-9980	0757-0845	28480	5905-00-733-4009
0757-0424	28480	5905-00-493-0736	0757-1094	28480	5905-00-917-0580
0757-0427	28480	5905-00-917-0578	0758-0017	28480	5905-00-988-1553
0757-0428	28480	5905-00-998-1794	0758-0024	28480	5905-00-978-5048
0757-0430	28480	5905-00-858-9207	0758-0049	28480	5905-00-917-0658

PART NUMBER - NATIONAL STOCK NUMBER CROSS REFERENCE INDEX

PART NUMBER	FSCM	NATIONAL STOCK NUMBER	PART NUMBER	FSCM	NATIONAL STOCK NUMBER
0812-0018	28480	5905-00-931-0284	1854-0063	28480	5961-00-985-9074
0836-0006	28480	5905-00-985-6325	1854-0071	28480	5961-00-137-4608
10178A	28480	6625-00136-7503	1854-0092	28480	5961-00-943-7572
1200-0037	28480	5935-00-089-1566	1854-0219	28480	5961-00-135-3969
1200-0041	28480	5935-00-971-9712	1854-0232	28480	5961-00-229-1963
1200-0043	28480	5970-00-805-7166	1854-0233	28480	5961-00-954-4864
1200-0168	28480	5935-00-124-5081	1854-0325	28480	5961-00-927-2851
1205-0002	28480	5961-00-716-9426	1854-0378	28480	5961-00-252-1331
1205-0011	28480	5999-00-789-3794	1855-0020	28480	5961-00-105-8867
1205-0037	28480	6625-00-403-6593	1855-0062	28480	5961-00-222-6451
1251-0007	28480	5935-00-082-0481	1855-0081	28480	5961-00-350-8299
1251-0172	28480	5935-00931-0401	1901-0025	28480	5961-00-978-7468
1400-0094	28480	5920-00-284-7819	1901-0040	28480	5961-00-965-5917
1410-0052	28480	5895-00-061-2906	1901-0047	28480	5961-00-929-7778
1450-0371	28480	6210-00-834-2578	1901-0050	28480	5961-00-914-7496
1520-0002	28480	5970-00-828-6406	1901-0347	28480	5961-00-927-5507
15525A	28480	5995-01-012-5653	1901-0416	28480	5961-00-867-9264
1820-0054	28480	5962-00-138-5248	1901-0518	28480	5961-00-430-6819
1820-0058	28480	5962-00-001-3105	1901-0639	28480	5961-00-787-3394
1820-0125	28480	5962-00-252-4921	1902-0041	28480	5961-00-858-7372
1820-0158	28480	5962-00-405-3777	1902-0049	28480	5961-00-911-9277
1820-0203	28480	5962-00-483-1956	1902-0071	28480	5961-00-835-9974
1820-0304	28480	5962-00-270-1961	1902-0175	28480	5961-00-232-3367
1820-0477	28480	5962-00-386-9155	1901-0244	28480	5961-00-787-4343
1820-0478	28480	5962-00-252-4927	1902-3036	28480	5961-00-350-2205
1853-0015	28480	5961-00-950-1642	1902-3082	28480	5961-00-448-9737
1853-0034	28480	5961-00-987-4700	1902-3094	28480	5961-00-493-5428
1853-0036	28480	5961-00-931-0372	1902-3097	28480	5961-00-147-0108
1853-0050	28480	5961-00-138-7314	1902-3139	28480	5961-00-494-4848
1854-0014	28480	5961-01-010-5794	1902-3182	28480	5961-00-229-1966
1854-0022	28480	5961-00-917-0660	1902-3191	28480	5961-00-620-9772

PART NUMBER - NATIONAL STOCK NUMBER CROSS REFERENCE INDEX

PART NUMBER	FSCM	NATIONAL STOCK NUMBER
1902-3203	28480	5961-00-458-4507
1902-3224	28480	5961-00-195-3526
1902-3234	28480	5961-00-491-6606
1902-3369	28480	5961-00-494-4850
1910-0030	28480	5961-00-772-5853
2100-0150	28480	5905-00-979-4343
2100-1738	28480	5905-00-256-8993
2100-1788	28480	5905-00-407-2402
2100-1984	28480	5905-000-139-2305
2100-1986	28480	5905-00-139-2306
2100-2030	28480	5905-00-254-3273
2100-2061	28480	5905-00-105-1775
2100-2489	28480	5905-00-105-1774
2100-2497	28480	5905-00-405-1341
2100-2516	28480	5905-00-131-3379
2100-2521	28480	5905-00-170-3842
2100-2522	28480	5905-00-476-5797
2100-2574	28480	5905-00-139-2307
2100-2633	28480	5905-00-476-5796
2110-0004	28480	5920-00-798-5710
2110-0027	28480	5920-00-082-7437
2950-0001	28480	5310-00-450-3324
3101-0070	28480	5930-00-919-1755
3101-0957	28480	5930-00-902-5107
3101-1395	28480	5930-00-164-0850
3160-0209	28480	4140-00-004-9000
4040-0749	28480	6625-00-031-4796
4040-0750	28480	5999-00-415-1213
4040-0751	28480	5999-00-230-8835
4040-0752	28480	5999-00-230-8832
4040-0753	28480	5999-00-230-8836
5040-0275	28480	3120-00-230-2009
5040-0400	28480	5910-00-446-5445
5040-0401	28480	5910-00-908-9414
5060-0222	28480	5340-00-435-5340
5060-0767	28480	6625-00-903-0348
8120-1348	28480	6150-01-004-8773
9100-1641	28480	5950-00-431-3203
9100-1652	28480	5950-01-020-9758
9100-1662	28480	5950-00-080-2704
9100-2247	28480	5950-00-405-3735
9100-2249	28480	5950-00-430-6882
9140-0051	28480	5950-00-069-7747
9140-0131	28480	5950-00-431-3938
9140-0137	28480	5950-00-984-3433
9140-0144	28480	5950-00-837-6029
9140-0159	28480	5950-00-728-4408

SECTION V

SERVICE SHEETS

5-1 INTRODUCTION

5-2 This section includes the following:

a. General Service Sheets G1 through G5, containing the theory of operation of the 3702B and procedures for troubleshooting the 3702B down to assembly level.

b. Assembly Service Sheets A1 through A27, containing circuits descriptions, component locations, grid references, and assembly schematics.

5-3 'Select on test' (ST) components are indicated on the schematic by asterisks(*) and their values shown nominally. If 'select on test' components are replaced, the appropriate adjustment procedures should be performed.

5-4 The complete reference designation of a component within an assembly is obtained by prefixing the component reference with the assembly number, eg A2R1.

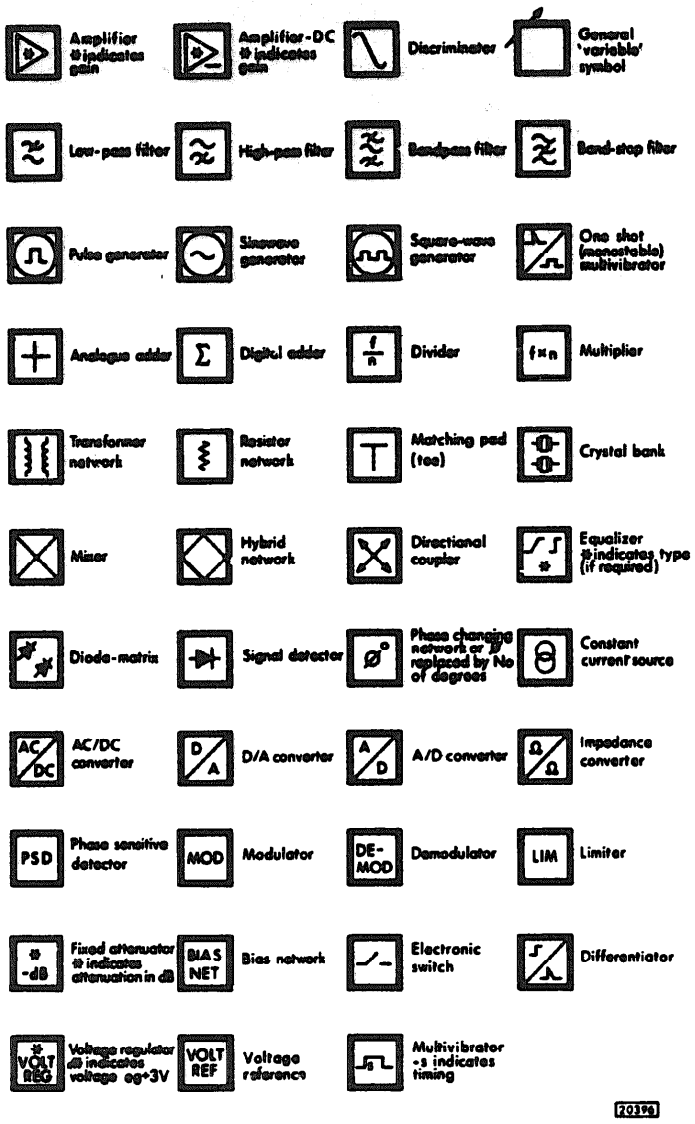


Figure 5-1. Block Diagram Notes

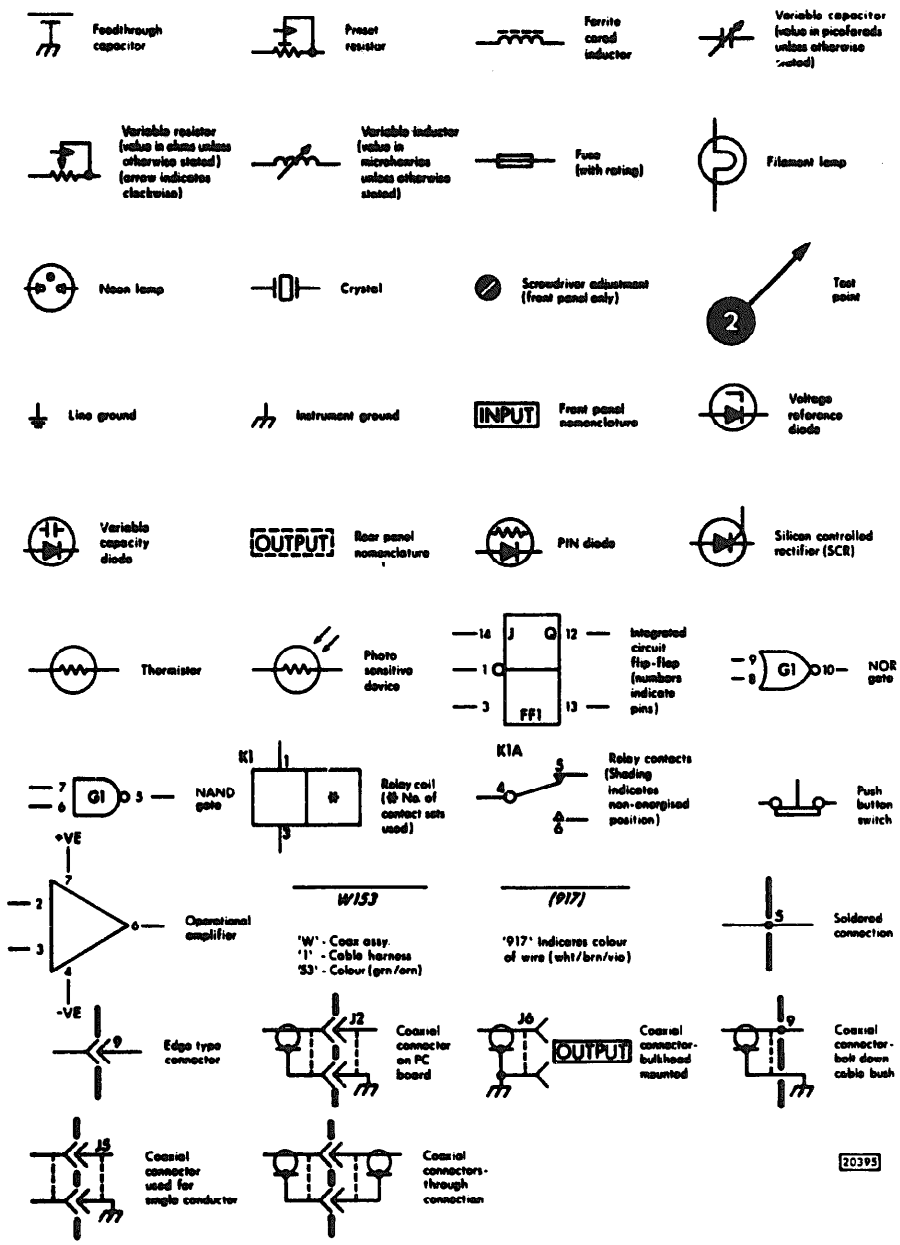


Figure 5-2. Schematic Notes

GENERAL SERVICE SHEET G1

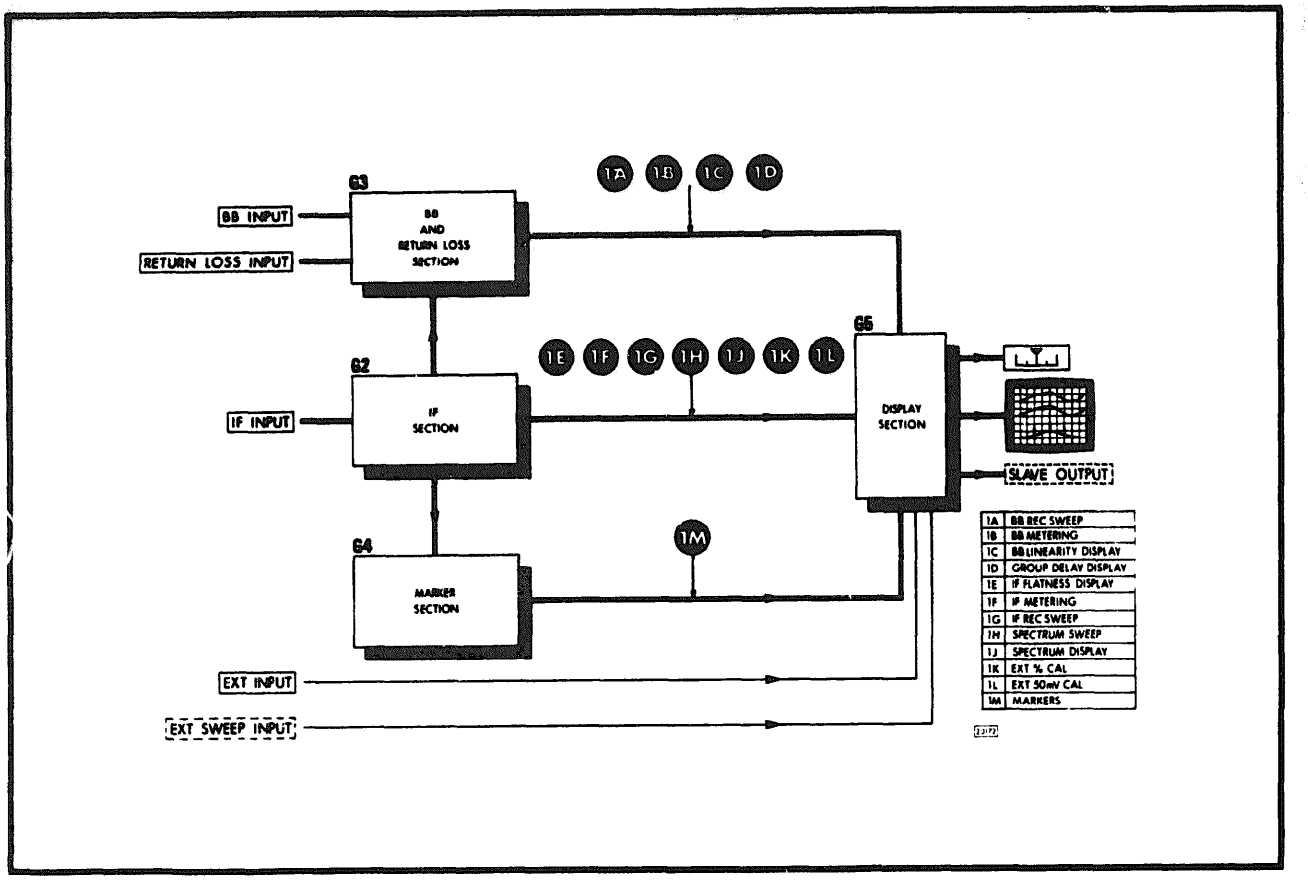


Figure G1-1 Simplified Block Diagram

G1-1 THEORY OF OPERATION

G1-2 The *hp* 3702B IF/BB Receiver is the receive and display section for the *hp* MLA, containing FM detection and measurement circuits. The outputs from these circuits are fed to a CRT display, on which two interacting parameters, such as IF amplitude response and group delay, can be simultaneously displayed. Metering of the IF and BB inputs allows absolute level measurements to be made, and indicates when input signals are at the correct operating level.

G1-3 The CRT display possesses a 'split-trace' calibration facility provided by the Y1/Y2 CALIBRATION switch. The vertical distance between the split traces can be adjusted by the Y1 & Y2 GAIN controls and is equivalent to the calibration step selected. These calibration steps can be selected from 0.1, 0.3, or 1.0dB for IF measurements; and from 1%, 3%, or 10% for BB linearity measurements. Group delay and differential phase calibration steps are provided in a similar manner by the plug-in. The EXT INPUT is used as an external y-axis input. Calibration of this input is internally generated and can be 50mV or 10% of input.

G1-4 The horizontal deflection on the CRT display has available two types of frequency marker. A 2MHz marker comb over the range 45 to 95MHz, and a pair of sliding markers continuously variable from 0 to 26MHz symmetrical about the 70MHz centre frequency marker.

G1-5 The sweep signal for the horizontal deflection circuits is selected by the SWEEP SOURCE switch. The sweep signal may be demodulated from the IF INPUT, applied to the EXT SWEEP INPUT on the rear panel, or internally separated from a composite BB + Sweep signal applied to the BB INPUT. This ability to internally recover the sweep signal permits the IF/BB Receiver to operate remote from the IF/BB Transmitter.

G1-6 TROUBLESHOOTING

G1-7 Troubleshooting procedure should always begin with reference to the SYSTEM SERVICE MANUAL, which indicates the conditions under which signals are present.

G1-8 A malfunction within the 37026 will be indicated by the SYSTEM SERVICE MANUAL, which will also reference the GENERAL SERVICE SHEET, and where possible, the test point. From the Simplified Block Diagram G1-1, test point information, and the location within the GENERAL SERVICE SHEET, a malfunction can then be isolated to the appropriate ASSEMBLY SERVICE SHEET, which should then be consulted.

G1-9 The Simplified Block Diagram G1-1 indicates the principal troubleshooting test points and divides the instrument into four main blocks, namely:

1. IF Section.
2. BB Section & Return Loss.
3. Marker Section.
4. Display Section.

G1-10 Test Point Troubleshooting Procedure

G11 A malfunction within the 3702B can be isolated to a particular service sheet by monitoring the signals at the test points shown in Figure G1-1 and the IF/BB RECEIVER FUNCTIONAL BLOCK DIAGRAM, which is contained in the envelope at the rear of this manual. To gain access to these points, the top and bottom covers must be removed from the instrument. The monitoring can be done using an hp 180A Oscilloscope via a 10:1 probe, and the results compared with the appropriate waveforms on Pages 5-10 through 5-40. Any discrepancy will indicate a fault at the relevant location.

G1-12 The schematic diagrams for Assemblies Al through A27 contain waveform and voltage information at test points and other appropriate locations such as transistors. This information is to aid in troubleshooting down to component level.

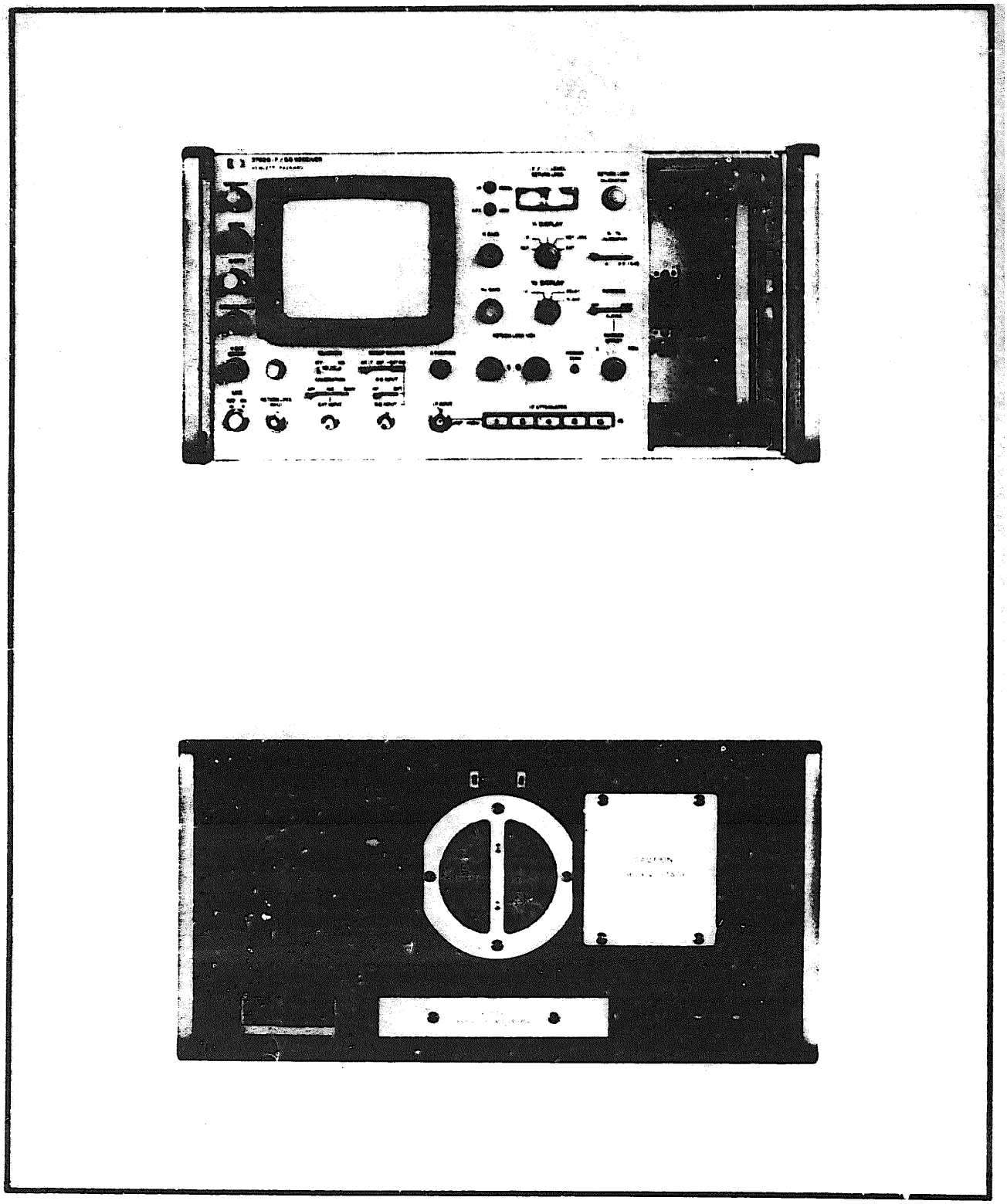


Figure G1-2 Front and Back Views

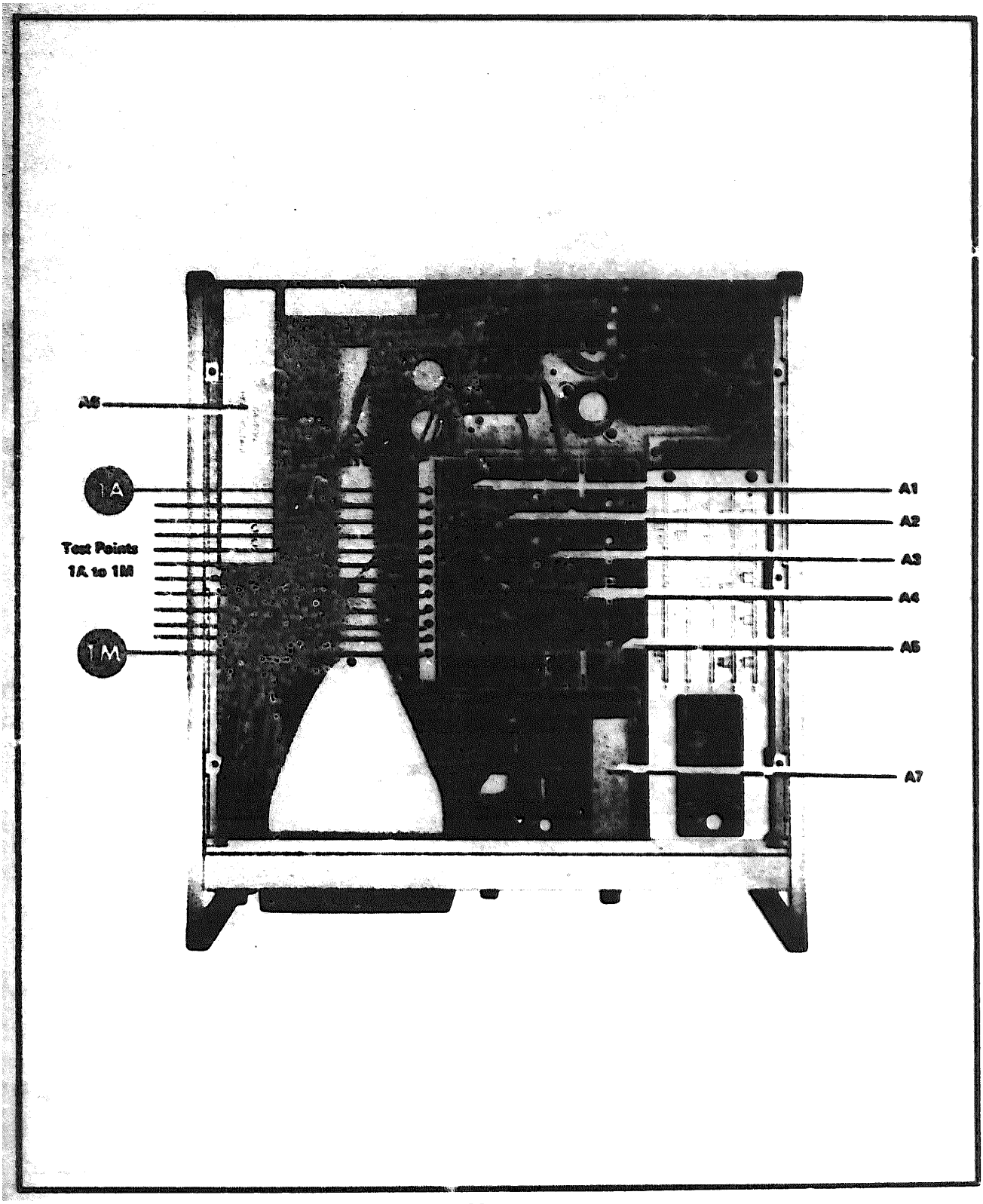


Figure G1-3 Assembly Locations - Top View

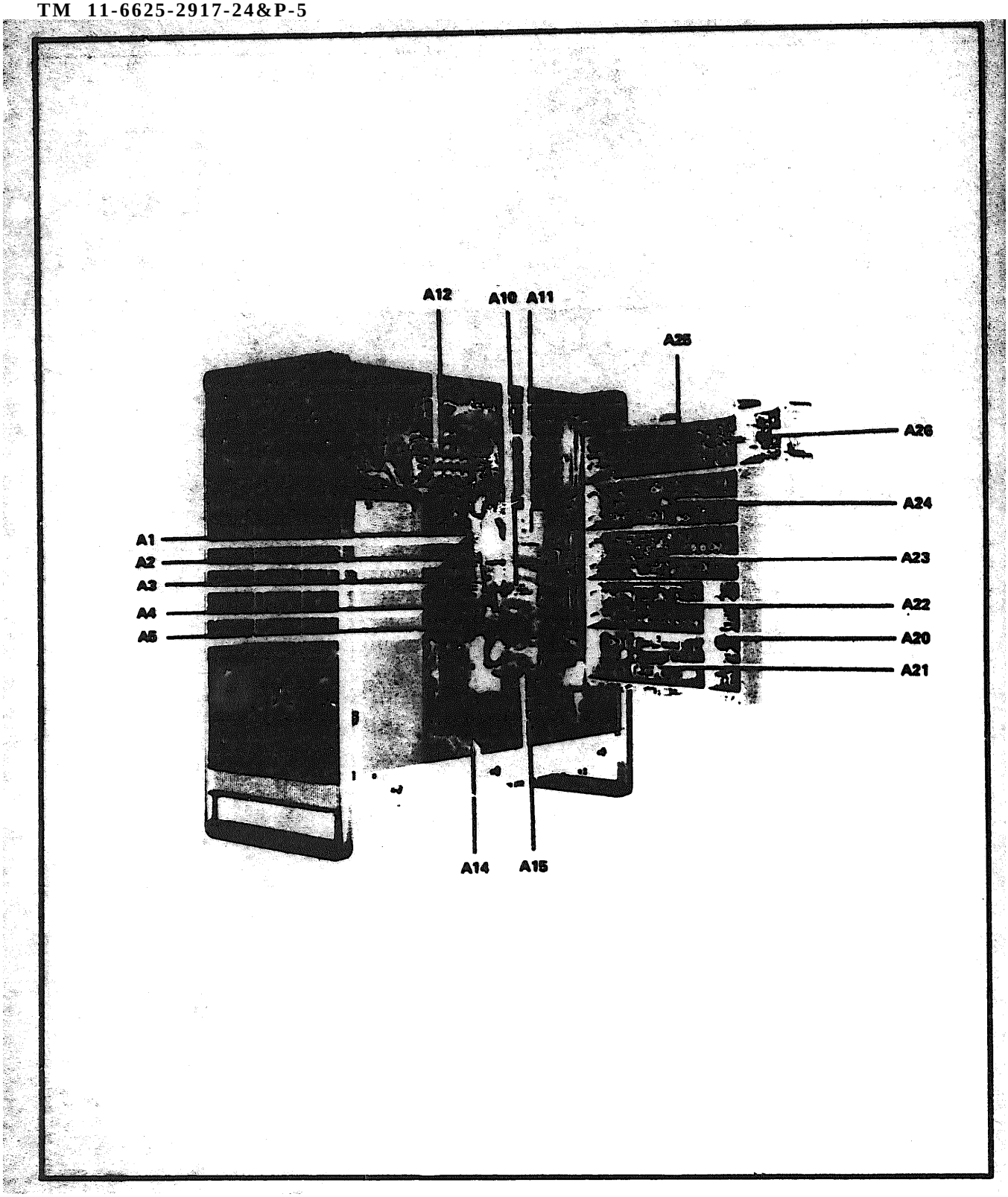


Figure G1-4 Assembly Locations - Inside Bottom View and Casting

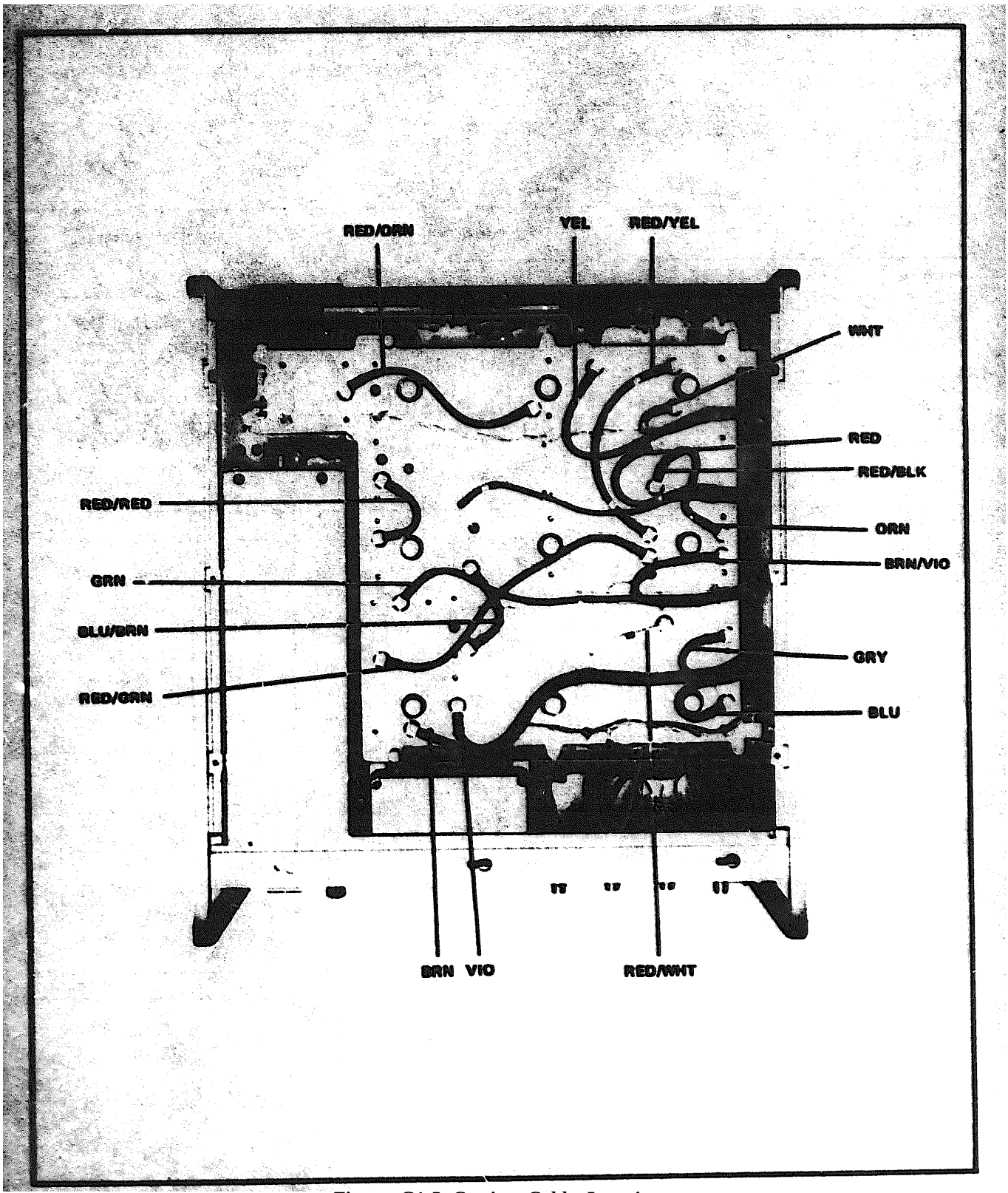


Figure G1-5 Casting Cable Locations

G1-13 General Test Points, as shown on the simplified block diagram Figure G1-1 and listed in the accompanying table are given below. The test points are shown together with typical waveforms as displayed on a 180A Oscilloscope using a 10:1 probe, unless otherwise stated.

Table 5-1. Test Point Information

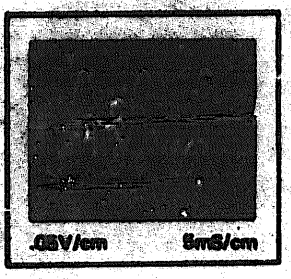
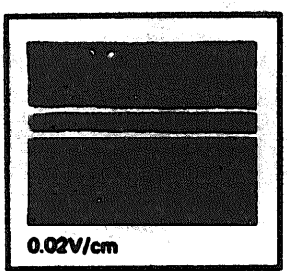
Test Point	Location	Procedure	Typical Signal
1A	On T.P. bracket. SWEEP SOURCE switch S4	a. Check that the BB recovered sweep signal is present in anti-phase when the SWEEP SOURCE switch is set to EXT BB−.	
1B	On T.P. bracket. A3(17)	a. Ensure that the Y1 Y2 CALIBRATION switch is set to OFF, and monitor with a DVM	+2.5±1V
1C	On T.P. bracket. A3(16)	a. Check the BB linearity display with the oscilloscope swept externally from the 3710A SWEEP OUTPUT, using a 1:1 probe. b. Check for calibration ratios of 1, 3 and 10% when the Y1 Y2 CALIBRATION switch is switched through its respective modes.	

Table 5-1. Test Point Information (Continued)

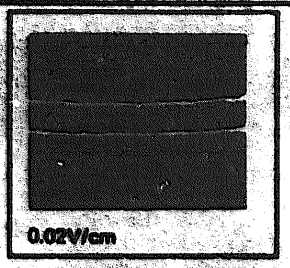
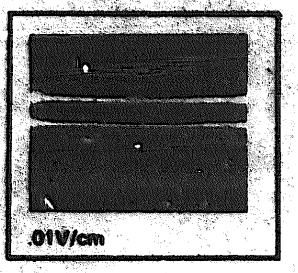
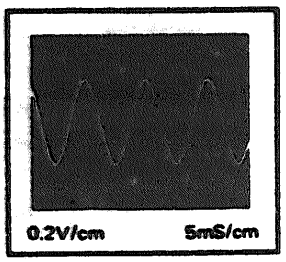
Test Point	Location	Procedure	Typical Signal
1D	On T.P. bracket. Plug-in (1)	a. Check the group delay display with the oscilloscope swept externally from the 3710A SWEEP OUTPUT, using a 1:1 probe.	
1E	On T.P. bracket. A4(5)	a. Check the IF flatness display with the oscilloscope swept externally from the 3710A SWEEP OUTPUT. b. Check for calibration ratios of 0.1, 0.3 and 1.0dB when the Y1 Y2 CALIBRATION switch is switched through its respective modes. NOTE: Use a 1:1 probe when monitoring this Test Point.	
1F	On T.P. bracket. A22(3)	a. Using a DVM, check the voltage level at 70MHz IF. b. Using a DVM, check the voltage level variation over the frequency range of 45 to 95MHz.	a Approximately 50mV b Total level variation <70mV
1G	On T.P. bracket A4 (20)	a. Check that the IF recovered sweep signal is present. The signal may be slightly distorted but should not contain any sudden changes in amplitude.	

Table 5-1 Test Point Information (Continued)

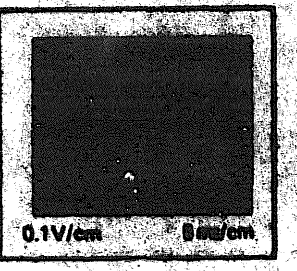
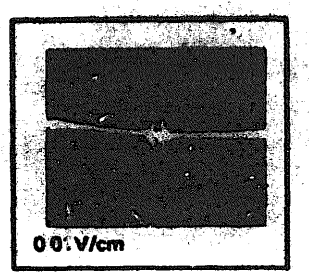
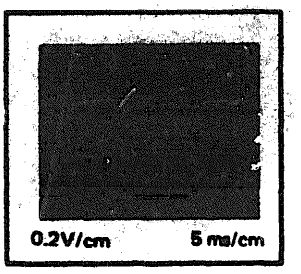
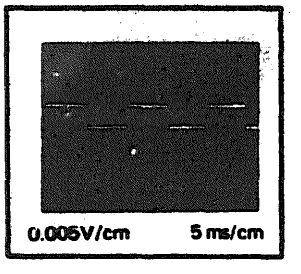
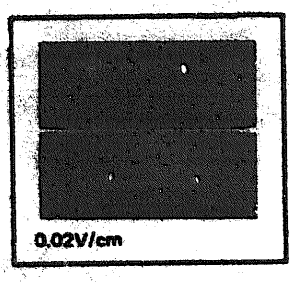
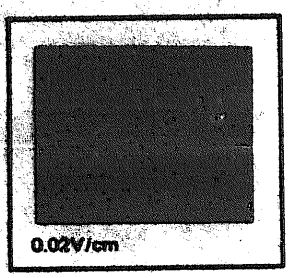
Test Point	Location	Procedure	Typcal Signal
1H	On T.P. bracket. A4(21)	a. Check the Spectrum sweep signal.	
1J	On T.P. bracket. A23(5)	a. Check the Spectrum display with the oscilloscope swept externally from the Spectrum Sweep, test point 1H. NOTE:- Use a 1:1 probe when monitoring the signal at this test point.	
1K	On T.P. bracket. A4(18)	a. Check that the EXT % CALIBRATION signal is present.	
1L	On T.P. bracket. A4(17)	a. Check that the EXT 50mV CALIBRATION signal is present.	

Table 5-1. Test Point Information (Continued)

Test Point	Location	Procedure	Typical Signal
1M	On T.P. bracket, A5(16)	a. Check the Spectrum marker display with the oscilloscope swept externally from the Spectrum sweep, test point 1H. b. Check the IF marker display, with the oscilloscope swept externally from the 3710A SWEEP OUTPUT.	a  b 

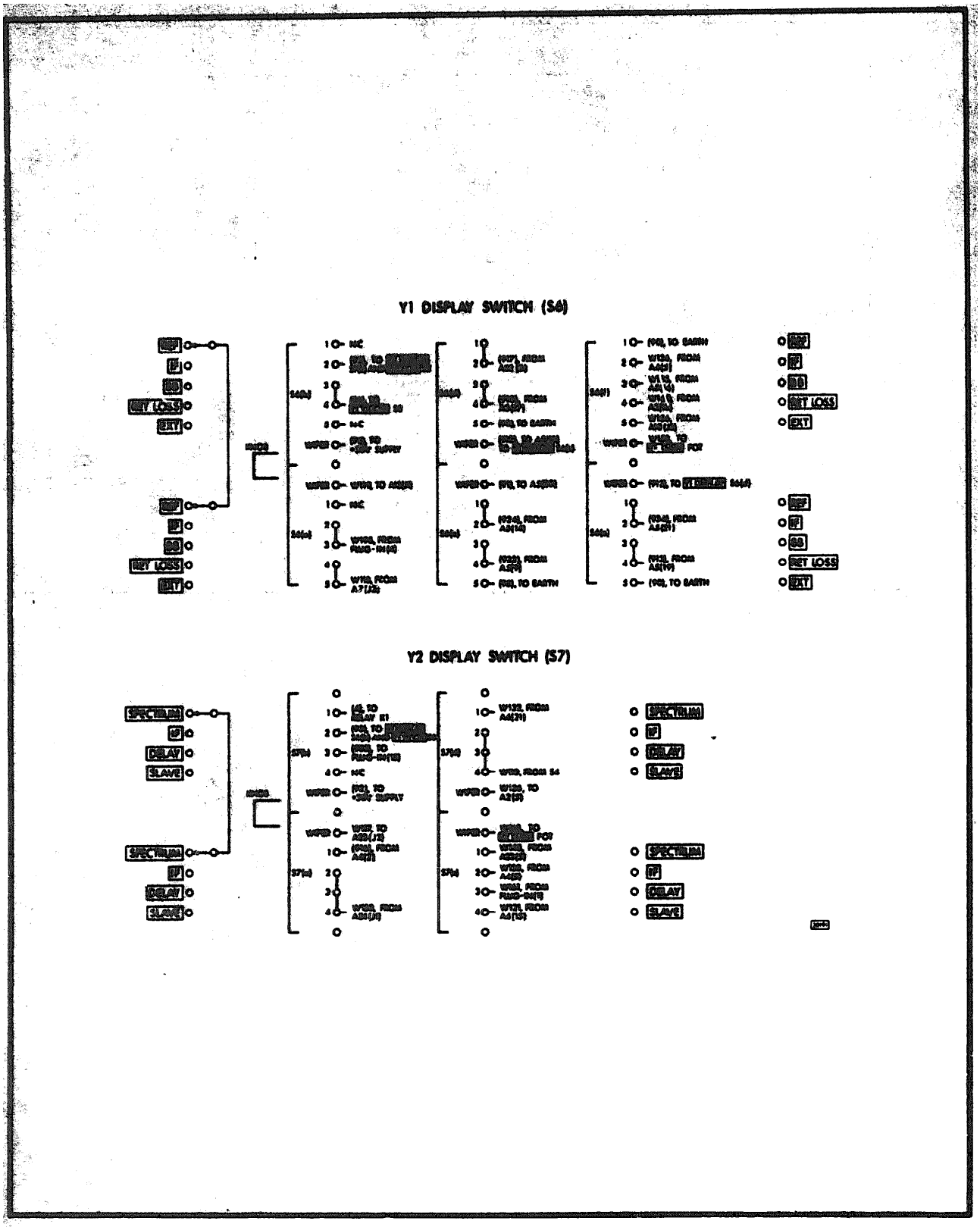


Figure G1-6 Y1 and Y2 DISPLAY Switches

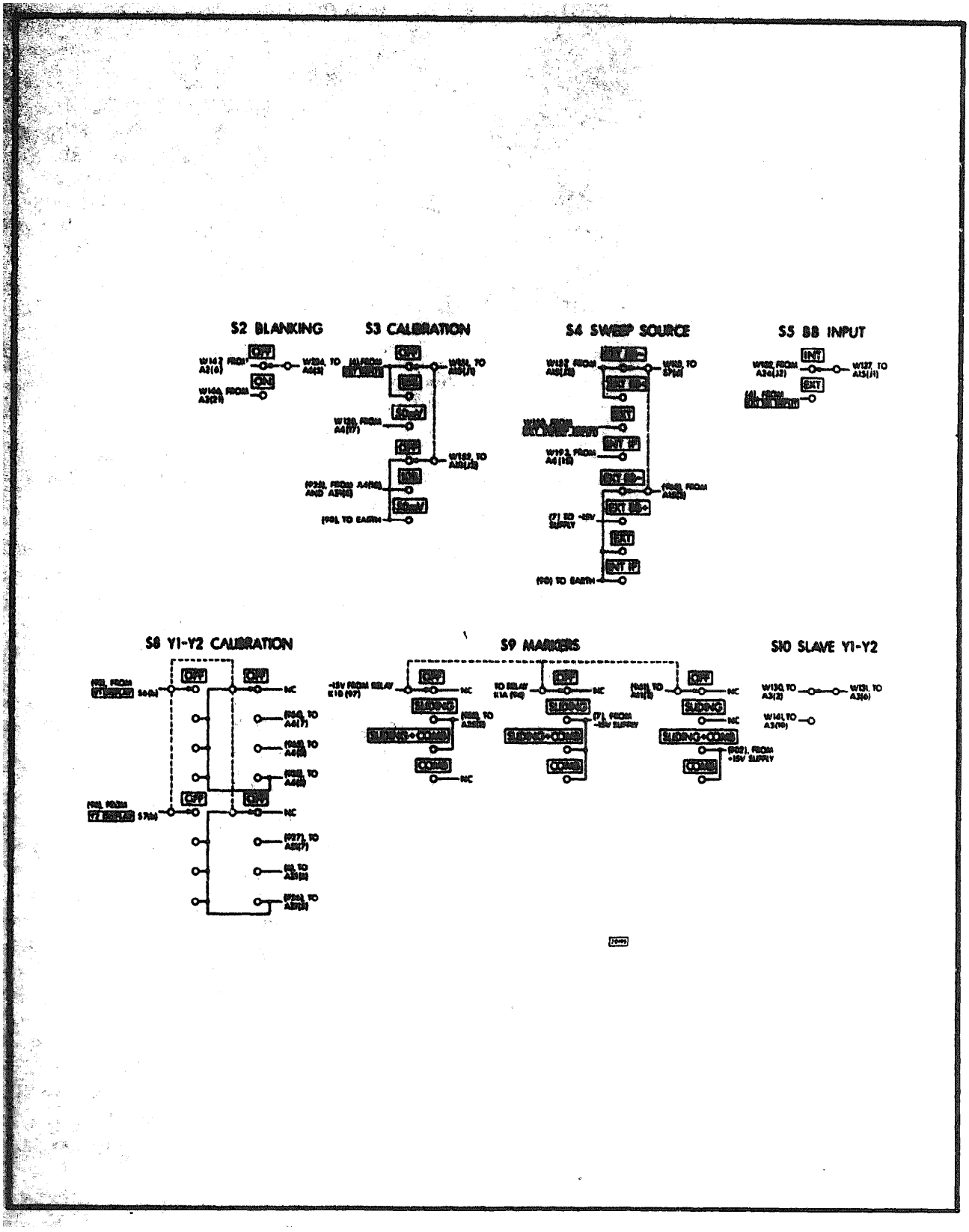


Figure G1-7 Remaining Switches

GENERAL SERVICE SHEET G2 - IF SECTION

G2-1 MODE OF OPERATION

G2-2 General

G2-3 The functions of the IF SECTION are listed below:

a to recover the BB signal from the IF input signal.

b. to recover the sweep signal from the IF input signal.

c. to provide the IF flatness display signal.

d. to provide the IF metering signals.

e. to provide the spectrum display signal and spectrum sweep.

f. to provide the calibration signal.

G2-4 The swept IF signal applied to the IF INPUT is adjusted, by the IF Attenuator A14, to a level of -10dBm, indicated by a zero meter reading, for application to the IF Amplifier and Detector A22. The signal from the IF flatness detector feeds an adder circuit in A4, and is then routed to the DISPLAY SECTION, G5. A calibration signal, from the calibration generator in A4, is added to the detected IF signal in the adder. The output from the IF amplifier is simultaneously applied to the IF meter detector and the group delay equalizer. The meter detector supplies a dc signal, corresponding to the IF level, to the meter on G5. The group delay equalizer is preset to compensate for group delay introduced in the IF amplifier and supplies one input to the mixer on A23. The other input to the mixer is obtained from the local oscillator. The local oscillator is maintained at a frequency 17.4MHz above the IF INPUT frequency by the action of the AFC loop, except in the SPECTRUM mode of the Y2 DISPLAY switch. The 17.4MHz output from the mixer has the same BB frequency modulation characteristics as the IF INPUT, and is bandpass filtered before application to the Demodulator A24. In A24, the mixer output is amplified and applied to the discriminator, which recovers the BB and sweep signals. These signals are simultaneously applied to high-pass and low-pass filters. The high-pass filter enables the recovered BB to be applied to the BB SECTION G3. The low-pass filter allows only the sweep information to be applied to the local oscillator and to the SWEEP SOURCE switch on G5.

G2-5 AFC Loop

G2-6 The purpose of the AFC loop is to enable the local oscillator to track with the IF INPUT frequency and so maintain the discriminator input at a constant frequency of 17.4MHz. By this action, the discriminator is always operating over the central and most linear portion of its characteristic, irrespective of the incoming frequency.

G2-7 The operation of the AFC loop is such that the discriminator will give an output voltage which is proportional to the input frequency and is preset such that a zero output voltage is achieved for an input frequency of 17.4MHz. The voltage controlled local oscillator is controlled by the output from the discriminator and is preset to give an output of 87.4MHz for a zero output from the discriminator.

G2-8 Consider a fixed 70MHz signal applied to the IF INPUT. The local oscillator will be at 87.4MHz, resulting in a mixer output of 17.4MHz. The mixer output is applied to the discriminator via a bandpass filter which rejects the other mixing products. The discriminator output is preset to give, a zero output voltage at 17.4MHz and therefore the local oscillator frequency will remain unchanged. If the frequency applied to the IF INPUT changes to 71MHz, the mixer output will change, before loop action, to 16.4MHz to produce a change in the discriminator output voltage. The resultant change in discriminator output voltage causes the local oscillator frequency to become 88.4MHz to maintain a mixer output frequency of 17.4MHz.

G2-9 Spectrum

G2-10 When the Y2 DISPLAY switch is in the SPECTRUM mode, the AFC loop is opened, and A24 effectively becomes inoperative. The Spectrum Sweep Generator A4 now produces the control for the local oscillator and provides the sweep signal to the DISPLAY SECTION G5. The SPECTRUM WIDTH control adjusts the amplitude of the sinewave applied to the local oscillator and the dc level of the signal is controlled by the SPECTRUM CENTRE control. The SPECTRUM CENTRE control is adjusted such that the local oscillator is swept symmetrically about 70MHz. The local oscillator output to the mixer is swept about 70MHz by an amount determined by the setting of the SPECTRUM WIDTH control.

G2-11 Consider a fixed 70MHz signal applied to the IF INPUT. The mixer output will become a zero beat as the local oscillator frequency sweeps through 70MHz. The mixer output is applied to a low-pass filter which rejects all the mixer products except the low frequency around the zero beat. The output from the low-pass filter is applied to the DISPLAY SECTION G5 to provide the 'birdie chirp' for the SPECTRUM display.

G2-12 Calibration Generator

G2-13 The calibration generator is essentially a bistable multivibrator which is triggered at the sweep frequency by pulses from the DISPLAY SECTION G5, to provide a square wave output at half the sweep frequency. One output from the calibration generator is applied to the BB SECTION G3 and the DISPLAY SECTION G5, to provide the BB calibration and the EXT INPUT calibration. The other output is supplied to the adder, via the switched attenuator, where it is superimposed on the output from the IF flatness detector on A22 to provide the split-trace IF calibration display. The Y1 Y2 CALIBRATION switch enables a split-trace of 0.1, 0.3 and 1.0dB to be selected by controlling the switched attenuator.

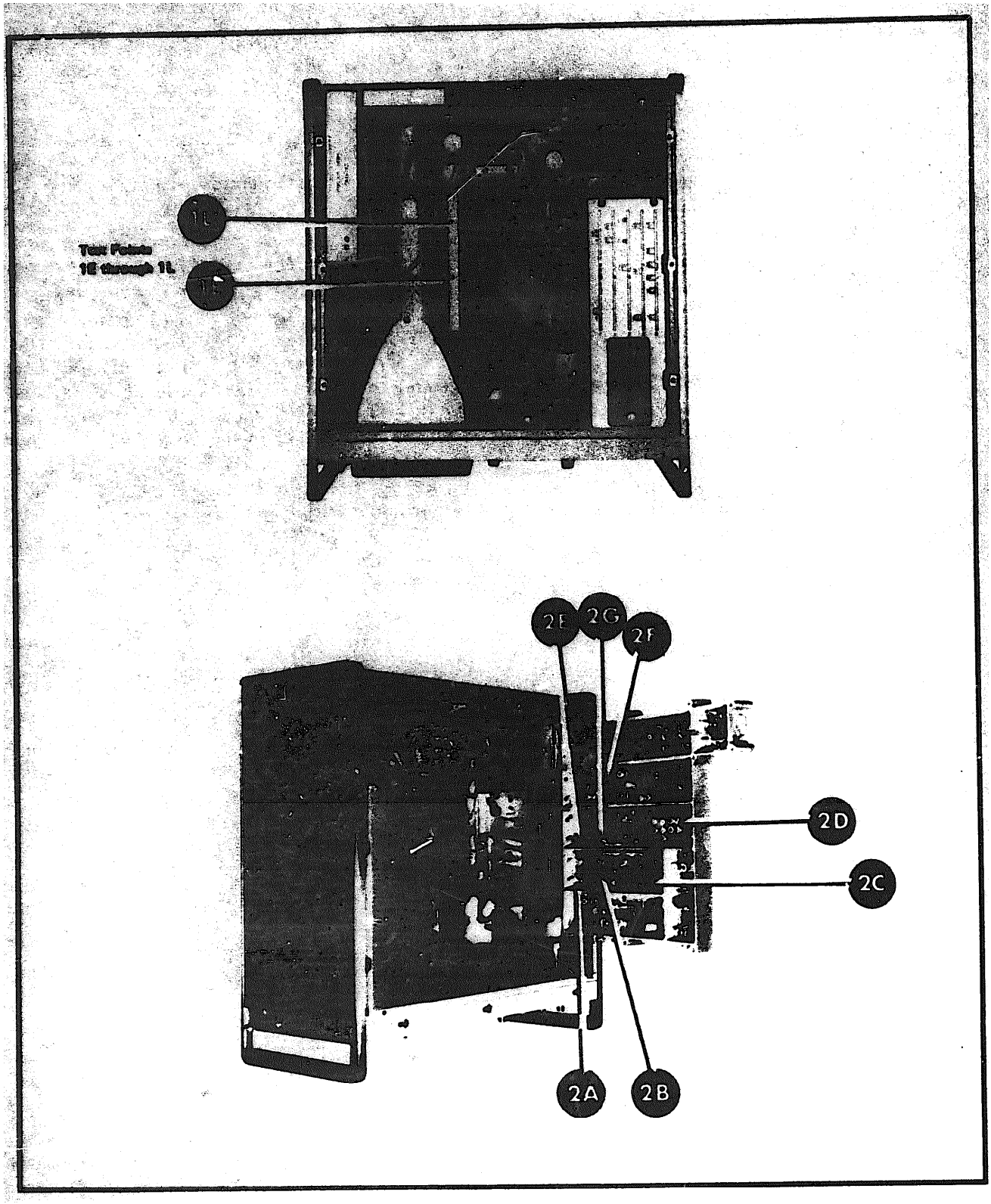


Figure G2-1 Test Points Locations

G2-14 TROUBLESHOOTING

G2-15 The typical outputs given in the trouble-shooting table are obtained from the 3702B with the system controls set as indicated below, except where otherwise stated. When the controls are altered for a specific test, the controls should be reset as indicated below on completion of that test.

1. Set the 3710A controls as below:

SWEEP .. .. OFF
SWEEP WIDTH 50MHz
DEVIATION 200kHz
IF FREQUENCY 70MHz
IF VERNIER 0
IF ATTENUATOR .. .. insert 10dB

2. Set the 3715A/3716A controls as below:

BB FREQUENCY .. .. OFF

3. Set the 3702B controls as below:

Y1 DISPLAY .. .. IF
Y2 DISPLAY .. .. IF
IF ATTENUATOR .. .. insert 10dB
BB INPUT .. .. INT.
SWEEP SOURCE .. .. IF

4. Connect the 3710A IF OUTPUT to the 3702B IF INPUT.

Table 5-2. Test Point Information

Test Point	Location	Procedure	Typical Signal
2A	A22(J2)	a. Disconnect the RED/WHT coded cable from A22J2. b. Connect the 432A Power Meter, via the 75/50Ω matching pad, to the RED/WHT coded cable. c. Measure the power level. d. Check the attenuator steps. The attenuator steps should be accurate to within 0.2dB. Reconnect the RED/WHT cable to A22J2.	c. -10dBm ±5dB†
2B	A4(4)	a. DC level. b. Check the level variation over the IF frequency range 45 to 95MHz.	a. +11.3V dc. b. <3mV.

†NOTE: Matching Pad losses are:

Rohde & Schwarz 6.0dB
Greenpar 8.2dB

Table 5-2. Test Point Information (Continued)

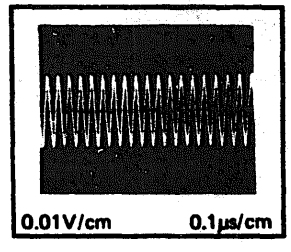
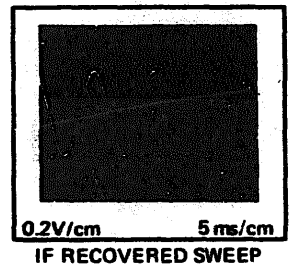
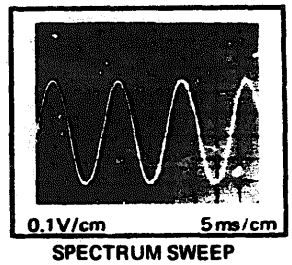
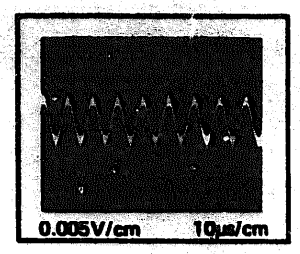
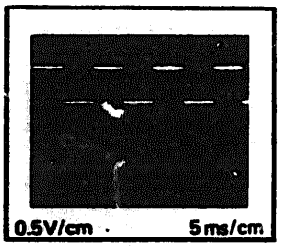
Test Point	Location	Procedure	Typical Signal
2C	A22J3	a. Disconnect the BRN/BLU coded cable from A22J3. b. Connect the 432A Power Meter via the 75/50Ω matching pad and a 15539A cable, to A22J3. c. Measure the output level. d. Measure the output variation as the 3710A IF FREQUENCY control is varied over the range 45 to 95MHz. Reconnect the BRN/BLU cable to A22J3.	c. +2dBm ±2dB. d. <0.8dB
2D	A24J3	a. Check that the signal level is 0.4V pk-pk. b. Monitor the frequency with the Electronic Counter. c. Check the variations in signal level as the 3710A IF FREQUENCY control is varied from 45 to 95MHz.	a  b. 17.4MHz ±100kHz c. <0.05V
2E	A23J2	a. To measure the IF recovered sweep, set the 3710A SWEEP control to INT. The signal may be slightly distorted but should not contain any sudden changes in amplitude. b. To measure the Spectrum sweep, set the Y2 DISPLAY switch to SPECTRUM and the SPECTRUM WIDTH fully clockwise. c. Check that the amplitude reduces to approximately 150mV as the SPECTRUM WIDTH control is varied from fully clockwise to fully anticlockwise. d. Check that the dc level variation is -1V to +2V as the SPECTRUM CENTRE control is varied from fully anticlockwise to fully clockwise.	 IF RECOVERED SWEEP  SPECTRUM SWEEP

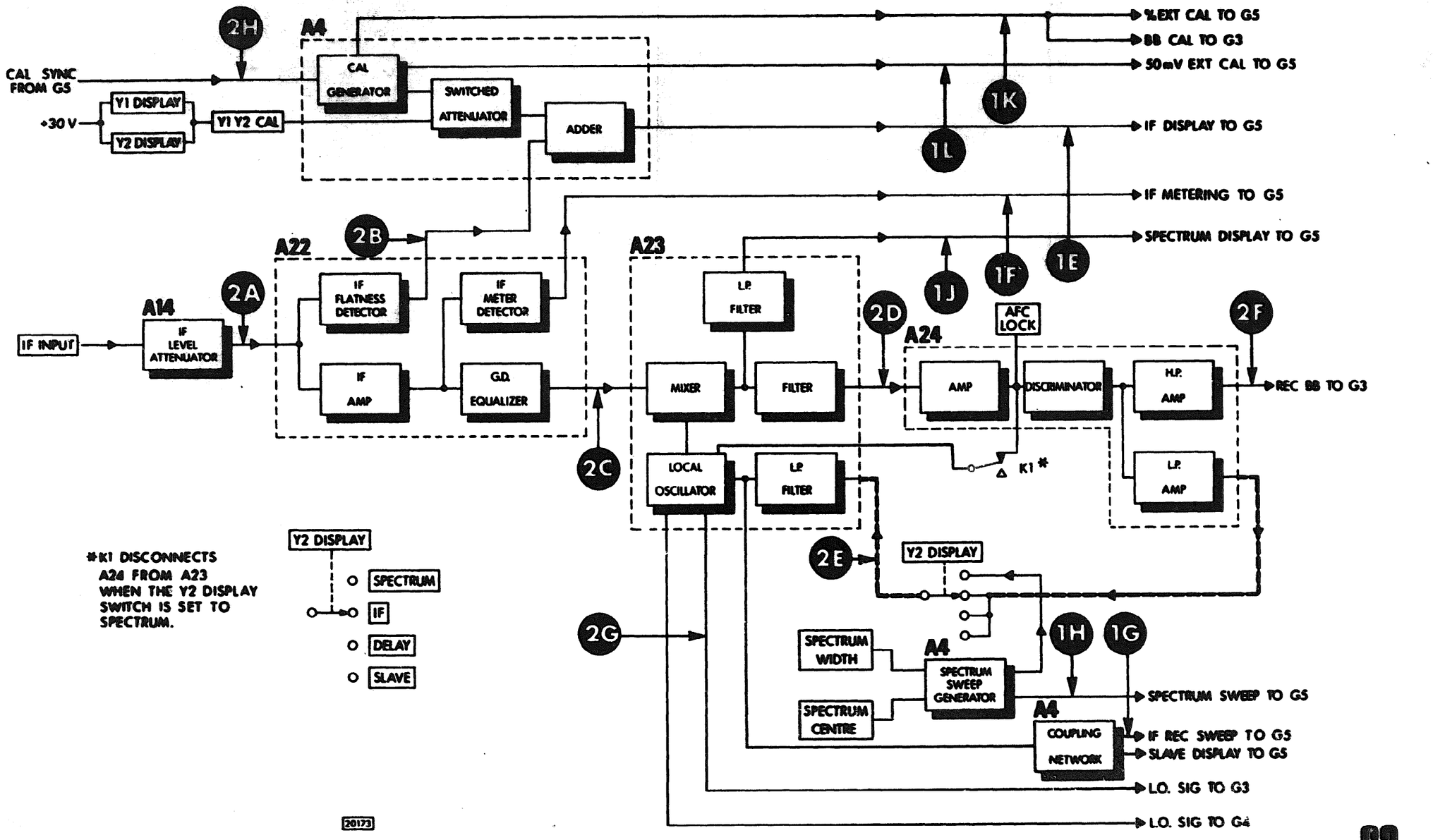
Table 5-2. Test Point Information (Continued)

Test Point	Location	Procedure	Typical Signal
2F	A24J2	a. Set the 3715A/3716A BB FREQUENCY control to 83.3kHz. b. Check the level for all BB FREQUENCY control settings up to 5.6MHz. c. Check the level as the 3710A IF FREQUENCY control is varied from 45 to 95MHz.	
2G	A23J3	a. Disconnect the RED/GRN coded cable from A23J3. b. Connect the 432A Power Meter via the 75/50Ω matching, pad to A23J3. c. Check the voltage level as the 3710A IF FREQUENCY control is varied from 45 to 95MHz. d. Disconnect the 3710A IF OUTPUT from the 3702B IF INPUT. e. Connect the 3710A AUX OUTPUT to the 3702B IF INPUT, and set the 3710A AUX OUTPUT to 70MHz XTAL. f. Check the frequency at A23J3 using the Electronic Counter. Reconnect the RED/GRN cable to A23J3.	c. 0dBmt f. 87.4MHz ±0.1MHz
2H	A4(16)	a. Set the 3710A SWEEP control to INT and monitor with Oscilloscope using a 10:1 probe	

IMPORTANT: For a more detailed Troubleshooting procedure for the AFC Loop, refer to Assembly Service Sheets A23 and A24 on Pages 5-94 to 5-95.

†NOTE: Matching Pad losses are:

Rohde & Schwarz	6.0dB
Greenpar	8.2dB



G2

Figure G2-2 Simplified Block Diagram

GENERAL SERVICE SHEET G3 - BB SECTION

G3-1 MODE OF OPERATION

G3-2 General

G3-3 Functionally, this Service Sheet consists of two sections:

a. The BB section, the input of which can be from an external source or the recovered BB from the IF SECTION G2. The BB section measures the power and examines the signal for variations in amplitude, and phase (when a 3703B or 3705A Plug-in is fitted), with the IF INPUT frequency, and converts the variations into a suitable form for application to the DISPLAY SECTION G5, ie, BB linearity (amplitude variations) and group delay (phase variations). If the external BB contains sweep information, the two signals are separated and the sweep is applied to the SWEEP SOURCE switch on G5.

b. The return loss section enables the power of the RETURN LOSS INPUT to be measured and examined for variations against frequency. The variations obtained are converted into a suitable form for application to the DISPLAY SECTION G5.

G3-4 Baseband

G3-5 The BB INPUT switch selects the source of the BB signal, and applies the signal to A15, which uses high-pass and low-pass filters to separate the BB from the sweep (if present). The sweep signal is then applied to the DISPLAY SECTION G5. The BB signal is applied to the BB Attenuator A13 via either the push-button switch S14 (when the Plug-in is removed) or a low-pass filter in the Plug-in. A portion of the BB signal is examined in the Plug-in for phase variations, and the resultant group delay or differential phase is applied to the DISPLAY SECTION G5. Detailed information on the operation of the Plug-in is contained in the relevant service manual. The BB Attenuator A13 is adjusted to give the correct signal input level to the BB Amplifier and Detector A21. The correct input level is indicated by a zero reading on the meter. The setting of the BB POWER attenuator will then give a direct reading in dBm of the BB INPUT power. The Y1 Y2 CALIBRATION switch enables the calibration signal from A4 to switch the gain of the amplifier, at half the weep rate, to provide the calibration of 1, 3 or 10%. The BB signal is detected, and the output is simultaneosly applied to the DISPLAY SECTION G5 to provide the meter signal; and to a Iow-pass filter on A3. The BANDWIDTH switch, controls the low-pass filter on A3 by limiting the bandwidth of the BB linearity display to 1 or 5kHz. The BANDWIDTH switch is located on the Plug-in and when no Plug-in is fitted, the bandwidth is set to 1 kHz, or 5kHz by means of the BB BANDWIDTH switch located in the Plug-in housing in the 3702B.

G3-6 Option 004

G3-7 Option 004 provides an additional BB INPUT, at a balanced impedance of 124 ohm. The lmpedance Converter A8 separates the BB signal from the sweep signal and converts each to 75 ohm impedance. The BB signal is applied to the three-position BB INPUT switch and the sweep signal is applied to the DISPLAY SECTION G5.

G3-8 Return Loss

G3-9 In the Return Loss mode, the AFC loop in the IF SECTION G2 must be operated with a replica of the IF Return Loss Input signal. The 3710A UNCAL IF OUTPUT is normally connected to the 3702B IF INPUT to operate the AFC loop, and the 3710A IF OUTPUT is connected to the 3702B RETURN LOSS INPUT via the *hp* 15520A Hybrid, to enable the return loss measurements to be made.

G3-10 The RETURN LOSS INPUT supplies one input of the return loss mixer, the other input being supplied by the output from the local oscillator on the IF SECTION G2. Due to the action of the AFC loop, the local oscillator signal will track the return loss input signal with a frequency difference of 17.4MHz. The output from the Re-

turn Loss Mixer A20 will therefore be a 17.4MHz signal with the same amplitude variations as at the RETURN LOSS INPUT. The mixer output is applied to the Return Loss Amplifier A7, the gain of which can be adjusted by the RETURN LOSS CALIBRATION control. The output from the amplifier is then applied, via the Y1 DISPLAY switch, to the BB POWER/RETURN LOSS Attenuator A13, and from there to the BB Amplifier, A21, where it is amplified and detected to provide a dc level output proportional to the amplitude variations at the RETURN LOSS INPUT.

G3-11 The RETURN LOSS CALIBRATION control enables the attenuator A13 to be calibrated in the following manner.

G3-12 A known return loss power is measured and the attenuator A13 is set to this known value. The RETURN LOSS CALIBRATION control is adjusted to set the input to amplifier A21 at the correct power level, which is indicated by a zero meter reading. The CRT position controls are adjusted to set the return loss display to a reference position. The unknown return loss to be measured is substituted for the known value and attenuator A13 is adjusted to bring the display trace back to the reference position. The attenuator setting is a direct reading of the Return Loss Power. The action of the circuits following the attenuator A13 is the same as when the BB is applied.

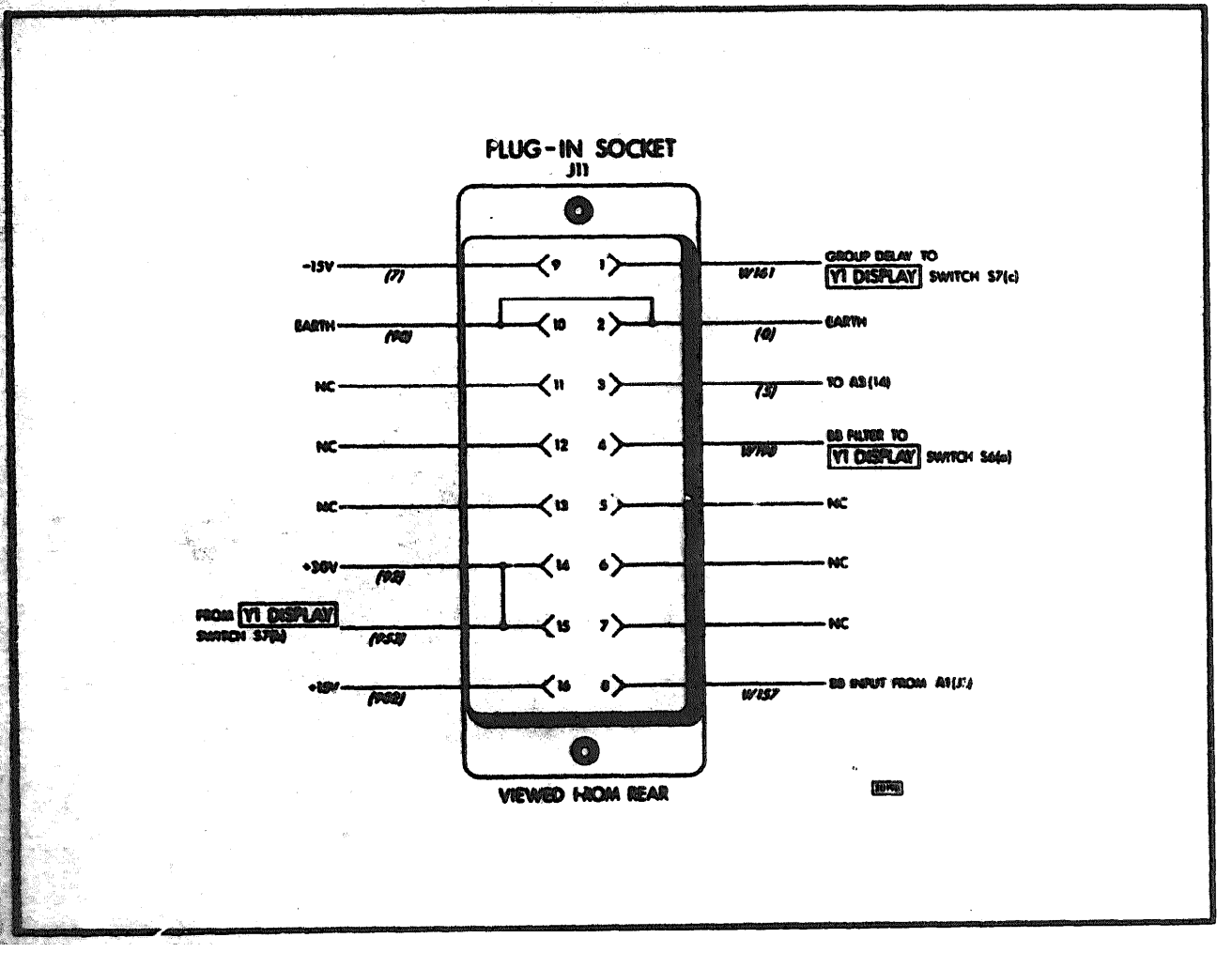


Figure G3-1 Plug-in Socket

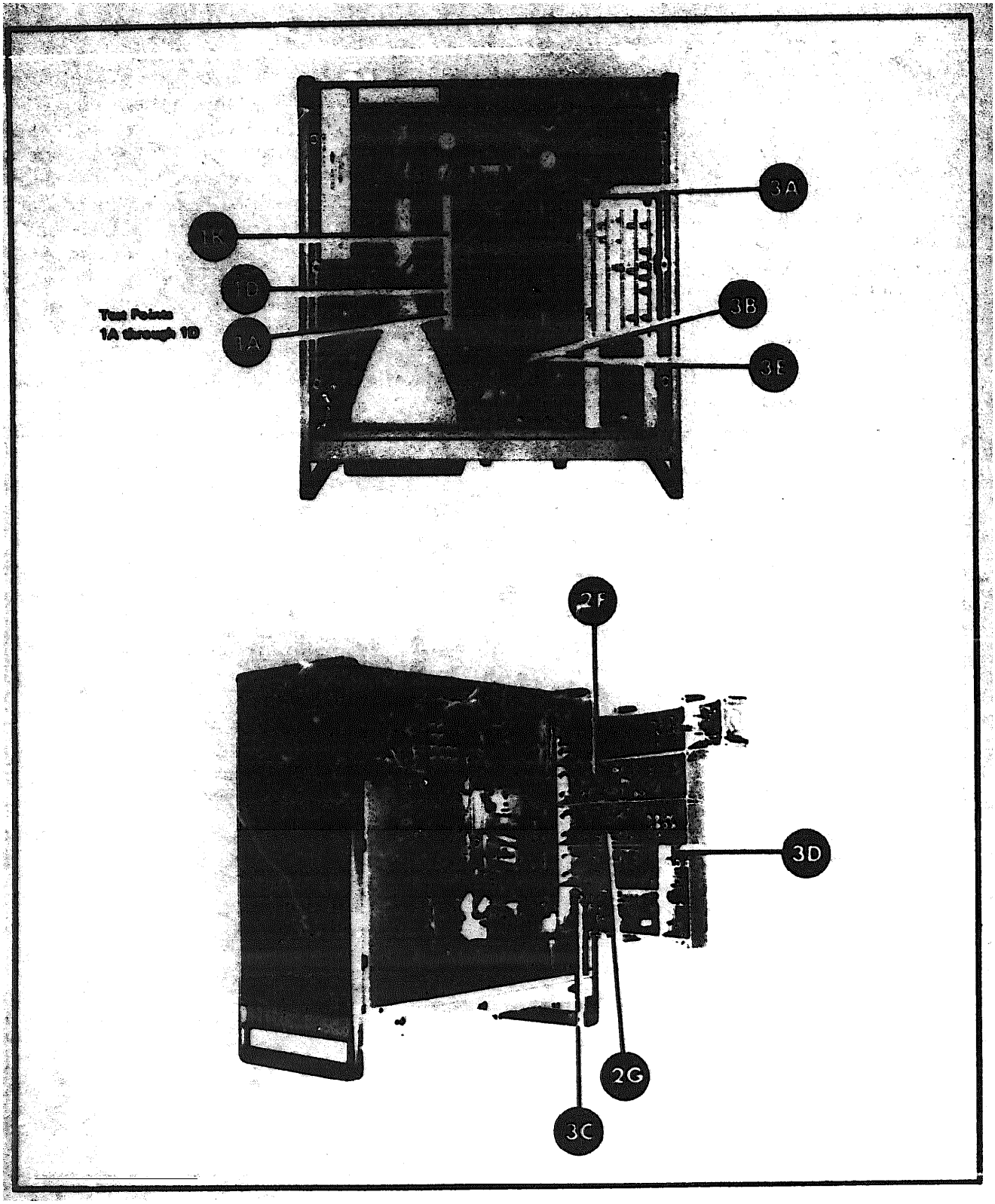


Figure G3-2. Test Point Locations

G3-13 TROUBLESHOOTING

G3-14 The typical outputs obtained for test points A, B and C in the troubleshooting table are derived from the 3702B when the system is adjusted as in Test Set Up 1.

TEST SET UP 1
Set the 3710A controls as below:

SWEEP .. .. OFF

Set the 3715A/3716A controls as below:

BB FREQUENCY 83.3kHz
BB POWER .. .. -10dBm
BB + SWEEP VERNIER .. .. CAL

Set the 3702B controls as below:

BB INPUT .. .. EXT
BB POWER .. .. -10dBm
Y1 DISPLAY .. .. BB
Y2 DISPLAY .. .. IF

Set the 3705A controls as below:

BB FREQUENCY 83.3kHz

Connect the 3715A/3716A BB + SWEEP OUTPUT to the 3702B BB INPUT.

G3-15 The typical outputs obtained for test points D and E in the troubleshooting table are derived from the 3702B when the system is adjusted as in Test Set Up 2.

TEST SET UP 2
Set the 3710A controls as below:

SWEEP .. .. OFF
SWEEP WIDTH 50MHz
IF FREQUENCY 70MHz
IF VERNIER 0
AUX OUTPUT .. .. UNCAL IF
IF ATTENUATOR .. .. insert 46dB

Set the 3715A/3716A controls as below:

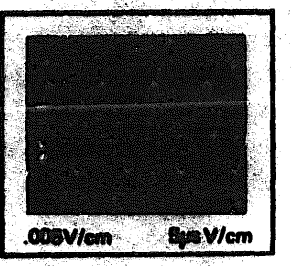
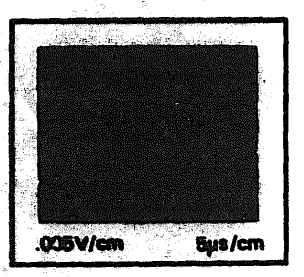
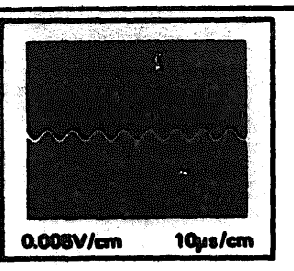
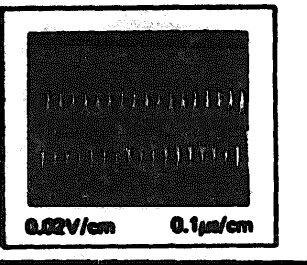
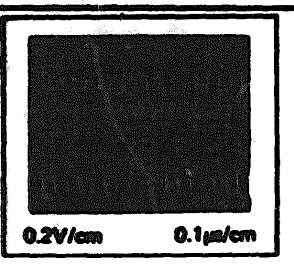
BB FREQUENCY .. .. OFF

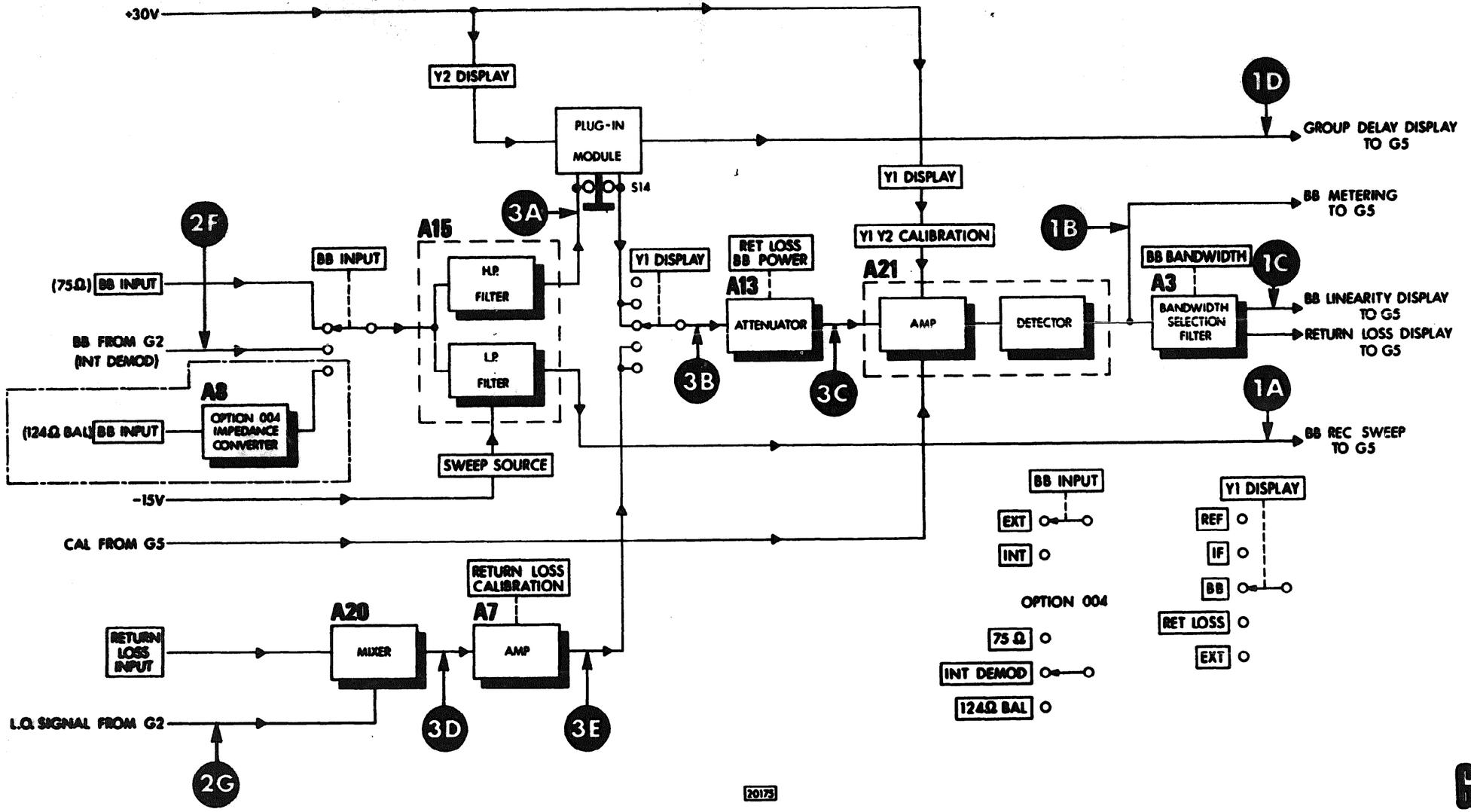
Set the 3702B controls as below:

RETURN LOSS CALIBRATION .. .. .. fully cw
Y1 DISPLAY .. .. RET LOSS
Y2 DISPLAY .. .. IF
IF ATTENUATOR .. .. insert 2dB
SWEEP SOURCE .. .. IF

Connect the 3710A IF OUTPUT to the 3702B RET LOSS INPUT. Connect the 3710A AUX OUTPUT to the 3702B IF INPUT, and check that the AFC LOCK lamp is alight.

Table 5-3. Test Point Information

Test Point	Location	Procedure	Typical Signal.
3A	J1(8) on rear of Plug-in	a. Check the signal level for all 3715A/ 3716A BB FREQUENCY control settings except OFF.	
3B	Y1 DISPLAY S6(A) (BRN/WHT coded cable).	a. Check the signal level for all 3715A/ 3716A BB FREQUENCY control settings. NOTE: If the 3702B is fitted with a 3705A plug-in, the 3705A BB FREQUENCY control setting must be the same as the 3715A/3716A.	
3C	A21J1	a. Use a 1:1 probe. Check the BB signal level for all identical settings of the 3702B and 3715A/116A BB POWER attenuators.	
3D	A20J3	a. Disconnect the GRN coded cable grom A20J3, and connect the 180A via the 15539A Test Cable to A20J3. b. Check as the 3710A IF FREQUENCY is adjusted over the range 45 to 95MHz. Reconnect the GRN cable to A20J3.	
3E	A7J2	a. Disconnect the BRN/GRY coded cable from A7J2, and connect the 180A via the 15539A Test Cable to A7J2. b. Check that the signal amplitude reduces to less than 0:1V as the RETURN LOSS CALIBRATION control is adjusted fully anticlockwise. Reconnect the BRN/GRY cable to A7J2.	



G3

Figure G3-3 Simplified Block Diagram

G4-1 MODE OF OPERATION

G4-2 General

G4-3 The function of the MARKER SECTION is to generate and process the following frequency markers for display on the CRT.

1. IF frequency markers which can be either a fixed 70MHz centre-marker with symmetrical sliding markers, a 2MHz crystal controlled marker comb - or a combination of both.

2. A 70MHz crystal controlled spectrum marker.

G4-4 The MARKERS switch, by connecting the ±15V lines to various oscillators, determines which markers are generated, except when the Y2 DISPLAY switch is set to SPECTRUM. Table G4-1 indicates which illators are operative for the various modes of the MARKERS switch.

G4-5 Centre and Sliding Markers

G4-6 The dc Bias Network on A5 supplies the dc voltage to control the frequency of the Voltage Controlled Oscillator (VCO) on A25. The MARKER OFFSET control (calibrated from 0 to 26MHz) can be adjusted to set the frequency of the VCO within the range 262.2MHz to 288.2MHz. Zero on the MARKER OFFSET control corresponds to a VCO frequency of 262.2MHz and 26 to 288.2MHz. The zero end of the MARKER OFFSET c calibrated by the MARKER ZERO control.

G4-7 The first mixer on the A25 has two i one from the VCO and the other via the I from the 87.4MHz crystal oscillator on A2(mixer product derived from the VCO output the third harmonic of the 87.4MHz oscillator selected via a low-pass filter to give a mixer c in the range 0 to 26MHz depending on the switch of the MARKER OFFSET control.

G4-8 Consider any setting of the MARKER SET control, say 10MHz. One input to the mixer will then be 10MHz while the other will be 874MHz from A26 via the hybrid mixer products thus formed, 87.4 + 10MH 87.4 – 10MHz, are selected by filtering together with some 87.4MHz signal leaked the second mixer from one input to the mixer. Thus one input to the third mixer cc of three frequencies, 77.4MHz, 87.4MHz 97.4MHz. The other mixer input from the Oscillator is held 17.4MHz above the frequency the IF input by the action of the AFC loop. A local oscillator sweeps through 77.4MHz, 87.4MHz and 97.4MHz the final mixer output will become zero beat. The zero beats will correspond to input frequency of 60MHz, 70MHz and 80 The zero beats are processed in A5 into a form to provide the marker display.

Table G4-1 Switching of Marker Oscillators

DISPLAY SWITCH	IF, DELAY OR SLAVE				SPECTRUM
MARKERS SWITCH	OFF	SLIDING	SLIDING + COMB	COMB	Any mode
Oscillator					
A11, 2MHz Xtal	No	No	Yes	Yes	No
A25, VCO	No	Yes	Yes	No	No
A26, 87.4MHz Xtal	No	Yes	Yes	Yes	No
A25, 70MHz Xtal	No	No	No	No	Yes

G4-9 Comb Markers

G4-10 With the marker comb switched on, the 2MHz Crystal Oscillator A11 provides a further input to the second mixer. The 87.4MHz combines with the 2MHz signal and its harmonics to produce a final mixer output of zero beats of 2MHz intervals.

G4-11 Spectrum Marker

G4-12 In SPECTRUM mode the AFC loop is inoperative and the local oscillator frequency is wept by the spectrum sweep around 70MHz. To produce the spectrum marker the second input to the final mixer is provided by the 70MHz crystal oscillator. A zero beat will now be produced when the local oscillator frequency sweeps through 70MHz.

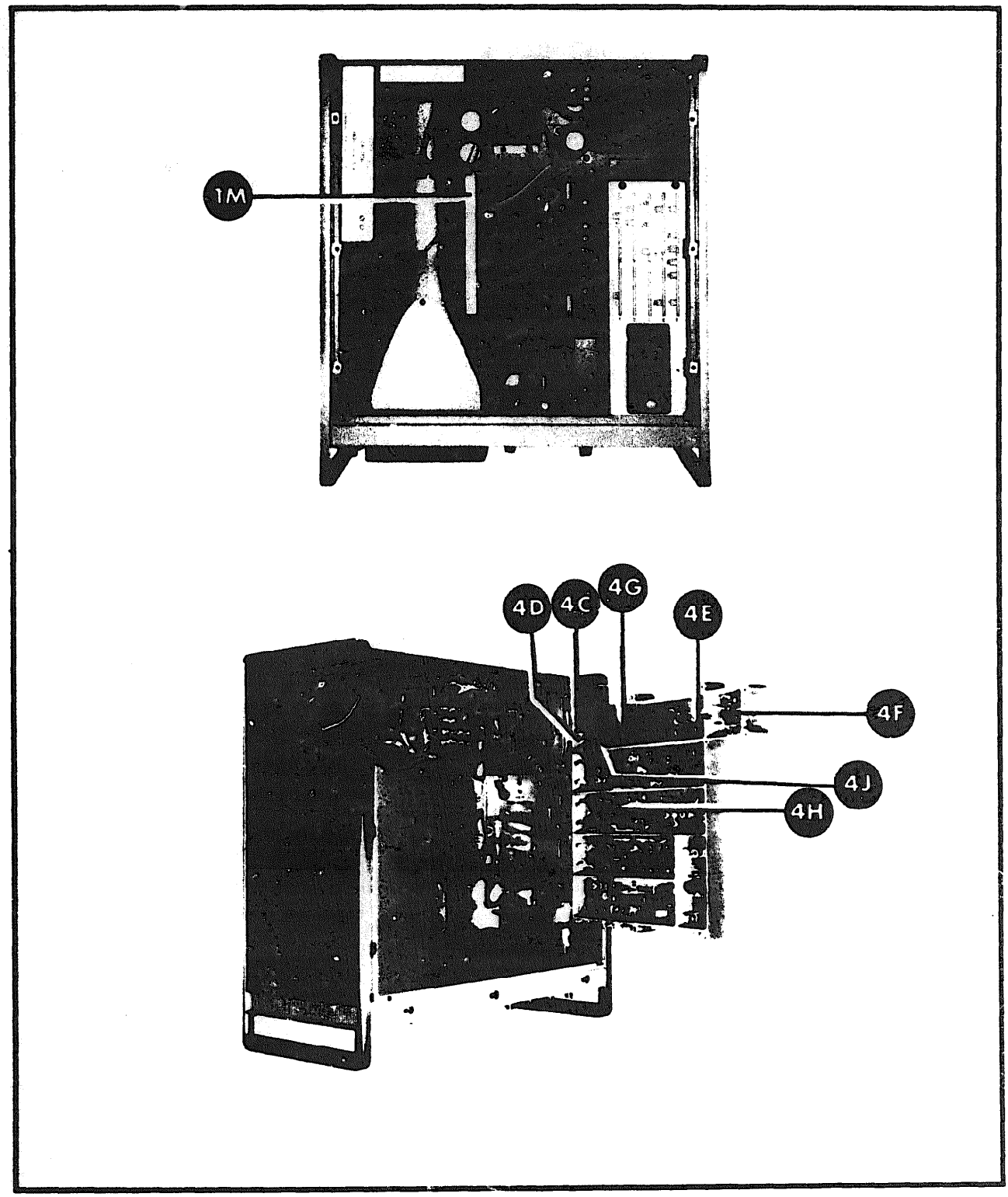


Figure G4-1 Test Point Locations

Table G4-2 Troubleshooting

Monitor Point	Location	Voltage	MARKERS Setting	Y2 DISPLAY Setting
4A	A11(1)	+15V	COMB, SLIDING + COMB	All
4B	A11(2)	-15V	All except OFF	All except SPECTRUM
4C	A25(2)	-15V	SLIDING, SLIDING + COMB	All except SPECTRUM
4D	A25(3)	-15V	All	

G4-13 TROUBLESHOOTING

G4-14 The markers required for display are selected by the MARKERS switch. The MARKERS switch and the Y2 DISPLAY switch govern which circuits will operate by controlling application of the power supply lines.

G4-15 Check the switching operation as indicated below.

G4-16 To troubleshoot the IF markers, the system controls must be set as follows:

1. Set the 3710A controls as below:

SWEEP .. .. INT
SWEEP WIDTH 50MHz
IF FREQUENCY 70MHz
IF ATTENUATOR .. .. insert 10dB

2. Set the 3702B controls as below:

Y1 DISPLAY .. .. ANY position
Y2 DISPLAY .. .. IF
IF ATTENUATOR .. .. insert 10dB
MARKERS .. .. as indicated

Connect the 3710A IF OUTPUT to the 3702B IF INPUT, and ensure that the AFC LOCK lamp is alight.

G4-17 To troubleshoot the Spectrum marker, check that the Y2 DISPLAY switch is set to SPECTRUM before monitoring test points H and J.

Table 5-4. Test Point Information

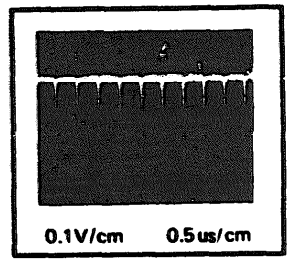
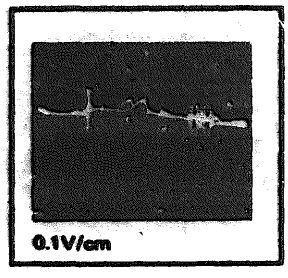
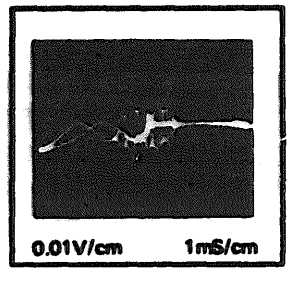
Test Point	Location	Procedure	Typical Signal
4E	A25(5)	This signal only contributes to the sliding markers operation. a. Check that the dc level is continuously variable by operation of the MARKER OFFSET control. b. Check the dc level with the MARKER ZERO control varied.	a. Approximately 1.5V within the range -2V to -7V. b. DC level variation 2V.
4F	A26(J1)	a. Set the MARKERS switch to any position except OFF. b. Disconnect the RED/ORN cable from A26J1. c. Connect the 432A Power Meter A26J1 via the 75/50Ω matching pad and measure the output for all positions of the MARKERS switch except OFF. d. Disconnect the 432A Power Meter and connect the Electronic Counter to A26J1, and measure the frequency output for all positions of the MARKERS switch except OFF. Reconnect the RED/ORN cable to A26J1.	c. +1dBm. d. 87.4MHz ±10kHz.
4G	A25(J1)	a. Set the MARKERS switch to COMB and perform the following checks, then set the MARKERS switch to SLIDING + COMB and repeat the checks. Disconnect the YEL coded cable from A11(J1). Connect the Oscilloscope via the 15539A Test Cable to A11(J1). b. Measure the frequency at A11J1 using the Electronic Counter.	a.  b. 2MHz ±10kHz.

Table 5-4. Test Point Information (Continued)

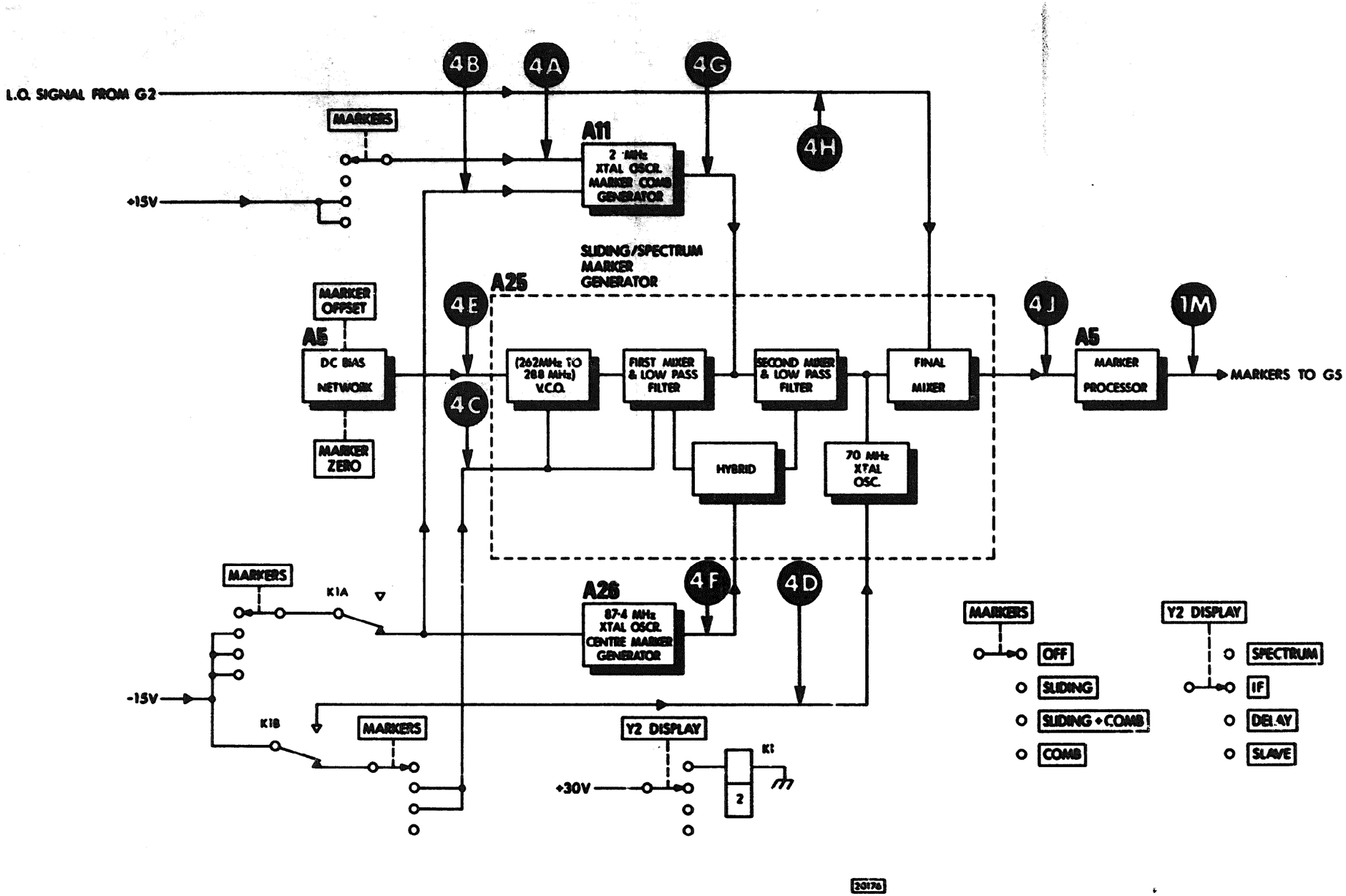
Test Point	Location	Procedure	Typical Signal
4H	A23J6	**Part 1** a. Set the Y2 DISPLAY switch to any position except SPECTRUM. b. Disconnect the RED/YEL coded cable from A23J6. c. Connect the 432A Power Meter to A23J6, via the 75/50Ω matching pad. d. Set the 3710A SWEEP switch to OFF,and vary the 3710A IF FREQUENCY from 45 to 95MHz. e. Disconnect the 3710A IF OUTPUT from the 3702B IF INPUT and connect the 3702B IF INPUT to the 3710A AUX OUTPUT. f. Set the 3710A AUX OUTPUT to 70MHz XTAL. g. Using the Electronic Counter, check that the frequency at A23J6 is 87.4 ±0.1MHz. Reconnect the RED/YEL cable to A23J6. Return to the set-up described in Paragraph G4-16. **Part 2** a. Set the Y2 DISPLAY switch to SPECTRUM. b. Disconnect the RED/YEL coded cable from A23J6. c. Connect the Spectrum Analyzer to A23J6. d. Check that the output is a swept frequency, the centre of which can be set to 70MHz using the SPECTRUM CENTRE control.	c. 0dBm †

†NOTE: Matching Pad losses are: Rohde & Schwarz 6.0dB
Greenpar 8.2dB

Table 5-4. Test Point Information (Continued)

Test Point	Location	Procedure	Typical Signal
4H		e. Check that the sweep width can be adjusted from ≤1MHz to ≥18MHz using the SPECTRUM WIDTH control. f. Disconnect the Spectrum Analyzer and connect the 432A Power Meter to A23J6 via the 75/50Ω matching pad. Reconnect the RED/YEL cable to A23J6.	f. 0dBm †
4J	A25J3	**Part 1** a. Set the Y2 DISPLAY switch to any position except SPECTRUM. Set the MARKERS to SLIDING at the MARKER OFFSET to 15. b. Disconnect the WHT coded cable from A25J3. c. Connect the 180A Oscilloscope to A25J3, via the 15530A Low-Pass Filter, with the oscilloscope being externally swept from the 3710A SWEEP OUTPUT. Check that the MARKER OFFSET control varies the two side traces. Reconnect the WHT cable to A25J3. **Part 2** a. Set the Y2 DISPLAY to SPECTRUM. b. Disconnect the WHT coded cable from A25J3. c. Set the 3702B SPECTRUM WIDTH fully CW. Connect the 180A Oscilloscope to A25J3, via the 15530A Low-Pass Filter, with the oscilloscope being externally swept from the Spectrum sweep, test point H. Check that the SPECTRUM CENTRE can adjust the display to the centre of the screen. Reconnect the WHT cable to A25J3.	 

†NOTE: Matching Pad losses are: Rohde & Schwarz 6.0dB
Greenpar 8.2dB



G4

Figure G4-2 Simplified Block Diagram

GENERAL SERVICE SHEET G5 - DISPLAY SECTION

G5-1 MODE OF OPERATION

G5-2 General

G5-3 The display section provides the CRT and meter displays of all the measurement functions.

G5-4 The display section is similar to a conventional oscilloscope operated in the chop mode to give simultaneous displays of Y1 and Y2, and has the usual oscilloscope controls.

G5-5 All inputs to the deflection amplifiers are routed via the Y1 and Y2 DISPLAY switches except the markers which are connected directly to the Y1 amplifier to enable markers to be available for all measurements.

G5-6 The meter function is controlled by the Y1 DISPLAY switch with A5 providing the meter calibration circuits.

G5-7 The input to the Y1 amplifier which is dc coupled is selected by the Y1 DISPLAY switch to be either earth (Ref), the BB Linearity or Return Loss signal from G3, the IF Flatness signal from G2, or an external signal from the EXT INPUT. Any signal applied to the EXT INPUT is amplified by the External Input Amplifier A10 before being applied to the Y1 DISPLAY switch. The dc level of the external input signal can be adjusted by the Y EXT OFFSET control. Also a CALIBRATION switch enables the gain of the amplifier to be switched by 10% to provide a 10% split trace

G5-8 The input to the Y2 amplifier is selected by the Y2 DISPLAY switch and can be either the Spectrum or IF Flatness signal from G2 or the Group Delay signal from G3. In slave operation the slave information is recovered in the AFC loop and fed to the Y2 DISPLAY switch via the IF recovered sweep path.

G5-9 The SLAVE OUTPUT from A3 is replica of either the Y1, or Y2 display with markers added, selected by the SLAVE Y1 and Y2 switch. The sweep signal is applied to the Horizontal Deflection Amplifier A2 via the Y2 DISPLAY switch and the SWEEP SOURCE switch. In all Y2 DISPLAY switch positions except SPECTRUM, the SWEEP SOURCE switch selects whether the signal is IF recovered sweep from G2; BB recovered sweep from G3; or from an external source via the EXT SWEEP INPUT. In SPECTRUM operation the spectrum sweep from G2 is applied directly to the Y2 DISPLAY switch. The Bias Network on A4 ensures that the coupling capacitor on A23 cannot be wrongly polarised.

G5-10 The X-PHASE SHIFT control on A2 is adjusted to compensate for any phase shift between the sweep signal and the Y1 information. A portion of the sweep signal is phase shifted 90^{o} and squared to provide the blanking pulse to suppress the return path of the CRT trace and also provide the calibration sync signal. The BLANKING switch allows the blanking to be switched OFF.

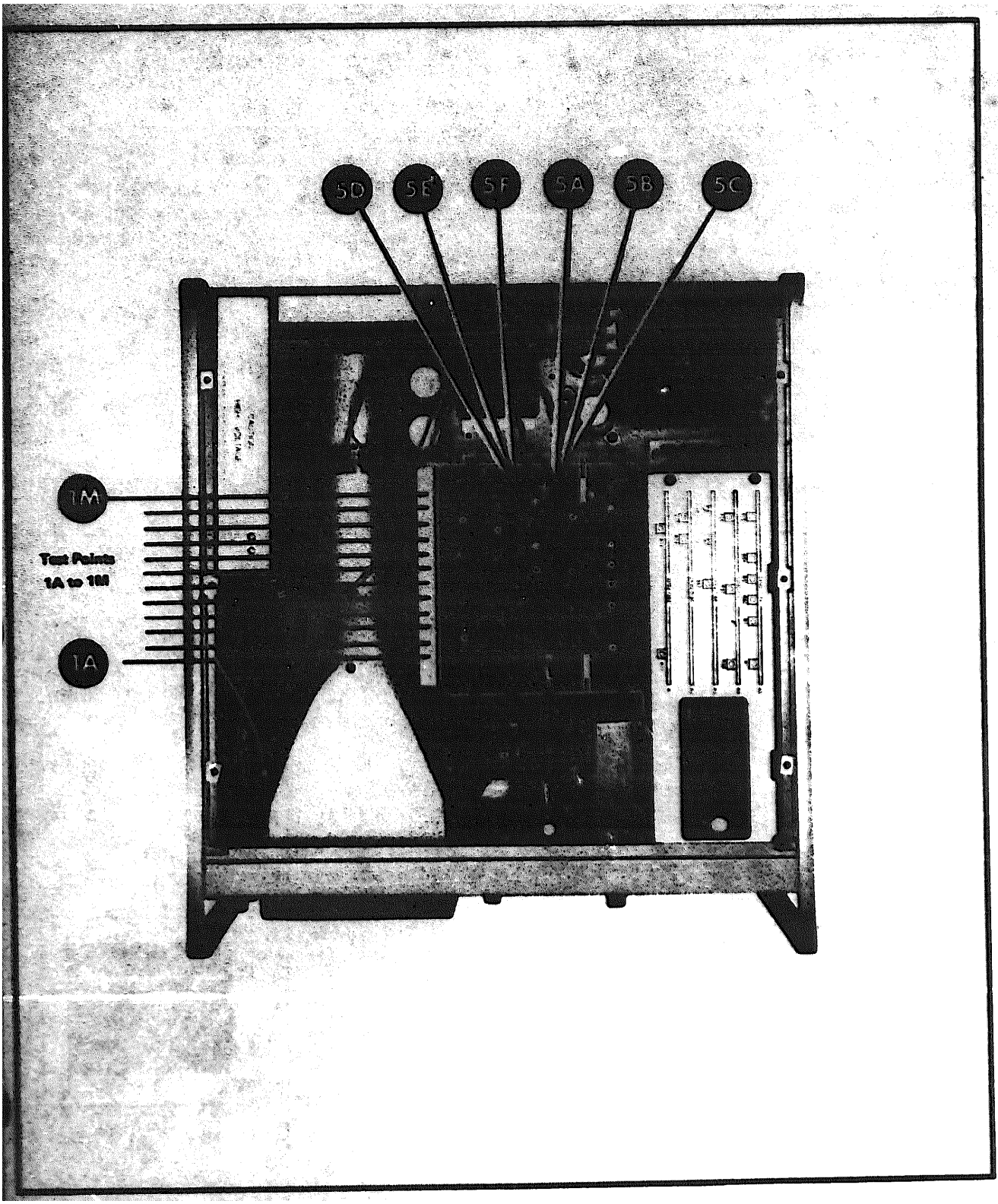


Figure G5-1 Test Point Locations

G5-11 TROUBLESHOOTING

G5-12 A fault will be located to this General Service Sheet when the signals at General Service Sheet G1 are correct but the meter or CRT display is faulty.

G5-13 For a meter fault refer directly to A5 Assembly Service Sheet. For all other faults attempt a back-to-back IF Flatness check as follows and check monitor points in troubleshooting table in order to isolate the fault to a particular Service Sheet.

1. Set 3710A controls as below:

SWEEP WIDTH 50MHz
SWEEP.. .. ..INT
IF FREQUENCY.. .. .. 70MHz

2. Set 3702B controls as below:

Y1 DISPLAY .. .. IF
Y2 DISPLAY .. .. IF
Y1 GAIN .. .. anticlockwise
Y1 POSITION .. .. anticlockwise
Y2 GAIN .. .. anticlockwise
Y2 POSITION .. .. clockwise
Y1/Y2 CALIBRATION .. .. OFF
MARKERS .. .. OFF
MARKER OFFSET 10MHz
SWEEP SOURCE .. .. IF REC.
EXT INPUT CALIBRATION .. .. OFF
IF ATTENUATOR 10dB

Connect the 3710A IF OUTPUT to the 3702B IF INPUT.

Table 5-5. Test Point Information

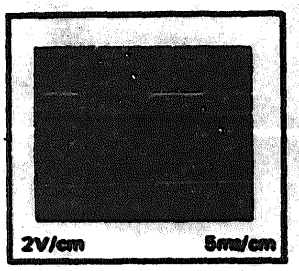
Test Point	Location	Procedure	Typical Signal
5A	A3 Fly-lead 2	Trigger Oscilloscope externally from the 3710A SWEEP OUTPUT. a. Monitor the dc level using 180A Oscilloscope and check for a dual trace. b. Set the Y1 POSITION control fully clockwise. Check the variation in dc level of each trace as the Y1 and Y2 POSITION controls are varied over their full range. Check that each POSITION control only adjusts one trace. Adjust the Y1 and Y2 POSITION controls to set the dc level to its mid position. Set MARKERS to SLIDING. b. Set the Y1 Y2 CALIBRATION control to 0.1dB and the Y1 GAIN control fully clockwise. c. Set the Y1 GAIN anti-clockwise and the Y2 GAIN fully clockwise.	a. dc level of upper trace >+70V dc level of lower trace <+20V b. dc level of upper trace reduces to <+20V. dc level of lower trace unaffected.  Y2 GAIN cw

Table 5-5 Test Point Information (Continued)

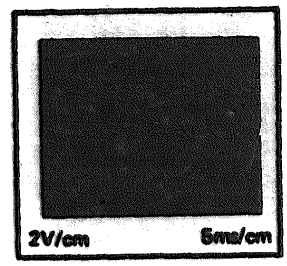
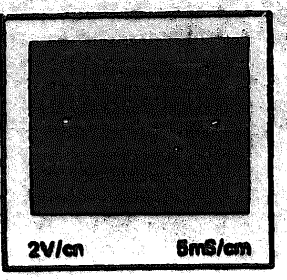
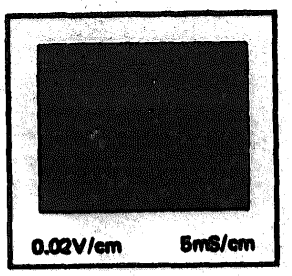
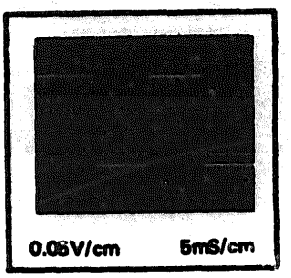
Test Point	Location	Procedure	Typical Signal
5B	A3 Fly-lead 3	As for A, but in anti-phase.	
5C	A3 Fly-lead 1	dc level	+94V
5D	A2 Fly-lead 3	Trigger the Oscilloscope externally from the 3710A SWEEP OUTPUT. a. Set the SWEEP SOURCE switch to EXT and monitor dc level of at least 50V ±8Vas the X-POSITION is varied over its full range. Adjust the X-position control to set the dc level to its mid position. b. Reset the SWEEP SOURCE switch to IF REC and adjust X-GAIN control for a sinewave just out of limiting. c. Turn X-GAIN fully anticlockwise and check for a signal amplitude reduction of 30V. d. Turn the X-PHASE SHIFT from fully anticlockwise to fully clockwise and check the phase shift is at least 180° e. Vary the 3710A SWEEP WIDTH control over the range 50 to 3MHz and check signal amplitude remains constant. f. Set the 3710A SWEEP to LINE and check for no significant change in the phase.	b 
5E	A2 Fly-lead 2	As for D and check signal is in anti-phase to the signal at D.	
5F	A2 Fly-lead 1	dc level (see A2R37).	

Table 5-5. Test Point Information (Continued)

Test Point	Location	Procedure	Typical Signal
5G	Blanking Switch A2(21)	a. BLANKING – OFF b. BLANKING – ON switching from 0V to 60V.	a 60V b 
5H	A10J3 Y1 DISPLAY S6(f) GRN/BLU coded cable	a. Monitor dc level and check variation as Y-EXT OFFSET is adjusted from fully anticlockwise to fully clockwise. b. Adjust Y EXT OFFSET to set the dc level to 0V. Set EXT INPUT CALIBRATION to 50mV. c. Connect 250mV CALIBRATION signal from the 180A Oscilloscope to the EXT INPUT. Set the EXT INPUT CALIBRATION to 10%.	a anticlockwise -15V clockwise +15V b  c 

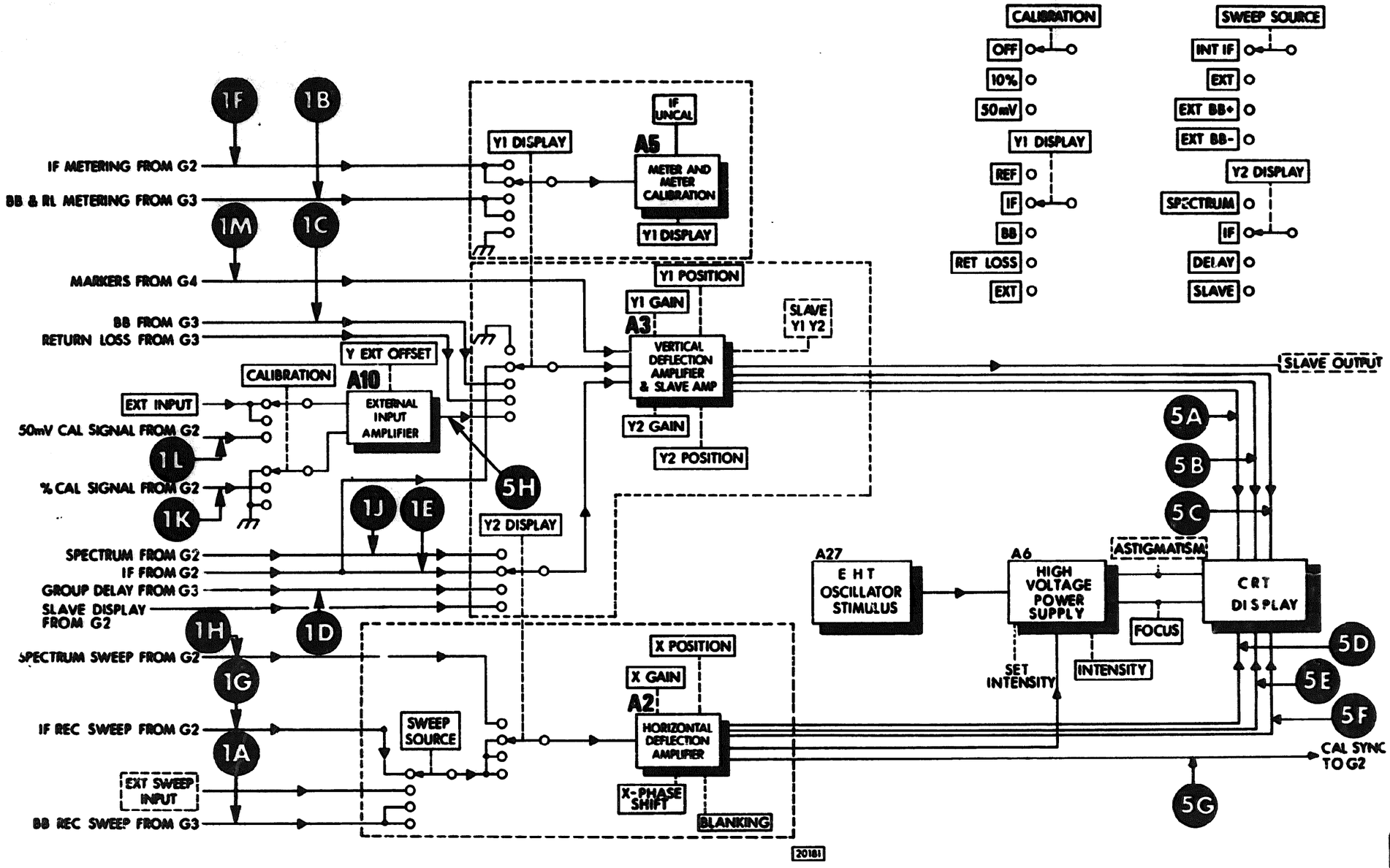


Figure G5-2 Simplified Block Diagram

ASSEMBLY SERVICE SHEET A1 - LOW VOLTAGE POWER SUPPLY

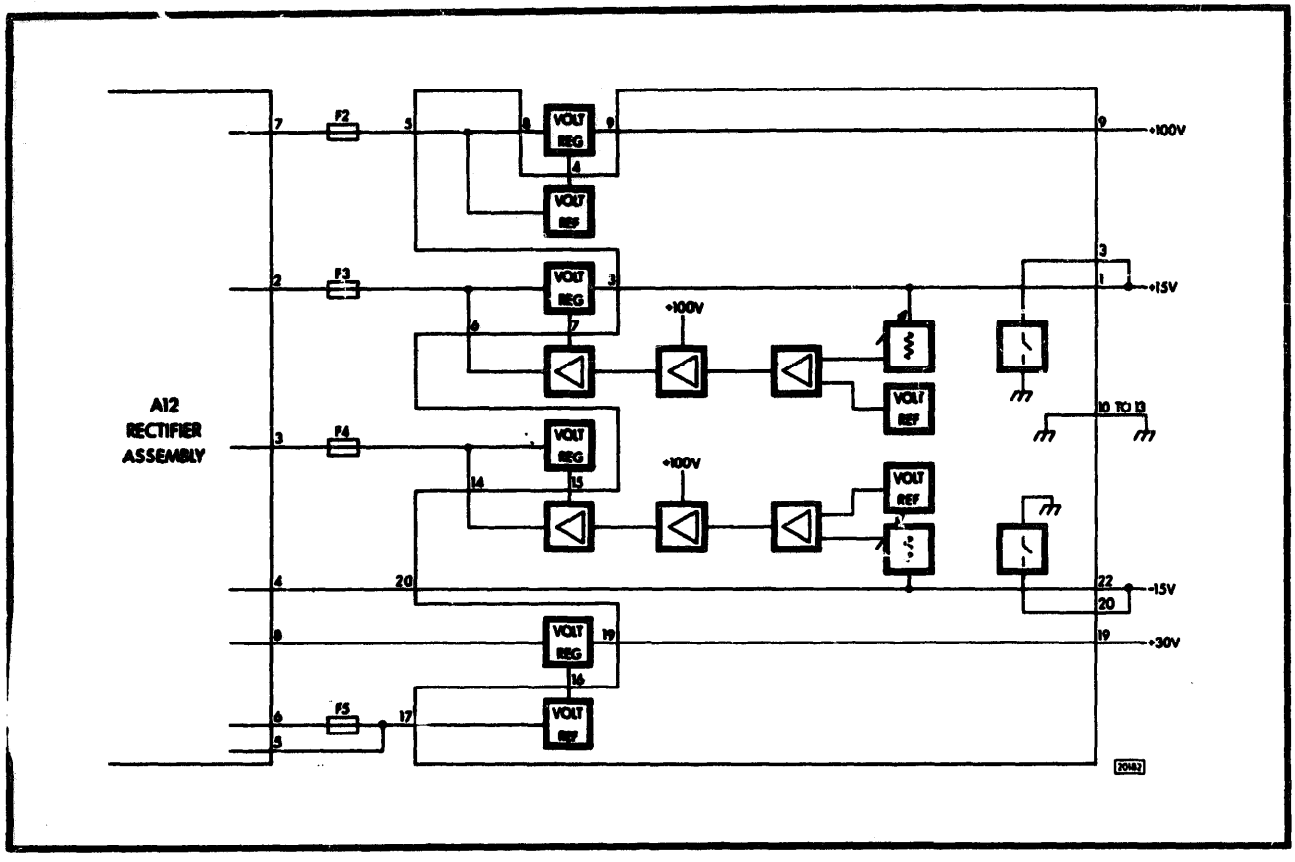


Figure A1-1 Simplified Block Diagram

A1-1 CIRCUIT DESCRIPTION

A1-2 There are four regulated voltage supply rails generated on this assembly, the +100V, the +30V, the +15V and the -15V rails.

A1-3 +100V Supply

A1-4 A reference voltage is applied to the base of Q1 from breakdown diode A1CR1. The +100V supply is thus regulated by Q1 sensing voltage changes between its base and emitter and adjusting the current available from half-wave rectifier. A12CR1. The +100V supply is used to bias the Set Intensity potentiometer R14, and the ±15V supplies.

A1-5 +30V Supply

A1-6 A reference voltage is applied to the base of Q4 from breakdown diode A1CR10. The +30V supply is thus regulated by Q4 sensing voltage changes between its base and emitter and adjusting the current available from full-wave bridge rectifiers A12CR10 to CR13.

A1-7 +15V Supply

A1-8 Transistor A1Q3 is a differential amplifier which provides thermal stability and amplification for error signals. The input at A1Q3A base is referenced by A1CR4, the other input to A1Q3B base monitors the +15V dc output rail. Any difference in input levels generates an error signal at A1Q3A collector which is applied to control transistor A1Q2. This signal, through driver transistor A1Q1, controls the series regulator and hence the +15V dc output rail. Adjustment of the +15V

dc output rail is controlled by R13. Note that the circuit operation is dependent upon the +100V supply.

A1-9 -15V Supply

A1-10 Transistor A1Q6 is a differential amplifier which provides thermal stability and amplification for error signals. The input at A1Q6A base is referenced by A1CR7, the other input to A1Q6B base monitors the -15V dc output rail. Any difference in input levels generates an error signal at A1Q6B collector which is applied to control transistor A1Q5. This signal, through driver transistor A1Q4, controls the series regulator and hence the -15V dc output rail. Adjustment of the -15V dc output rail is controlled by R23. Note that the circuit operation is dependent upon the +100V supply.

A1-11 Overvoltage Protection

A1-12 Thyristors CR6 and CR9 along with breakdown diodes CR5 and CR8 provide overvoltage protection on the +15V and -15V supply lines. If the voltage of any supply exceeds that of the breakdown diode in its protection circuit, the breakdown diode will conduct turning the thyristor on which will in turn short circuit the supply and blow the line fuse.

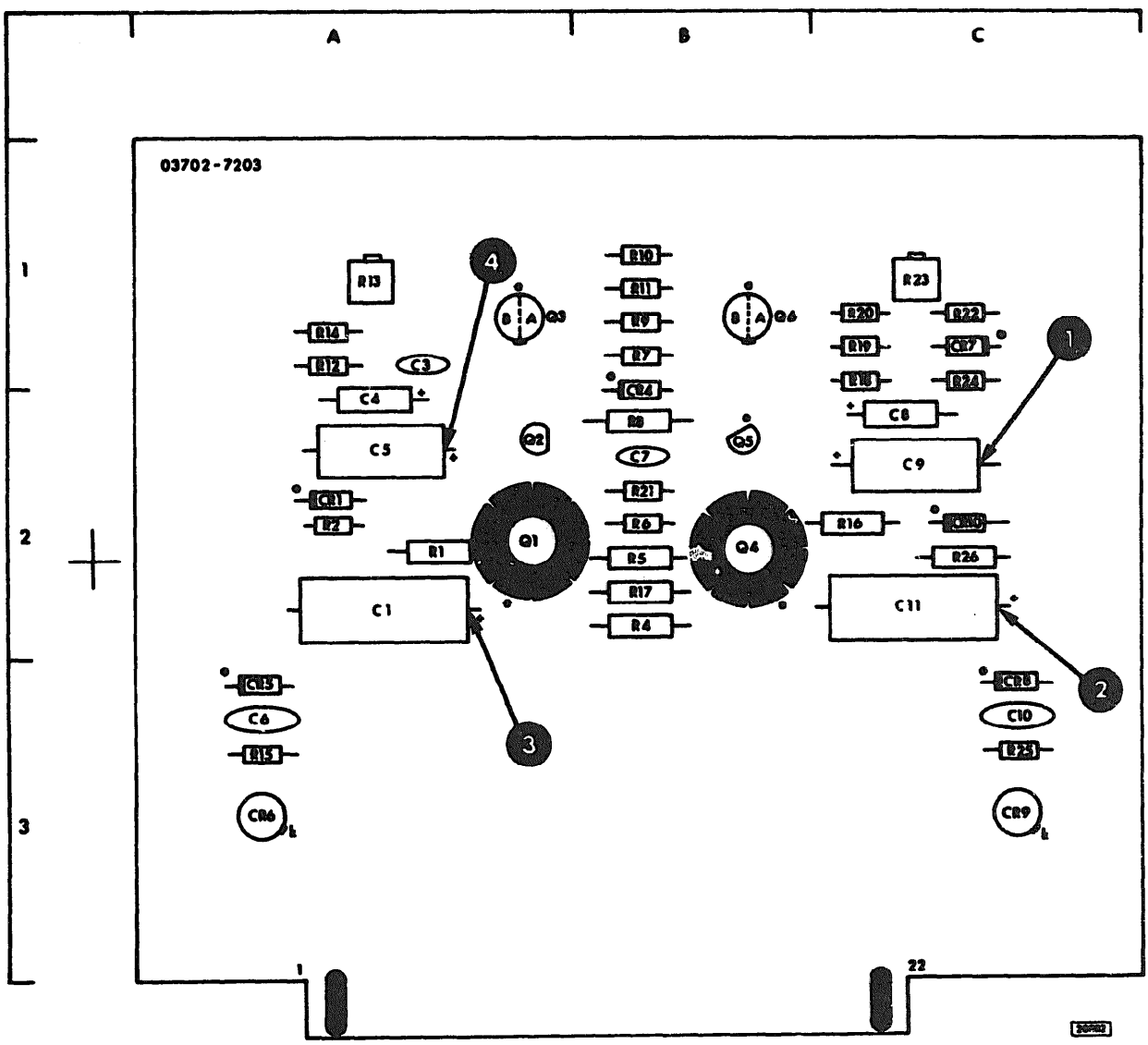
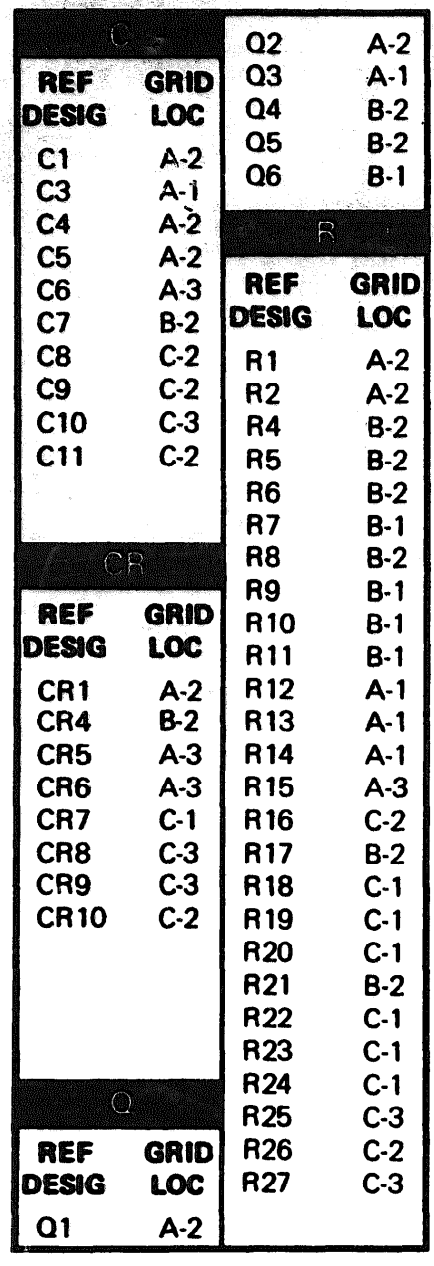


Figure A1-2 Component Location



C

REF DESIG	GRID LOC
C1	A-2
C3	A-1
C4	A-2
C5	A-2
C6	A-3
C7	B-2
C8	C-2
C9	C-2
C10	C-3
C11	C-2

CR

REF DESIG	GRID LOC
CR1	A-2
CR4	B-2
CR5	A-3
CR6	A-3
CR7	C-1
CR8	C-3
CR9	C-3
CR10	C-2

Q

REF DESIG	GRID LOC
Q1	A-2
Q2	A-2
Q3	A-1
Q4	B-2
Q5	B-2
Q6	B-1

R

REF DESIG	GRID LOC
R1	A-2
R2	A-2
R4	B-2
R5	B-2
R6	B-2
R7	B-1
R8	B-2
R9	B-1
R10	B-1
R11	B-1
R12	A-1
R13	A-1
R14	A-1
R15	A-3
R16	C-2
R17	B-2
R18	C-1
R19	C-1
R20	C-1
R21	B-2
R22	C-1
R23	C-1
R24	C-1
R25	C-3
R26	C-2
R27	C-3

Figure A1-3 Grid Reference

Figure A1-4 Schematic Diagram - Assembly A1

ASSEMBLY SERVICE SHEET A2 HORIZONTAL DEFLECTION

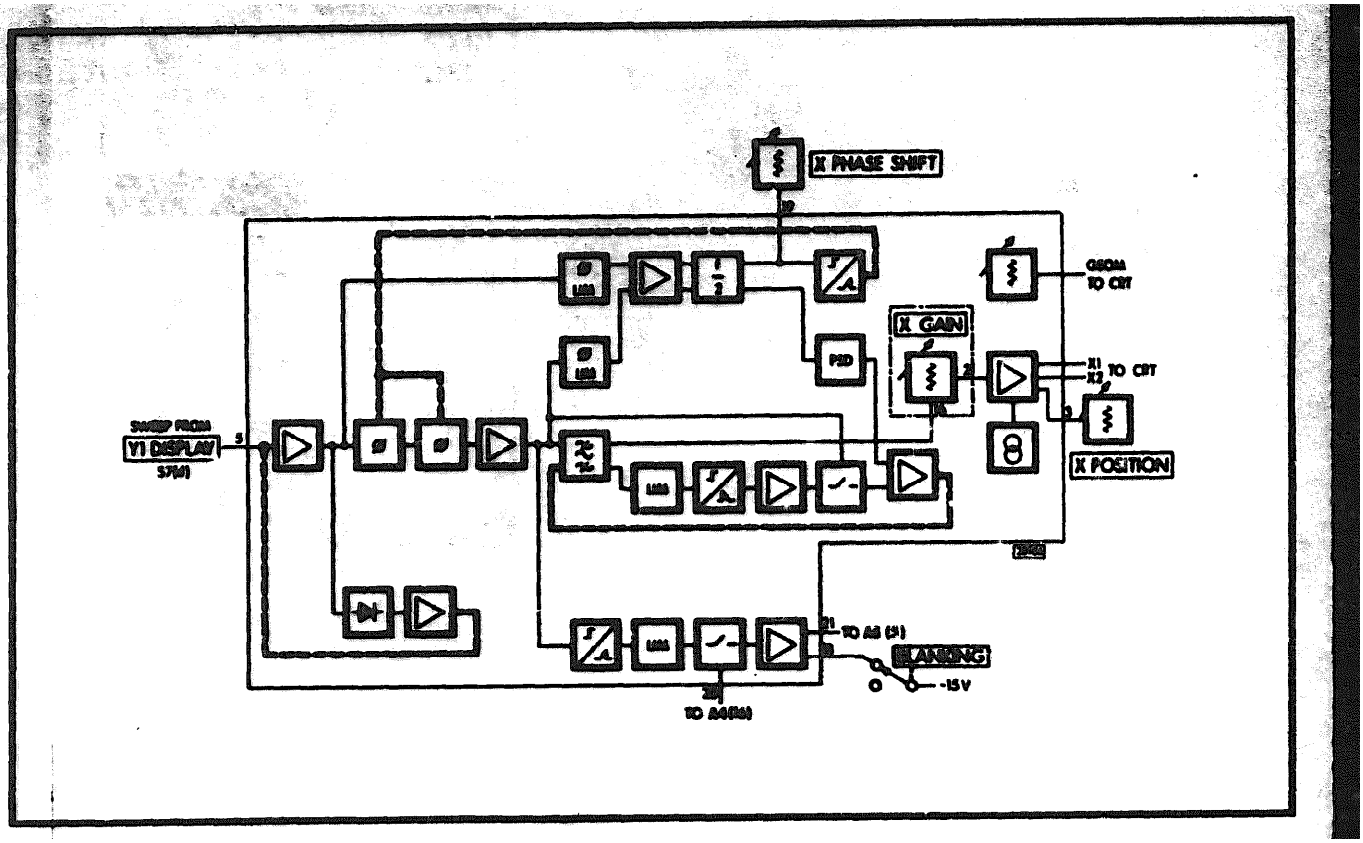


Figure A2-1 Simplified Block Diagram

A2-1 CIRCUIT DESCRIPTION

A2-2 This assembly applies a constant amplitude sinewave, in phase with the Y-axis amplitude variations, to the horizontal deflection plates X1 and X2.

A2-3 The complete circuit can be broken down into four main blocks.

1. **Automatic Gain Control** – which provides a constant X-axis display, independent of Sweep Width changes.

2. **Automatic Phase Control** – compensates for any phase differences introduced between the horizontal and vertical axes due to the recovered sweep.

3. **Tracking Filter** – narrow bandpass filter with a centre frequency that can be varied to coincide with the sweep frequency. Thus only the sweep frequency is passed while the harmonic content is rejected.

4. **Blanking Circuit** – supplies blanking pulses to the CRT via the High Voltage Assembly A6.

A2-4 Automatic Gain Control

A2-5 Initially the gain of amplifier MC1 is determined by the resistance of R2, E1 and R75. Consider an increase in signal amplitude at the input. This causes an increase in the output from MC1 resulting in an increase in the output from peak detector CR3, Q16, R79 and C28 which when

amplified and inverted by the error amplifier MC10 will reduce the current through, and hence the brightness of lamp DS1. A reduction of the brightness of DS1 will increase the resistance of Q1 reducing the amplifier gain and restoring the output from MC1 to the original level.

A2-6 Automatic Phase Control

A2-7 Initially the sweep signal at the output of MC2 will have an arbitrary phase shift introduced by phase shifters ϕ1 and ϕ2, depending upon the position of the X PHASE SHIFT control R4. With the BLANKING switch set to OFF and phase shift between the vertical information (Y) and the horizontal sweep (X) will result in a separation of the markers on the forward and flyback traces. The X PHASE SHIFT control R4 is adjusted to bring the markers together, ie, in phase. The control circuit will now function in the following manner to keep the correct phase relationship between horizontal and vertical axes.

A2-8 The input and output from the phase shifters are applied to two very high gain limiting amplifiers MC6 and MC7. The output from the amplifiers saturate to either +12V or -12V when the input sinewave passes through zero, ie, the output will be +12V when the sinewave is decreasing through zero, and -12V when the sinewave is increasing through zero. (See Figure A2-2 Timing Waveforms).

A2-9 Suppose now there is a change in the phase of the incoming sweep signal (60^{o} shown in Figure A2-2), then the output square wave from MC6 will either lead or lag the output from MC7. The outputs from MC6 and MC7 are applied via pulse amplifiers Q14 and Q13 to the R-S flip-flop MC8, which triggers on the positive going edges giving a pulsed output with a mark to space ratio proportional to the phase shift in the input signal. The flip-flop output is integrated by error integrator MC9 giving a dc voltage proportional to the input phase change. This will result in an increase or decrease in current through lamps DS2 and DS3, thereby changing the resistance of E2 and E3 giving a decrease or increase in the phase change through ϕ1 and ϕ2, keeping the display in phase.

A2-10 MC2 acts as a unity gain buffer to prevent other circuits from loading phase shifter ϕ2, when E3 has a high resistance.

A2-11 Tracking Filter

A2-12 The sweep signal from the phase control loop is passed through active bandpass filter MC3 to improve its harmonic content. However, since the sweep frequency can be anywhere in the range 10 to 100Hz, and the bandwidth of the filter is 6Hz, the centre frequency of the filter must be controllable or the sweep frequency may be outside the filter bandwidth. The filter also introduces a 180^{o} phase shift at its centre frequency but at other frequencies varies as shown in Figure A2-3.

A2-13 To control the centre frequency of the filter, the filter output is applied to limiting amplifier MC4, producing a square wave as described under the Automatic Phase Control section. The square wave is applied to pulse amplifier Q5 via differentiator C10, R15 and R16. The pulse amplifier Q5 is normally biased on by R15 and R16, but will be turned off by the negative pulses from the differentiator. The resulting pulses on Q5 collector will turn the N channel FET sampler Q6 on, sampling the input at MC3 via C12 and charging the store capacitor C13, which is buffered to the input of error amplifier MC5 by Q7. Transistor Q8 compensates for variations in Q7 due to temperature.

A2-14 Any change in the input sweep frequency will produce a change in charge on C13, producing an error voltage which when amplified by MC5 will change the current through DS4. This alters the value of control resistor E4 shifting the filter centre frequency to coincide with the input frequency.

A2-15 To speed up the loop response of the tracking filter, transistors Q21-22 and integrated circuit MC12 detect instantaneous changes of phase in the R-S flip-flop MC8 inferring a frequency change and shifts MC5 output to the value required by the new frequency.

A2-16 Output Stage

A2-17 The output from the active filter MC3 is applied via the X GAIN control R3 to differential amplifier Q10 to Q12, giving a differential output on Q10 and Q12 collectors, which is applied to the X deflection plates. The X POSITION control R7 varies the dc bias on the base of Q12. Q11 is a constant current generator supplying bias current to Q10 and Q12.

A2-18 Blanking Circuit

A2-19 The sweep output from MC2 is phase shifted by 90° by integrator Q18 and is then applied to limiting amplifier MC11. With the BLANKING switch ON, Q19 is alternately switched on and off producing a 0 to 60V pk-pk blanking pulse which is applied to the intensity control grid via emitter follower Q20.

A2-20 The CRT intensity is constant when changing the BLANKING switch from ON to OFF.

A2-21 Screen geometry is adjusted by bias resistor R37.

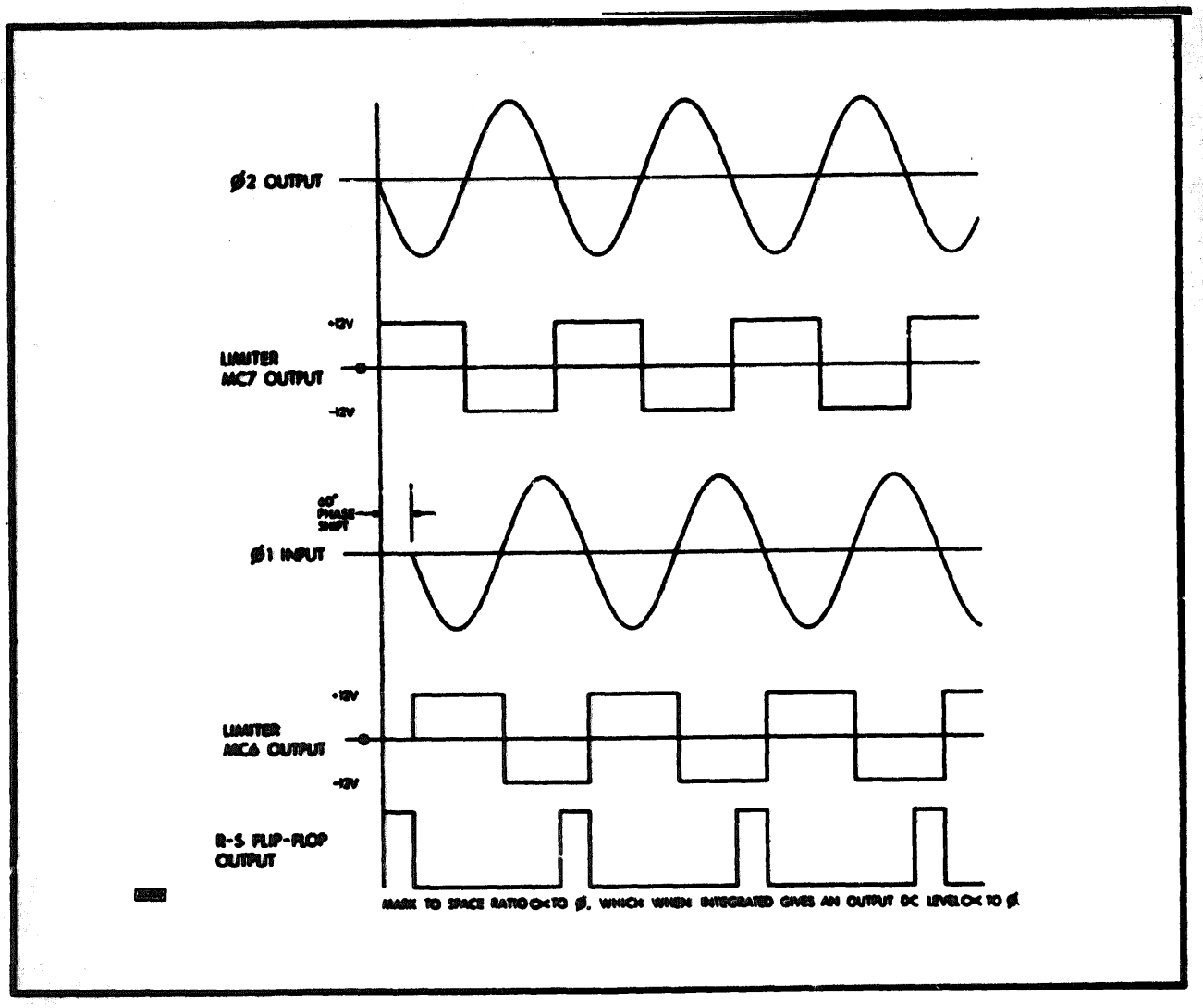


Figure A2-2 Timing Waveforms

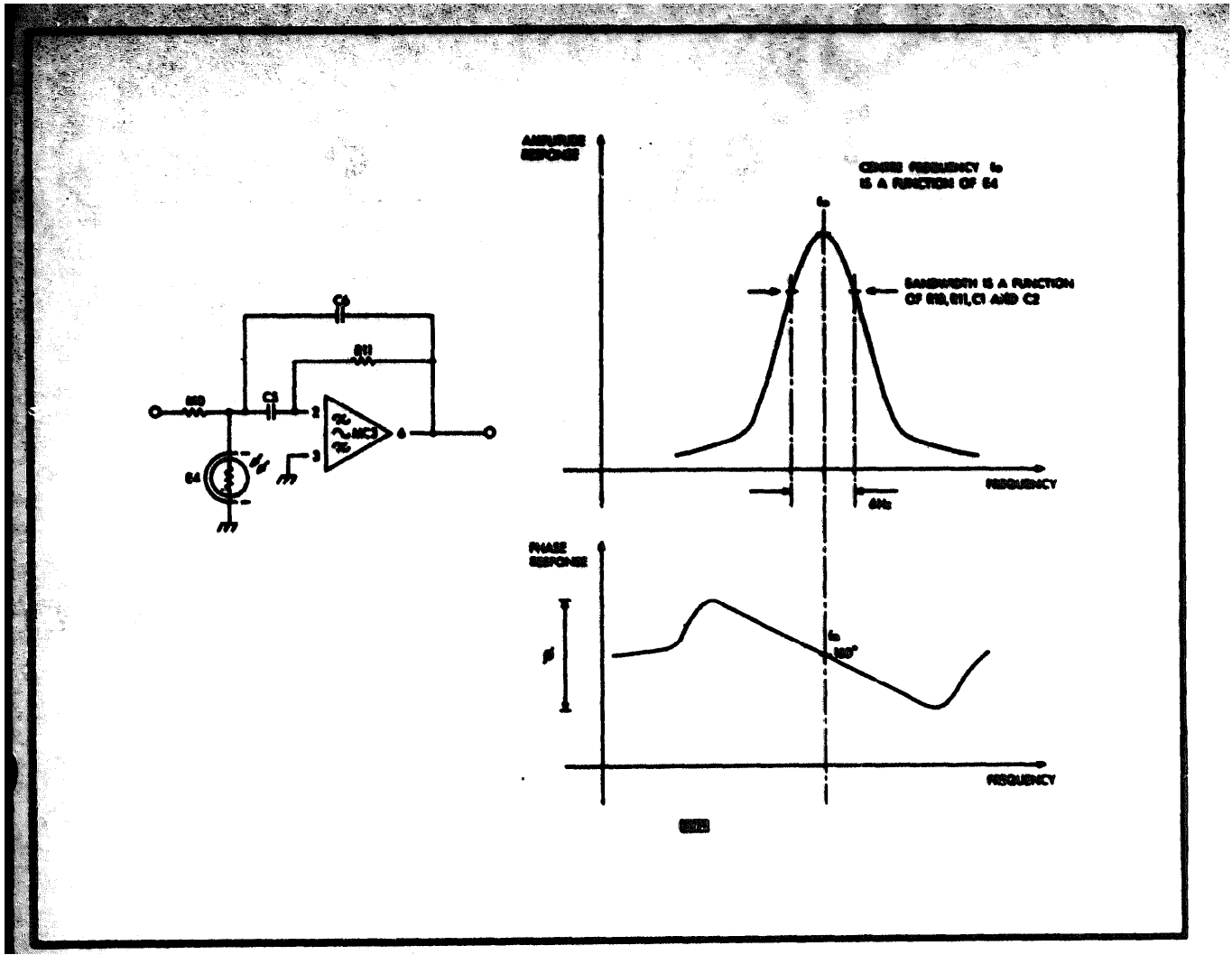


Figure A2-3 Active Filter

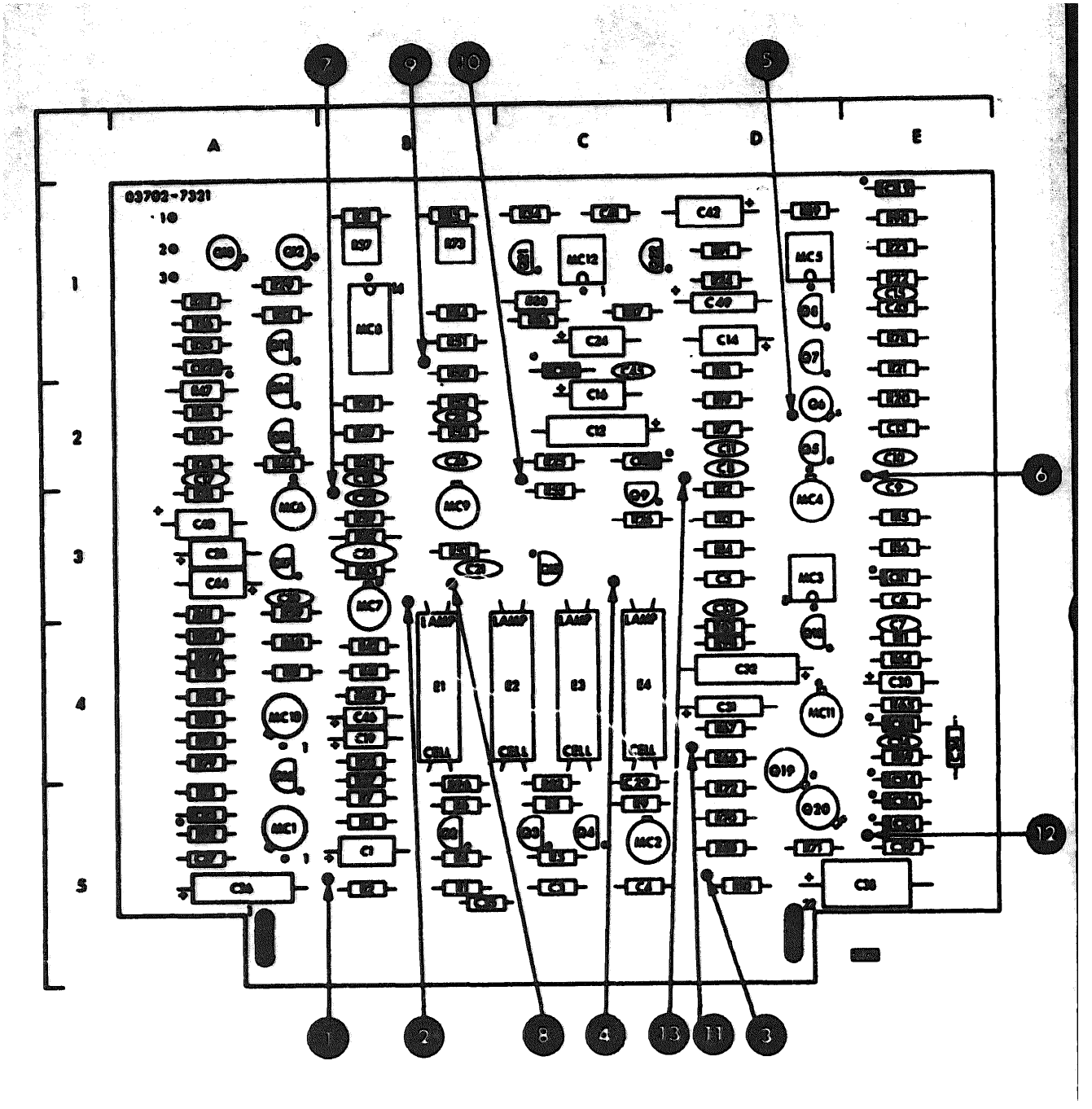
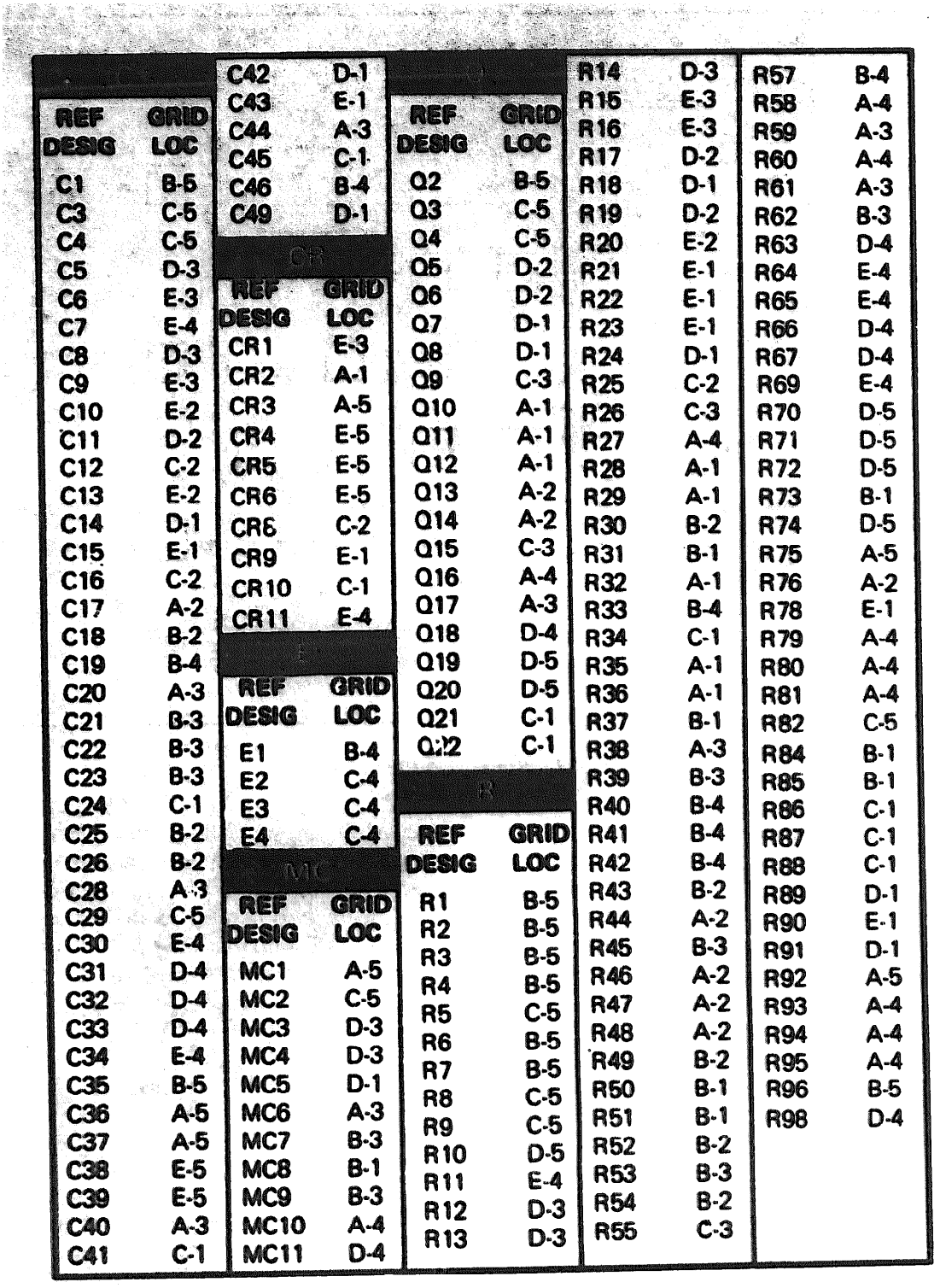


Figure A2-4 Component Location



REF DESIG	GRID LOC
C1	B-5
C3	C-5
C4	C-5
C5	D-3
C6	E-3
C7	E-4
C8	D-3
C9	E-3
C10	E-2
C11	D-2
C12	C-2
C13	E-2
C14	D-1
C15	E-1
C16	C-2
C17	A-2
C18	B-2
C19	B-4
C20	A-3
C21	B-3
C22	B-3
C23	B-3
C24	C-1
C25	B-2
C26	B-2
C28	A-3
C29	C-5
C30	E-4
C31	D-4
C32	D-4
C33	D-4
C34	E-4
C35	B-5
C36	A-5
C37	A-5
C38	E-5
C39	E-5
C40	A-3
C41	C-1
C42	D-1
C43	E-1
C44	A-3
C45	C-1
C46	B-4
C49	D-1

REF DESIG	GRID LOC
CR1	E-3
CR2	A-1
CR3	A-5
CR4	E-5
CR5	E-5
CR6	E-5
CR8	C-2
CR9	E-1
CR10	C-1
CR11	E-4

REF DESIG	GRID LOC
E1	B-4
E2	C-4
E3	C-4
E4	C-4

REF DESIG	GRID LOC
MC1	A-5
MC2	C-5
MC3	D-3
MC4	D-3
MC5	D-1
MC6	A-3
MC7	B-3
MC8	B-1
MC9	B-3
MC10	A-4
MC11	D-4

REF DESIG	GRID LOC
Q2	B-5
Q3	C-5
Q4	C-5
Q5	D-2
Q6	D-2
Q7	D-1
Q8	D-1
Q9	C-3
Q10	A-1
Q11	A-1
Q12	A-1
Q13	A-2
Q14	A-2
Q15	C-3
Q16	A-4
Q17	A-3
Q18	D-4
Q19	D-5
Q20	D-5
Q21	C-1
Q22	C-1

REF DESIG	GRID LOC
R1	B-5
R2	B-5
R3	B-5
R4	B-5
R5	C-5
R6	B-5
R7	B-5
R8	C-5
R9	C-5
R10	D-5
R11	E-4
R12	D-3
R13	D-3
R14	D-3
R15	E-3
R16	E-3
R17	D-2
R18	D-1
R19	D-2
R20	E-2
R21	E-1
R22	E-1
R23	E-1
R24	D-1
R25	C-2
R26	C-3
R27	A-4
R28	A-1
R29	A-1
R30	B-2
R31	B-1
R32	A-1
R33	B-4
R34	C-1
R35	A-1
R36	A-1
R37	B-1
R38	A-3
R39	B-3
R40	B-4
R41	B-4
R42	B-4
R43	B-2
R44	A-2
R45	B-3
R46	A-2
R47	A-2
R48	A-2
R49	B-2
R50	B-1
R51	B-1
R52	B-2
R53	B-3
R54	B-2
R55	C-3
R57	B-4
R58	A-4
R59	A-3
R60	A-4
R61	A-3
R62	B-3
R63	D-4
R64	E-4
R65	E-4
R66	D-4
R67	D-4
R69	E-4
R70	D-5
R71	D-5
R72	D-5
R73	B-1
R74	D-5
R75	A-5
R76	A-2
R78	E-1
R79	A-4
R80	A-4
R81	A-4
R82	C-5
R84	B-1
R85	B-1
R86	C-1
R87	C-1
R88	C-1
R89	D-1
R90	E-1
R91	D-1
R92	A-5
R93	A-4
R94	A-4
R95	A-4
R96	B-5
R98	D-4

Figure A2-5 Grid Reference

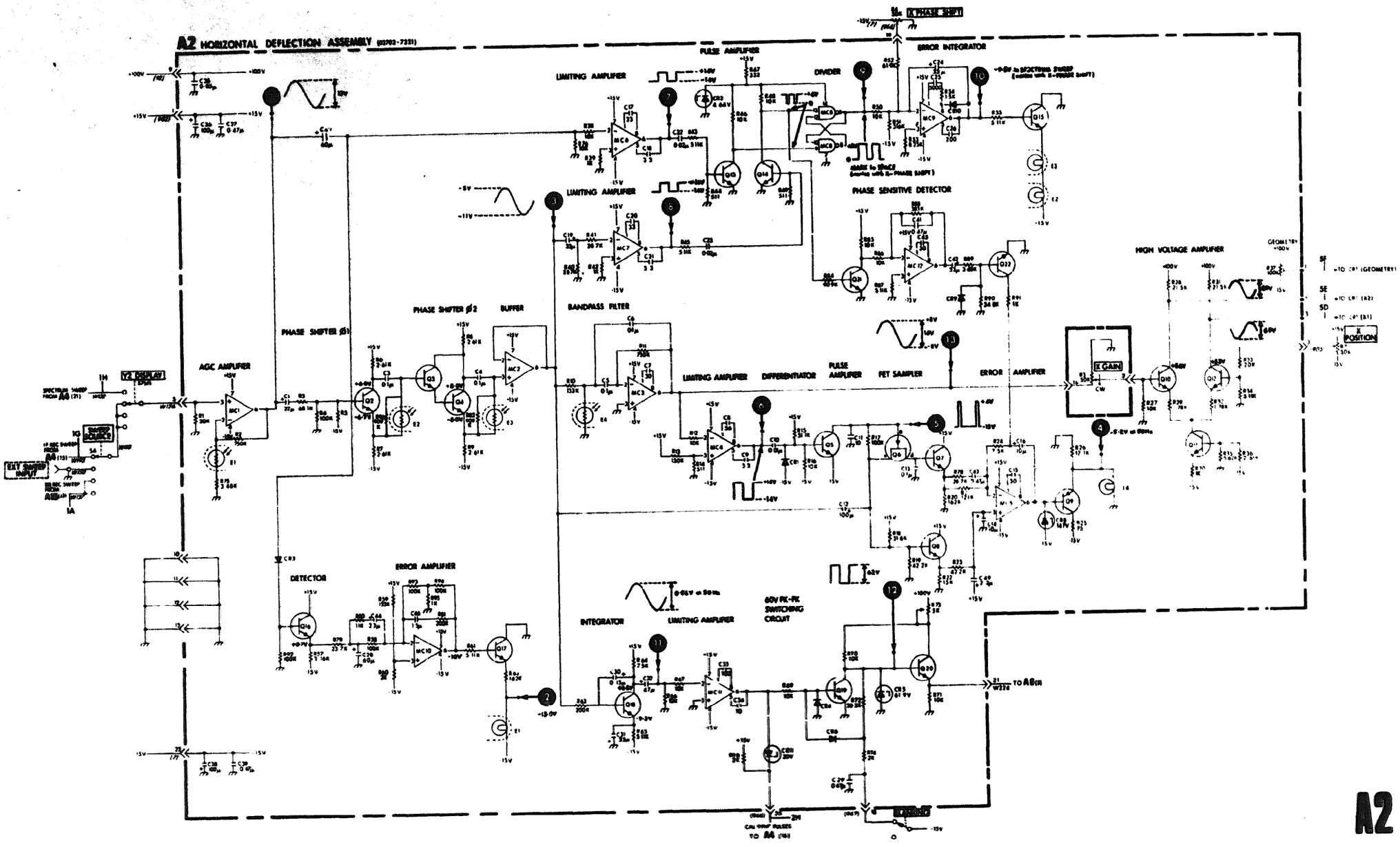


Figure A2-6 Schematic Diagram - Assembly A2

ASSEMBLY SERVICE SHEET A3 - VERTICAL DEFLECTION

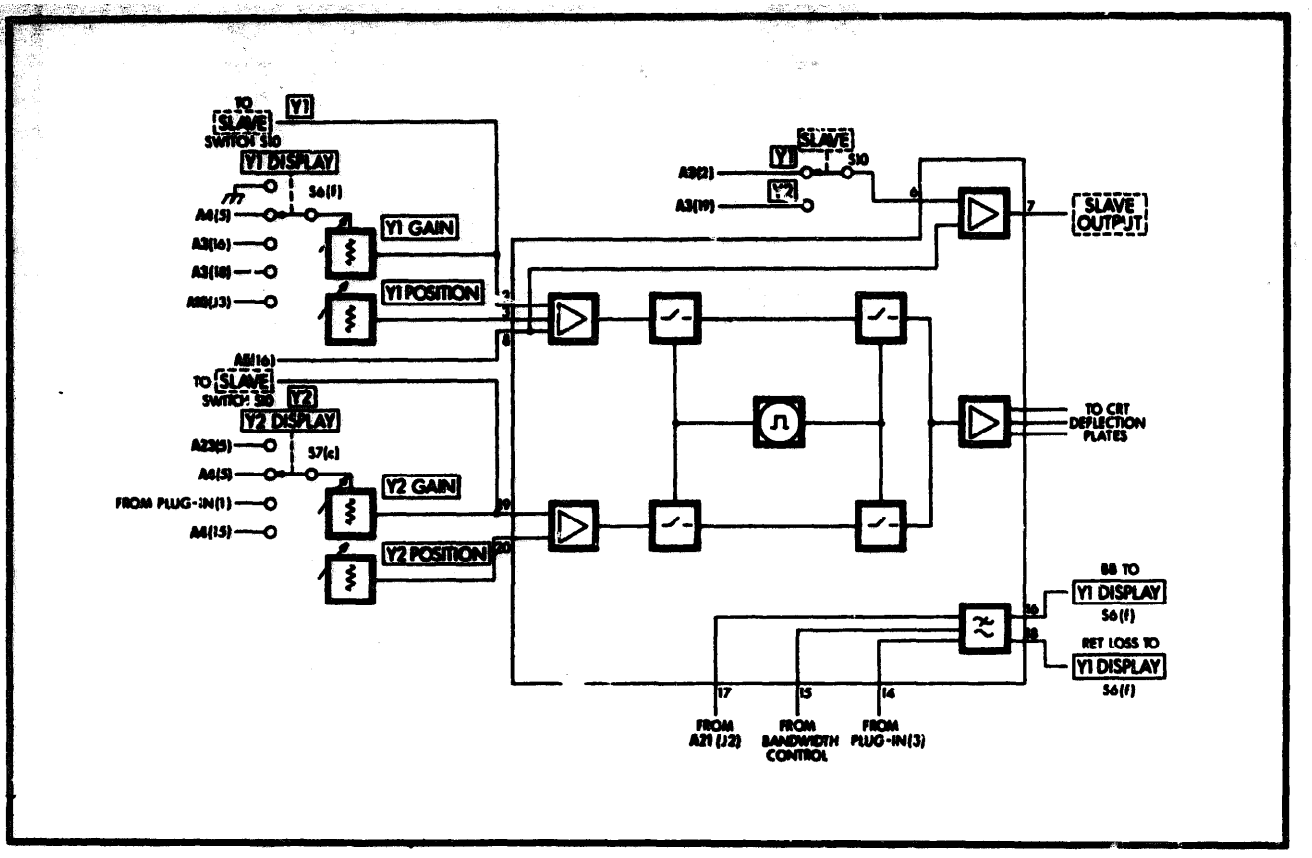


Figure A3-1 Simplified Block Diagram

A3-1 CIRCUIT DESCRIPTION

A3-2 The two signals to be displayed are applied via the Y1 DISPLAY and Y2 DISPLAY switches and the Y1 GAIN and Y2 GAIN controls to the input amplifiers in assembly A3. The outputs from the amplifiers are applied to series and shunt switches which are controlled by an astable multivibrator. The 'chopped' signals are applied to a high voltage amplifier which supplies the signals to the vertical deflection plates on the CRT.

A3-3 Y1 Deflection

A3-4 The signal to the Y1 trace is simultaneously applied to the Y1 amplifier and to the SLAVE amplifier. The Y1 amplifier, which comprises MC1 and Q1, is a low voltage amplifier in which Q1 provides a low output impedance over the amplifier frequency range. The markers from Assembly A5(16) are also applied to the Y1 amplifier and to the SLAVE amplifier via R67. The Y1 POSITION control varies the dc reference to the Y1 amplifier.

A3-5 Y2 Deflection

A3-6 The Y2 amplifier operates in the same way as the Y1 amplifier.

A3-7 Trace Chopping

A3-8 Since the CRT is only a single beam type, it is necessary to rapidly sample the Y1 and Y2 traces in order to display them simultaneously.

A3-9 Transistors Q4 and Q7 form a free running multivibrator, switching between 0V and -15V, at approximately 100kHz. DC restoration by CR1, R11 and CR2, R24 ensures that the series switches Q3 and Q8 can be switched on irrespective of voltage levels at Q1 and Q2 emitters.

A3-10 When the collector voltage at Q7 changes from -15V to 0V, Q6 and Q8 are turned on. The 15V at the collector of 04 holds off Q3 and Q5 effectively grounding the signal from the Y1 amplifier. This also short circuits R25 allowing the signal from the Y2 amplifier to pass to the high voltage amplifier Q9 through Q12. Zener diodes CR3 through CR6 limit the amplitude of chopped waveform.

A3-11 The chopped signal containing the Y1 and Y2 information is applied to the high voltage amplifier Q9 through Q12. The collectors of Q10 and Q11 drive the CRT vertical deflection plates at the correct operating voltage giving a double beam display. The amplifier balance is adjusted by R63, to give zero volts between Q10 and Q11 collectors with no signal in and the Y1 and Y2 GAIN and POSITION controls in the mid position. Capacitors C23 and C24 are adjusted for optimum pulse response.

A3-12 Slave Output

A3-13 The Y1 and Y2 signals on the wipers of the Y1 DISPLAY switch, R8A and the Y2 DISPLAY switch, R9A are also applied, via the SLAVE Y1 Y2 switch, S10, to the slave amplifier MC3. Here the slave signal is combined with the markers from A5(16), and the output from the slave amplifier is routed directly to the rear panel SLAVE OUTPUT connector.

A3-14 BB Post Detector Filter

A3-15 The detected BB signal from A21(J2) is applied, via pin 17, to either a 1kHz or 5kHz low pass filter depending upon the position of the BB BANDWIDTH control in the plug-in housing, or the position of the BANDWIDTH control on the 3703B/3705A plug-in.

A3-16 Transistors Q14 and Q15 form an active filter circuit with a cut-off frequency of 5kHz. When either the plug-in BANDWIDTH control or the BB BANDWIDTH control in the plug-in housing is set to 1kHz, the active filter circuit is modified by switching Q13 hard on and effectively grounding C14.

A3-17 Referring to Figure A3-2, if we assume that the input impedance is high, there will be no current drawn through R50 and R51 and thus no voltage drop. The, input voltage will then appear at Q14 emitter and C13 will have no effect on the input signal. The detected BB signal is therefore applied to the Sallen and Key filter Q15, R53, R54, C15 and C16, with a cut-off frequency of 5kHz. When C14 is connected from Q14 base to ground this transforms Q14, R50, R51, C13, C14 into a Sallen and Key filter, with a cut-off frequency of 1kHz.

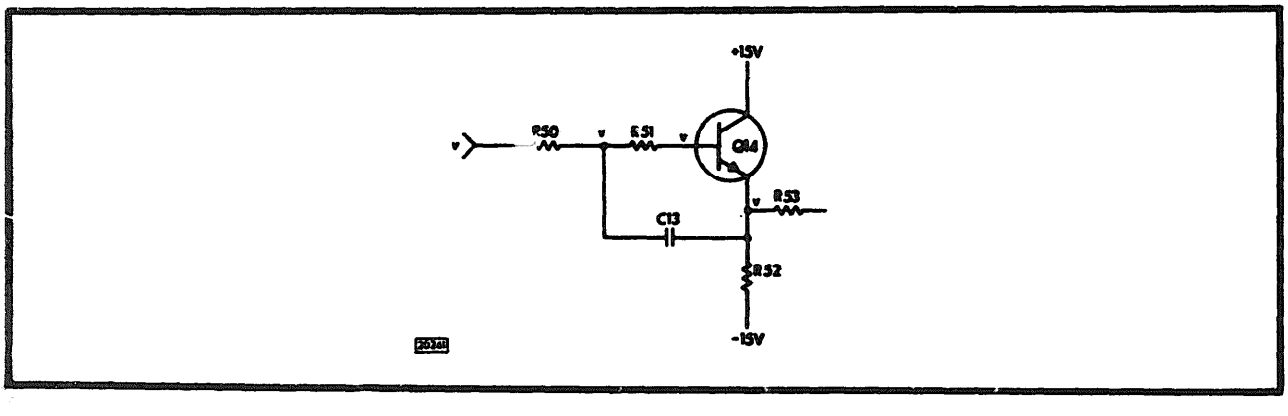


Figure A3-2 Detector Filter

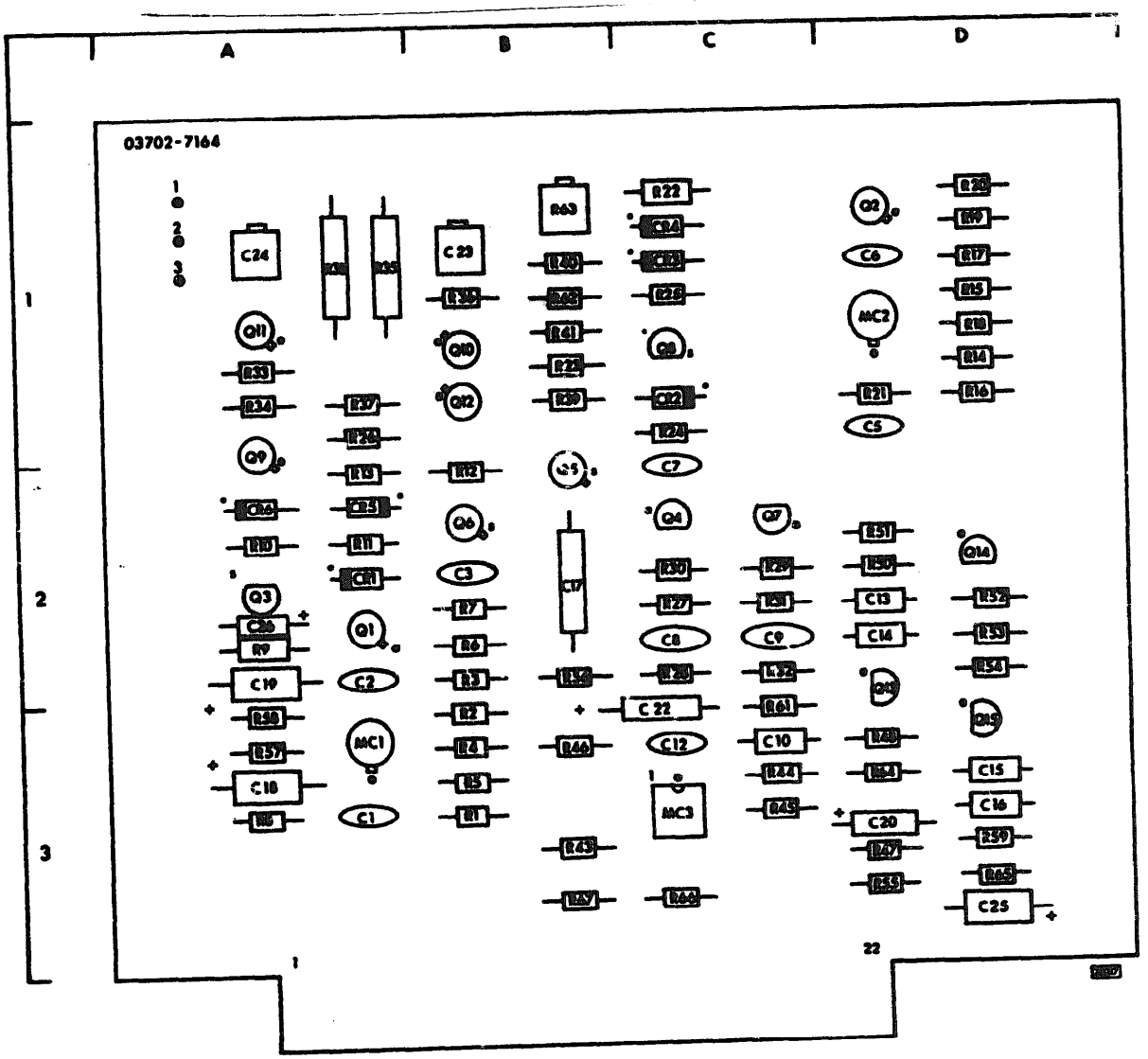
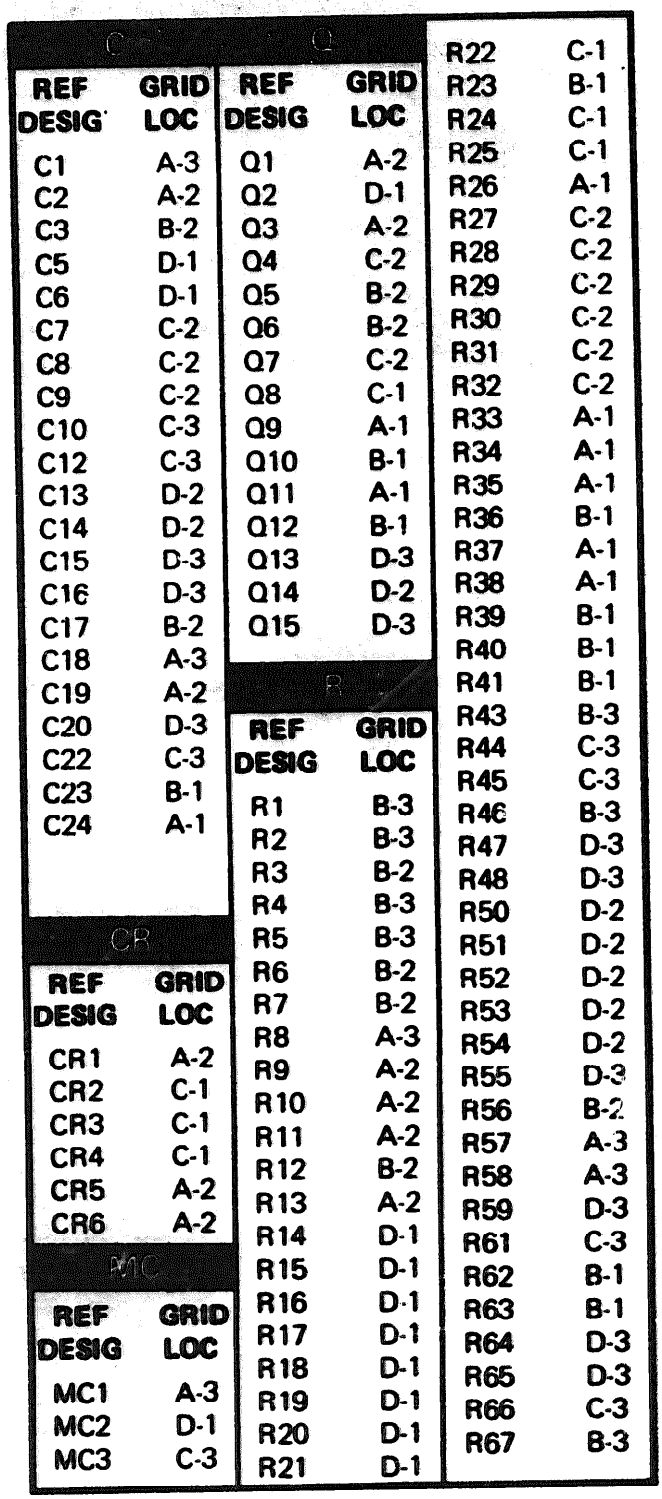


Figure A3-3. Component Location



C

REF DESIG	GRID LOC
C1	A-3
C2	A-2
C3	B-2
C5	D-1
C6	D-1
C7	C-2
C8	C-2
C9	C-2
C10	C-3
C12	C-3
C13	D-2
C14	D-2
C15	D-3
C16	D-3
C17	B-2
C18	A-3
C19	A-2
C20	D-3
C22	C-3
C23	B-1
C24	A-1

CR

REF DESIG	GRID LOC
CR1	A-2
CR2	C-1
CR3	C-1
CR4	C-1
CR5	A-2
CR6	A-2

MC

REF DESIG	GRID LOC
MC1	A-3
MC2	D-1
MC3	C-3

Q

REF DESIG	GRID LOC
Q1	A-2
Q2	D-1
Q3	A-2
Q4	C-2
Q5	B-2
Q6	B-2
Q7	C-2
Q8	C-1
Q9	A-1
Q10	B-1
Q11	A-1
Q12	B-1
Q13	D-3
Q14	D-2
Q15	D-3

R

REF DESIG	GRID LOC
R1	B-3
R2	B-3
R3	B-2
R4	B-3
R5	B-3
R6	B-2
R7	B-2
R8	A-3
R9	A-2
R10	A-2
R11	A-2
R12	B-2
R13	A-2
R14	D-1
R15	D-1
R16	D-1
R17	D-1
R18	D-1
R19	D-1
R20	D-1
R21	D-1
R22	C-1
R23	B-1
R24	C-1
R25	C-1
R26	A-1
R27	C-2
R28	C-2
R29	C-2
R30	C-2
R31	C-2
R32	C-2
R33	A-1
R34	A-1
R35	A-1
R36	B-1
R37	A-1
R38	A-1
R39	B-1
R40	B-1
R41	B-1
R43	B-3
R44	C-3
R45	C-3
R46	B-3
R47	D-3
R48	D-3
R50	D-2
R51	D-2
R52	D-2
R53	D-2
R54	D-2
R55	D-3
R56	B-2
R57	A-3
R58	A-3
R59	D-3
R61	C-3
R62	B-1
R63	B-1
R64	D-3
R65	D-3
R66	C-3
R67	B-3

Figure A3-4 Grid Reference

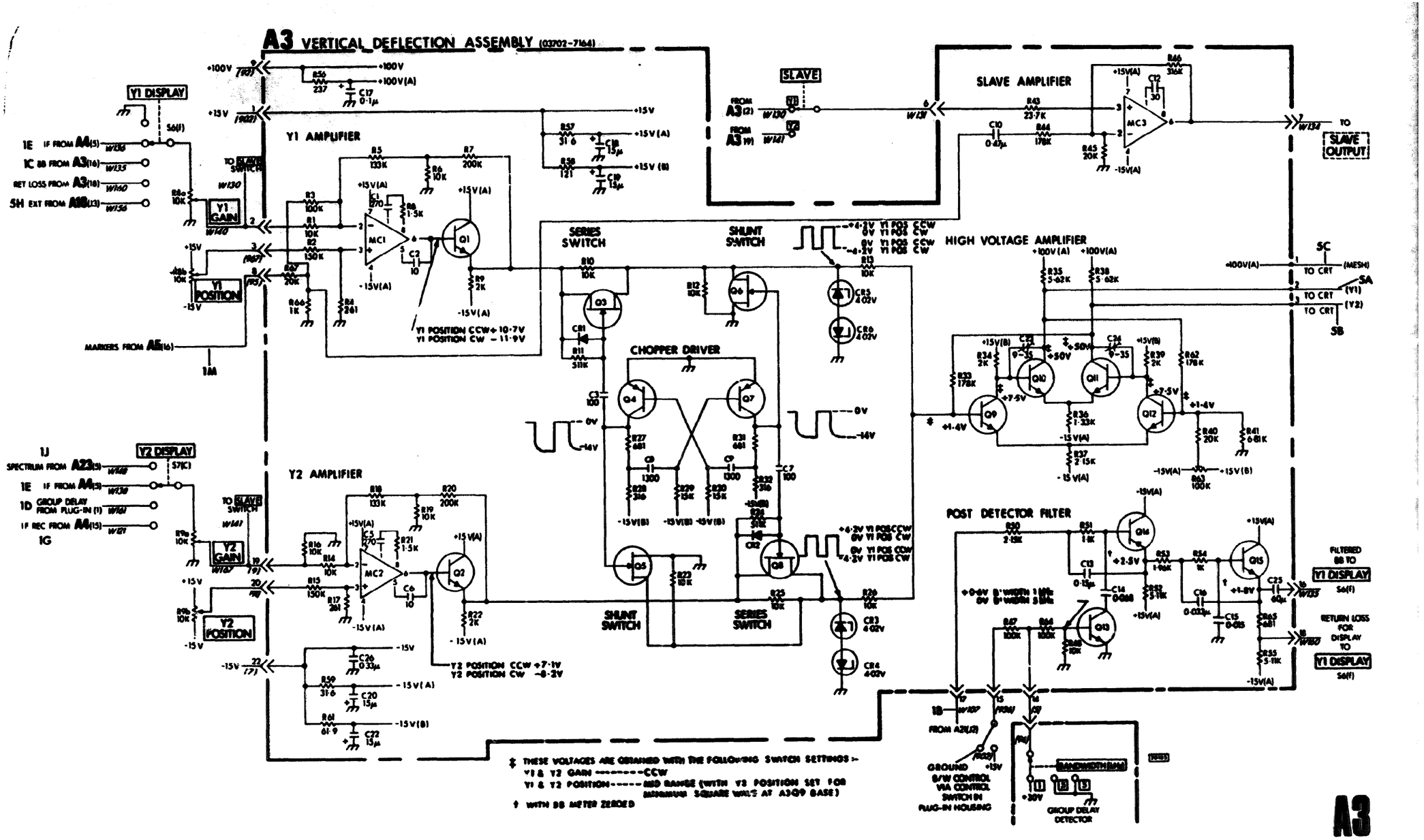


Figure A3-5 Schematic Diagram - Assembly A3

ASSEMBLY SERVICE SHEET A4 - CALIBRATOR ASSEMBLY & SPECTRUM SWEEP OSCILLATOR

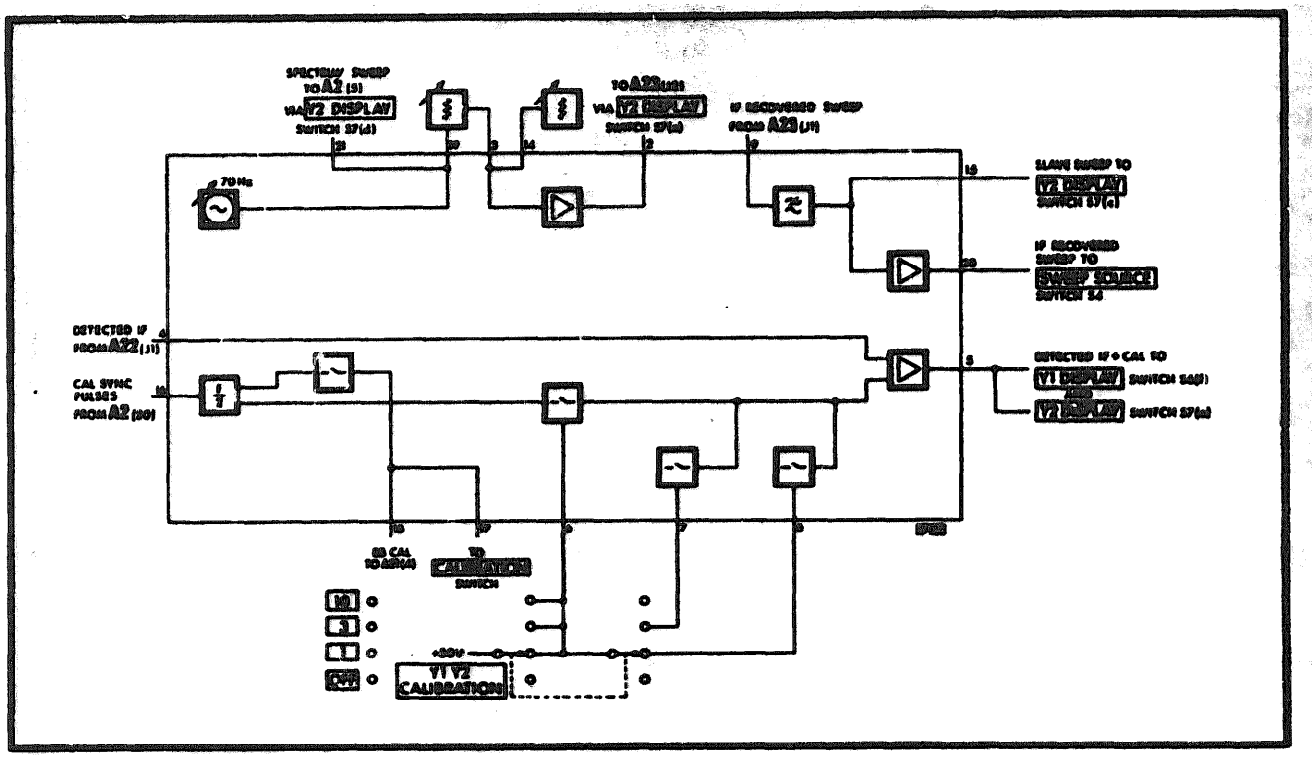


Figure A4-1. Simplified Block Diagram

A4-1 CIRCUIT DESCRIPTION

A4-2 70Hz Oscillator

A4-3 Transistors Q1 and Q2 are connected in differential pair configuration to form a Wien Bridge Oscillator. The oscillator output level is adjusted by R53 and the frequency is controlled by C1, C2 and R2. The oscillator output is ac coupled, via the SPECTRUM WIDTH potentiometer R3, to the Summing Circuit MC1. The SPECTRUM WIDTH control varies the amplitude of the sine-wave output from the oscillator, and the resulting sinewave is added to a dc offset, provided by the SPECTRUM CENTRE control R6. The output from MC1 passes to the A23 board via the Y2 DISPLAY switch.

A4-4 Calibration Circuits

A4-5 Diodes CR1 and CR2 shift the level of the input square wave from the blanking circuitry in Assembly A2, in order to obtain the correct drive level for MC3. The output from MC3(G1) is a squarewave which is divided by two by bistable MC4 to give a squarewave at ½ the sweep frequency, which is used as the calibration switching waveform for all the calibration circuits.

A4-6 The 'Q' output from MC4 is applied to Q3 after attenuation, and the '$\bar{Q}$' output from MC4 provides the input to NAND gate G2 in MC3. The output from Q3 provides the BB calibration signal to the BB amplifier in A21 and the 10% external calibration signal to CALIBRATION switch S3. The output from G2, which requires a +30V enable signal via the Y1 Y2 CALIBRATION switch, feeds Q4, which provides an IF Calibration Square wave to MC5. The square wave from Q4 is adjustable by R25 and is attenuated on the 1dB and 3dB ranges by switching Q6 and Q5 to ground respectively.

A4-7 The detected IF signal from A22 is summed with the IF calibration square wave from Q4 by MC5. This provides a split trace IF signal for display. R38 and C11 define the detected IF bandwidth.

A4-8 The IF recovered sweep from A23 is filtered by the low pass filter L1, L2, C5 through C7 and is fed simultaneously to inverter MC2 and to the Y2 DISPLAY switch. The Y2 DISPLAY switch provides the Slave Display.

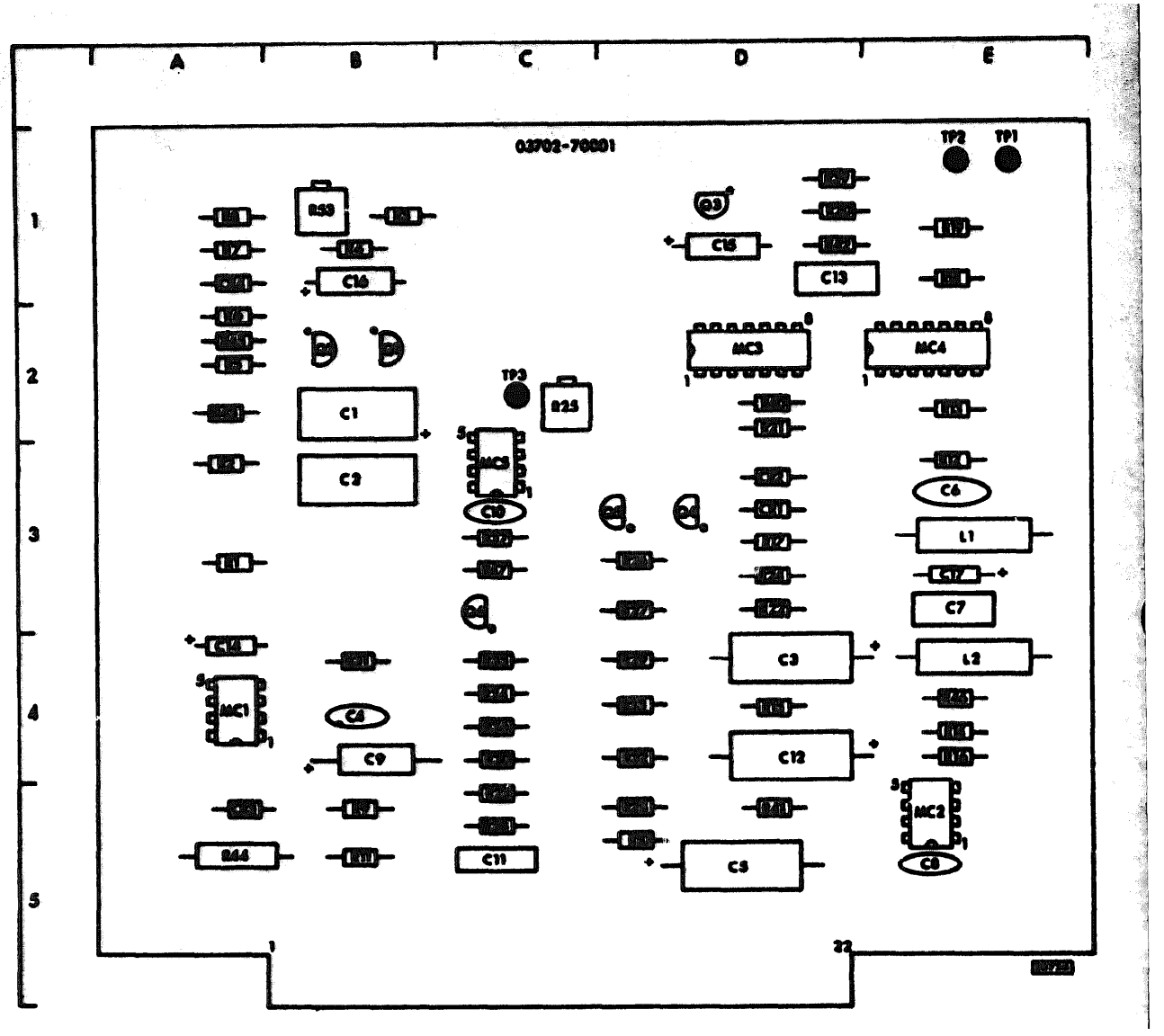
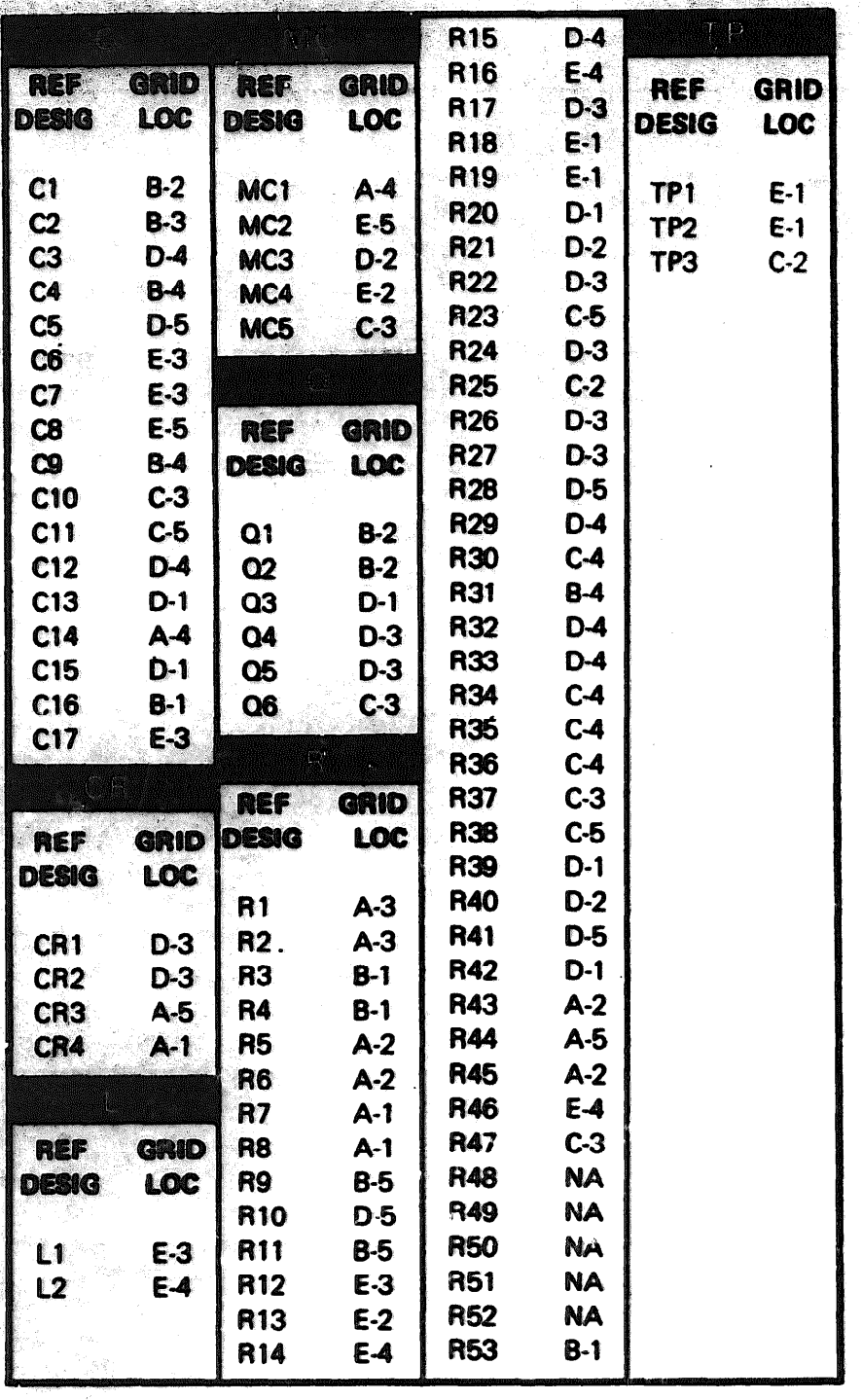


Figure A4-2 Component Location



REF DESIG	GRID LOC
C1	B-2
C2	B-3
C3	D-4
C4	B-4
C5	D-5
C6	E-3
C7	E-3
C8	E-5
C9	B-4
C10	C-3
C11	C-5
C12	D-4
C13	D-1
C14	A-4
C15	D-1
C16	B-1
C17	E-3

REF DESIG	GRID LOC
CR1	D-3
CR2	D-3
CR3	A-5
CR4	A-1

REF DESIG	GRID LOC
L1	E-3
L2	E-4

REF DESIG	GRID LOC
MC1	A-4
MC2	E-5
MC3	D-2
MC4	E-2
MC5	C-3

REF DESIG	GRID LOC
Q1	B-2
Q2	B-2
Q3	D-1
Q4	D-3
Q5	D-3
Q6	C-3

REF DESIG	GRID LOC
R1	A-3
R2	A-3
R3	B-1
R4	B-1
R5	A-2
R6	A-2
R7	A-1
R8	A-1
R9	B-5
R10	D-5
R11	B-5
R12	E-3
R13	E-2
R14	E-4
R15	D-4
R16	E-4
R17	D-3
R18	E-1
R19	E-1
R20	D-1
R21	D-2
R22	D-3
R23	C-5
R24	D-3
R25	C-2
R26	D-3
R27	D-3
R28	D-5
R29	D-4
R30	C-4
R31	B-4
R32	D-4
R33	D-4
R34	C-4
R35	C-4
R36	C-4
R37	C-3
R38	C-5
R39	D-1
R40	D-2
R41	D-5
R42	D-1
R43	A-2
R44	A-5
R45	A-2
R46	E-4
R47	C-3
R48	NA
R49	NA
R50	NA
R51	NA
R52	NA
R53	B-1

REF DESIG	GRID LOC
TP1	E-1
TP2	E-1
TP3	C-2

Figure A4-3 Grid Reference

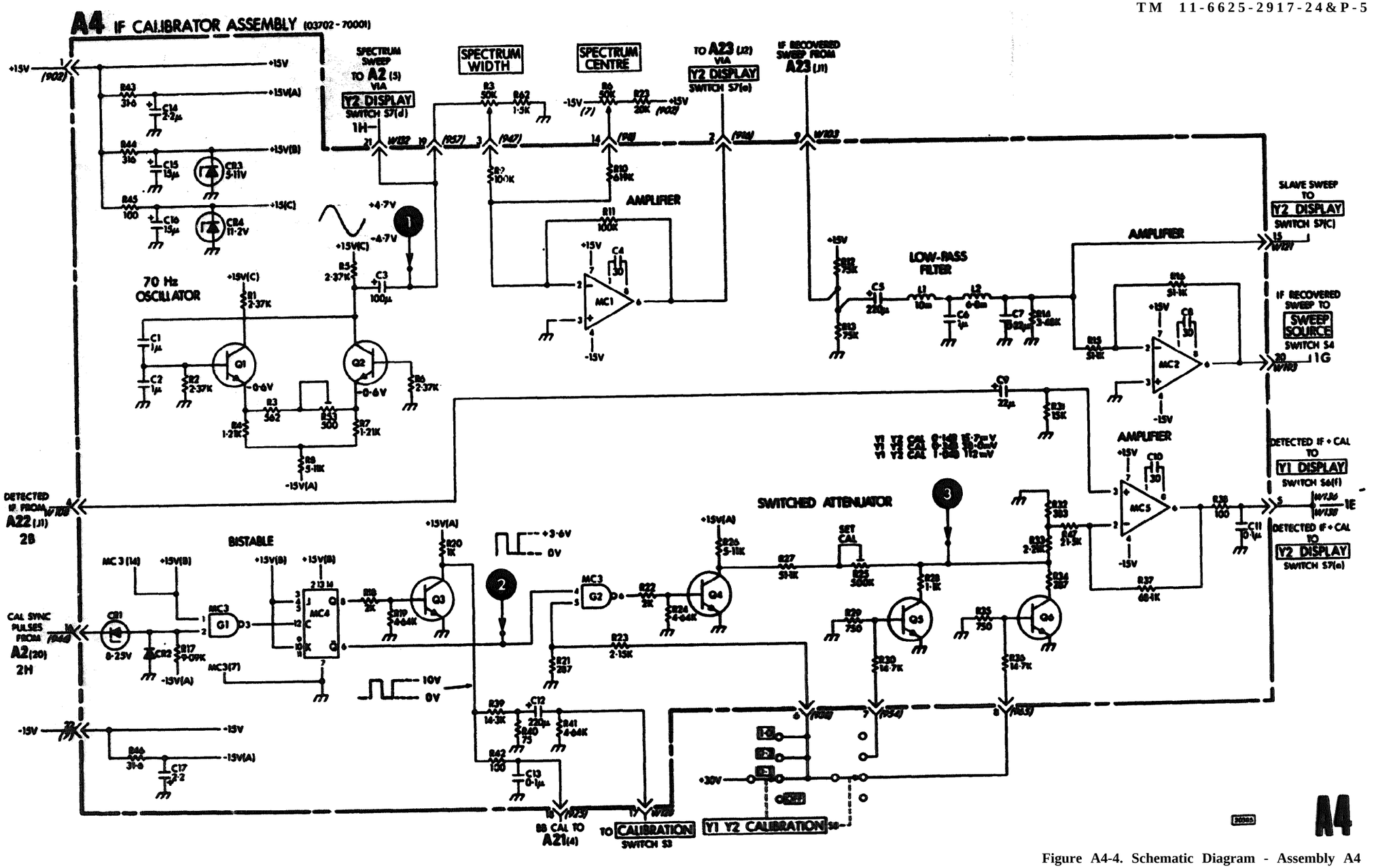


Figure A4-4. Schematic Diagram - Assembly A4

ASSEMBLY SERVICE SHEET A5 - METER CONTROL AND MARKER PROCESSOR

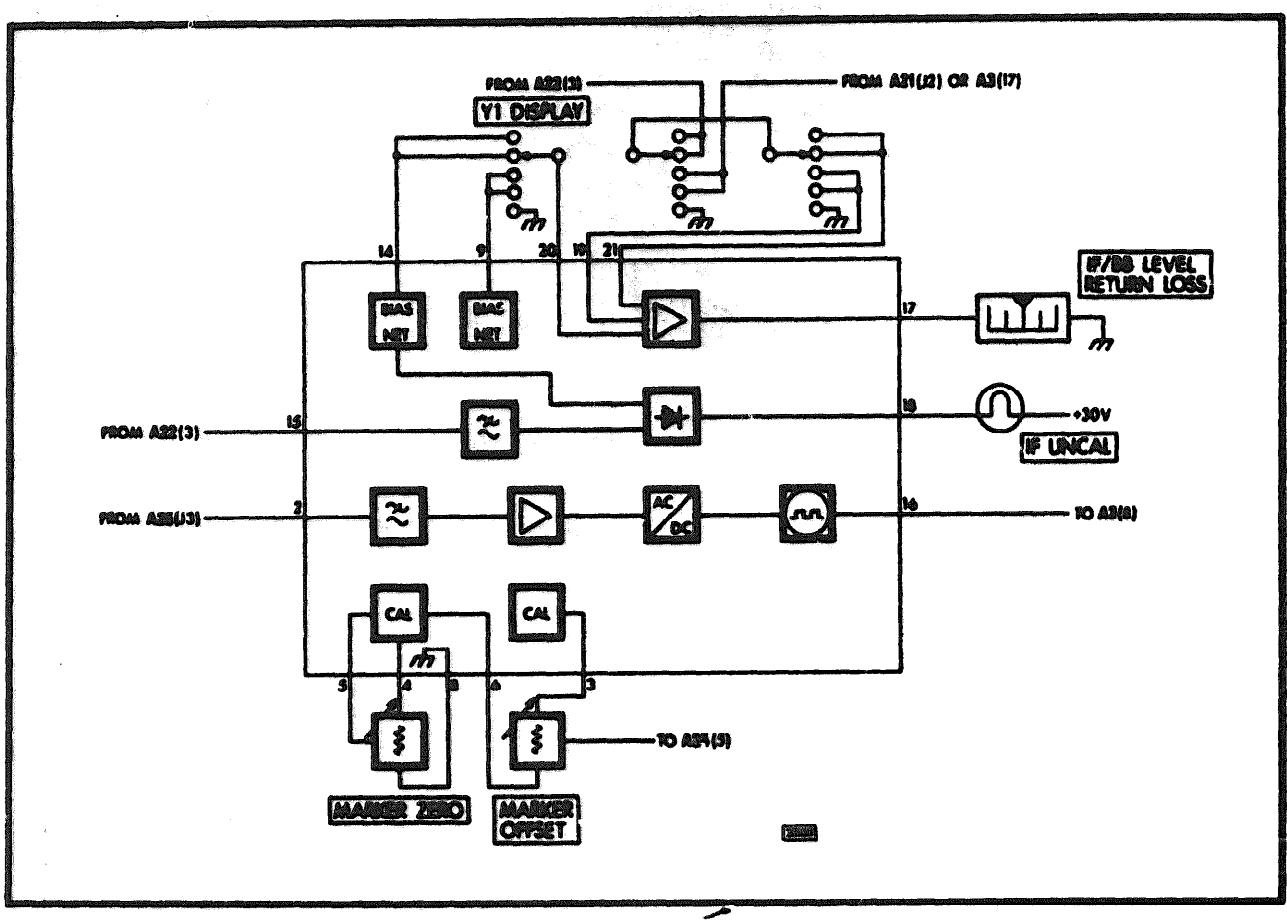


Figure A5-1 Simplified Block Diagram

A5-1 CIRCUIT DESCRIPTION

A5-2 Meter Control

A5-3 The meter amplifier MC1 compares the IF or BB input voltage level with the reference level determined by R57 or R60. Capacitor C1 integrates fast input changes effectively damping the meter and any modulation which might cause jitter.

A5-4 The detected IF output from A22(3) is applied to low-pass filter MC3, which is a three-pole active filter. Any 3dB ripple on the IF signal is removed by this filter, and the output is applied to MC2.

A5-5 Dual comparator MC2 compares the level of the IF signal from MC3 with the reference level determined by R57. If both inputs to MC2 are equal, there will be no output and Q1 will be OFF leaving the IF UNCAL lamp extinguished. If the output level from MC3 varies by more than ±½dB from the reference level, then MC2 will cause Q1 to conduct and the IF UNCAL lamp will light.

A5-6 Marker Processor

A5-7 Markers from the marker generator in A25 are applied to amplifier Q4, Q5 which has a low-pass section to eliminate frequencies above

15kHz. Amplifier Q6 through Q9 amplifies the markers by 52dB.

A 5 - 8 The zero beats are amplified by differential pair Q10, Q11. Full wave rectifier CR3 and CR4 provides negative markers to a non-saturating Schmitt Trigger Q12, Q13, which shapes the markers to give a square wave response, and Q14 further amplifies this square wave. The markers are then applied to the Vertical Deflection Amplifier and Slave Amplifier in A3.

A5-9 Marker Offset Calibration

A 5 - 1 0 The voltage at the wiper of the MARKER OFFSET pot, R11, is used to set the frequency of the voltage controlled oscillator on the A25 Board. Diodes CR5 and CR6 provide low voltage zener reference. Transistors Q15 and Q18 provide temperature compensation for Q16 and Q17. The upper voltage level determined by R54 is used to set the marker frequency at the high end of the MARKER OFFSET dial, while R10 sets the MARKER ZERO.

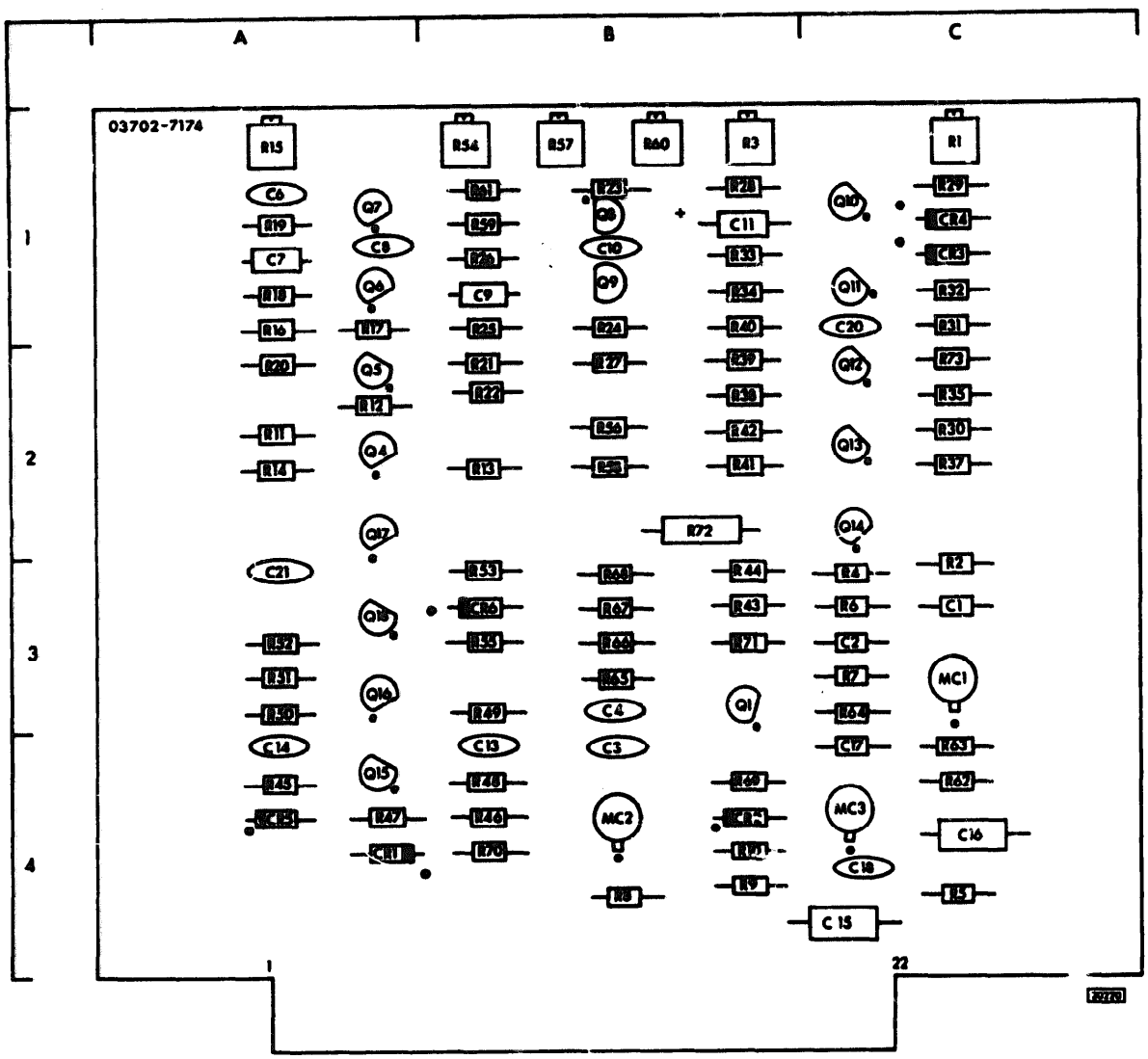
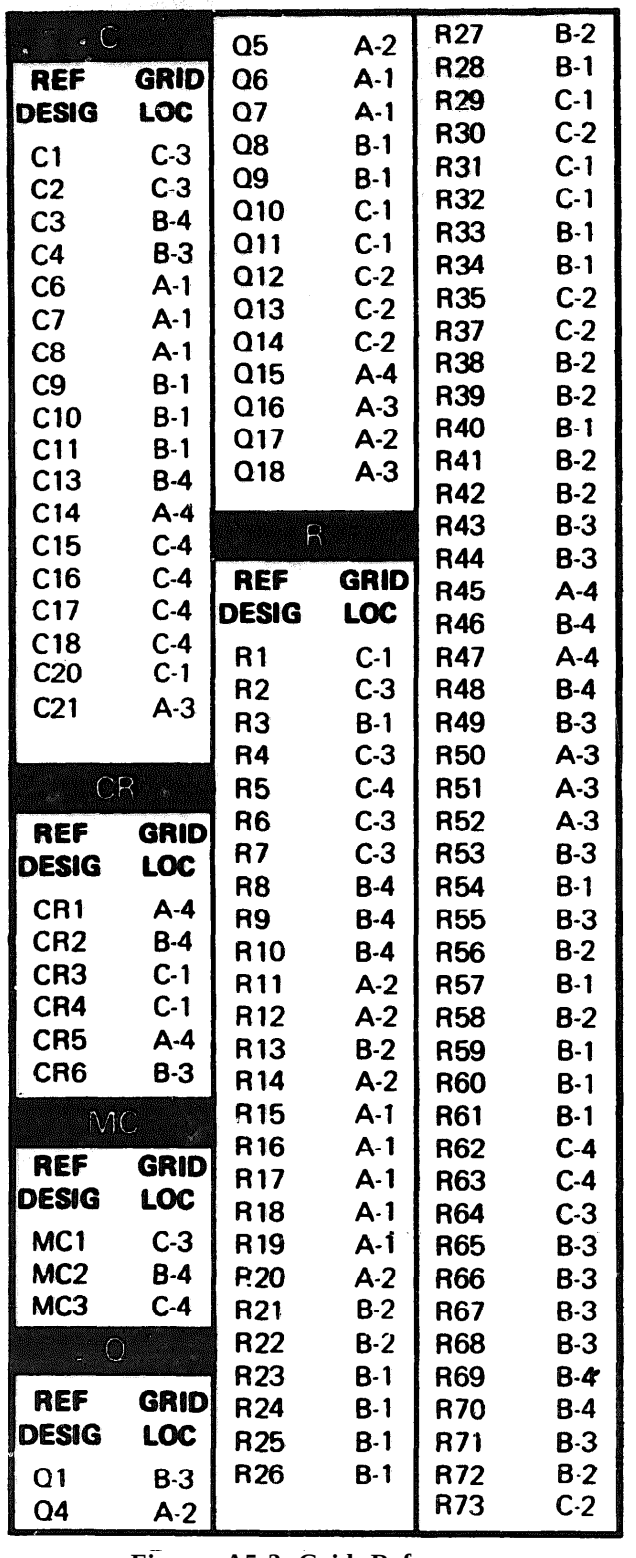


Figure A5-2 Component Location



C

REF DESIG	GRID LOC
C1	C-3
C2	C-3
C3	B-4
C4	B-3
C6	A-1
C7	A-1
C8	A-1
C9	B-1
C10	B-1
C11	B-1
C13	B-4
C14	A-4
C15	C-4
C16	C-4
C17	C-4
C18	C-4
C20	C-1
C21	A-3

CR

REF DESIG	GRID LOC
CR1	A-4
CR2	B-4
CR3	C-1
CR4	C-1
CR5	A-4
CR6	B-3

MC

REF DESIG	GRID LOC
MC1	C-3
MC2	B-4
MC3	C-4

Q

REF DESIG	GRID LOC
Q1	B-3
Q4	A-2
Q5	A-2
Q6	A-1
Q7	A-1
Q8	B-1
Q9	B-1
Q10	C-1
Q11	C-1
Q12	C-2
Q13	C-2
Q14	C-2
Q15	A-4
Q16	A-3
Q17	A-2
Q18	A-3

R

REF DESIG	GRID LOC
R1	C-1
R2	C-3
R3	B-1
R4	C-3
R5	C-4
R6	C-3
R7	C-3
R8	B-4
R9	B-4
R10	B-4
R11	A-2
R12	A-2
R13	B-2
R14	A-2
R15	A-1
R16	A-1
R17	A-1
R18	A-1
R19	A-1
R20	A-2
R21	B-2
R22	B-2
R23	B-1
R24	B-1
R25	B-1
R26	B-1
R27	B-2
R28	B-1
R29	C-1
R30	C-2
R31	C-1
R32	C-1
R33	B-1
R34	B-1
R35	C-2
R37	C-2
R38	B-2
R39	B-2
R40	B-1
R41	B-2
R42	B-2
R43	B-3
R44	B-3
R45	A-4
R46	B-4
R47	A-4
R48	B-4
R49	B-3
R50	A-3
R51	A-3
R52	A-3
R53	B-3
R54	B-1
R55	B-3
R56	B-2
R57	B-1
R58	B-2
R59	B-1
R60	B-1
R61	B-1
R62	C-4
R63	C-4
R64	C-3
R65	B-3
R66	B-3
R67	B-3
R68	B-3
R69	B-4
R70	B-4
R71	B-3
R72	B-2
R73	C-2

Figure A5-3 Grid Reference

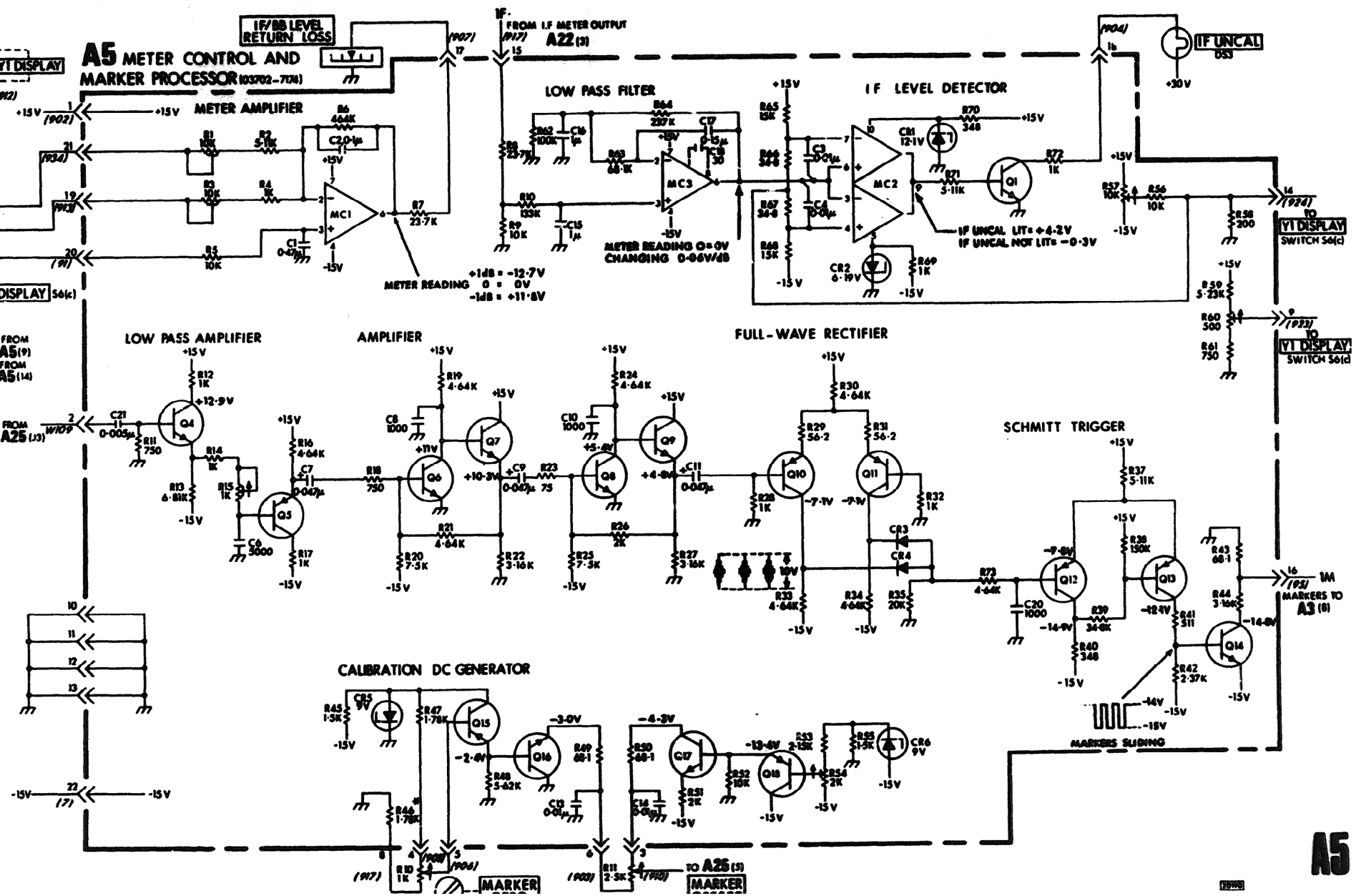


Figure A5-4. Schematic Diagram - Assembly A5

ASSEMBLY SERVICE SHEET A6 - EHT POWER SUPPLY

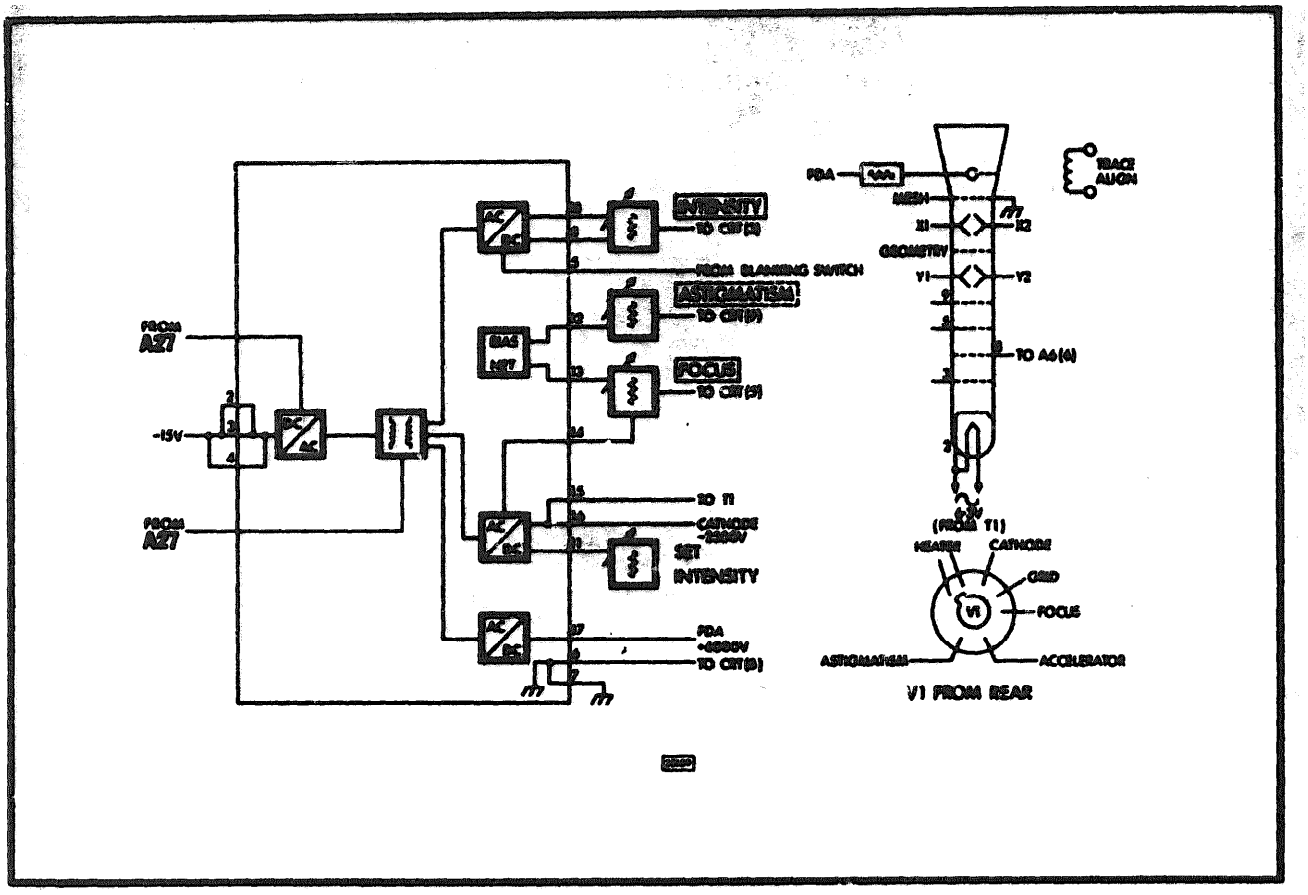


Figure A6-1 Simplified Block Diagram

A6-1 CIRCUIT DESCRIPTION

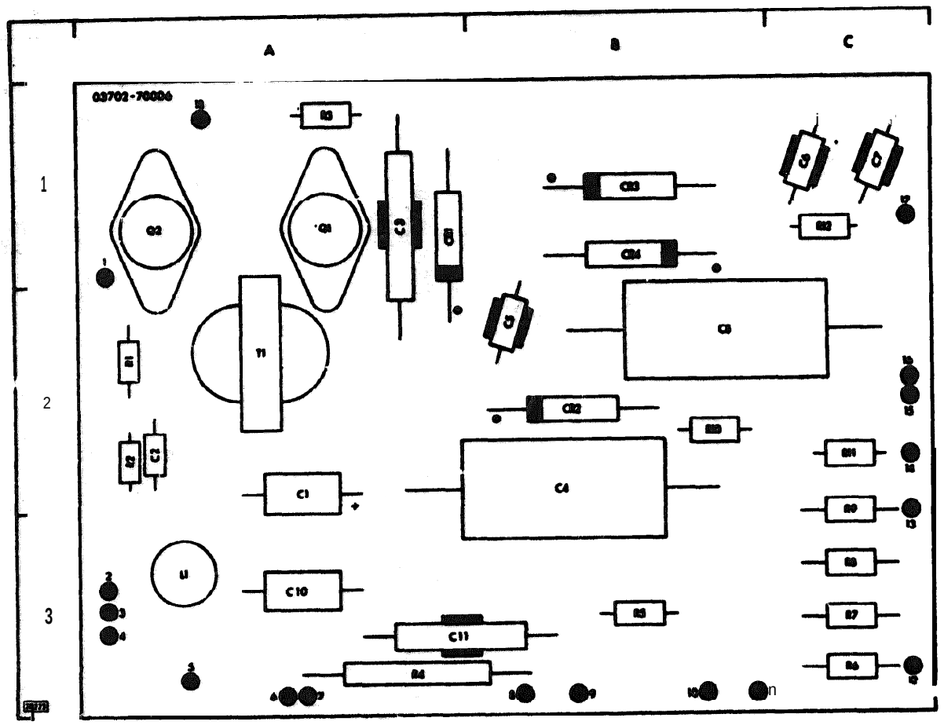
A 6 - 2 Transistors Q1, Q2 and transformer T1 operates as a push-pull inverter supplying high voltage ac from -15V dc. A square wave from the multivibrator on A27 initially switches Q1 and starts the circuit oscillating. Once oscillations have started feedback from the windings switch Q1 and Q2 producing a 15kHz, 30V pk-pk square wave on T1 primary. This is transformed to approximately 5000V pk-pk on T1 secondary.

A 6 - 3 Half-wave rectifier CR1 provides -2650V dc which is applied to the CRT grid via the INTENSITY control R1. This control sets the grid-cathode potential and hence the beam current. Providing the BLANKING switch S2 is in the ON position, a blanking signal from A2(21) is applied via A6(5) driving the grid beyond cut-off and reducing the beam current to zero.

A 6 - 4 Half-wave rectifier CR2 and C8 provide -2500V dc for the CRT cathode. Potential divider chain R6 through R9 and R11 provides control voltages for the ASTIGMATISM control R13 and for the FOCUS control R2. The SET INTENSITY pot R14 provides 0 to +100V to back off CR2 by up to +100V, and hence control the cathode potential and vary the intensity. C31 reduces the effects of intensity modulation.

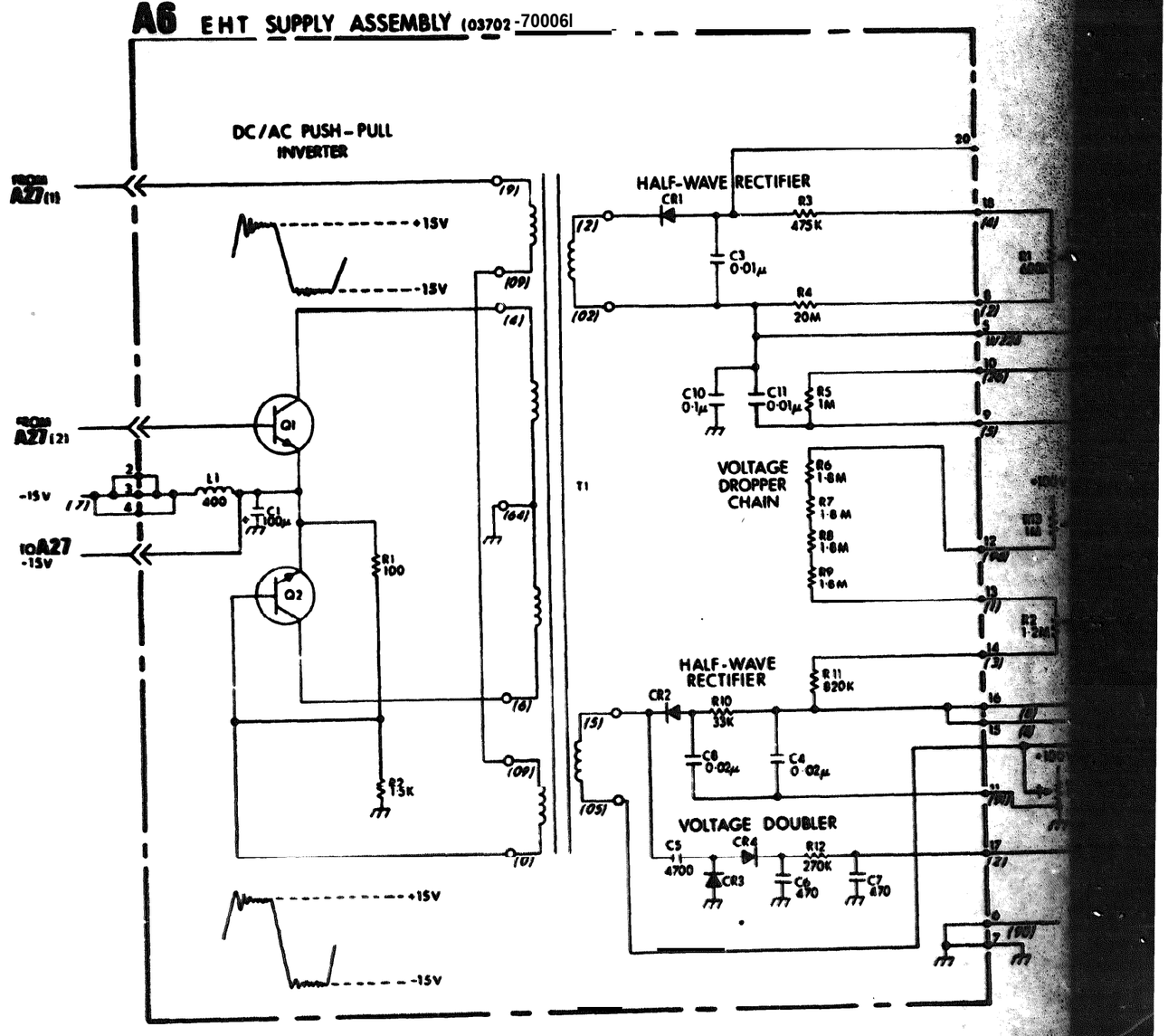
A6-5 The voltage doubler CR3, CR4, C5, C7 and R12 provides a post deflection acceleration (PDA) voltage of approximately 5 to 6kV for the CRT.

A6-6 Trace alignment is achieved by the TRACE ALIGN control R12 which varies the potential across L1 between +15V and -15V.



C		CR2	B-2	R	
REF DESIG	GRID LOC	CR3	B-1	REF DESIG	GRID LOC
C1	A-2	CR4	B-1	R1	A-2
C3	A-1	L		R2	A-2
C4	B-2	REF DESIG	GRID LOC	R3	A-1
C5	B-2	L1	A-3	R4	A-3
C6	C-1	Q		R5	B-3
C7	C-1	REF DESIG	GRID LOC	R6	C-3
C8	B-2	Q1	A-1	R7	C-3
C11	A-3	Q2	A-1	R8	C-3
CR				R9	C-3
REF DESIG	GRID LOC			R10	B-2
CR1	A-1			R11	C-2
				R12	C-1

Figure A6-2 Component Location and Grid Reference



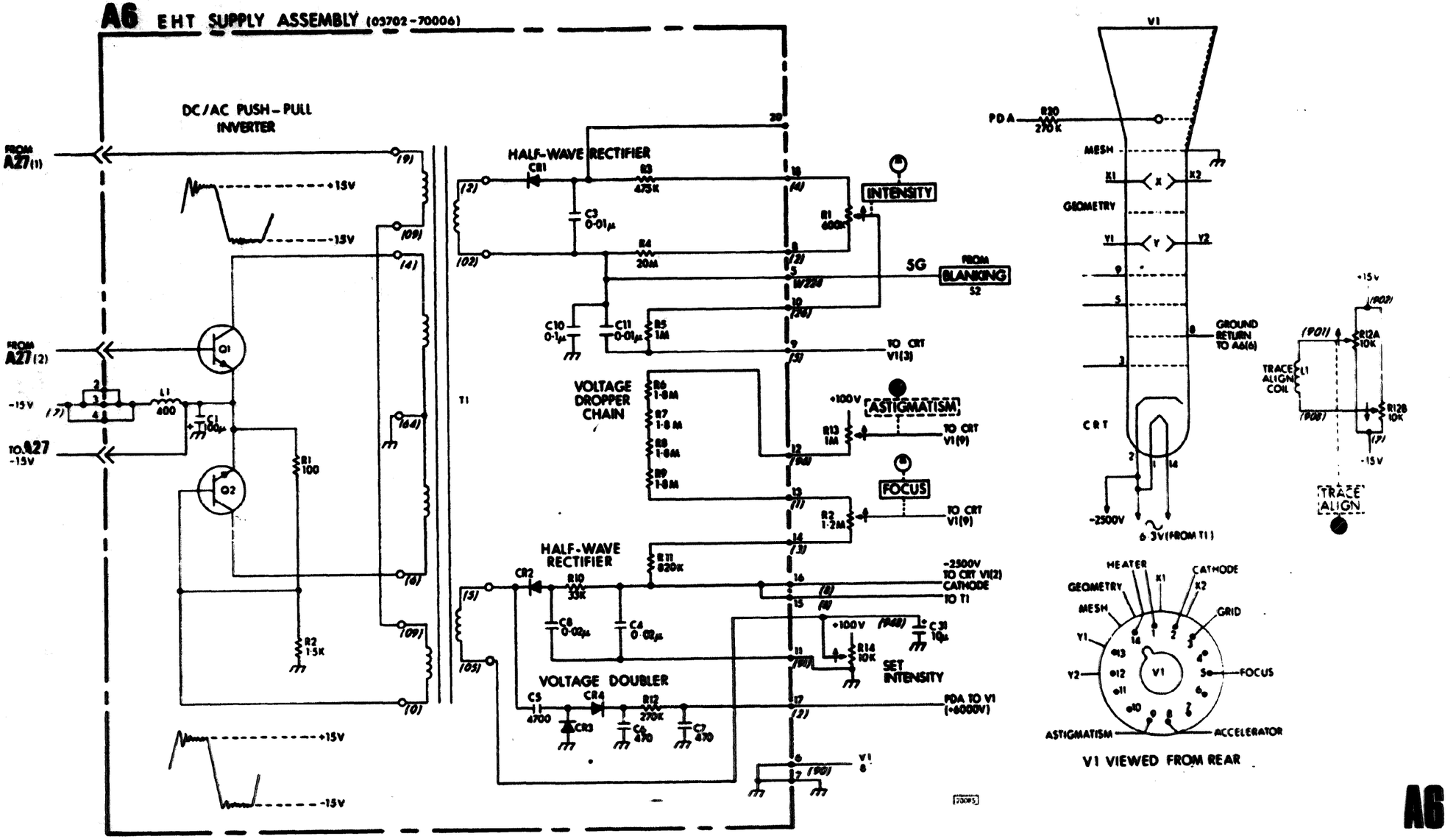


Figure A6-3. Schematic Diagram - Assembly A6

ASSEMBLY SERVICE SHEET A7 - RETURN LOSS CALIBRATION AMPLIFIER

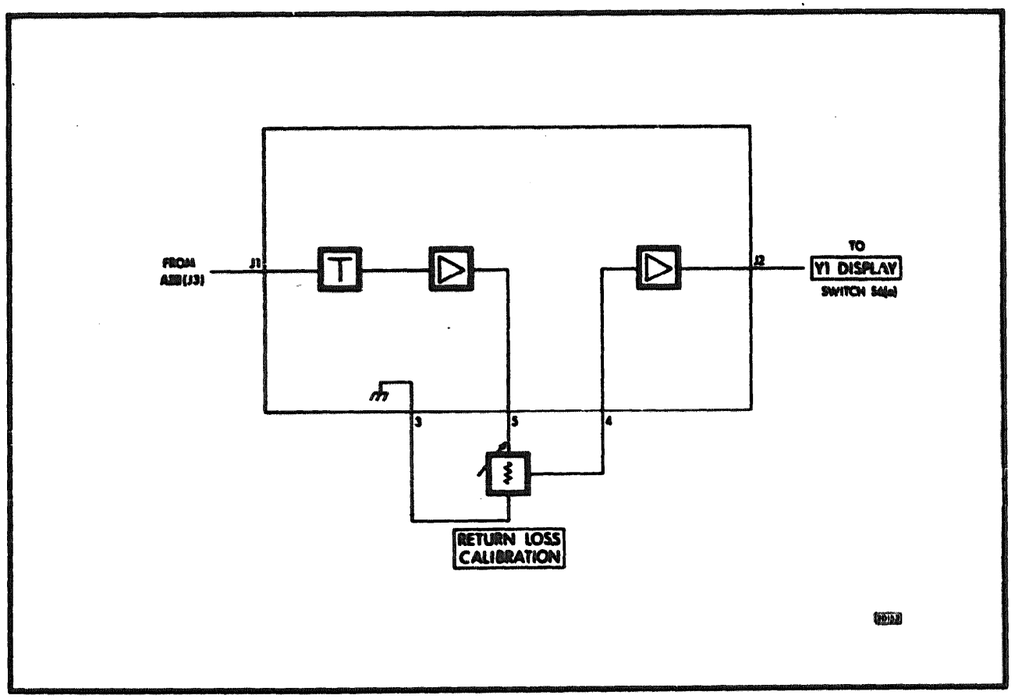
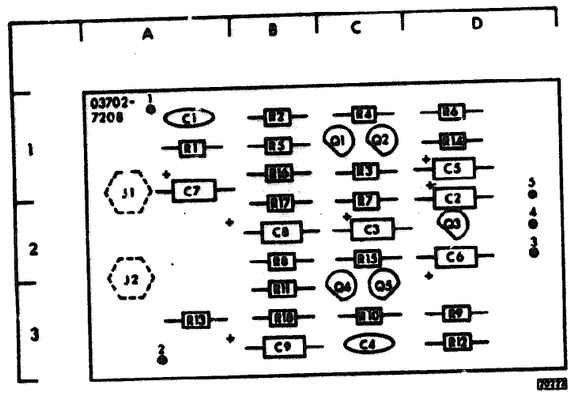


Figure A7-1 Simplified Block Diagram

A7-1 CIRCUIT DESCRIPTION

A 7 - 2 The output from the Return Loss Mixer A20 is applied to the base of Q1 via J1 and matching pad C1, R1. Q1 and Q2 form a feedback pair with a voltage gain of approximately 9, ie, the ratio of R4:R2. Resistor A7R1, being in parallel with the input impedance of Q1, determines the input impedance of the circuit which should be close to 75Ω. The RETURN LOSS CALIBRATION pot R1 can be used to vary the total gain of amplifiers Q1 through Q5. The signal from pot R1 passes to the output feedback pair Q4, Q5 via emitter follower Q3.

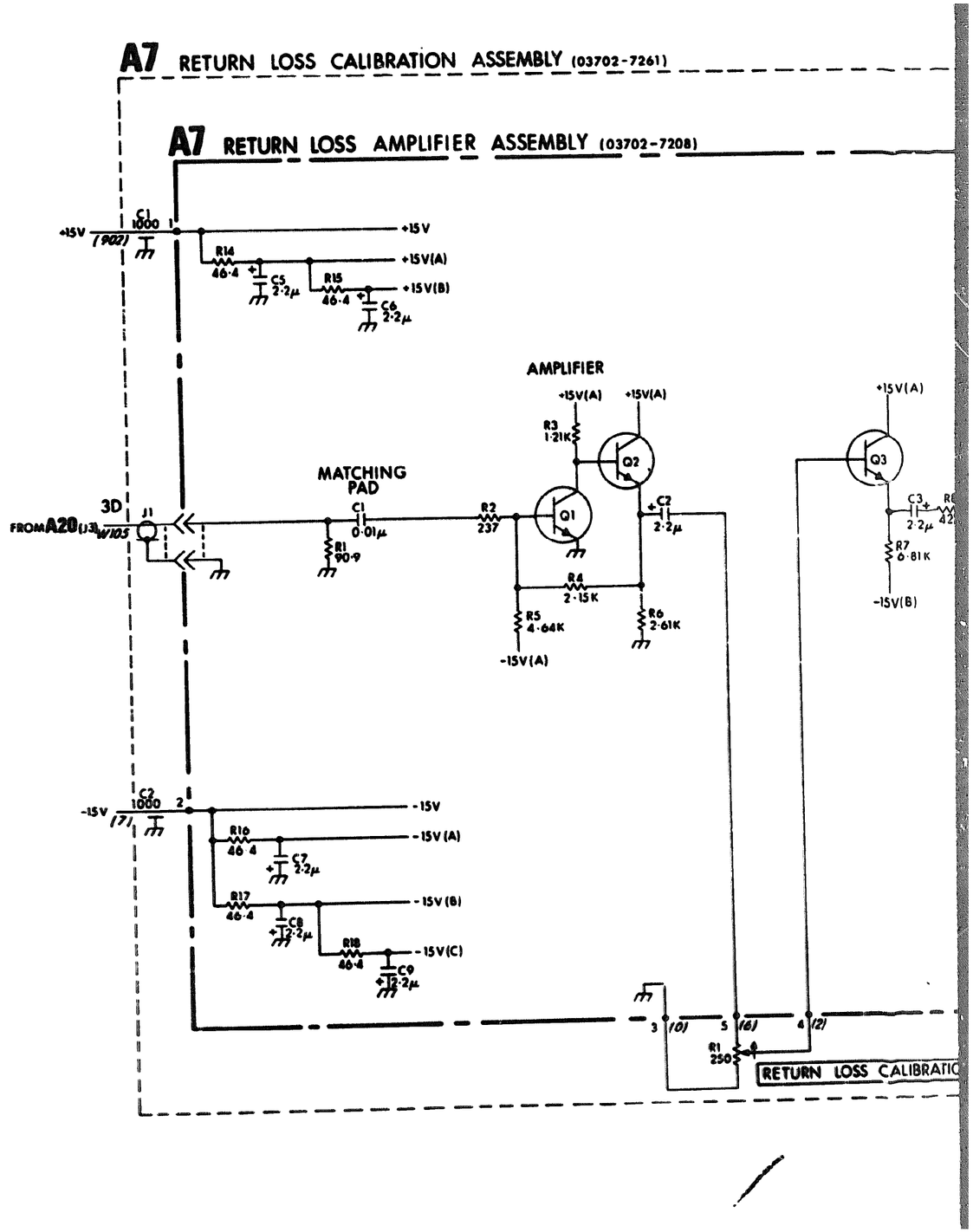


C	
REF DESIG	GRID LOC
C1	A-1
C2	D-2
C3	C-2
C4	C-3
C5	D-1
C6	D-2
C7	A-1
C8	B-2
C9	B-3

Q	
REF DESIG	GRID LOC
Q1	C-1
Q2	C-1
Q3	D-2
Q4	C-3
Q5	C-3

R	
REF DESIG	GRID LOC
R1	A-1
R2	B-1
R3	C-1
R4	C-1
R5	B-1
R6	D-1
R7	C-2
R8	B-2
R9	D-3
R10	C-3
R11	B-3
R12	D-3
R13	A-3
R14	D-1
R15	C-2
R16	B-1
R17	B-2
R18	B-3

Figure A7-2 Component Location and Grid Reference



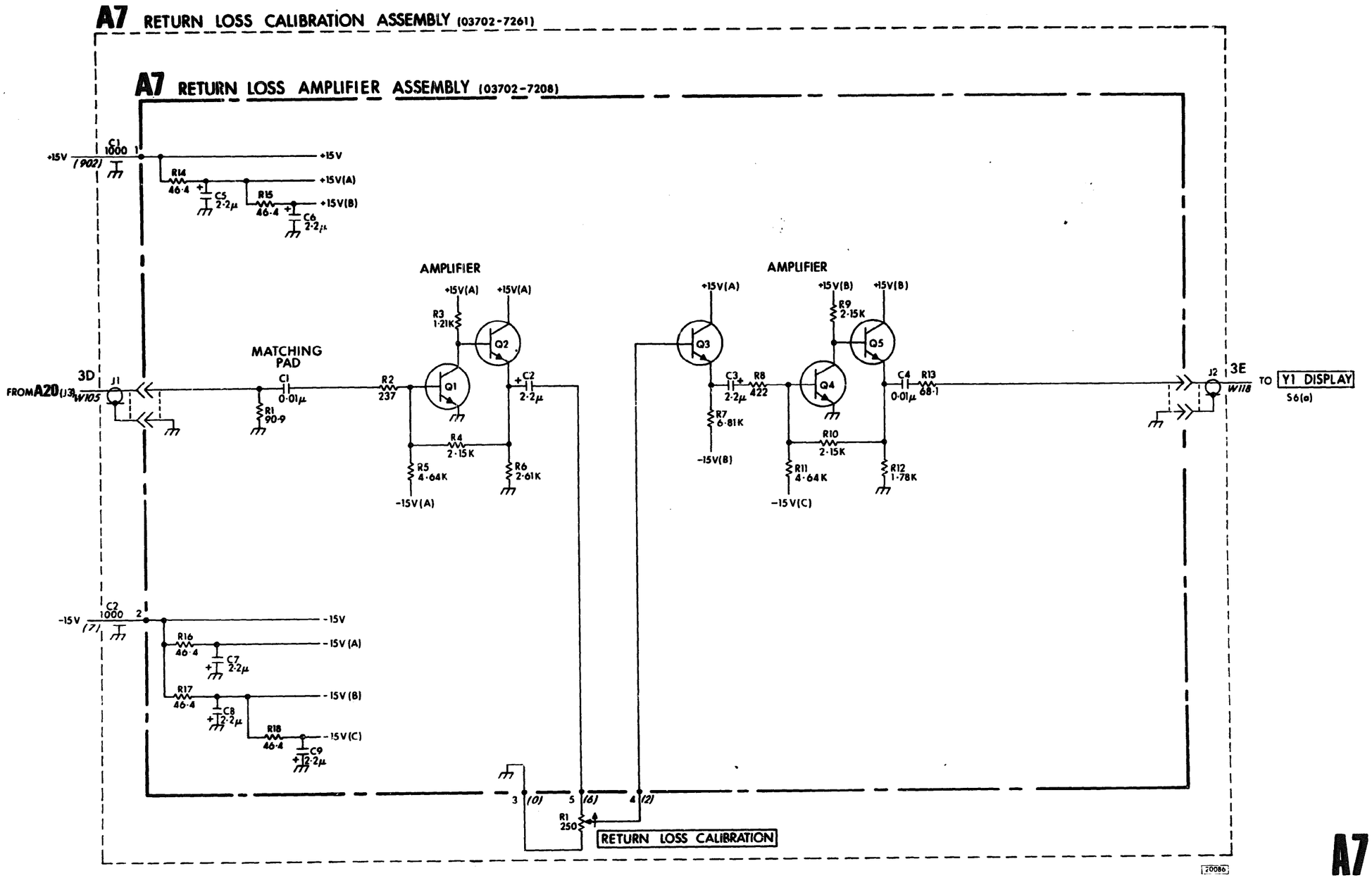


Figure A7-3 Schematic Diagram - Assembly A7

ASSEMBLY SERVICE SHEET A8/A9 - IMPEDANCE CONVERTER AND BB INPUT SWITCH [OPT 004]

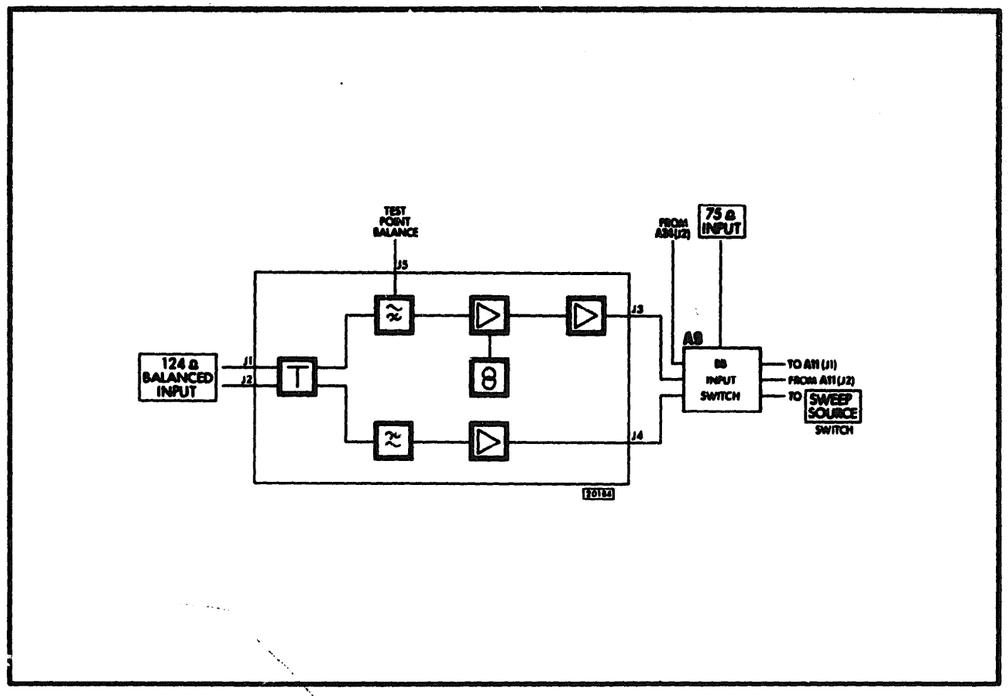


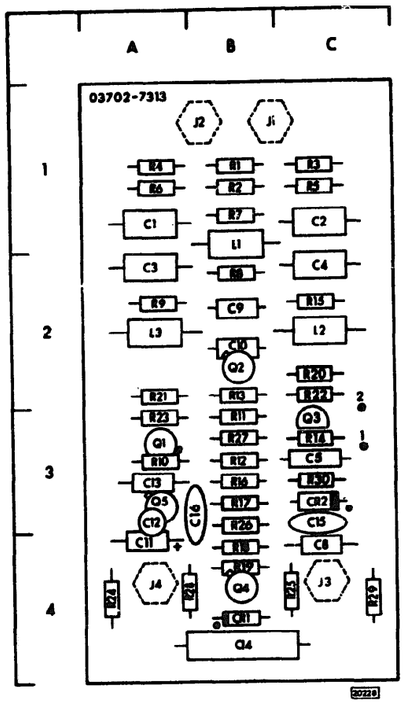
Figure A8/A9-1 Simplified Block Diagram

A8-1 CIRCUIT DESCRIPTION

A8-2 The Impedance Converter Assembly is designed to convert 124Ω balanced BB signals to 75Ω unbalanced BB. The input to the Impedance Converter may be BB, Sweep, or a combination of both.

A8-3 Differential amplifier Q1 through Q3 amplifies the BB signals, with the single-ended output from Q1 collector being further amplified by Q4, which has an output impedance of 75Ω. High pass filtering at the input to the differential amplifier blocks the sweep component.

A8-4 The sweep signal is amplified by Q5 after passing through a low pass filter which effectively blocks any BB component. The signal from Q5 collector is passed via the BB INPUT switch in A9 to the SWEEP SOURCE switch where it is directed to the X-deflection circuits.



C	
REF DESIG	GRID LOC
C1	A-1
C2	C-1
C3	A-2
C4	C-2
C5	C-3
C8	C-4
C9	B-2
C10	B-2
C11	A-4
C12	A-4
C13	A-3
C14	B-4
C15	C-3
C16	B-3

CR	
REF DESIG	GRID LOC
CR1	B-4
CR2	C-3

J	
REF DESIG	GRID LOC
J1	B-1
J2	B-1
J3	A-4
J4	C-4
J5	B-2

L	
REF DESIG	GRID LOC
L1	B-1
L2	C-2
L3	A-2
L4	C-2
L5	A-2

Q	
REF DESIG	GRID LOC
Q1	A-3
Q2	B-2
Q3	C-3
Q4	B-4
Q5	A-3

R	
REF DESIG	GRID LOC
R1	B-1
R2	B-1
R3	C-1
R4	A-1
R5	C-1
R6	A-1
R7	B-1
R8	B-2
R9	A-2
R10	A-3
R11	B-3
R12	B-3
R13	B-2
R14	C-3
R15	C-2
R16	B-3
R17	B-3
R18	B-4
R19	B-4
R20	C-2
R21	A-2
R22	C-3
R23	A-3
R24	A-4
R25	C-4
R26	B-3
R27	B-3
R28	A-4
R29	C-4
R30	C-3

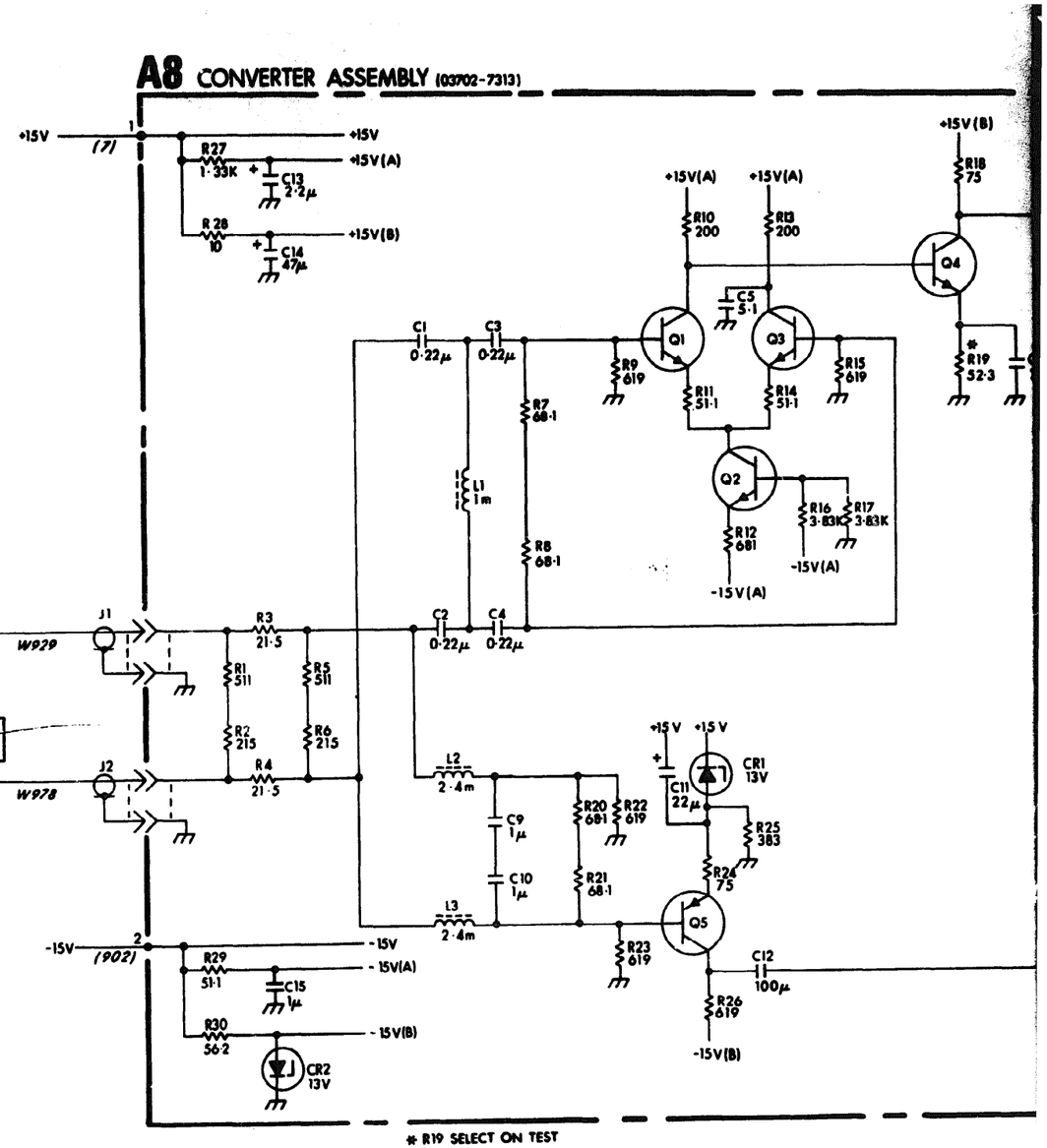


Figure A8/A9-2 Component Location and Grid Reference

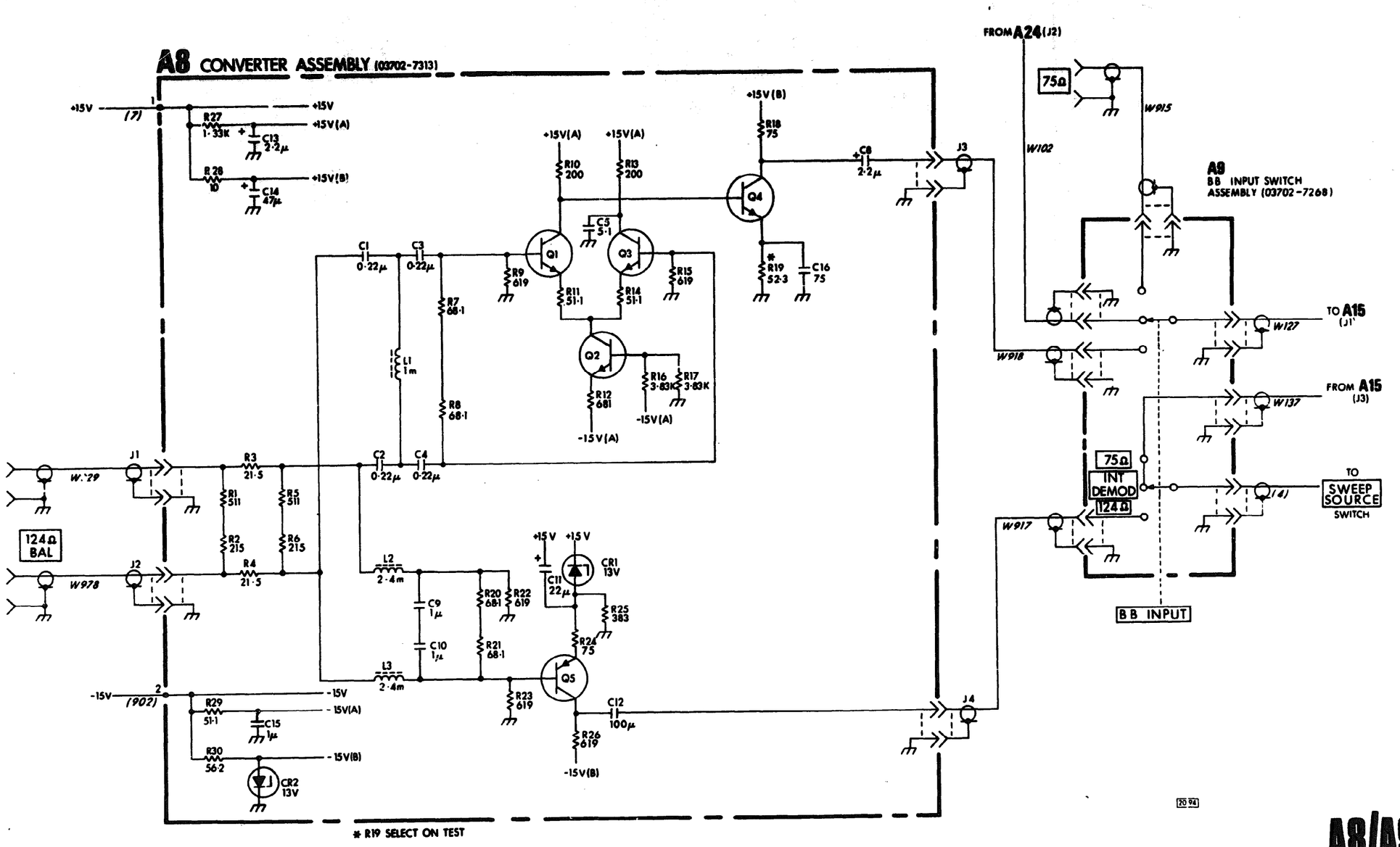
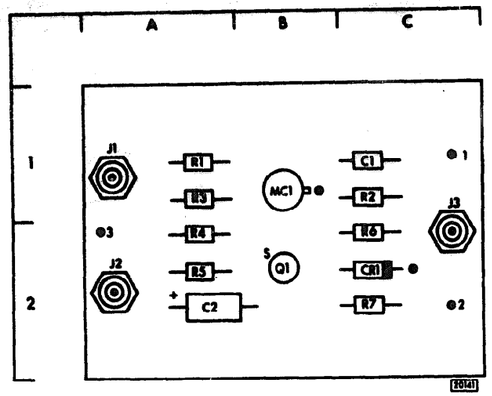


Figure A8/A9-3 Schematic Diagram - Assembly A8/A9



C	
REF DESIG	GRID LOC
C1	C-1
C2	A-2

CR	
REF DESIG	GRID LOC
CR1	C-2

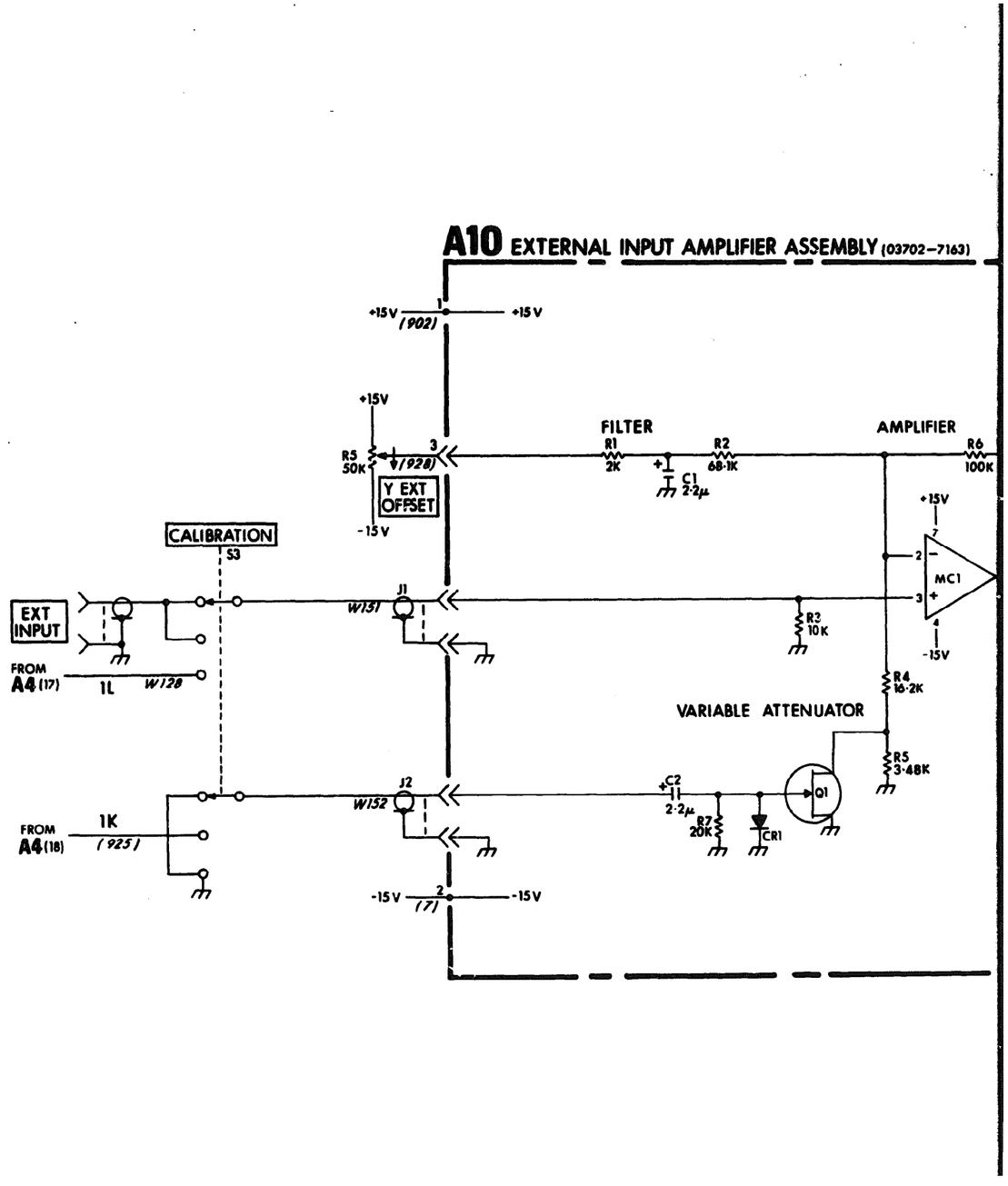
J	
REF DESIG	GRID LOC
J1	A-1
J2	A-2
J3	C-2

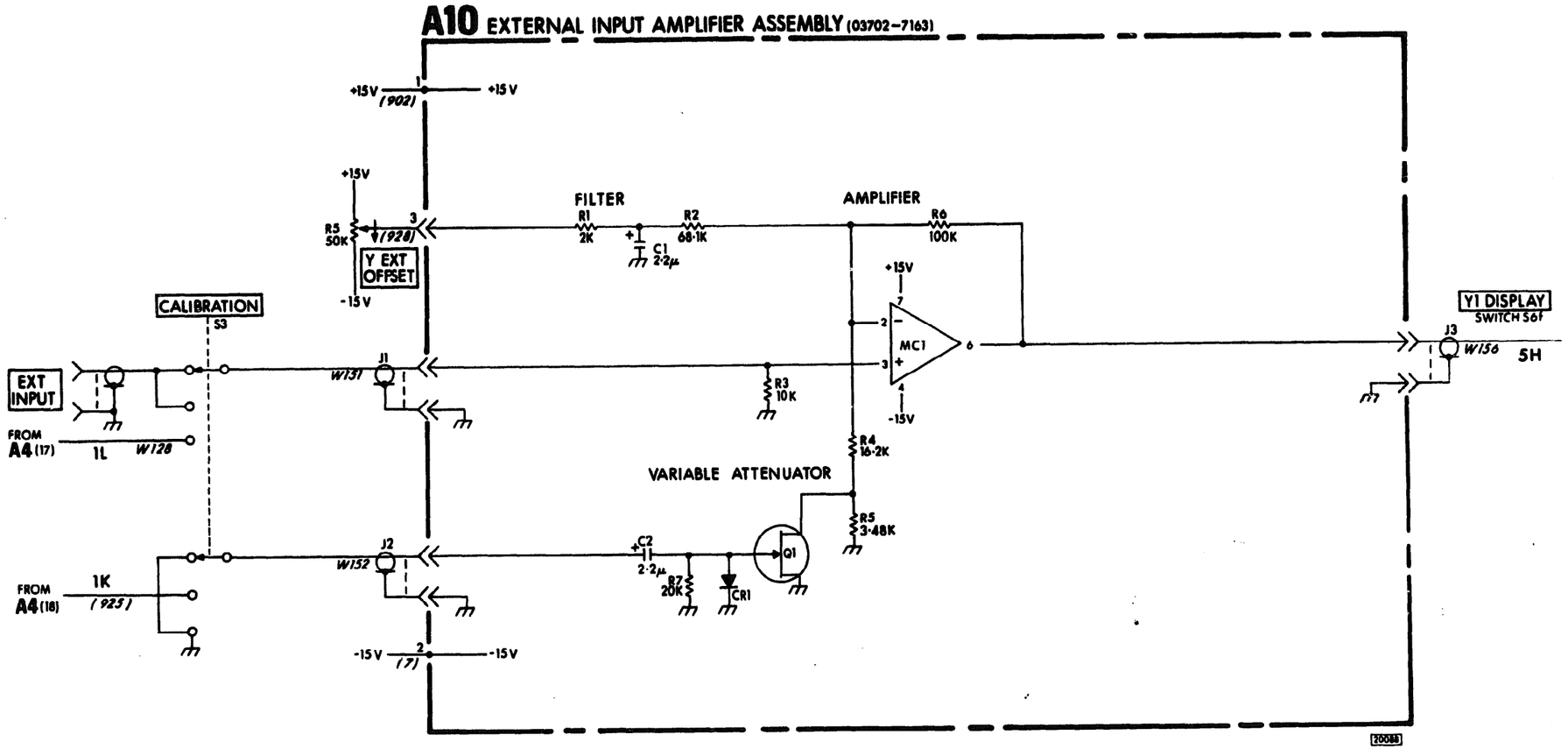
MC	
REF DESIG	GRID LOC
MC1	B-1

Q	
REF DESIG	GRID LOC
Q1	B-2

R	
REF DESIG	GRID LOC
R1	A-1
R2	C-1
R3	A-1
R4	A-2
R5	A-1
R6	C-2
R7	C-2

Figure A10-2 Component Location and Grid Reference





A10

Figure A10-3 Schematic Diagram - Assembly A10

ASSEMBLY SERVICE SHEET A11 - MARKER COMB GENERATOR

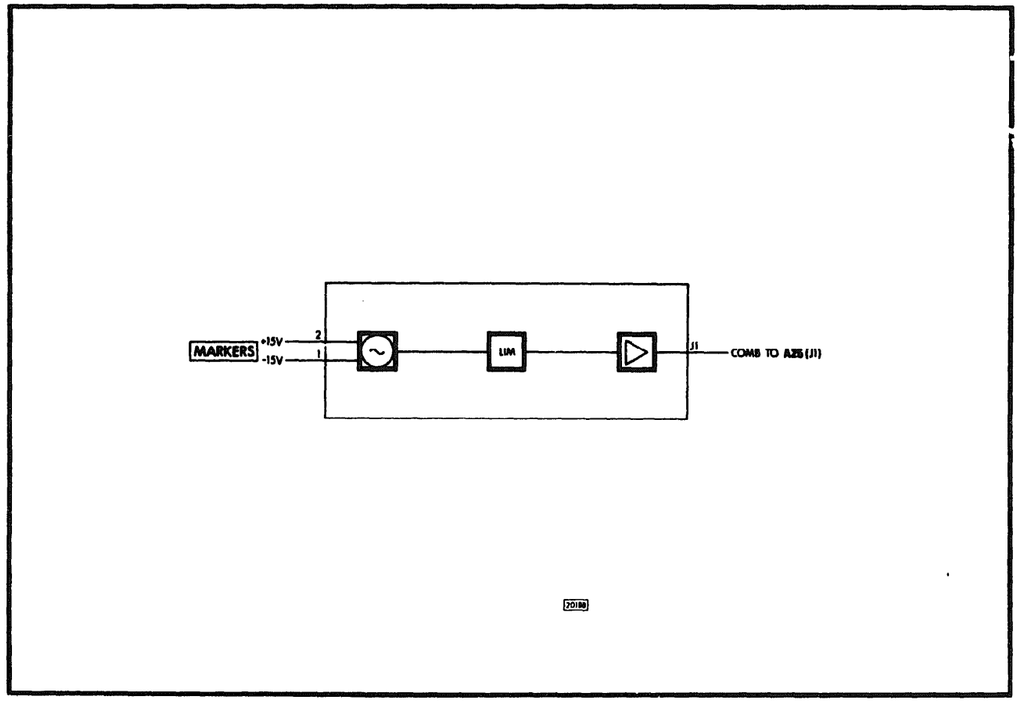
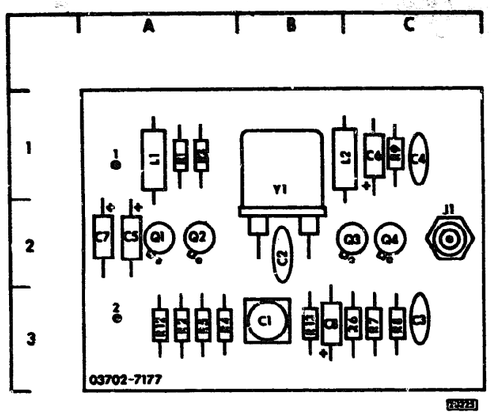


Figure A11-1 Simplified Block Diagram

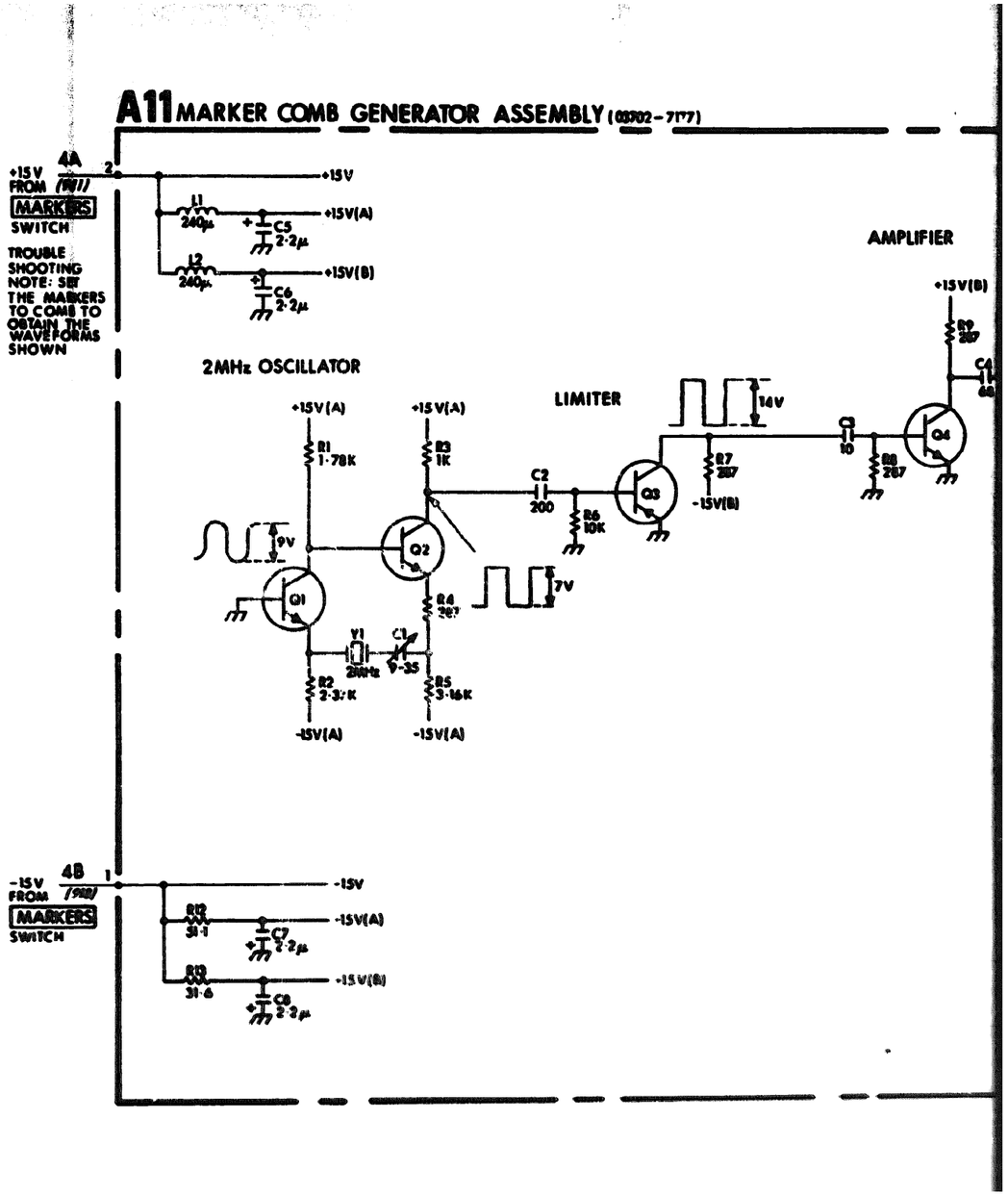
A11-1 CIRCUIT DESCRIPTION

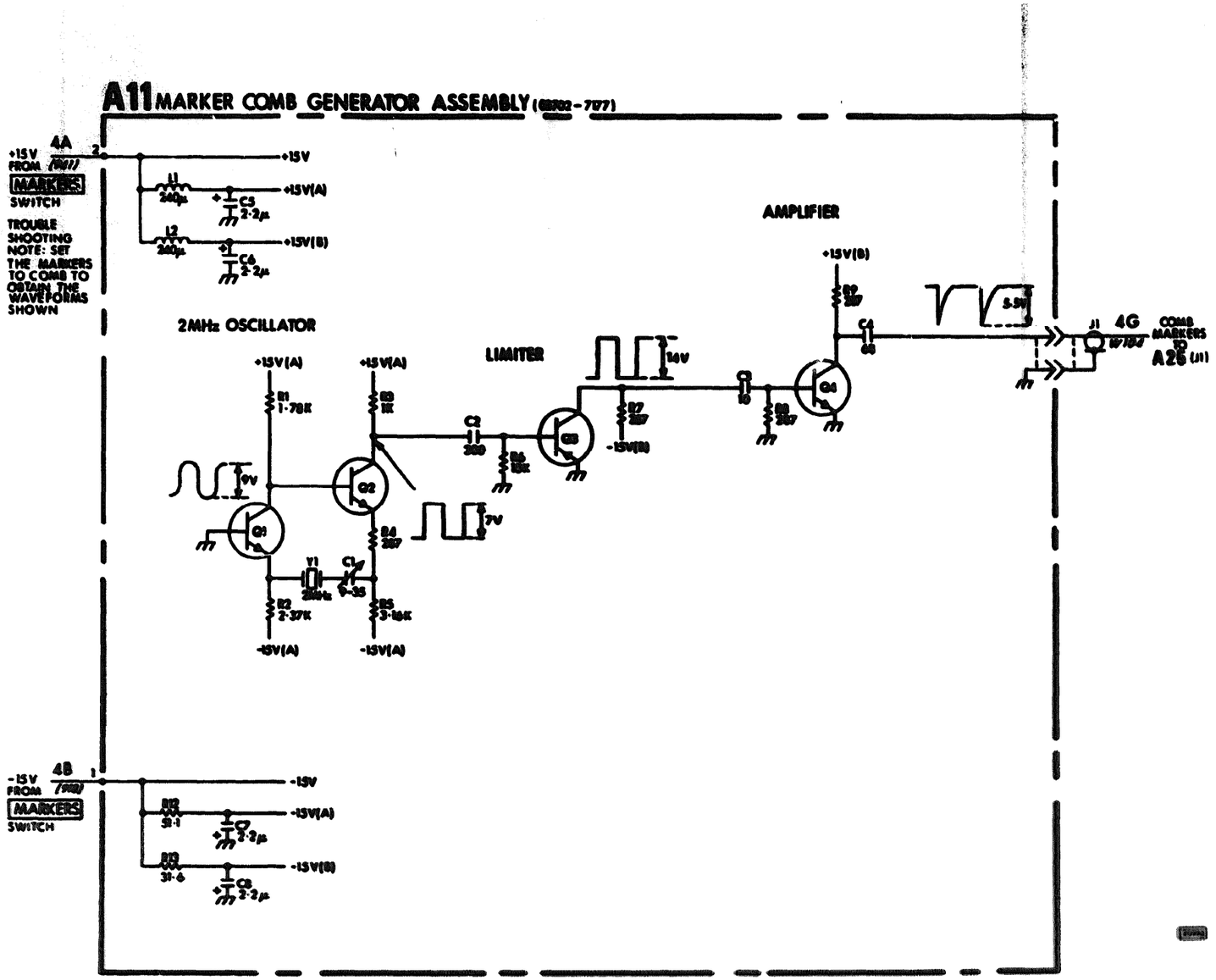
A11-2 The marker comb is generated by the 2MHz crystal oscillator Q1 and Q2. The sinewave on the collector of Q2 is limited by Q3 to produce a 2MHz square wave, which when differentiated by C3 and R8, forms positive pulses. The pulses are then amplified and inverted by Q4 and applied via J1 to the Sliding/Spectrum Marker Generator assembly A25.



C		R	
REF DESIG	GRID LOC	REF DESIG	GRID LOC
C1	B-3	R1	A-1
C2	B-2	R2	A-3
C3	C-3	R3	A-1
C4	C-1	R4	A-3
C5	A-2	R5	A-3
C6	C-1	R6	C-3
C7	A-2	R7	C-3
C8	B-3	R8	C-3
L		R9	C-1
REF DESIG	GRID LOC	R12	A-3
		R13	B-3
L1	A-1		
L2	B-1		
Q		Y	
REF DESIG	GRID LOC	REF DESIG	GRID LOC
Q1	A-2	Y1	B-1
Q2	A-2		
Q3	C-2		
Q4	C-2		

Figure A11-2 Component Location and Grid Reference





A11

Figure A11-3 Schematic Diagram - Assembly A11

ASSEMBLY SERVICE SHEET A12 - POWER SUPPLY RECTIFIERS

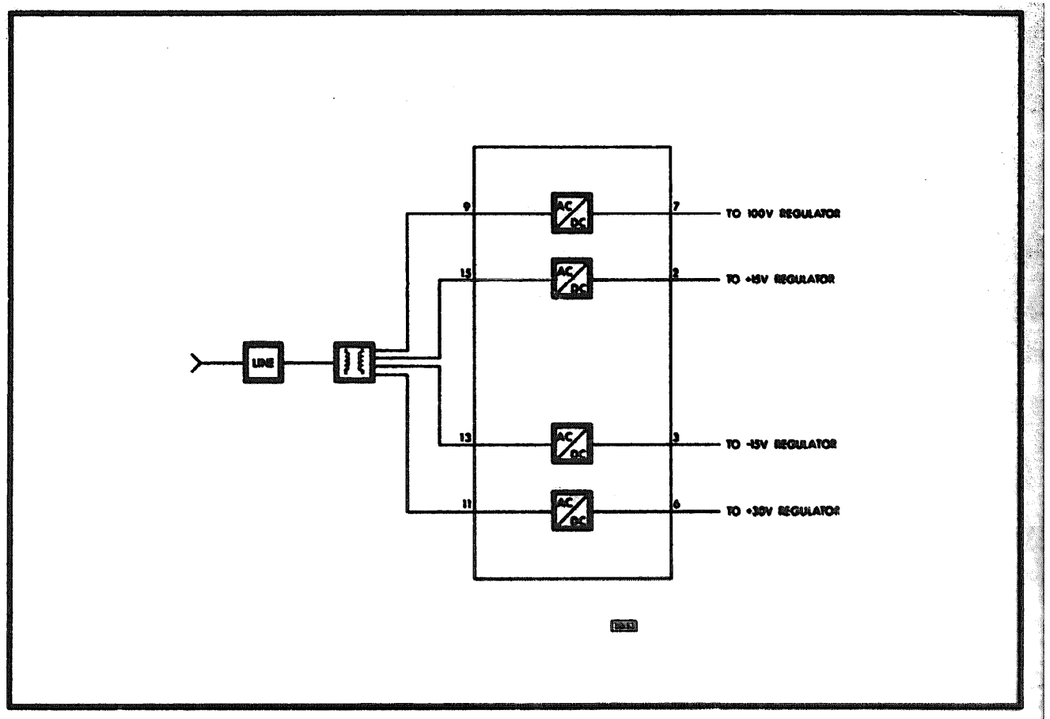


Figure A12-1 Simplified Block Diagram

A12-1 CIRCUIT DESCRIPTION

A12-2 The LINE voltage via Line Module E1 is reduced and isolated by transformer T1 to provide the rectifiers with the required voltages. The transformer primary windings are connected in a series-parallel configuration to enable Line voltages of 100V to 240V to be used according to the setting of the circuit card in E1. The line fuse should be a 2A slow-blow when using 100V Line and 1A slow-blow when using 240V Line.

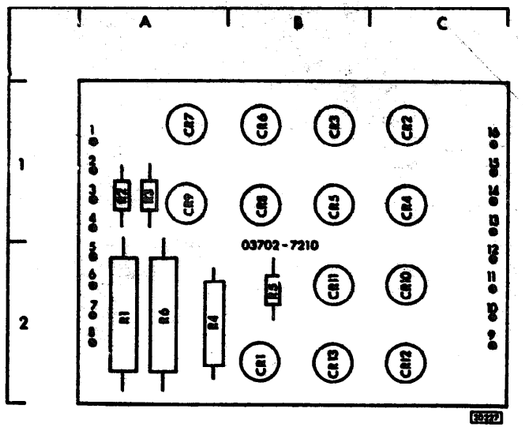
A12-3 Half-wave rectifier CR1 provides 154V dc to drive the +100V regulator Q1.

A12-4 Bridge rectifier CR2 to CR5 provides 27V dc to drive the +15V regulator Q2.

A12-5 Bridge rectifier CR6 to CR9 provides 27V dc to drive the -15V regulator Q3.

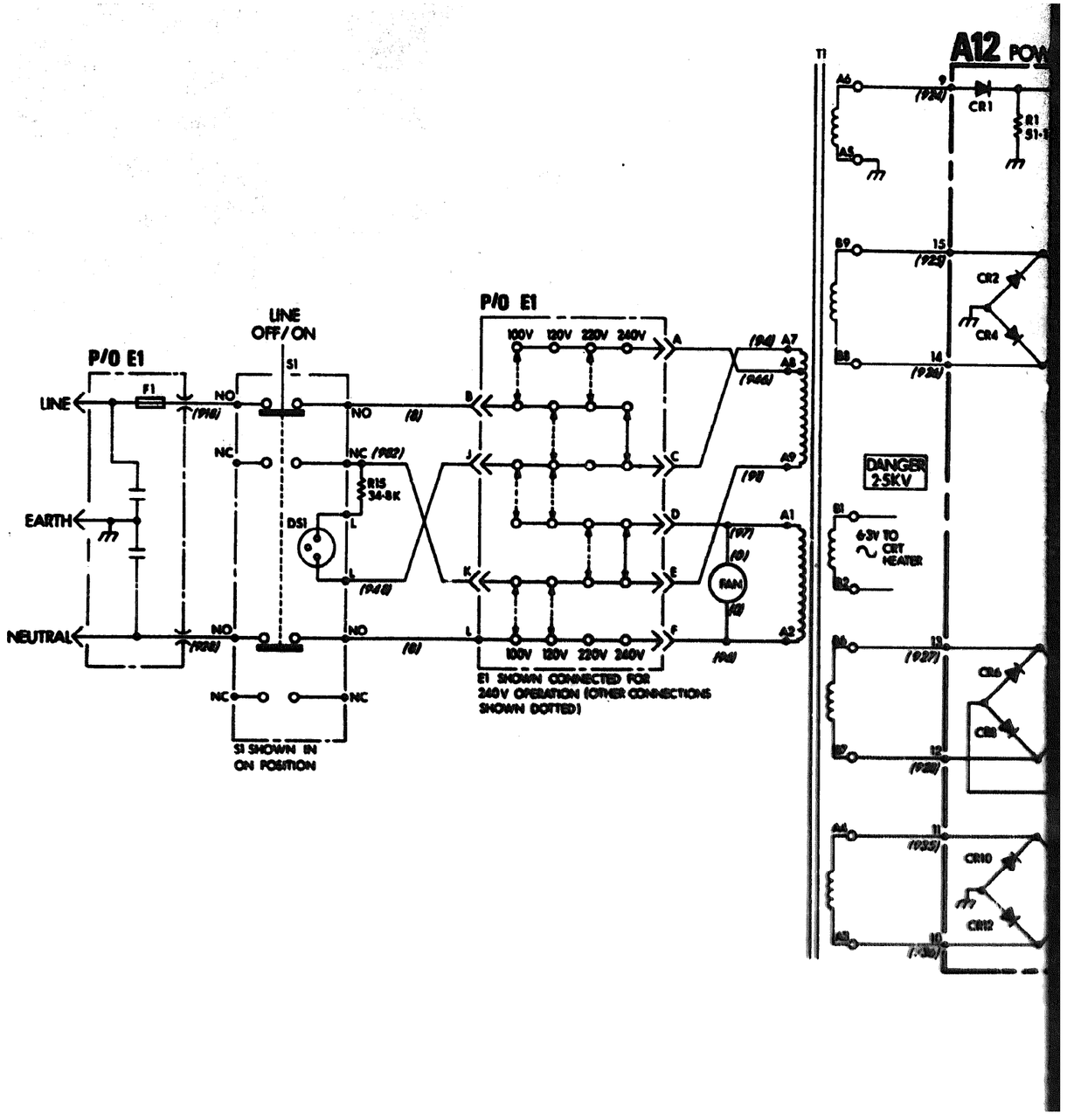
A12-6 Bridge rectifier CR10 to CR13 provides 72V dc to drive the +30V regulator Q4, for which R6 is the collector load.

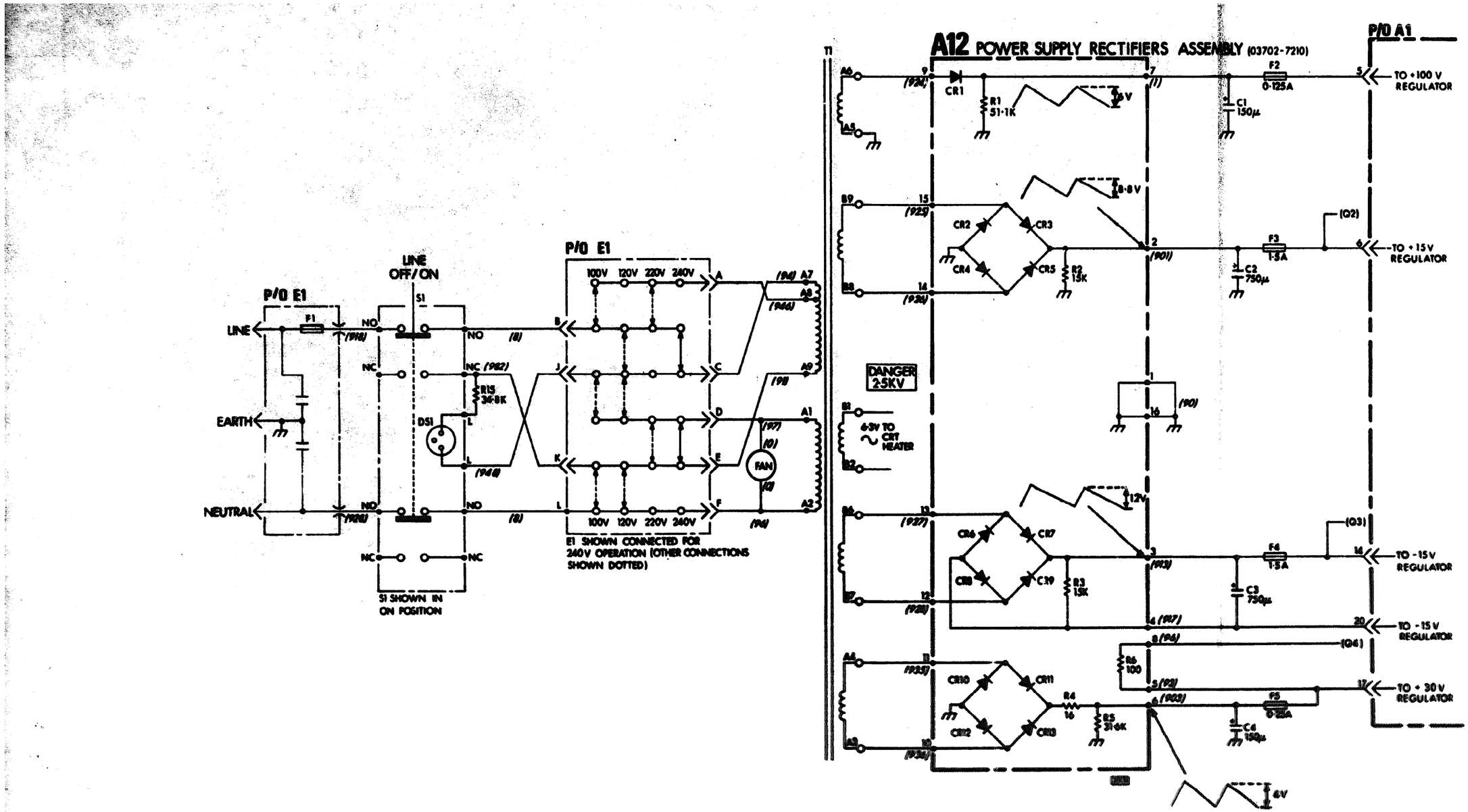
A12-7 The 6.3V winding supplies the CRT heater which is also connected to the CRT cathode at a dc level of -2500V.



CR		CR11	B-2
REF DESIG	GRID LOC	CR12	C-2
CR1	B-2	CR13	B-2
CR2	C-1		
CR3	B-1	R	
CR4	C-1	REF DESIG	GRID LOC
CR5	B-1	R1	A-2
CR6	B-1	R2	A-1
CR7	A-1	R3	A-1
CR8	B-1	R4	A-2
CR9	A-1	R5	B-2
CR10	C-2	R6	A-2

Figure A12-2 Component Location and Grid Reference





A12

Figure A12-3 Schematic Diagram - Assembly A12

ASSEMBLY SERVICE SHEET A13 - BB ATTENUATOR

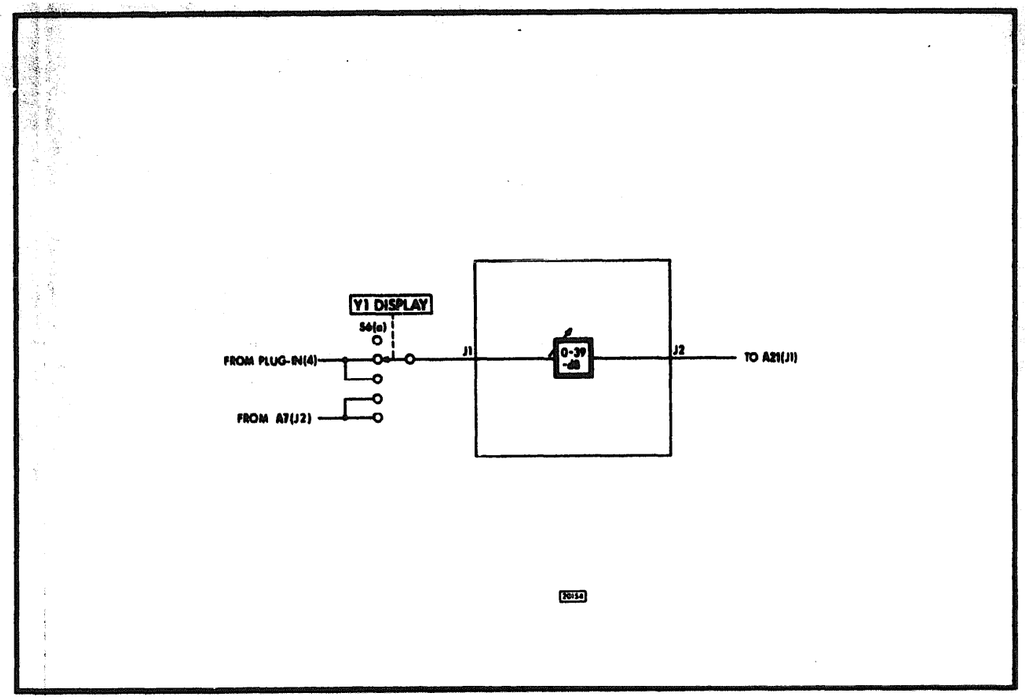


Figure A13-1 Simplified Block Diagram

A13-1 CIRCUIT DESCRIPTION

A13-2 The BB Attenuator provides 39dB of attenuation in 1dB steps, and is calibrated from -10dB to -49dB. When the BB metering is nulled, the reading on the 3702B BB ATTENUATOR indicates the power level of the BB INPUT.

A13-3 For BB power measurements the Attenuator reads in dBm, and for Return Loss measurements it reads in dB.

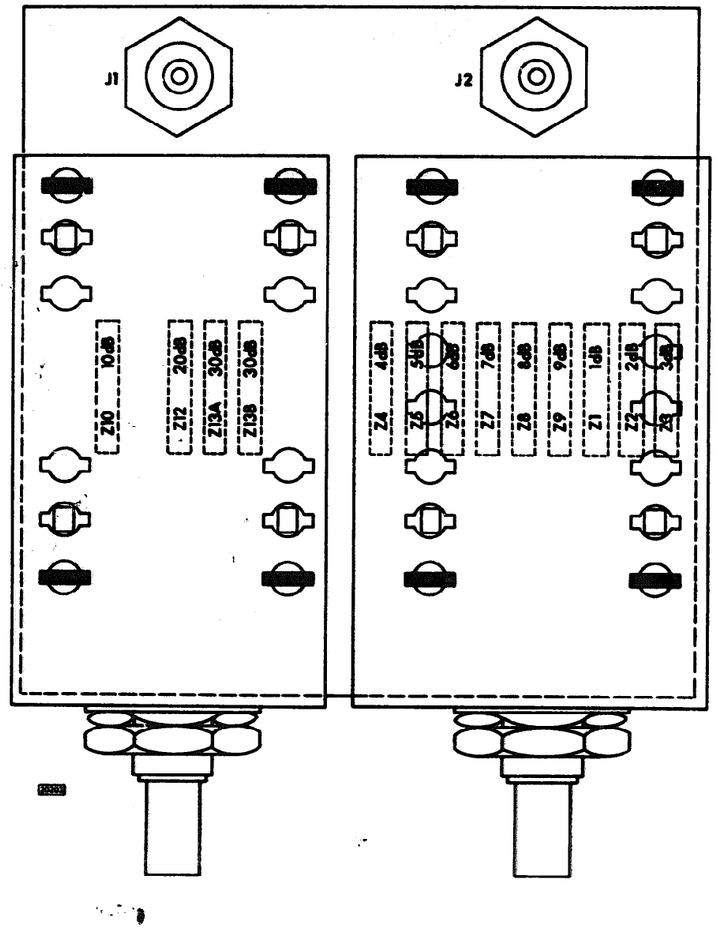
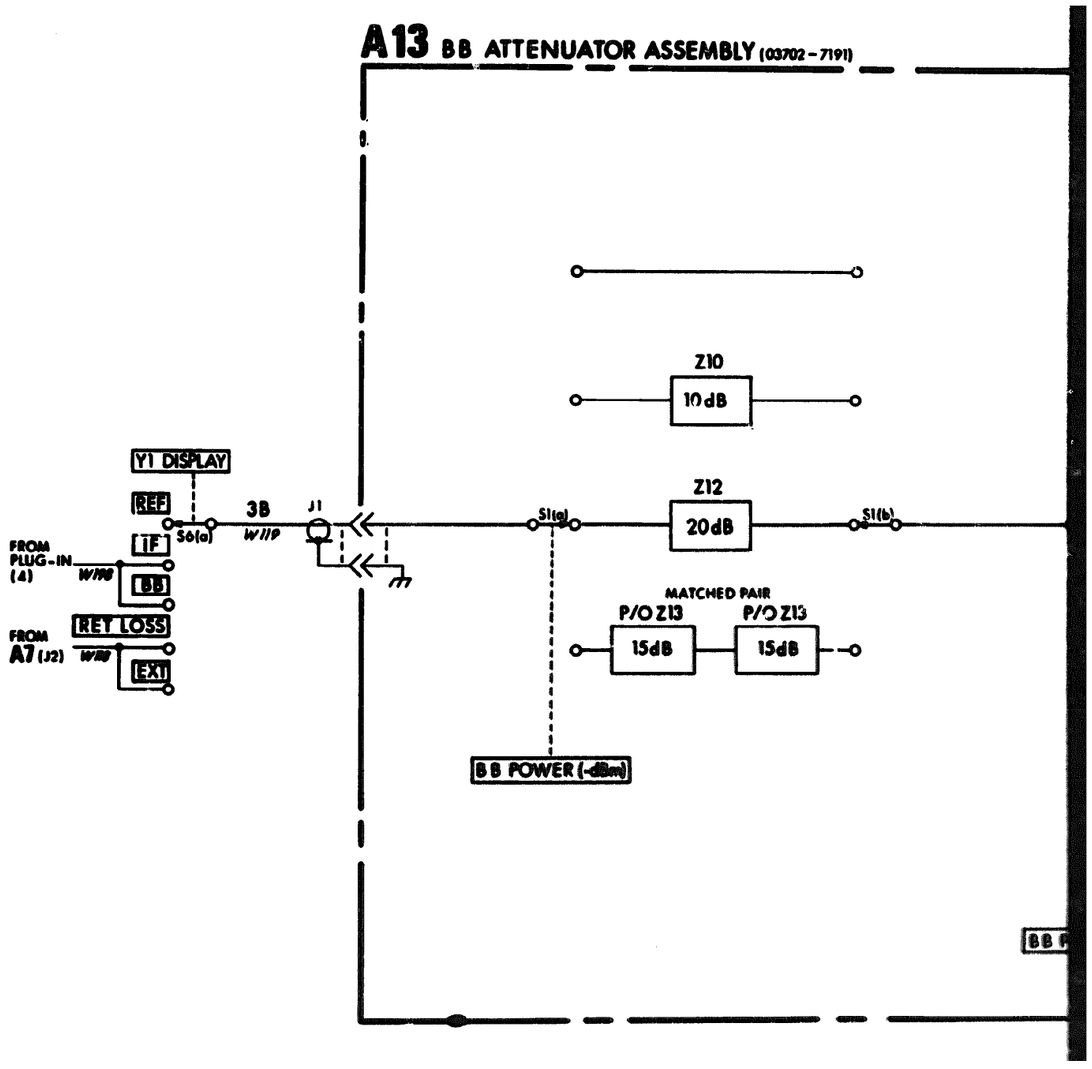
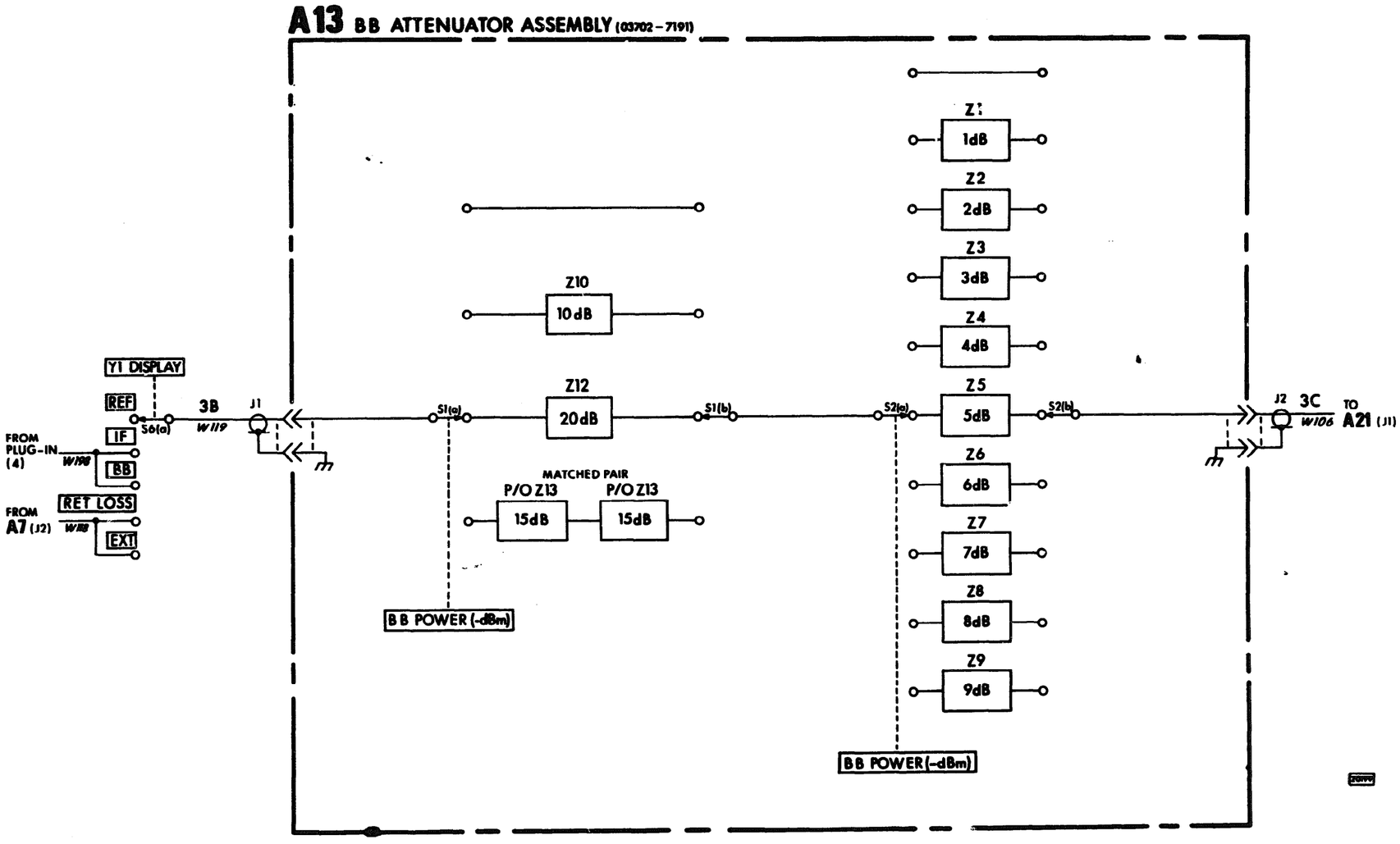


Figure A13-2 Component Location





A13

Figure A13-3 Schematic Diagram - Assembly A13

ASSEMBLY SERVICE SHEET A14 - IF ATTENUATOR

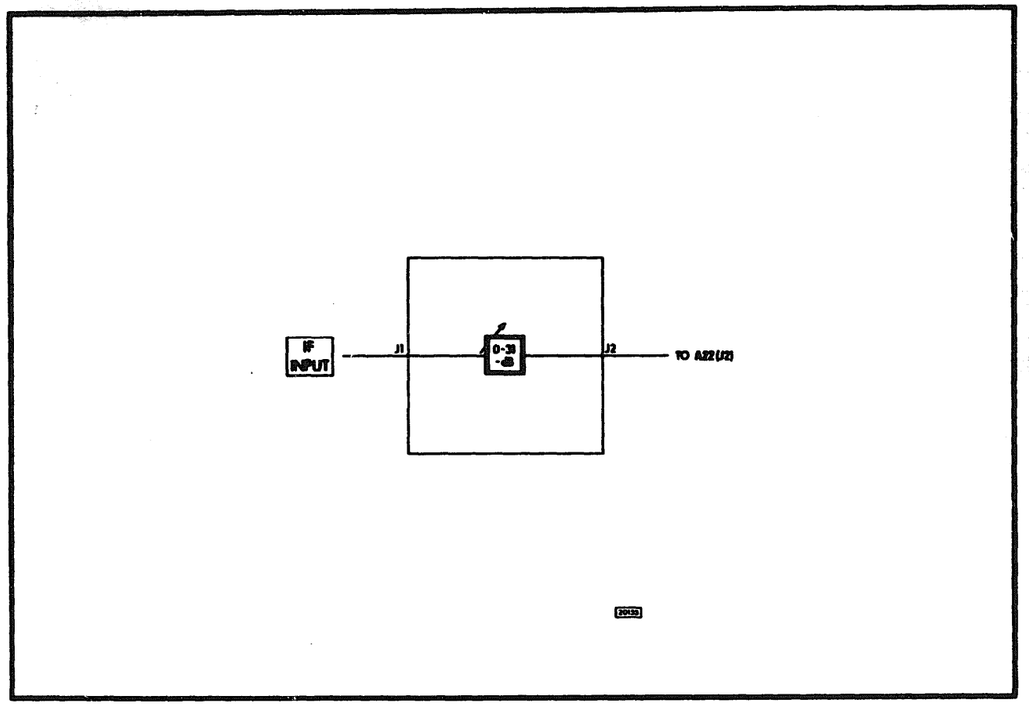
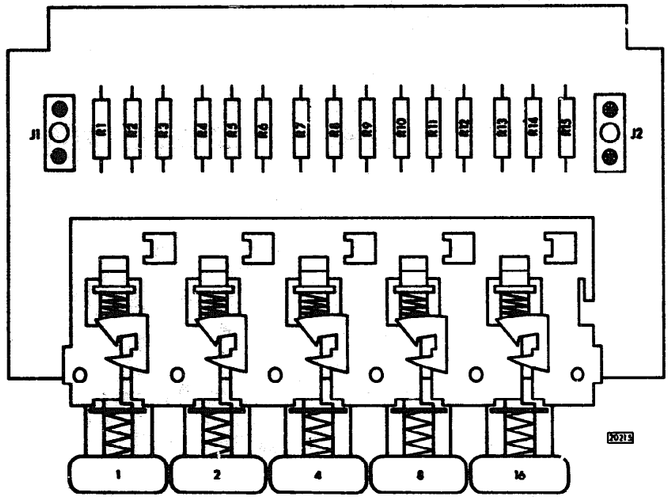


Figure A14-1 Simplified Block Diagram

A14-1 CIRCUIT DESCRIPTION

A14-2 This five section attenuator, adjustable in 1dB steps from 0 to 22dB, allows IF signals in the range -10 to +12dBm to be applied to the IF INPUT connector J6. Output to IF Amplifier and Detector assembly A22 is adjusted to -10dBm.



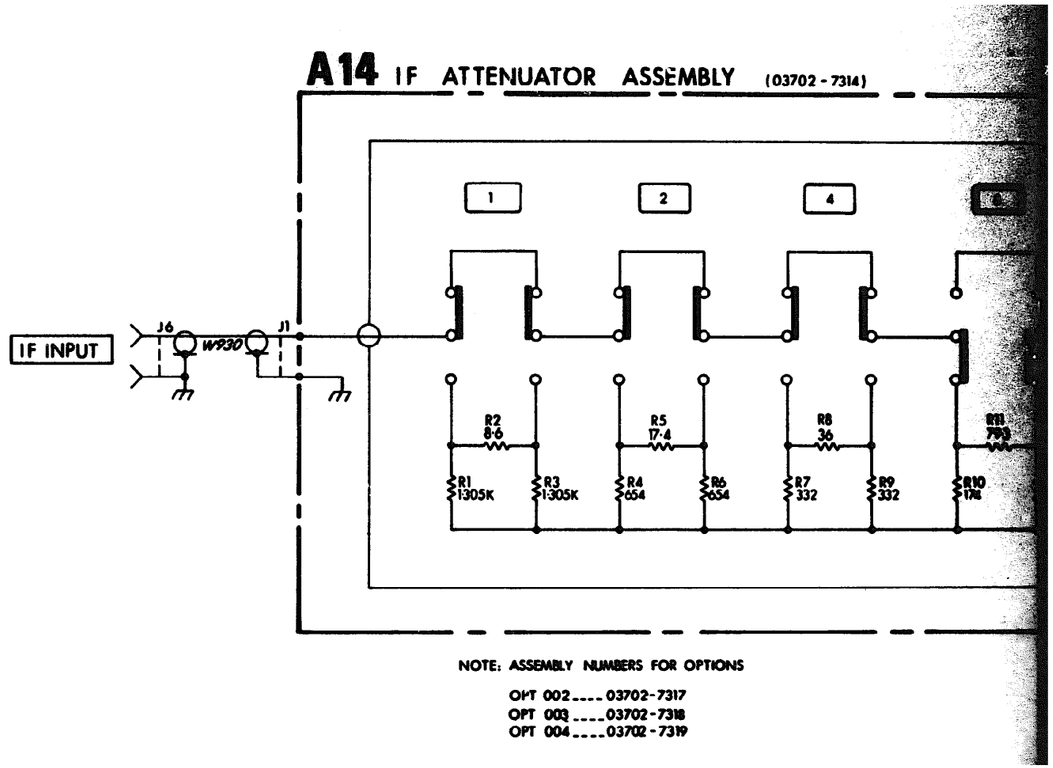
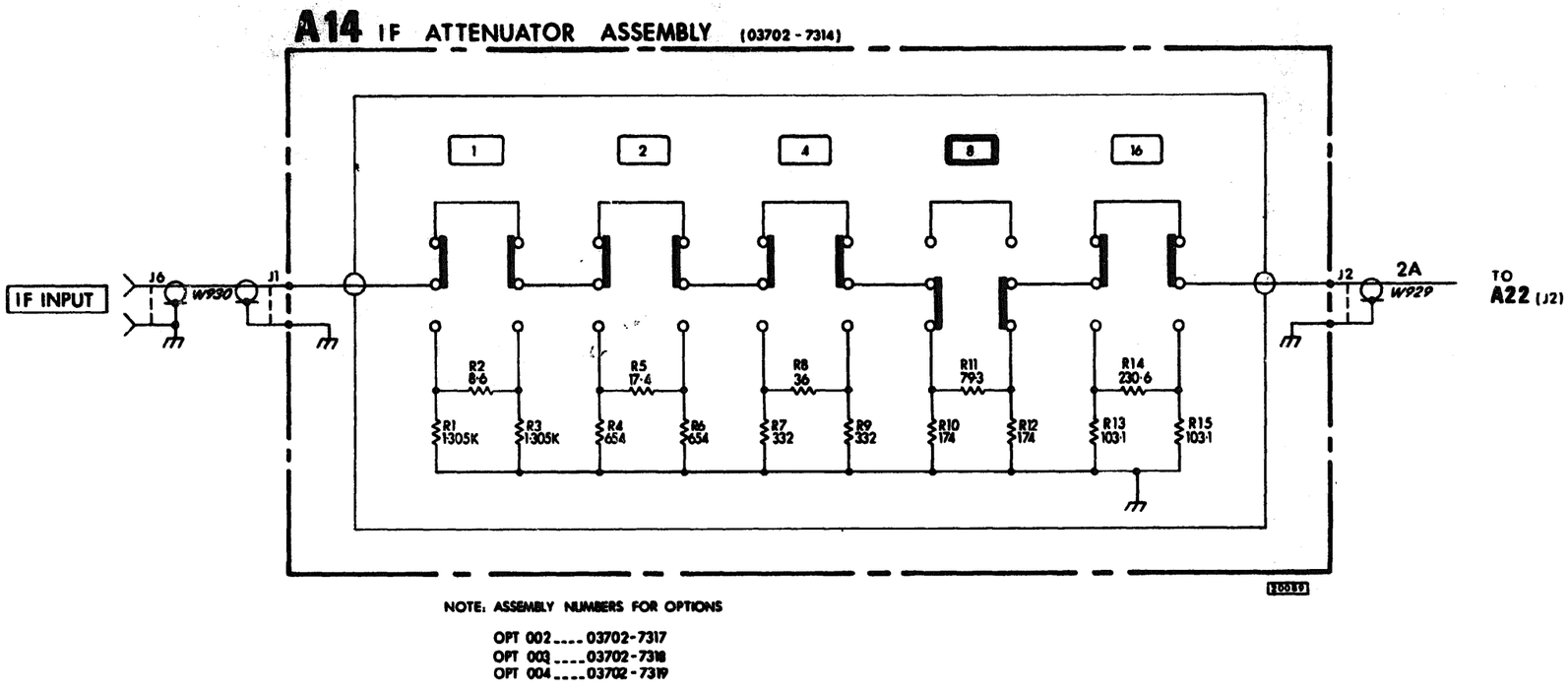


Figure A14-2 Component Location



NOTE: ASSEMBLY NUMBERS FOR OPTIONS

OPT 002 ---- 03702-7317
OPT 003 ---- 03702-7318
OPT 004 ---- 03702-7319

A14

Figure A14-3 Schematic Diagram - Assembly A14

ASSEMBLY SERVICE SHEET A15 - BB + SWEEP SPLITTER

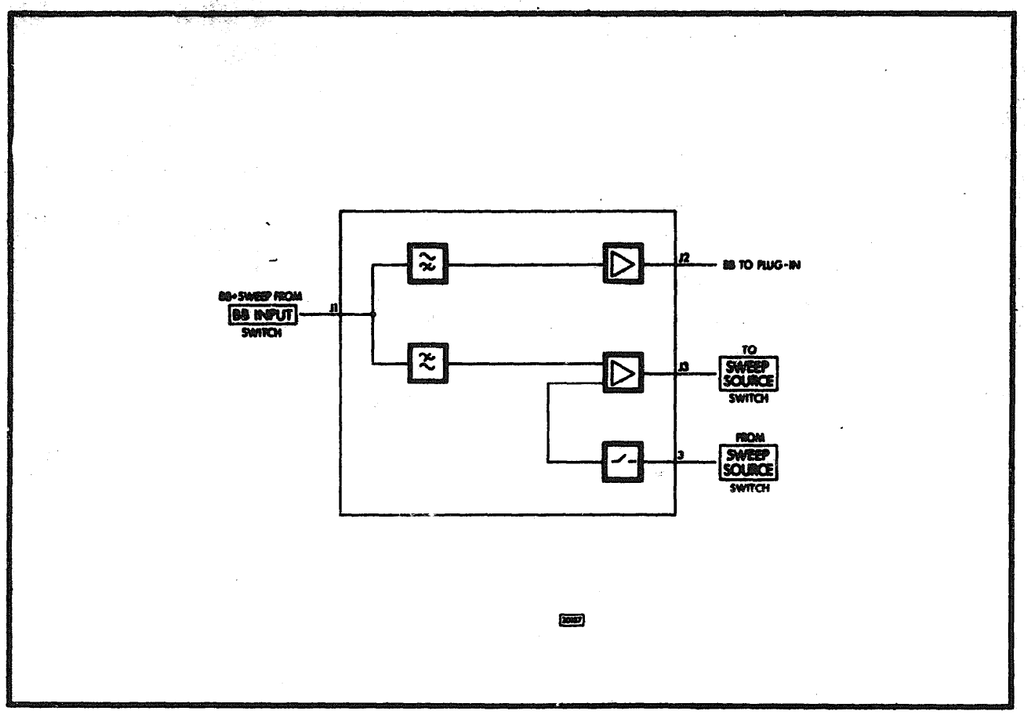


Figure A15-1 Simplified Block Diagram

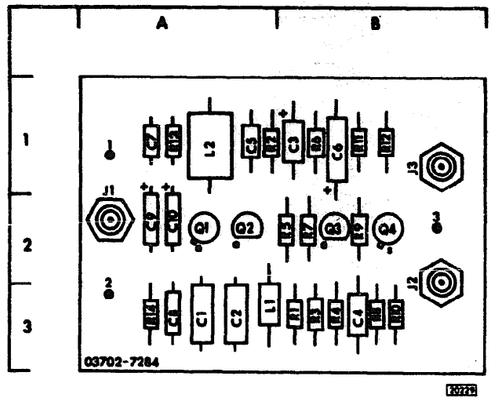
A15-1 CIRCUIT DESCRIPTIONS

A15-2 The BB + Sweep Splitter consists of a BB amplifier and a sweep amplifier/phase inverter. The BB + Sweep signal (INT or EXT) is applied to J1 via the BB INPUT switch. High pass filter C1, C2 and L1 blocks the sweep component, the remaining BB being amplified by Q1 and then applied to the plug-in via J2.

A15-3 The low-pass filter L2, C5 presents a high impedance to BB frequencies and a low impedance to sweep frequencies, thus blocking the BB frequency component. The sweep signal is amplified by differential amplifier Q2 and Q3.

A15-4 With the SWEEP SOURCE switch in the +BB position no voltage is present at Pin 3, and consequently the gate of FET Q4 is connected to ground driving it into saturation. This effectively provides a low impedance path to ground for any signal present at the base of Q3. The input signal at the base of Q2 will then be amplified and non-inverted at the collector of Q3.

A15-5 With the SWEEP SOURCE switch set to -BB, -15V is applied via Pin 3 to the gate of Q4 driving it to cut-off. The signal at the base of Q3 will now be large in comparison to the input signal at the base of Q2, and the resultant output at the Q3 collector will be an amplified sweep signal having 180^{0} phase shift with respect to the input.



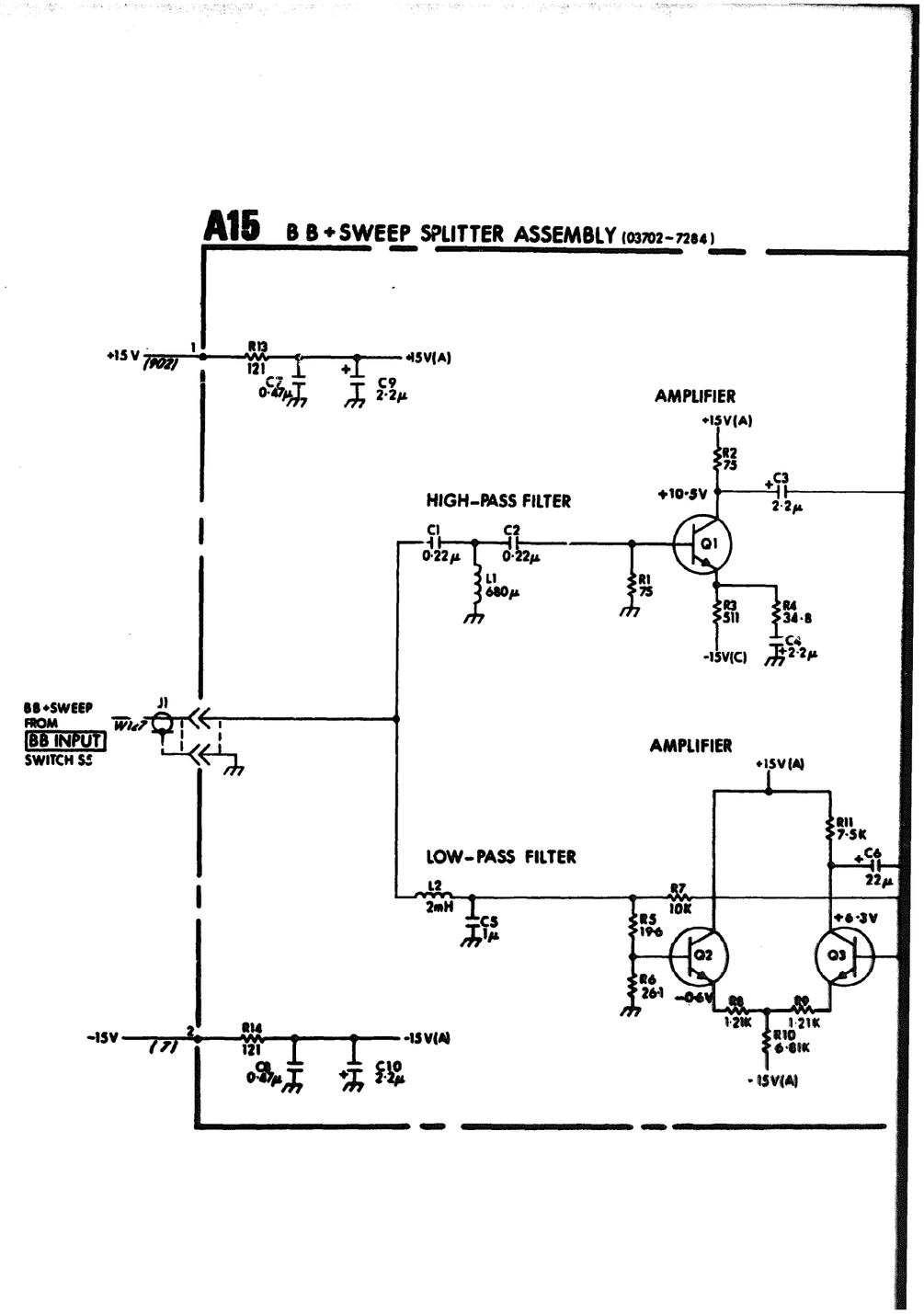
C	
REF DESIG	GRID LOC
C1	A-3
C2	A-3
C3	B-1
C4	B-3
C5	A-1
C6	B-1
C7	A-1
C8	A-3
C9	A-2
C10	A-2

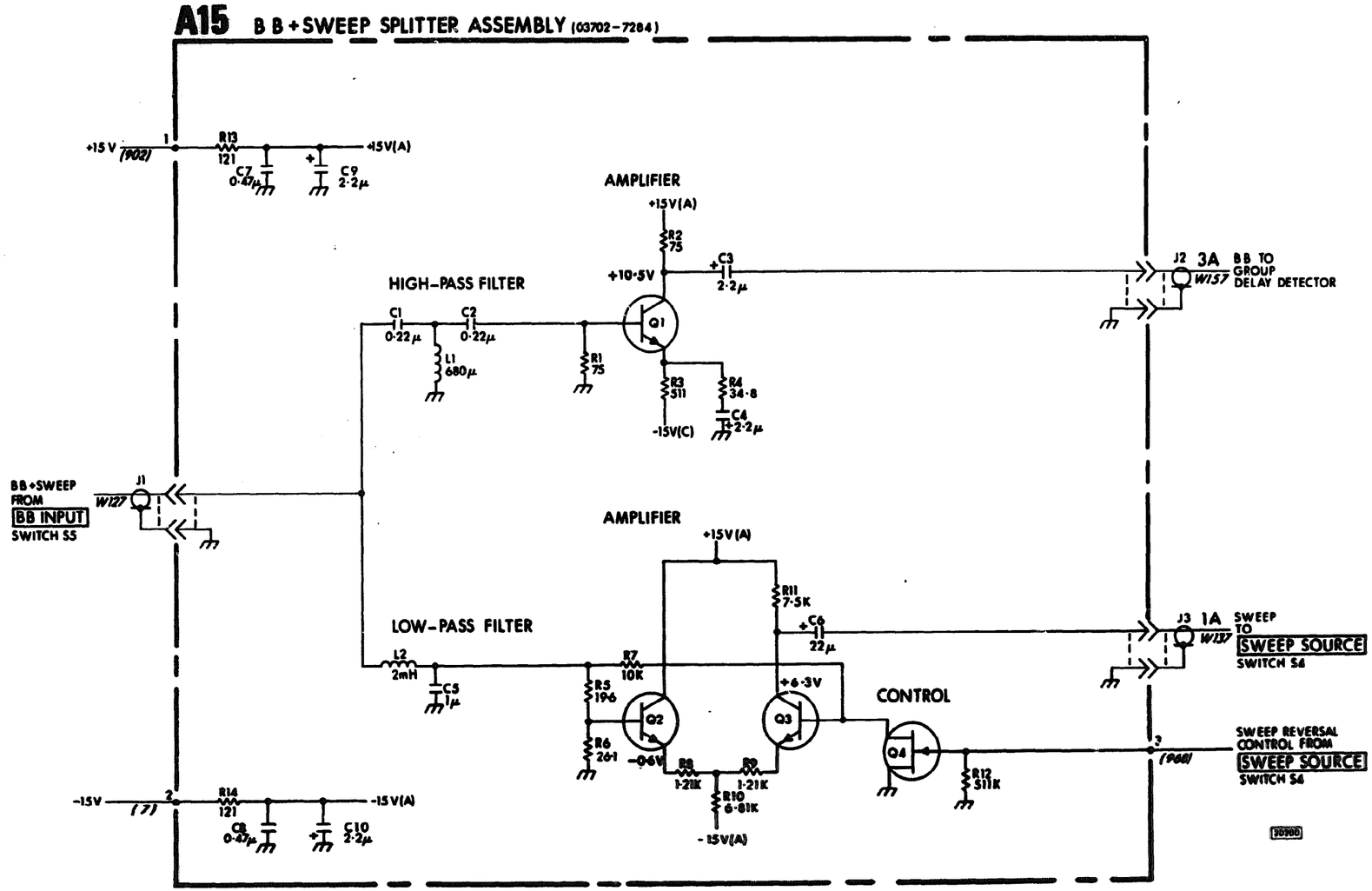
L	
REF DESIG	GRID LOC
L1	A-3
L2	A-1

Q	
REF DESIG	GRID LOC
Q1	A-2
Q2	A-2
Q3	B-2
Q4	B-2

R	
REF DESIG	GRID LOC
R1	B-3
R2	A-1
R3	B-3
R4	B-3
R5	B-2
R6	B-1
R7	B-2
R8	B-3
R9	B-2
R10	B-3
R11	B-1
R12	B-1
R13	A-1
R14	A-3

Figure A15-2 Component Location and Grid Reference





A15

Figure A15-3 Schematic Diagram - Assembly A15

ASSEMBLY SERVICE SHEET A20 - RETURN LOSS MIXER

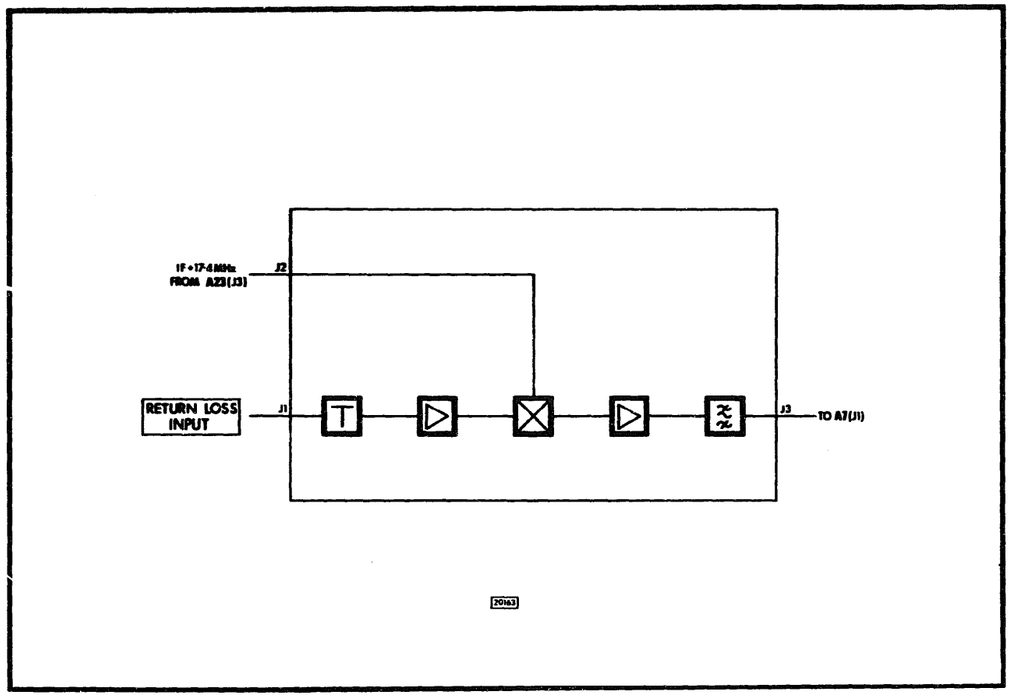
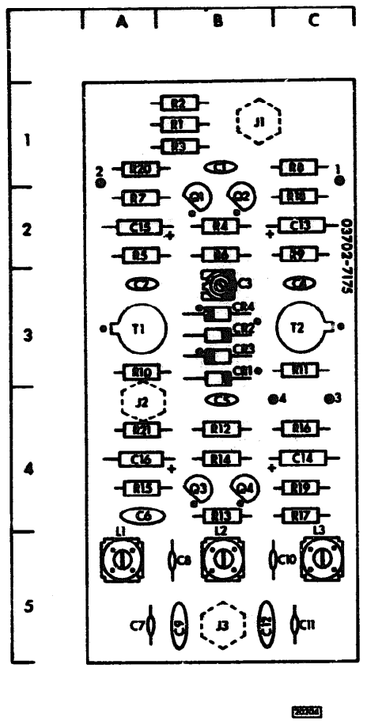


Figure A20-1 Simplified Block Diagram

A20-1 CIRCUIT DESCRIPTION

A20-2 Matching pad R1 through R3 ensures a good match at the RETURN LOSS INPUT. Amplifier Q1, Q2, which has capacitive feedback, provides a flat response over the frequency range 45MHz to 95MHz by adjustment of C3.

A20-3 Transformers T1 and T2, and diodes CR1 through CR4, together mix the IF return loss signal with the IF +17.4MHz signal from the local oscillator on A23. The lower sideband at 17.4MHz is amplified by Q3 and Q4 and applied to filter C6 through C12, L1 through L3, which has a bandwidth of 1MHz centred on 17.4MHz. This removes any unwanted mixing products before the signal is applied to the Return Loss Calibration Amplifier on A7.



C	
REF DESIG	GRID LOC
C1	B-1
C2	A-3
C3	B-3
C4	C-3
C5	B-4
C6	A-4
C7	A-5
C8	B-5
C9	B-5
C10	B-5
C11	C-5
C12	B-5
C13	C-2
C14	C-4
C15	A-2
C16	A-4

CR	
REF DESIG	GRID LOC
CR1	B-3
CR2	B-3
CR3	B-3
CR4	B-3

J	
REF DESIG	GRID LOC
J1	B-1
J2	A-4
J3	B-5

L	
REF DESIG	GRID LOC
L1	A-5
L2	B-5
L3	C-5

Q	
REF DESIG	GRID LOC
Q1	B-2
Q2	B-2
Q3	B-4
Q4	B-4

R	
REF DESIG	GRID LOC
R1	B-1
R2	B-1
R3	B-1
R4	B-2
R5	A-2
R6	B-2
R7	A-2
R8	C-1
R9	C-2
R10	A-3
R11	C-3
R12	B-4
R13	B-4
R14	B-4
R15	A-4
R16	C-4
R17	C-4
R18	C-2
R19	C-4
R20	A-1
R21	A-4

T	
REF DESIG	GRID LOC
T1	A-3
T2	C-3

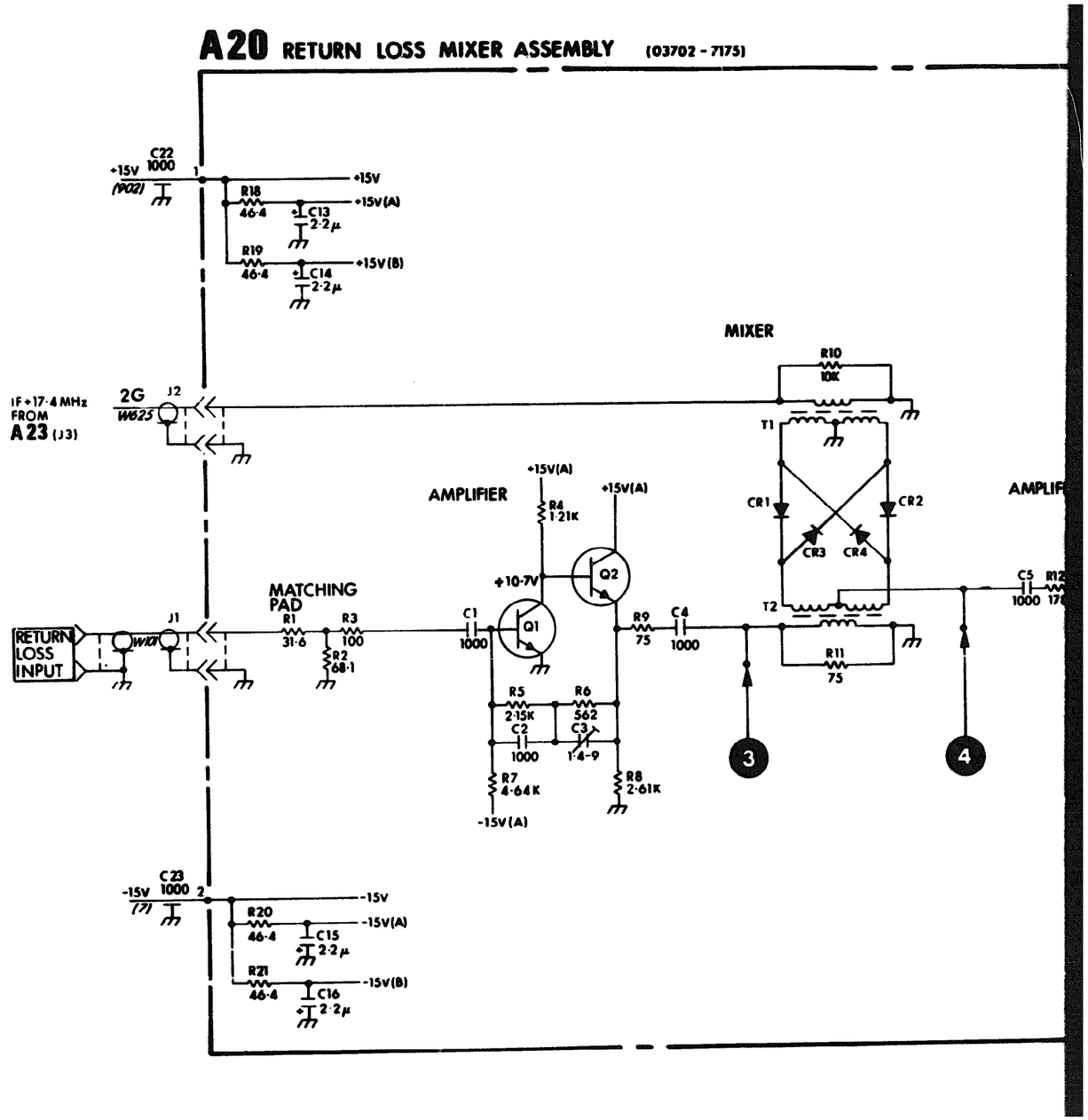
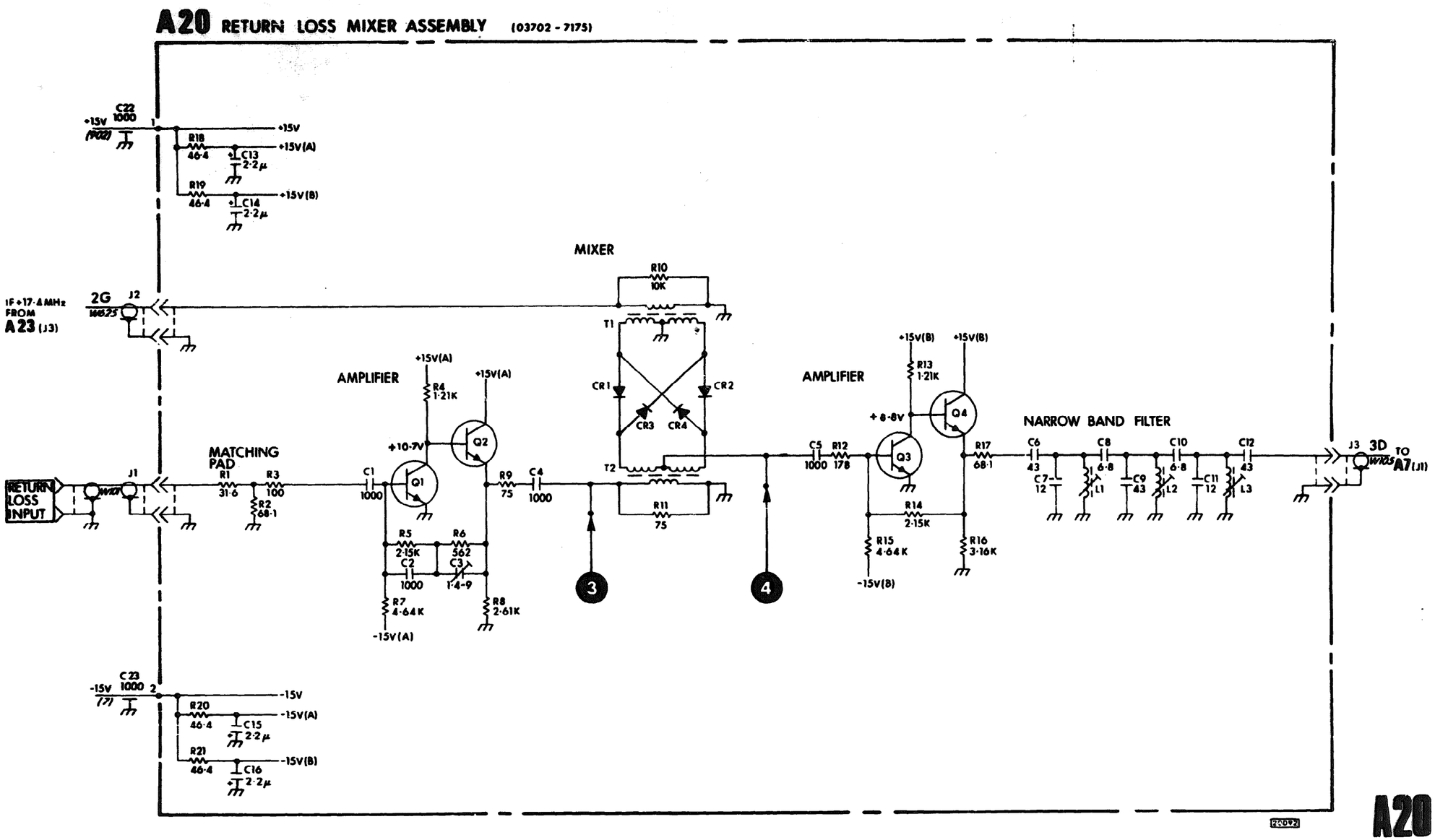


Figure A20-2 Component Location and Grid Reference



GRID LOC
A-3
C-3

Figure A20-3 Schematic Diagram - Assembly A20

ASSEMBLY SERVICE SHEET A21 - BB/RETURN LOSS AMPLIFIER

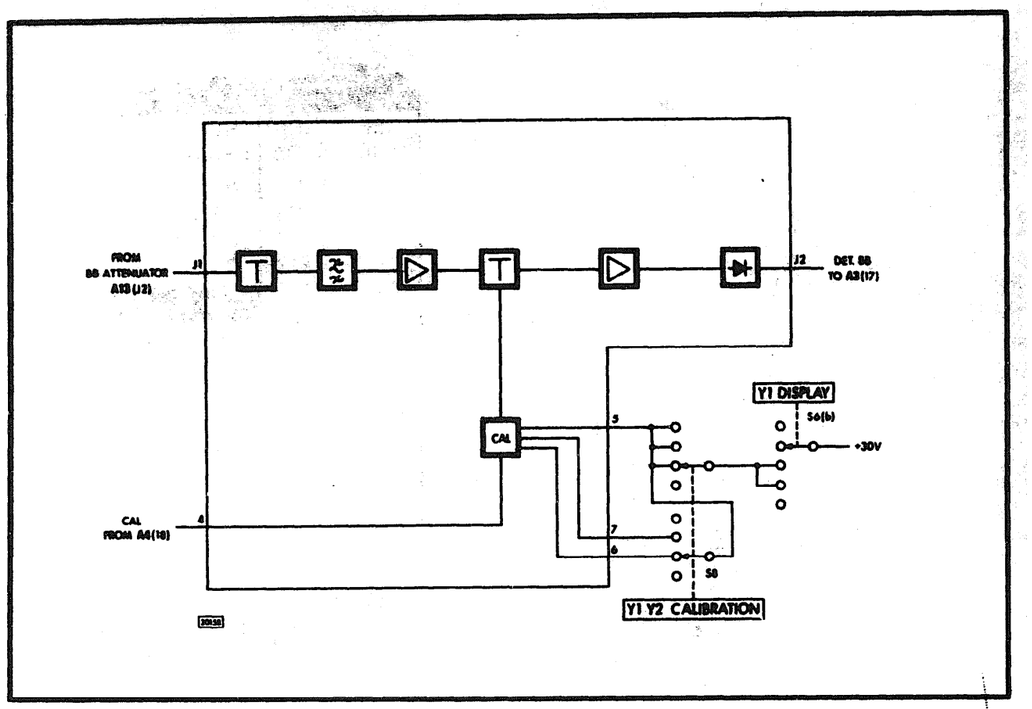


Figure A21-1 Simplified Block Diagram

A21-1 CIRCUIT DESCRIPTION

A21-2 The input signal at J1, from the BB Attenuator, is applied to the base of Q1 via matching pad R1 through R3 and bandpass filter C1 through C4, L1, L2. The filter has a passband between 10kHz and 15MHz, which is adjustable by L2.

A21-3 The amplifier has four stages of amplification Q1, Q2, Q3, Q4, Q5, Q6, Q7 followed by an amplitude detector Q8, Q9, Q10. Resistor R17 is selected to give a 3V pk-pk signal at C13, with the RETURN LOSS/BB POWER attenuator set to the BB input level. Capacitance C12 is adjustable to give flat hf response.

A21-4 The gain of the amplifier is altered, at half the sweep rate, by 1%, 3% or 10%, depending upon the setting of the Y1 Y2 CALIBRATION switch.

A21-5 With the Y1 Y2 CALIBRATION switch set to OFF there is no dc supply to Q11 collector. The calibration signal will not switch Q11 effectively reverse biasing CR2, CR4 and CR6.

A21-6 With the Y1 Y2 CALIBRATION switch set to 1%, +30V is applied to breakdown zener diodes CR7, CR9 and CR10. The zener diode voltages are such that when Q11 is cut off, CR2, CR4 and CR6 will remain reverse biased. The calibration signal to Q11 base causes Q11 to switch from cut-off to

saturation at half the sweep rate. During saturation the current drawn by Q11 will pull the potential at CR10 towards earth, causing CR6 to become forward biased and short R37, R38. CR2 and CR4 will be held reversed biased by CR9. The 1% calibration will therefore switch the attenuation of the baseband signal as shown in Figure A21-2.

A21-7 With the Y1 Y2 CALIBRATION switch set to 3%, the action of the circuit is similar to that for 1% with CR4 and CR6 being switched. Similarly, for 10%, CR2, CR4 and CR6 are switched.

A21-8 The detector Q8 through Q10 produces an output proportional to the amplitude of the signal at Q9 base. Transistor Q8 functions similarly to a dc restorer, while Q10 drives the meter amplifier on A5 and the post detection filter on A3.

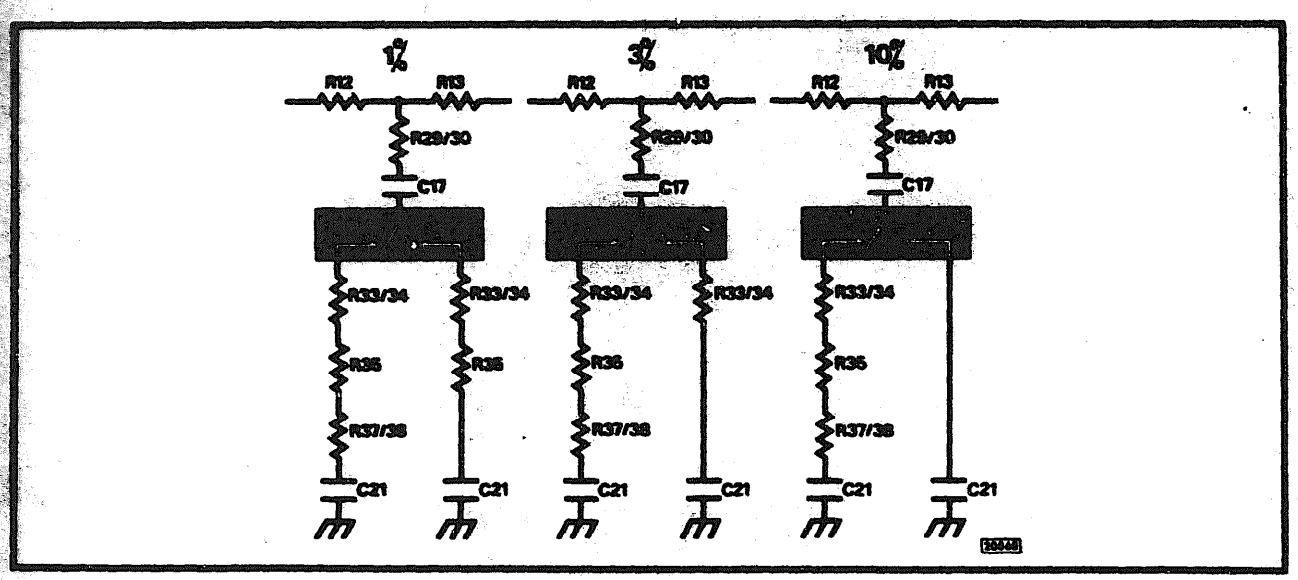


Figure A21-2 Baseband Calibration

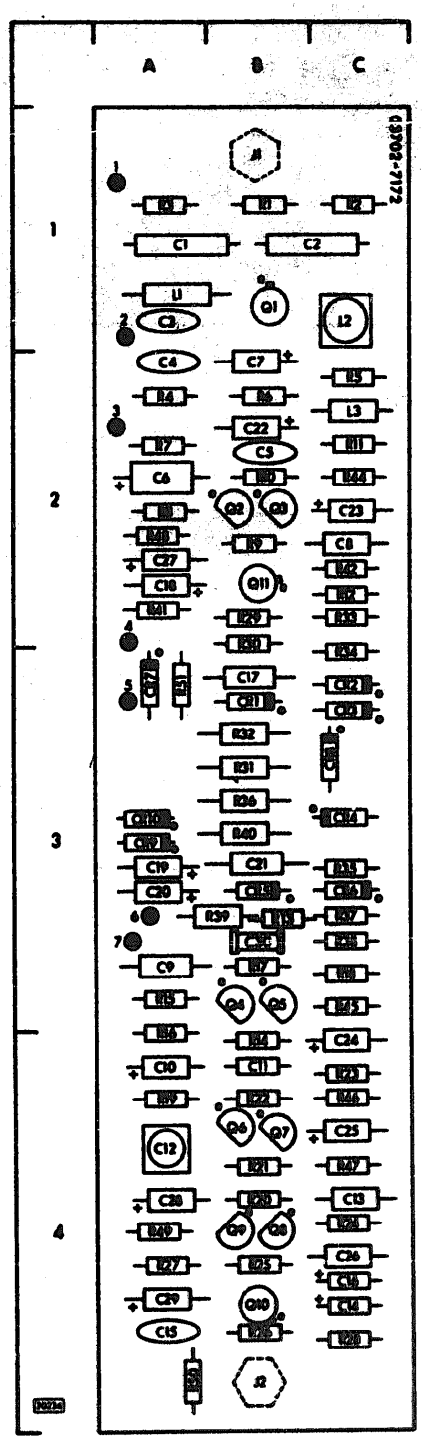


Figure A21-3 Component Location

C

REF DESIG	GRID LOC
C1	A-1
C2	C-1
C3	A-1
C4	A-2
C5	B-2
C6	A-2
C7	B-2
C8	C-2
C9	A-3
C10	A-4
C11	B-4
C12	A-4
C13	C-4
C14	C-4
C15	A-4
C16	C-4
C17	B-3
C18	A-2
C19	A-3
C20	A-3
C21	B-3
C22	B-2
C23	C-2
C24	C-4
C25	C-4
C26	C-4
C27	A-2
C28	A-4
C29	A-4
C30	B-3

CR

REF DESIG	GRID LOC
CR1	B-3
CR2	C-3
CR3	C-3
CR4	C-3
CR5	B-3
CR6	C-3
CR7	A-3
CR8	C-3
CR9	A-3
CR10	A-3

J

REF DESIG	GRID LOC
J1	B-1
J2	B-4

L

REF DESIG	GRID LOC
L1	A-1
L2	C-1
L3	C-2

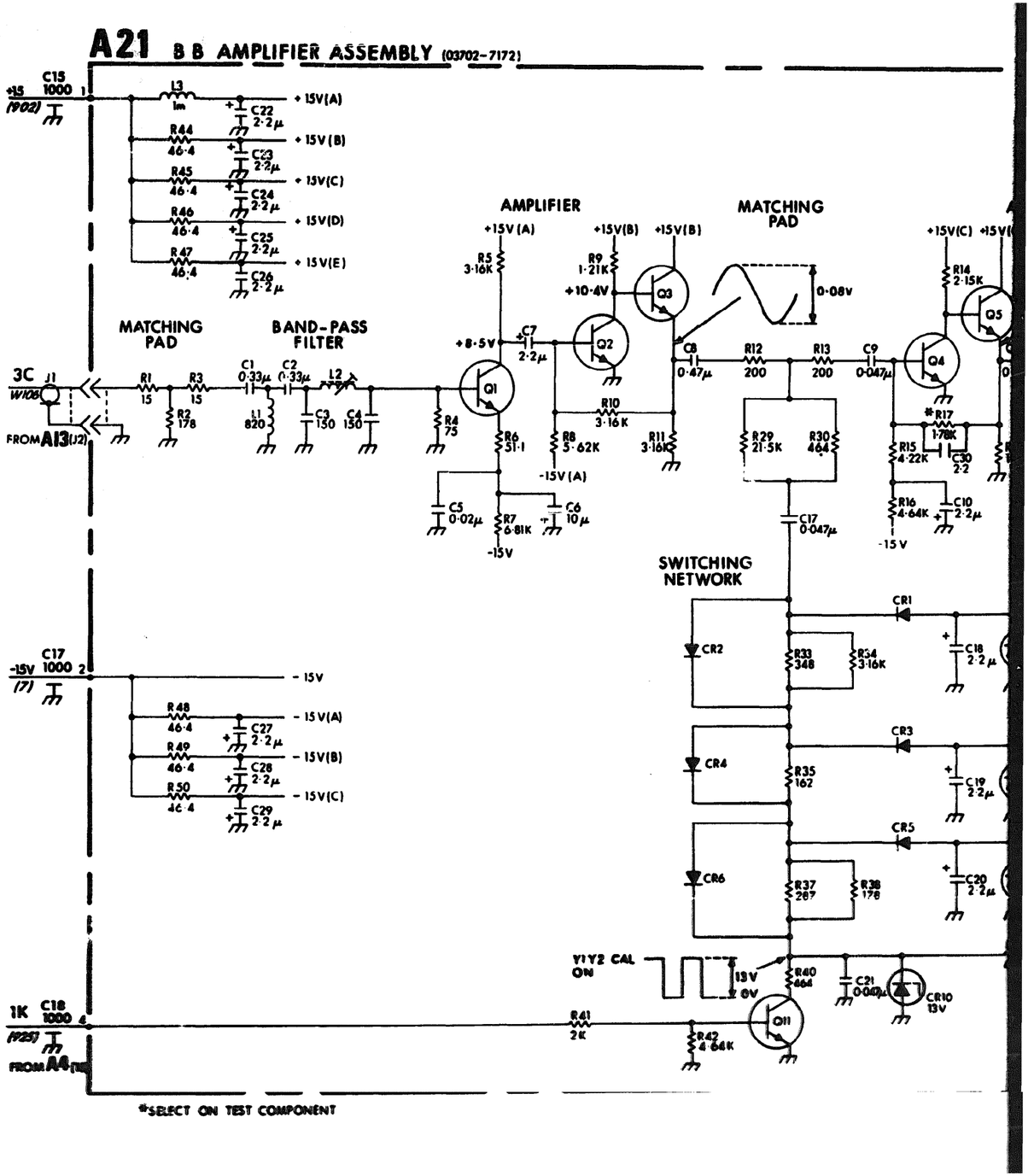
Q

REF DESIG	GRID LOC
Q1	B-1
Q2	B-2
Q3	B-2
Q4	B-3
Q5	B-3
Q6	B-4
Q7	B-4
Q8	B-4
Q9	B-4
Q10	B-4
Q11	B-2

R

REF DESIG	GRID LOC
R1	B-1
R2	C-1
R3	A-1
R4	A-2
R5	C-2
R6	B-2
R7	A-2
R8	A-2
R9	B-2
R10	B-2
R11	C-2
R12	C-2
R13	B-3
R14	B-4
R15	A-3
R16	A-4
R17	B-3
R18	C-3
R19	A-4
R20	B-4
R21	B-4
R22	B-4
R23	C-4
R24	C-4
R25	B-4
R26	B-4
R27	A-4
R28	C-4
R29	B-2
R30	B-2
R31	B-3
R32	B-3
R33	C-2
R34	C-3
R35	C-3
R36	B-3
R37	C-3
R38	C-3
R39	A-3
R40	B-3
R41	A-2
R42	C-2
R44	C-2
R45	C-3
R46	C-4
R47	C-4
R48	A-2
R49	A-4
R50	A-4
R51	A-3

Figure A21-4 Grid Reference



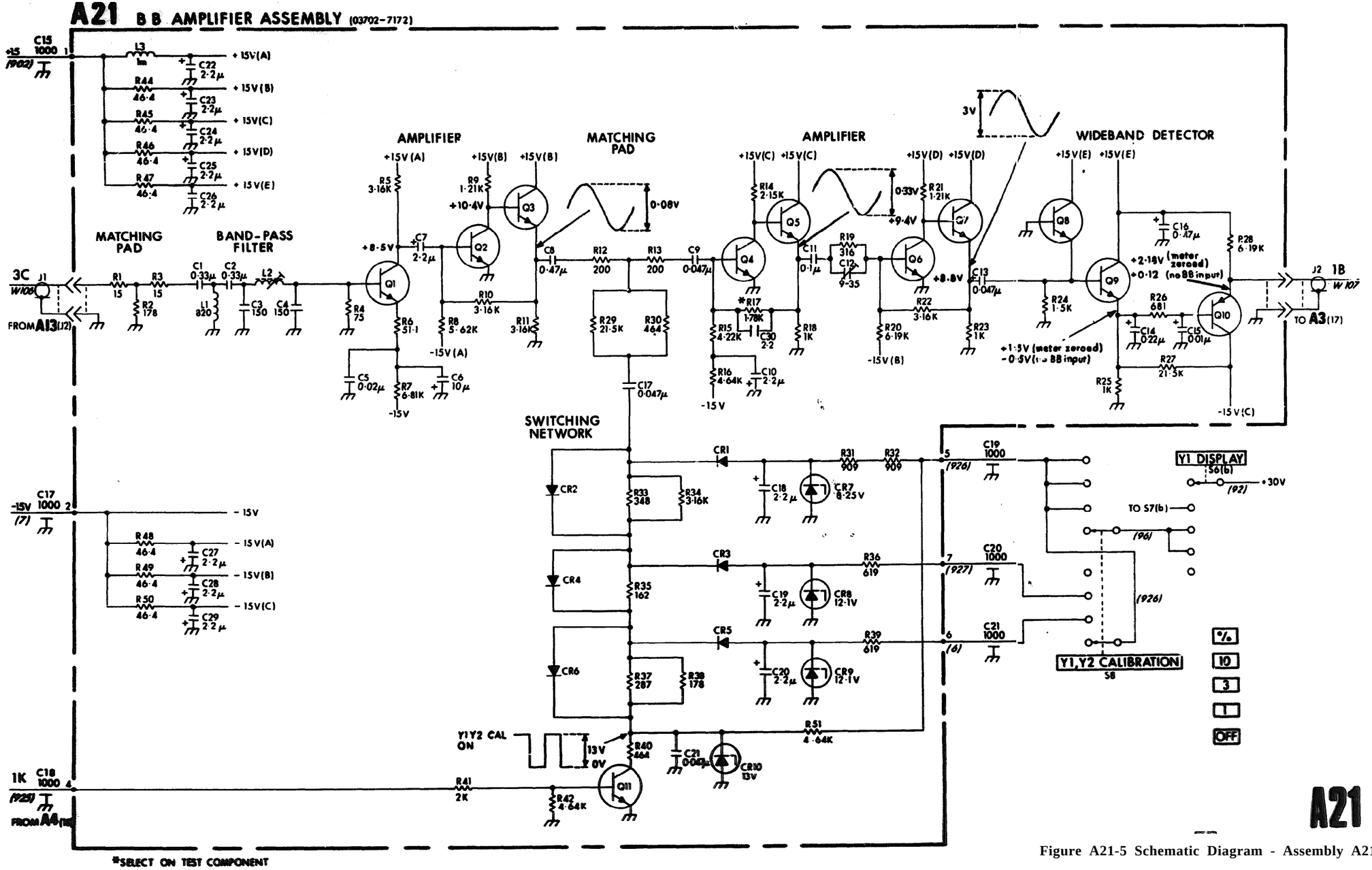


Figure A21-5 Schematic Diagram - Assembly A21

ASSEMBLY SERVICE SHEET A22 - IF AMPLIFIER AND DETECTOR

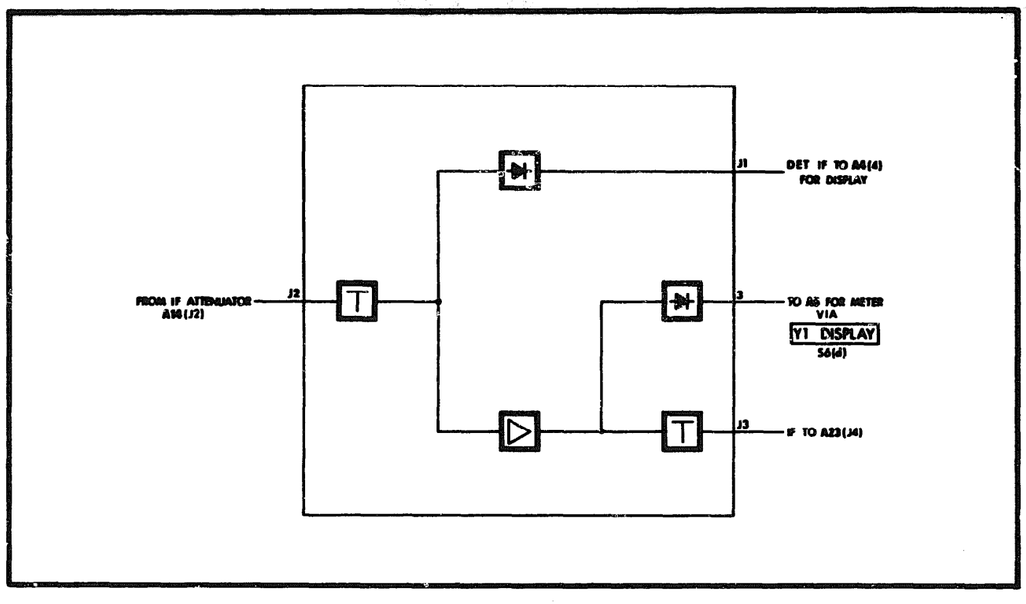


Figure A22-1 Simplified Block Diagram

A22-1 CIRCUIT DESCRIPTION

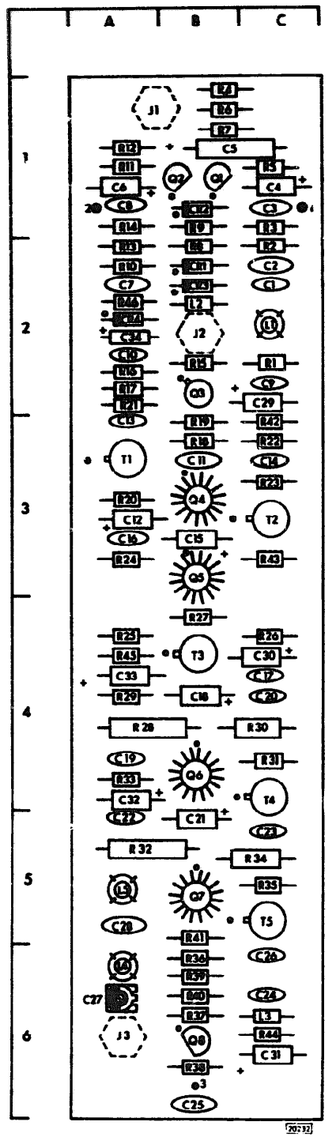
A22-2 Transistors Q3 through Q7, in common base configuration, form a flat response, wideband, IF amplifier operating in the range 45MHz to 95MHz. The output from Q7 is applied simultaneously to detector Q8 and matching pad R39 through R41.

A22-3 The IF amplifier supplies a +11dBm signal at the input of detector Q8, which gives a voltage proportional to the IF level. This means that, with the Y1 DISPLAY switch in the REF and IF positions and with -10dBm at J2, a centre reading of the IF LEVEL meter will be obtained.

A22-4 Resistors R39 through R41 match the output from Q7 to the group delay equalizer circuit C27, C28, L4 and L5, which provides an overall flat group delay characteristic. The output from the group delay equalizer is applied to the IF Mixer and Local Oscillator in A23.

A22-5 Balanced detector CR1 through CR3, Q1, Q2 also gives a dc output proportional to the IF amplitude. This detector is sensitive enough to detect changes of less than 0.01dB in amplitude, and has a flatness of 0.01dB over the IF swept range. The output from Q1 passes, via J1 and the Y1 DISPLAY and Y2 DISPLAY switches, to be displayed on either the Y1 trace, the Y2 trace or both.

A22 IF AMPLIFIER & DETECTOR ASSEMBLY (03702-7212)



C	
REF DESIG	GRID LOC
C1	C-2
C2	C-2
C3	C-1
C4	C-1
C5	C-1
C6	A-1
C7	A-2
C8	A-1
C9	C-2
C10	A-2
C11	B-3
C12	A-3
C13	A-3
C14	C-3
C15	B-3
C16	A-3
C17	C-4
C18	B-4
C19	A-4
C20	C-4
C21	B-5
C22	A-5
C23	C-5
C24	C-6
C25	B-6
C26	C-6
C27	A-6
C28	A-5
C29	C-2
C30	C-4
C31	C-6
C32	A-4
C33	A-4
C34	A-2

J	
REF DESIG	GRID LOC
J1	A-1
J2	B-2
J3	A-6

L	
REF DESIG	GRID LOC
L1	C-2
L2	B-2
L3	C-6
L4	A-6
L5	A-5

Q	
REF DESIG	GRID LOC
Q1	B-1
Q2	B-1
Q3	B-2
Q4	B-3
Q5	B-3
Q6	B-4
Q7	B-5
Q8	B-6

R	
REF DESIG	GRID LOC
R1	C-2
R2	C-2
R3	C-1
R4	B-1
R5	C-1
R6	B-1
R7	B-1
R8	B-2
R9	B-1
R10	A-2
R11	A-1
R12	A-1
R13	A-2
R14	A-1
R15	B-2
R16	A-2
R17	A-2
R18	B-3
R19	B-3
R20	A-3
R21	A-2
R22	C-3
R23	C-3
R24	A-3
R25	A-4
R26	C-4
R27	B-4
R28	A-4
R29	A-4
R30	C-4
R31	C-4
R32	A-5
R33	A-4
R34	C-5
R35	C-5
R36	B-6
R37	B-6
R38	B-6
R39	B-6
R40	B-6
R41	B-5
R42	C-3
R43	C-3
R44	C-6
R45	A-4
R46	A-2

CR	
REF DESIG	GRID LOC
CR1	B-2
CR2	B-1
CR3	B-2
CR4	A-2

T	
REF DESIG	GRID LOC
T1	A-3
T2	C-3
T3	B-4
T4	C-4
T5	C-5

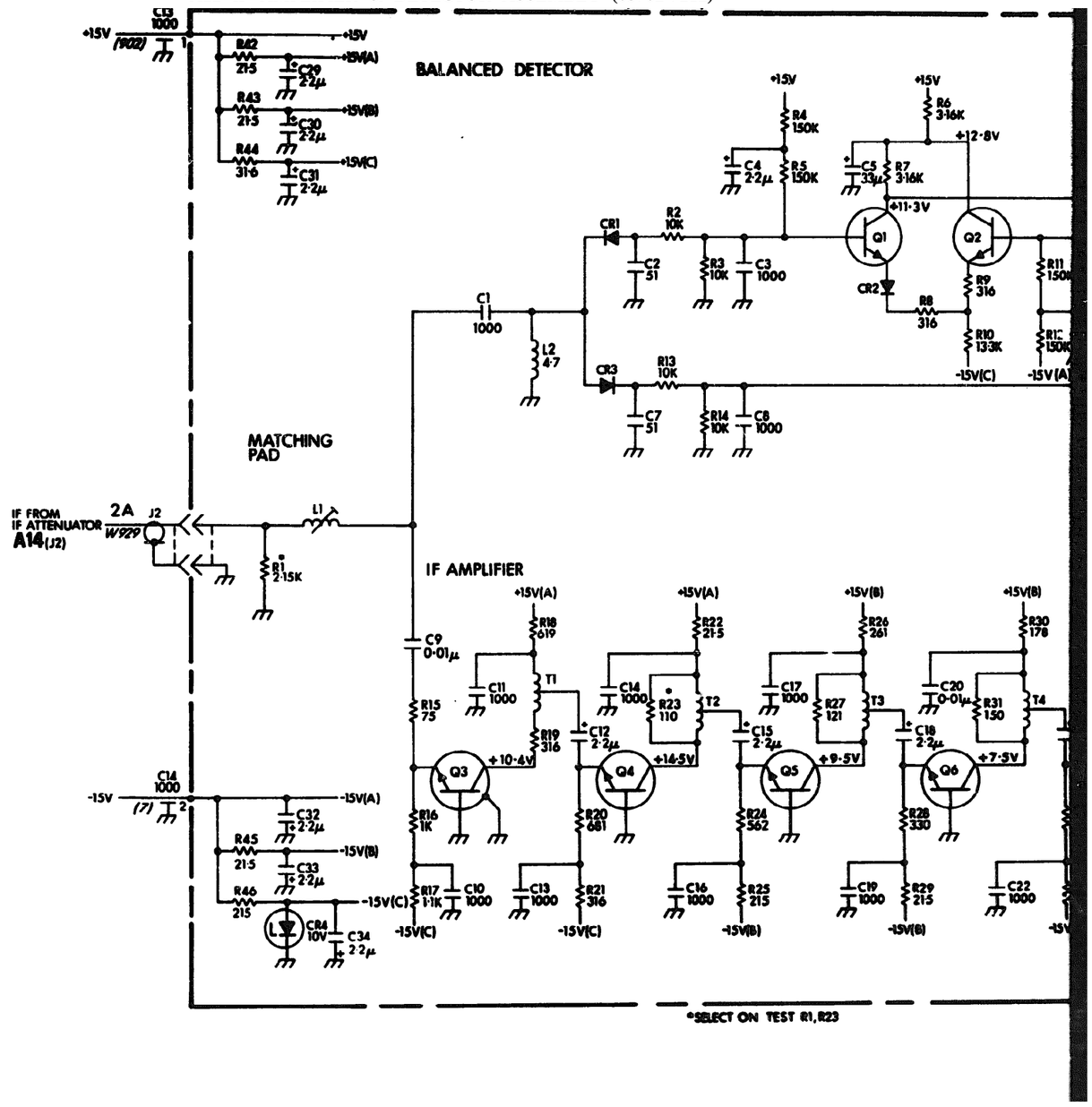


Figure A22-2 Component Location and Grid Reference

A22 IF AMPLIFIER & DETECTOR ASSEMBLY (03702-7212)

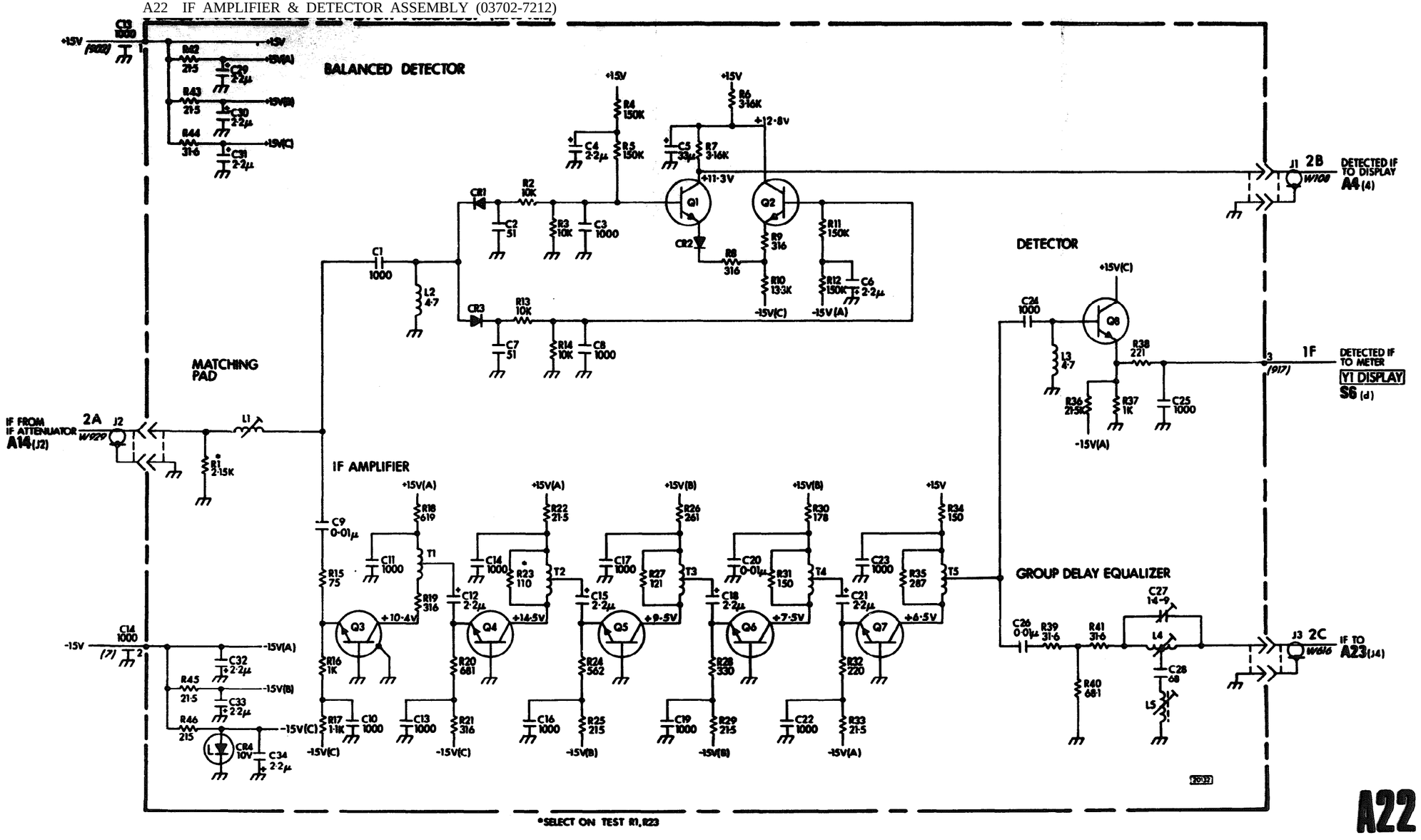


Figure A22-3 Schematic Diagram - Assembly A22

ASSEMBLY SERVICE SHEET A23 - IF MIXER AND LOCAL OSCILLATOR

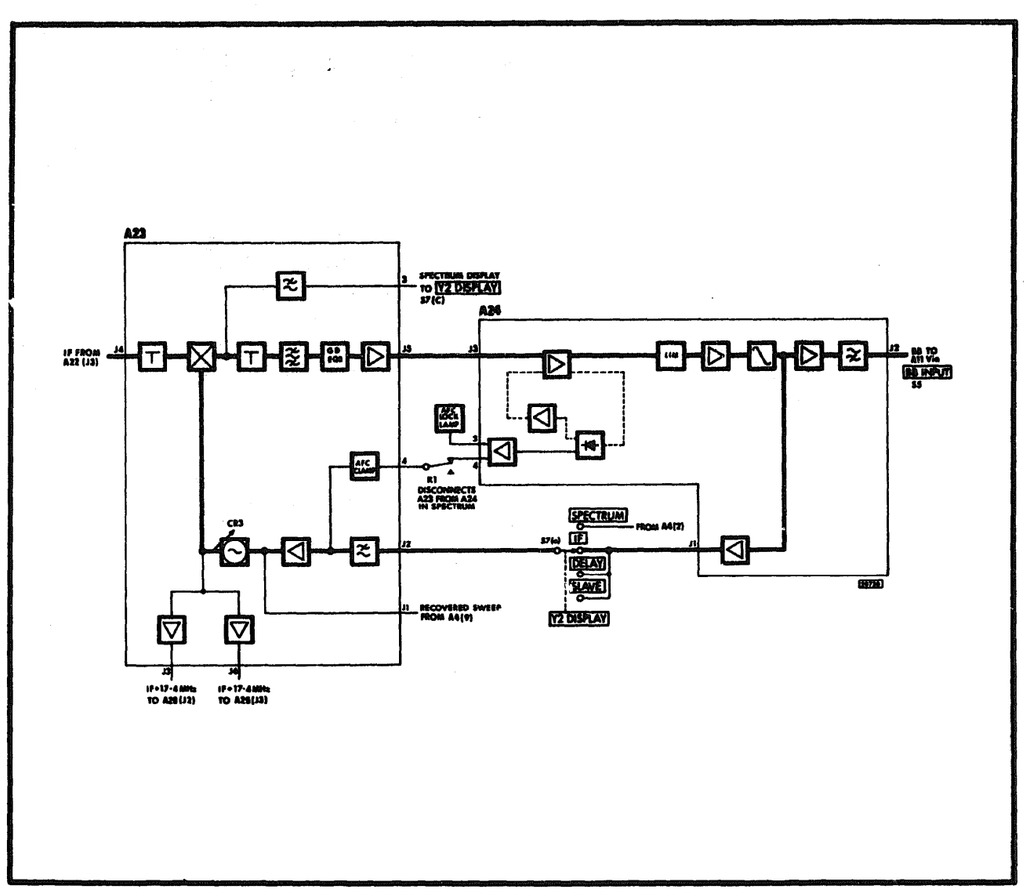


Figure A23-1 Simplified Block Diagram

A23-1 CIRCUIT DESCRIPTION

A23-2 The 70Mhz signal from the IF Amplifier in A22 is fed, via matching pad R33 through R35, to balanced mixer T1 through T4, CR5. The 70MHz is mixed with 87.4MHz from local oscillator MC2 and the sum, difference and harmonic components are passed to the group delay equalizer, via a butterworth filter, and to the Y2 DISPLAY switch as the Spectrum Display signal.

A23-3 The filter, which is tuned to have a band-pass between 8MHz and 25MHz, passes only the difference component of the fundamental frequencies. Equalizer coil L8 is adjusted for the best Differential Gain linearity response at 5.6MHz.

A23-4 Output amplifier Q8 through Q8 feeds the IF Demodulator, A24, and the gain is adjusted by R41 to give a signal level of 400mV at J5.

A23-5 AFC Loop

A23-6 The frequency control voltage, from the IF Demodulator, A24, via the Y2 DISPLAY switch, is applied to a twin-T notch filter which gives maximum rejection to BB tones at 83.3kHz. From the filter the signal passes to the local oscillator circuit, via MC1, and to an AFC lock clamp Q1, CR1, CR2.

A23-7 The focal oscillator output, via Q4 and Q5, provides drive to the balanced mixer. The focal oscillator also provides drive, via buffers Q2 and Q3, to mixer circuits on the Return Loss Mixer A20 and the Marker Generator A25. Parasitic suppressor resistors, R16, R20 and R24, prevent break-through of spurious oscillations or harmonics.

A23-3 AFC Lock Capture

A23-9 The AFC lock capture ensures that the focal oscillator frequency remains within the capture range of the AFC loop when there is no IF INPUT The AFC lock capture circuit is made inoperative when the Y2 DISPLAY switch is set to SPECTRUM.

A23-10 With an IF INPUT signal present, and the focal oscillator locked to the input frequency, A24Q16 wilt be saturated, its collector will be at earth and the AFC LOCK lamp will be lit. Q1 will not conduct and CR1 and CR2 will be reverse biased, hence R9 will have no effect on the dc level applied to CR3 and consequently no effect on the focal oscillator frequency.

A23-11 With the IF INPUT signal removed, A24Q16 will cut-off and its collector will rise towards +30V. This will cause A24CR12 to break down and Q1 will conduct to saturation. This effectively shorts Q1 emitter to collector and CR1 or CR2 becomes forward biased. The local oscillator frequency is now controllable by R9.

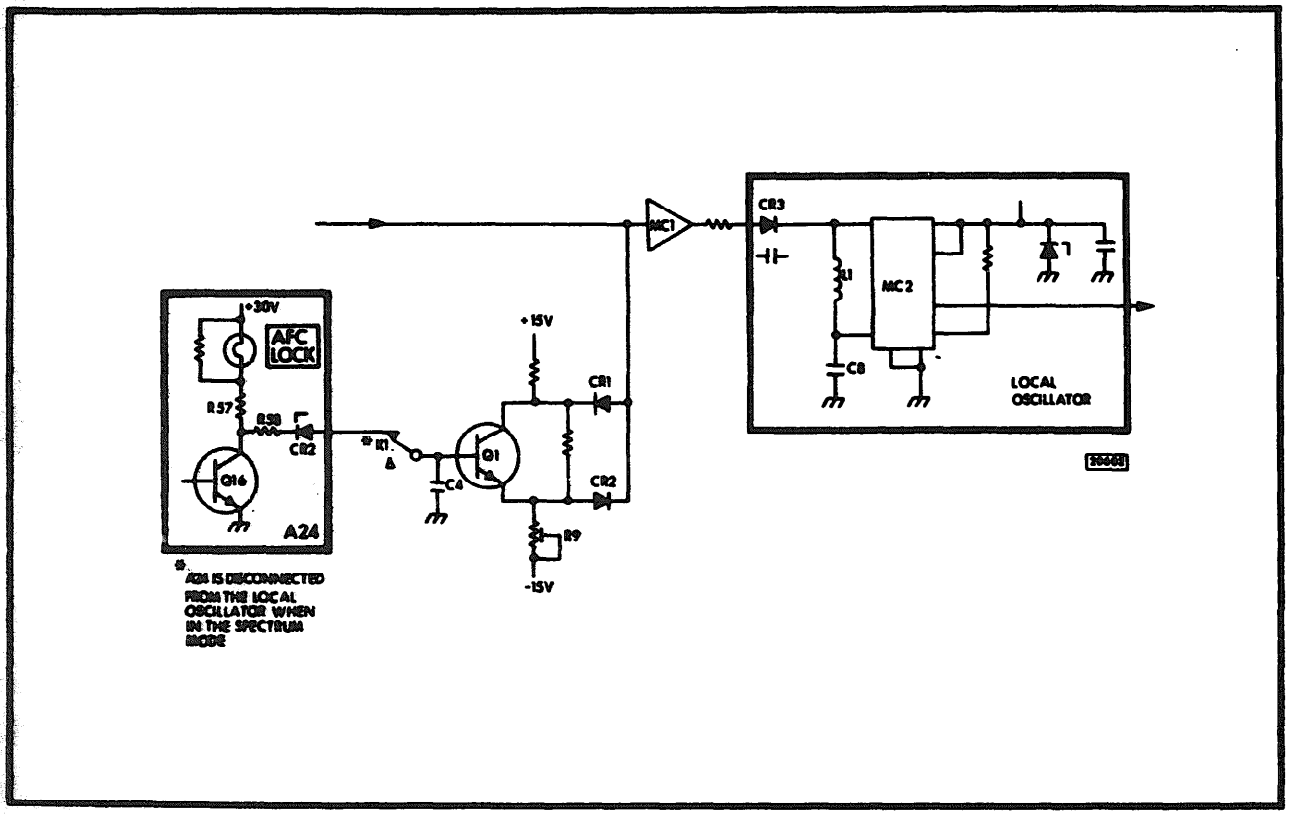


Figure A23-2 AFC Lock Capture

A23-12 AFC LOOP TROUBLESHOOTING

Procedure	Troubleshooting
1. Obtain access to the casting.	
2. Disconnect the RED/RED coded cable from A24J3.	
3. Using an oscilloscope, monitor the dc level at A24TP1 and adjust A24R53 for 0±100mV.	0 ±100mV not obtainable: check the dc levels at Q1 through Q8 as per the schematic diagram.
4. Monitor the dc level at A24MC1 Pin 6. Check that A24R53 can vary the dc level by at least ±5V about 0.	DC level cannot be varied by ±5V: fault lies in MC1 circuit.
5. Monitor the dc level at A24MC2 Pin 6. Check that slight adjustment of A24R53 will cause the level to change suddenly from +15V -15V. (The correct setting for R53 is at the crossover point).	DC level not changing from +15V to -15V: fault lies in MC2 circuit.
6. Repeat step 5 white monitoring the dc level at A24MC3 Pin 6.	DC level not changing from +15V to -15V: fault ties in MC3 circuit.
7. Return A24R53 to the correct setting as indicated in step 5.	
8. Reconnect the RED/REC coded cable to A24J3.	
9. Set the Y2 DISPLAY switch to IF and remove any connections from the IF INPUT.	
10. Monitor the dc level at A23TP1. Check that A23R9 can adjust this level at feast over the range 0 to -5V. Set A23R9 for -2V.	**DC level cannot be adjusted over the range 0 to -5V: refer to the schematic diagram, in conjunction with Paragraph A23-8.**
11. Disconnect the BRN/VIO coded cable from **A23J2, the RED/GRN coded cable from A23J3**, and the RED/YEL **coded cable from A23J6**.	
12. Connect an Electronic Counter to A23J3 and a Power Meter, via a 75/50Ω Matching Pad, to A23J6. Set the Y2 DISPLAY switch to SPECTRUM and adjust A23R6 to give an Electronic Counter reading of 87.4MHz ±0.2MHz. Check that the level at A23J6 is not less than -5dBm.	NOTE: Matching Pad losses are : Rohde & Schwarz ..... 6.0dB Greenpar 8.2dB

Procedure	Troubleshooting
13. Vary A23R6 slowly over a sufficient range to give Electronic Counter readings from 62MHz up to 113MHz, and check that the power output from A23J6 does not drop below -5dBm. Reset A23R6 for 87.4MHz ±0.2MHz.	Discrepancies in level or frequency: fault lies in the Local Oscillator circuitry, A23MC2/CR3; or in transistors Q1/Q2. If A23R6 cannot adjust the frequency over the complete range, and A23R9 CAN adjust the frequency: fault lies at Q1.
14. Set the 3710A/3716A controls as follows: SWEEP .. .. OFF BB FREQUEN OFF IF FREQUENCY . . . . . 70MHz IF ATTENUATOR . . . . . 10dB IF VERNIER . . . . . 0 Insert 10dB in the 3702B IF ATTENUATOR. Connect the 3710A IF OUTPUT to the 3702B IF INPUT.	
15. Monitor the signal levels at A23Q6 through A23J5 and at A24J3 through A24Q4. Check these signals against those shown on the schematic diagrams. Check that the signal level at A23Q6 remains constant as the 3710A IF FREQUENCY is varied from 64 to 76MHz. Reset the IF FREQUENCY to 70MHz.	Any discrepancies will indicate a fault at the relevant location.

NOTES:

a. To obtain the signal level indicated at A24TP1. the following settings are required:

3716A BB FREQUENCY 500kHz
3710A DEVIATION . . . . . 200kHz rms

b. To obtain the signal levels indicated at A24MC1/MC2/MC3, the following settings are required:

3710A SWEEP . . . . . INT
3710A SWEEP WIDTH. 50MHz

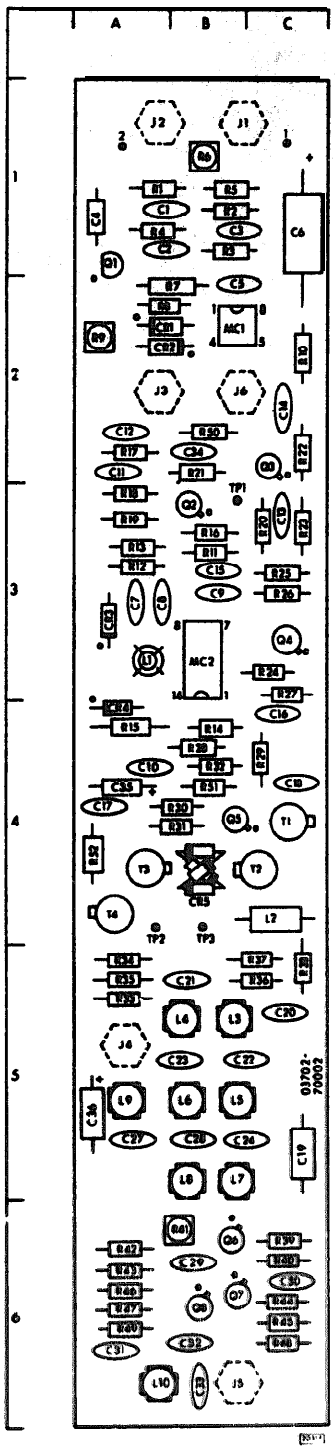


Figure A23-3 Component Location

REF DESIG	GRID LOC
C1	A-1
C2	A-1
C3	B-1
C4	A-1
C5	B-2
C6	C-1
C7	A-3
C8	B-3
C9	B-3
C10	A-4
C11	A-2
C12	A-2
C13	C-3
C14	C-2
C15	B-3
C16	C-4
C17	A-4
C18	C-4
C19	C-5
C20	C-5
C21	B-5
C22	B-5
C23	B-5
C24	B-5
C27	A-5
C28	B-5
C29	B-6
C30	C-6
C31	A-6
C32	B-6
C33	B-6
C34	B-2
C35	A-4
C36	A-5

REF DESIG	GRID LOC
CR1	A-2
CR2	A-2
CR3	A-3
CR4	A-4
CR5	B-4

J

REF DESIG	GRID LOC
J1	C-1
J2	A-1
J3	A-2
J4	A-5
J5	B-6
J6	C-2

L

REF DESIG	GRID LOC
L1	A-3
L2	C-4
L3	B-5
L4	B-5
L5	B-5
L6	B-5
L7	B-5
L8	B-5
L9	A-5
L10	A-6

MC

REF DESIG	GRID LOC
MC1	B-2
MC2	B-3

REF DESIG	GRID LOC
Q1	A-1
Q2	B-3
Q3	C-2
Q4	C-3
Q5	B-4
Q6	B-6
Q7	B-6
Q8	B-6

R

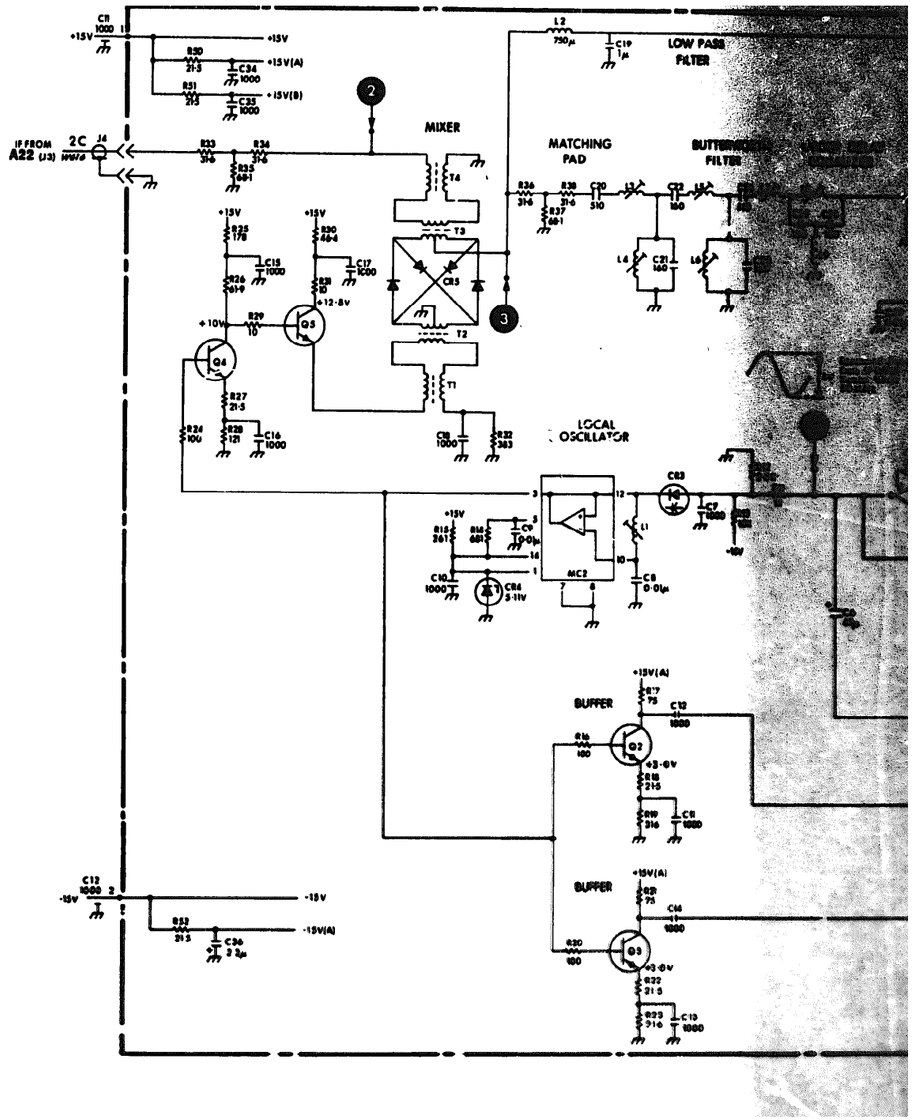
REF DESIG	GRID LOC
R1	A-1
R2	B-1
R3	B-1
R4	A-1
R5	B-1
R6	B-1
R7	A-2
R8	A-2
R9	A-2
R10	C-2
R11	B-3
R12	A-3
R13	A-3
R14	B-4
R15	A-4
R16	B-3
R17	A-2
R18	A-3
R19	A-3
R20	C-3
R21	B-2
R22	C-2
R23	C-3
R24	C-3
R26	C-3
R27	C-3
R28	B-4
R29	C-4
R30	B-4
R31	B-4
R32	B-4
R33	A-5
R34	A-5
R35	A-5
R36	C-4
R37	C-4
R38	C-4
R39	C-6
R40	C-6
R41	B-6
R42	A-6
R43	A-6
R44	C-6
R45	C-6
R46	A-6
R47	A-6
R48	C-6
R49	A-6
R50	B-2
R51	B-4
R52	A-4

T

REF DESIG	GRID LOC
T1	C-4
T2	C-4
T3	A-4
T4	A-4

Figure A23-4 Grid Reference

A23 IF MIXER AND LOCAL OSCILLATOR ASSEMBLY (03702-70002)



A23 IF MIXER AND LOCAL OSCILLATOR ASSEMBLY (03702-70002)

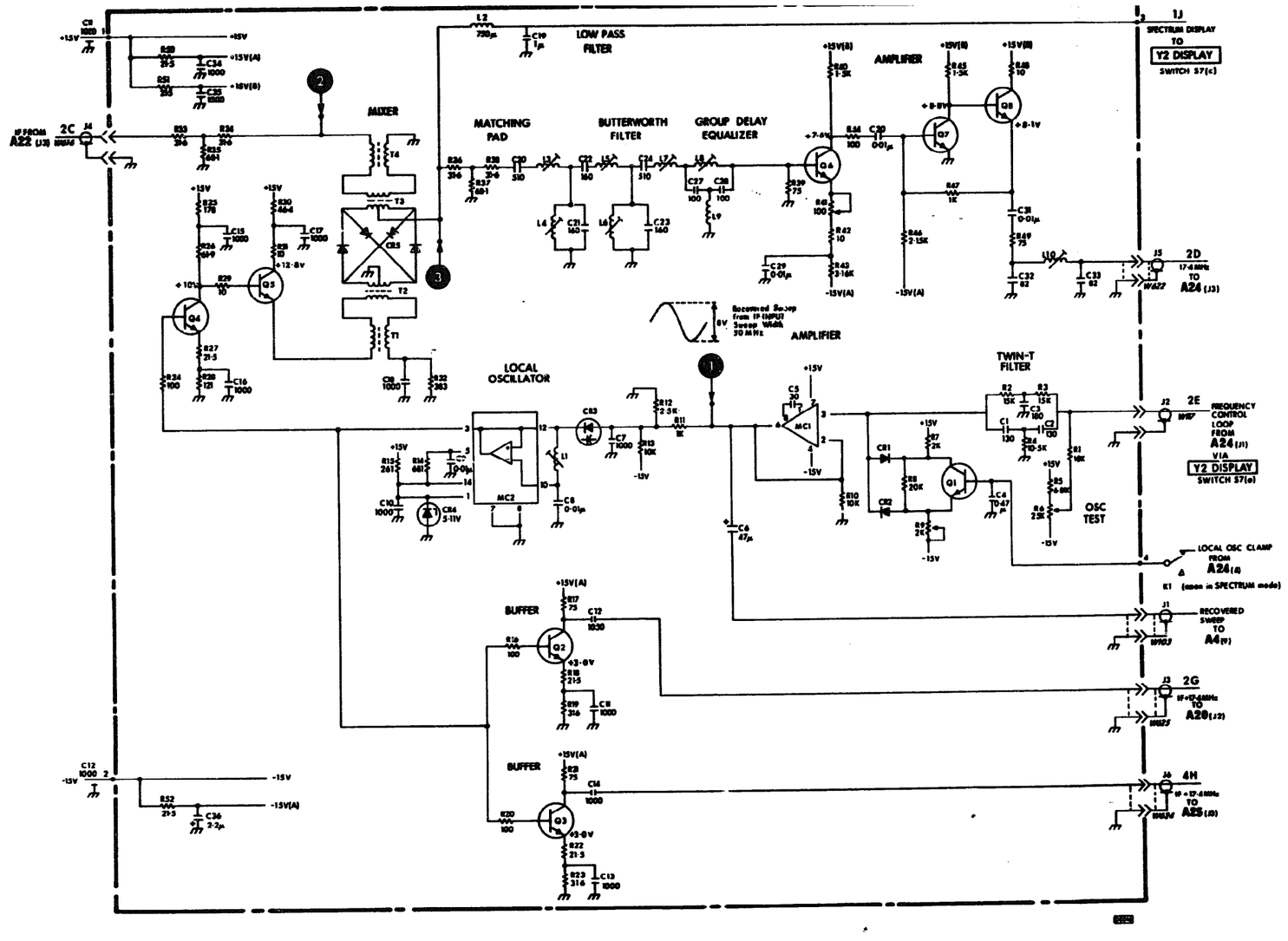


Figure A23-5 Schematic Diagram Assembly A23

ASSEMBLY SERVICE SHEET A24 - IF DEMODULATOR ASSEMBLY

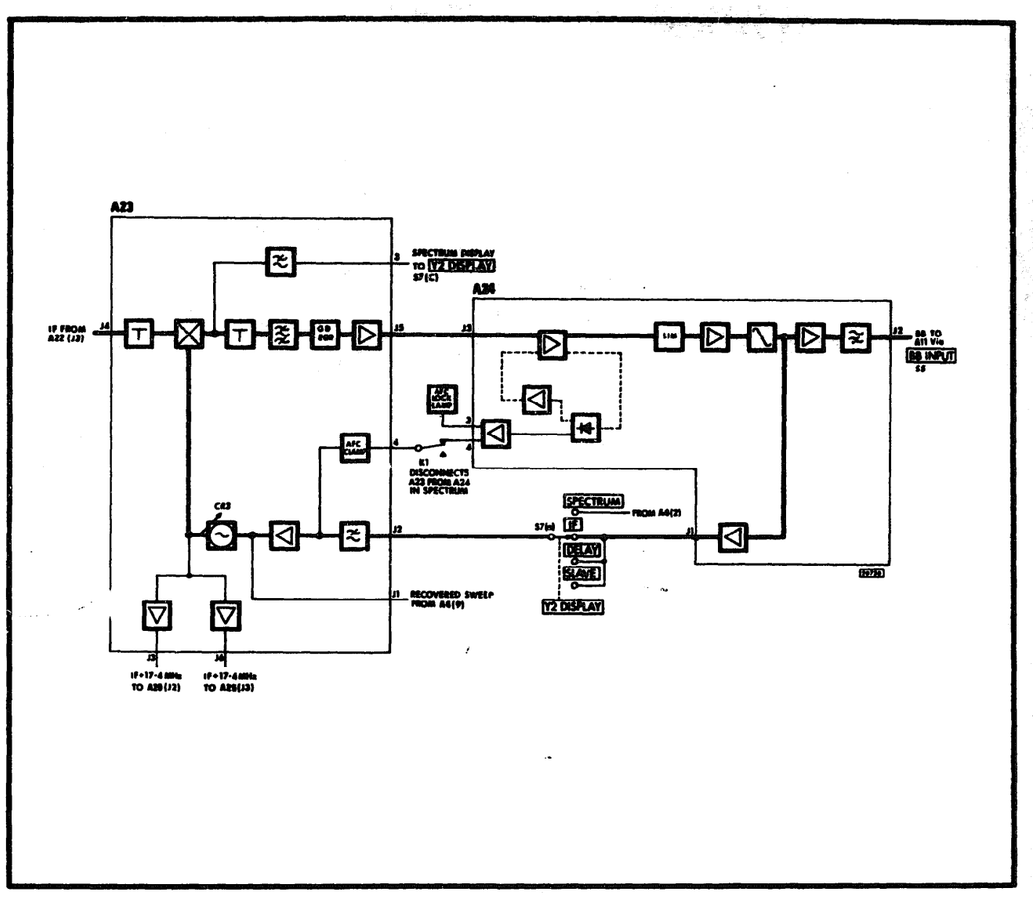


Figure A24-1 Simplified Block Diagram

A24-1 AGC Amplifier

A24-2 The incoming 17.4MHz signal from A23 is amplified by the feedback pair Q12, Q13. In the amplifier input path is a PIN diode attenuator CR3. Any change in current through CR3 will alter the attenuation. Therefore a change in level at the amplifier input is detected by CR7. and fed back via detector CR9 to alter the current in Q14 and CR3.

A24-3 The AFC LOCK lamp will light when Q16 is tuned hard on, that is, when the signal level detected by the voltage doubling detector CR7, CR8 reaches a sufficient level to turn Q15 on.

A24-4 Discriminator

A24-5 The output from the AGC amplifier passes, via series limiter CR4, CR5 and low-pass filter L6, L7, C43 through C45, to the discriminator circuitry.

Transistors Q1 and Q2 form a feedback pair which amplify the signal before application to tuned limiter Q3, Q4. This limiter is tuned to approximately 15MHz, and L1 is adjusted for optimum linearity across the detection range.

A24-6 The most important consideration for the IF Demodulator is that it must be linear in order to obtain faithful reproduction of any non-linearities in frequencydeviation of the IF input signal. This is achieved by the action of the AFC Loop, which maintains the local oscillator frequency, in A23, 17.4MHz above the frequency of the meaning IF. The discriminator (see Figure A24-2) is preset to give a 0V output for 17.4MHz input. When the IF input frequency is 17.4MHz below the local oscillator frequency from A23 no change will occur. However, when the IF input frequency varies from the local oscillator output frequency by more or less than 17.4MHz the discriminator output will vary accordingly. The discriminator output change is fed back, via the AFC loop to shift the local oscillator frequency such that the A23 mixer output returns to 17.4MHz. In this way the AFC loop ensures that the input to the discriminator is always 17.4MHz. With a swept IF input, the action of the AFC loop results in the sweep being recovered at the local oscillator control input.

A24-7 The output from the discriminator will contain BB and sweep components. The BB component is fed, via emitter follower Q9, to high-pass amplifier, Q10, Q11 then to the BB Amplifier or the Plug-in by way of the BB INPUT switch. C10, R25 offers high impedance to sweep frequencies and C11, R27 gives a slight improvement in high frequency response. Low-pass filter C14 through C16, L4, L5 gives a flat response from 83.3kHz to 5.6MHz.

A24-8 The dc + sweep component is amplified and low-pass filtered by MC1 and MC2 before passing, via buffer MC3 and the Y2 DISPLAY switch, to the A23 board as the AFC voltage to the local oscillator.

A24-9 AFC LOOP TROUBLESHOOTING

A24-10 For detailed troubleshooting of the A23/A24 AFC Loop, refer to Paragraph A23-12.

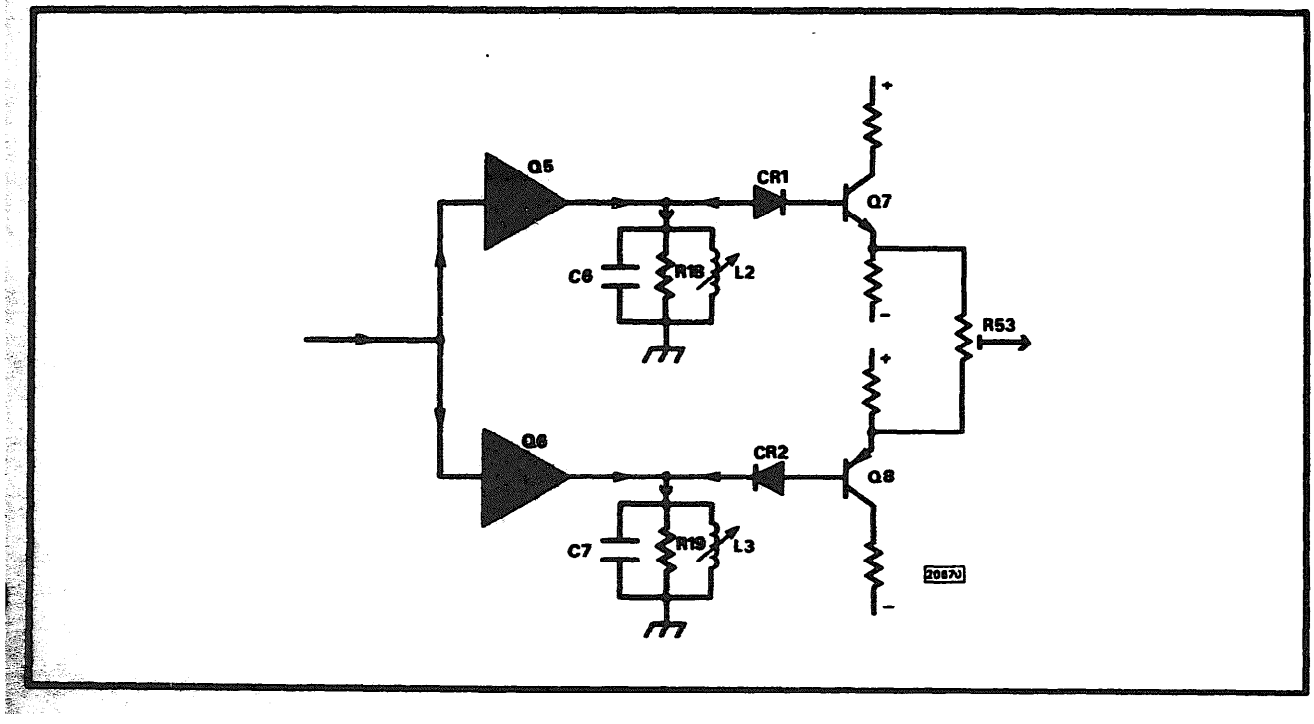


Figure A24-2 Simplified Discriminator

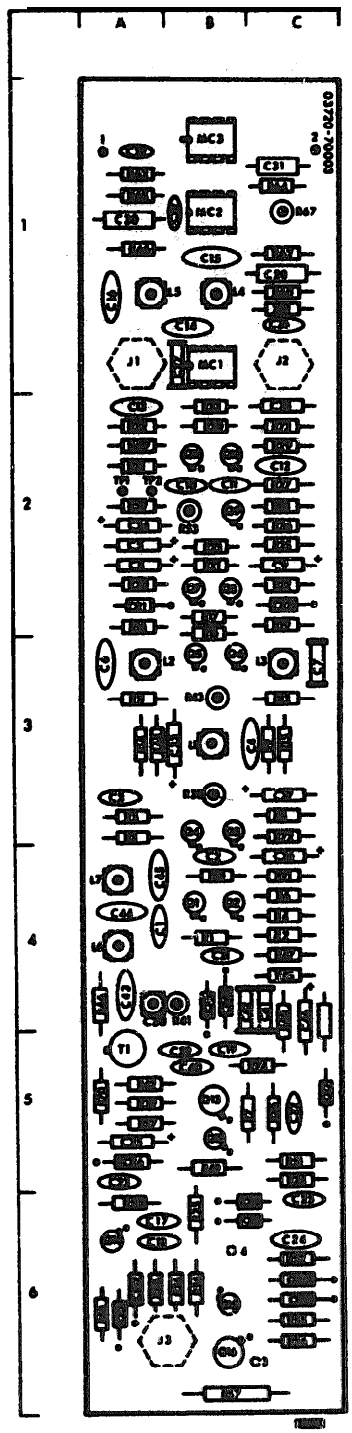


Figure A24-3 Component Location

REF DESIG	GRID LOC
C1	A-4
C2	B-4
C3	A-3
C4	B-3
C5	A-2
C6	A-3
C7	C-3
C8	A-2
C9	C-2
C10	B-2
C11	B-2
C12	C-2
C13	A-2
C14	B-1
C15	B-1
C16	A-1
C17	A-6
C18	A-6
C19	B-5
C20	A-4
C21	B-4
C22	C-5
C23	A-5
C24	C-6
C25	C-6
C26	C-1
C27	B-1
C28	C-1
C29	B-1
C30	A-1
C31	C-1
C32	A-1
C33	B-3
C34	A-2
C35	A-5
C36	C-4
C37	C-3
C38	C-2
C39	B-5
C40	B-5
C41	C-4
C42	B-4
C43	A-4
C44	A-4
C45	A-4
C46	C-4

CR

REF DESIG	GRID LOC
CR1	A-2
CR2	C-2
CR3	A-6
CR4	B-4
CR5	B-4
CR6	A-5
CR7	C-5
CR8	B-6
CR9	B-6
CR10	C-6
CR11	C-6
CR12	A-6

L

REF DESIG	GRID LOC
L1	B-3
L2	A-3
L3	C-3
L4	B-1
L5	A-1
L6	A-4
L7	A-4

MC

REF DESIG	GRID LOC
MC1	B-1
MC2	B-1
MC3	B-1

Q

REF DESIG	GRID LOC
Q1	B-4
Q2	B-4
Q3	B-3
Q4	B-3
Q5	B-3
Q6	B-3
Q7	B-2
Q8	B-2
Q9	B-2
Q10	B-2
Q11	B-2
Q12	B-5
Q13	B-5
Q14	A-6
Q15	B-6
Q16	B-6

R

REF DESIG	GRID LOC
R1	B-4
R1	C-4
R3	A-3
R4	C-4
R5	A-3
R6	C-4
R7	B-5
R8	C-3
R9	C-3
R10	B-4
R11	A-3
R13	C-3
R14	A-3
R15	C-3
R16	B-2
R17	B-2
R18	A-2
R19	C-2
R20	A-2
R21	B-2
R22	C-2
R23	B-2
R24	C-5
R25	C-2
R26	C-2
R27	C-2
R28	C-2
R29	C-2
R30	B-2
R31	A-2
R32	A-2
R33	B-2
R34	A-6
R35	B-6
R36	C-5
R37	A-5
R38	B-3
R39	A-5
R40	C-4
R41	A-4
R42	A-5
R43	B-3
R45	C-4
R46	A-4
R47	C-4
R48	A-6
R49	B-5
R50	A-6
R51	C-5
R52	C-6
R53	B-2
R54	A-6
R55	C-6
R56	C-6
R57	B-6
R58	A-6
R59	A-2
R60	C-1
R61	C-1
R62	C-1
R63	A-1
R64	C-1
R65	A-1
R66	A-1
R67	C-1
R68	A-3
R69	A-2
R70	A-5
R71	C-4
R72	C-3
R73	C-2
R74	B-5
R75	C-4

J

REF DESIG	GRID LOC
J1	A-1
J2	C-1
J3	A-6

T

REF DESIG	GRID LOC
T1	A-5

A24 IF DEMODULATOR ASSEMBLY (03702-70003)

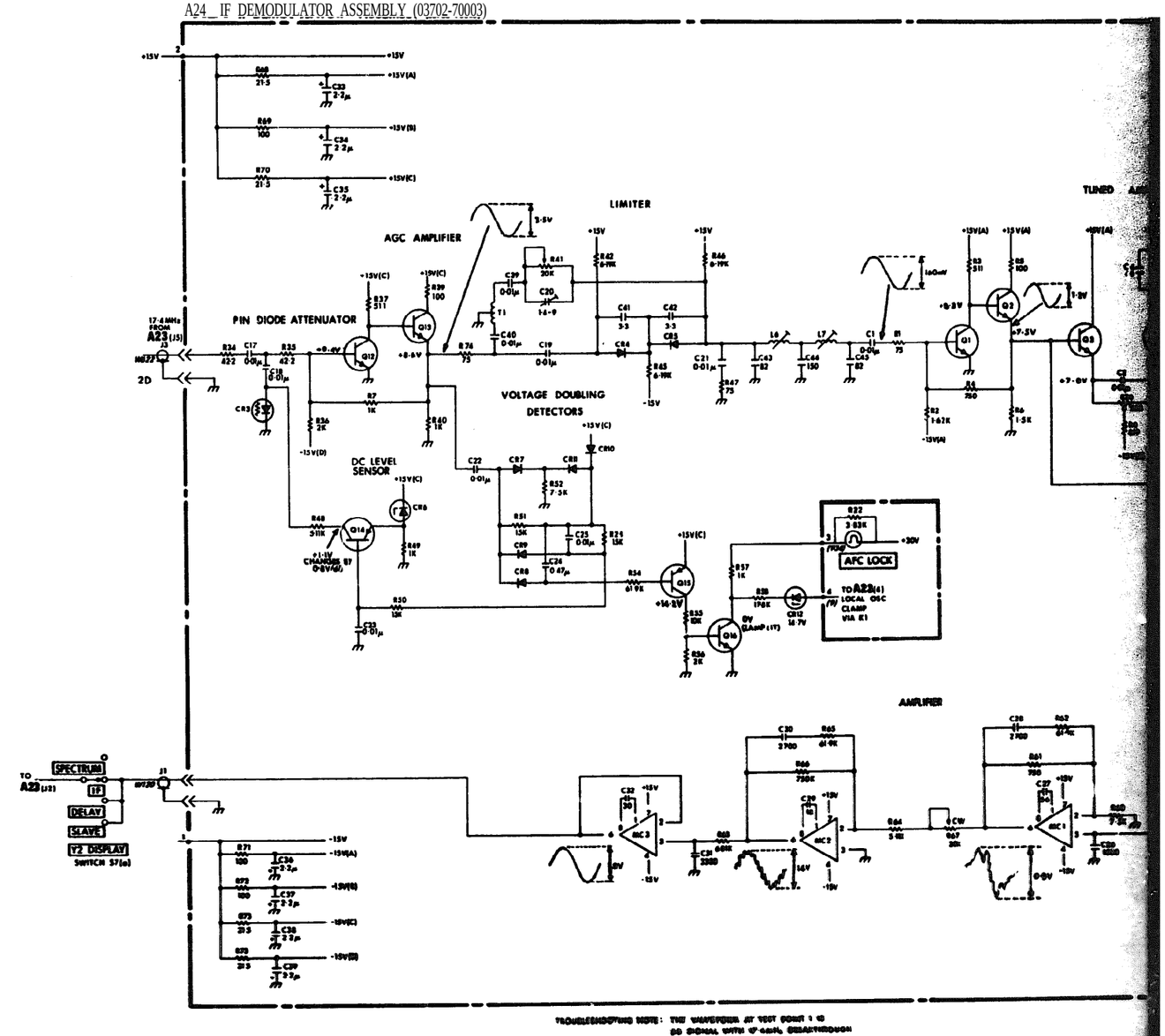


Figure A24-4 Grid Reference

C-1
C-1
A-1
C-1
A-1
A-1
C-1
A-3
A-2
A-5
C-4
C-3
C-2
B-5
C-4

GRID LOC

A-1
C-1
A-6

GRID LOC

A-5

A24 IF DEMODULATOR ASSEMBLY (03702-70003)

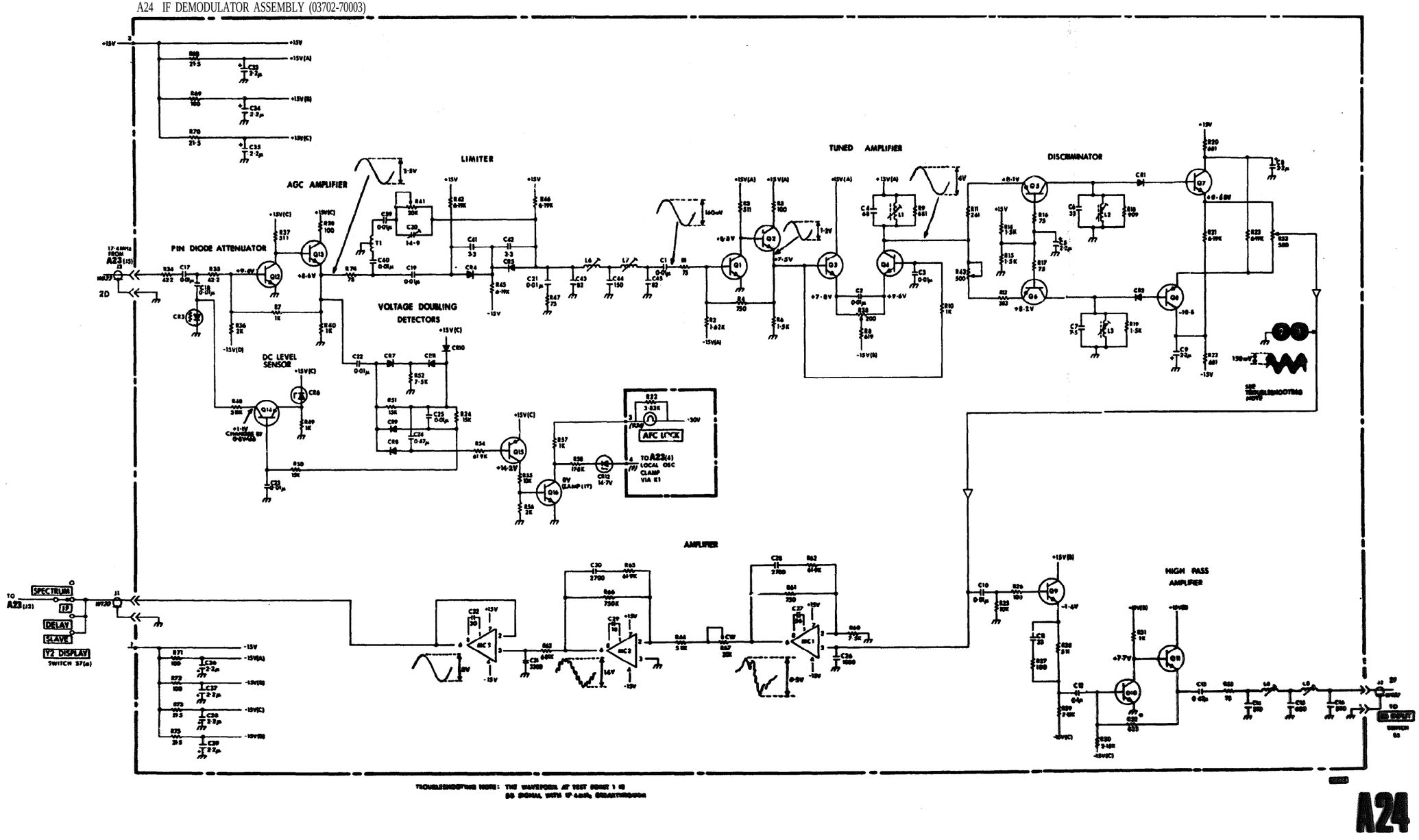


Figure A24-5 Schematic Diagram - Assembly A24

ASSEMBLY SERVICE SHEET A25 - SLIDING SPECTRUM MARKER GENERATOR

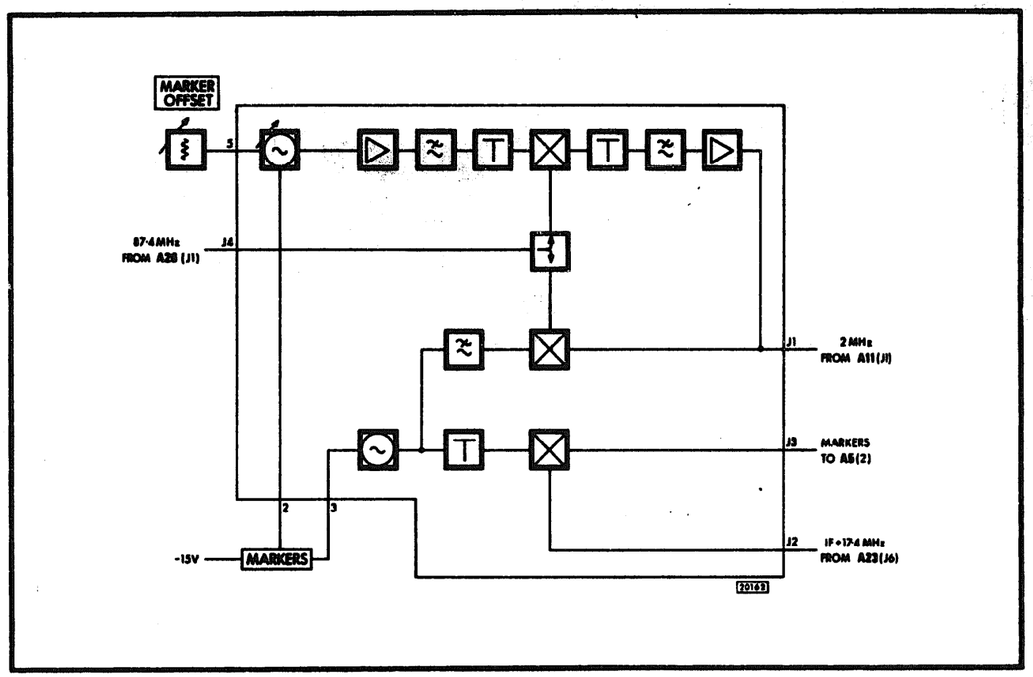


Figure A25-1 Simplified Block Diagram

A25-1 CIRCUIT DESCRIPTION

A25-2 Sliding Markers

A25-3 Voltage controlled oscillator Q1 generates a signal, in the range 262MHz to 287MHz, which is dependent on the bias voltage from the MARKER OFFSET control to varacter CR1. Variable inductor L1 is tuned to allow the oscillator frequency to vary from 262MHz to 287MHz over the full range of the MARKER OFFSET control. Wideband amplifier Q2 feeds the oscillator signal, via a low-pass filter and matching pad, to the first mixer. The low-pass filter prevents any harmonics from the oscillator reaching the mixer.

A25-4 The Centre Marker Generator A26 provides an 87.4MHz signal to the power splitter, which divides the signal equally between two mixers while preventing mixing products from one mixer affecting the other. Mixer T1, T2 mixes the 3rd harmonic of the 87.4MHz with the output from the voltage controlled oscillator. The difference frequency, 0 to 25MHz, is filtered by low-pass filter L6, L7, C14 and after amplification by Q3 through Q6, the resulting signal is applied to mixer T4, T5.

A25-4 Mixer T4, T5 mixes the 87.4 MHZ, from the Centre Marker Generator A26, with the 0 to 25MHz to produce an output of 87.4MHz with two 0 – 25MHz sidebands. Low pass filter L8 through L10, C22, C23 passes these frequencies to a third mixer T6, T7, but blocks higher frequencies.

A25-6 Mixer T6, T7 Mixes the IF +17.4Mhz signal from the A23 local oscillator circuit with the

output from mixer T4, T5 to produce zero beat markers which are applied to the Marker Processor A5.

A25-7 With the MARKERS switch set to COMB, the Marker Comb Generator A11 provides a series of pulses at 2MHz to mixer T4, T5. The output from T6, T7 will therefore contain zero beats spaced at 2MHz intervals.

A25-8 Spectrum Marker

A25-9 Relay K1 is controlled by the Y2 DISPLAY and MARKERS switches. With the Y2 DISPLAY switch set to SPECTRUM, the -15V bias rail is disengaged from the Centre Marker Generator A26 and from the Marker Comb Generator A11. At the same time, the MARKERS switch is caused to energize the -15V rail tooscillator Q7 and mixer T6, T7 produces a zero marker, centred on 70MHz.

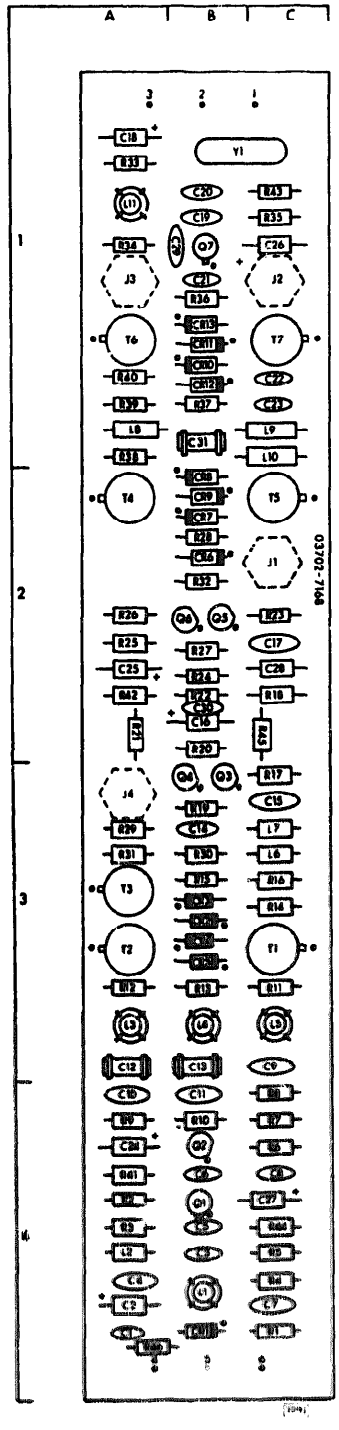


Figure A25-2 Component Location

C

REF DESIG	GRID LOC
C1	A-4
C2	A-4
C3	B-4
C4	A-4
C5	B-4
C6	B-4
C7	C-4
C8	C-4
C9	C-3
C10	A-4
C11	B-4
C12	A-3
C13	B-3
C14	B-3
C15	C-3
C16	B-2
C17	C-2
C18	A-1
C19	B-1
C20	B-1
C21	B-1
C22	C-1
C23	C-1
C24	A-4
C25	A-2
C26	C-1
C27	C-4
C28	C-2
C29	B-1
C30	B-2

CR

REF DESIG	GRID LOC
CR1	B-4
CR2	B-3
CR3	B-3
CR4	B-3
CR5	B-3
CR6	B-2
CR7	B-2
CR8	B-2
CR9	B-2
CR10	B-1
CR11	B-1
CR12	B-1
CR13	B-1

J

REF DESIG	GRID LOC
J1	C-2
J2	C-1
J3	A-1
J4	A-3

L

REF DESIG	GRID LOC
L1	B-4
L2	A-4
L3	A-3
L4	B-3
L5	C-3
L6	C-3
L7	C-3
L8	A-1
L9	C-1
L10	C-1
L11	A-1

Q

REF DESIG	GRID LOC
Q1	B-4
Q2	B-4
Q3	B-3
Q4	B-3
Q5	B-2
Q6	B-2
Q7	B-1

R

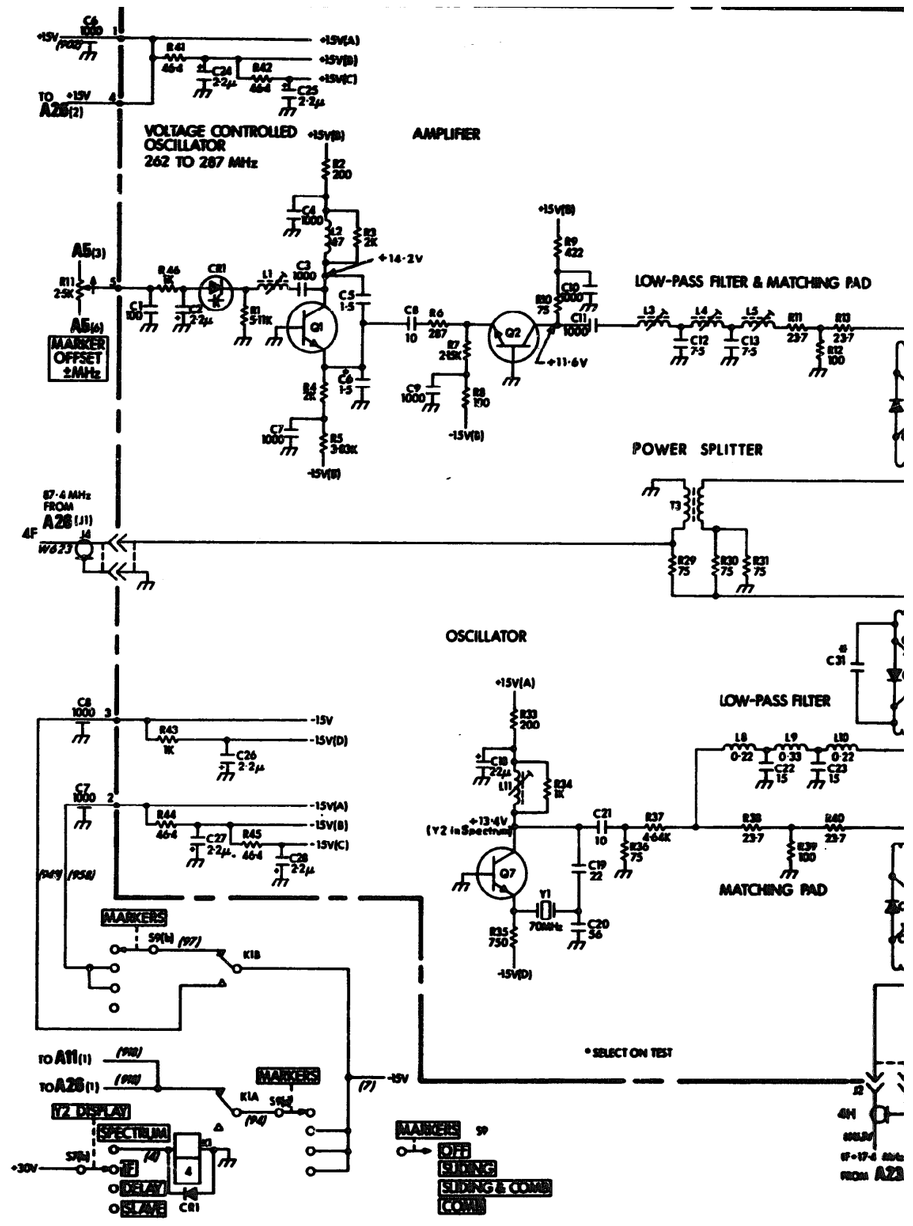
REF DESIG	GRID LOC
R1	C-4
R2	A-4
R3	A-4
R4	C-4
R5	C-4
R6	C-4
R7	C-4
R8	C-4
R9	A-4
R10	B-4
R11	C-3
R12	A-3
R13	B-3
R14	C-3
R15	B-3
R16	C-3
R17	C-3
R18	C-2
R19	B-3
R20	B-2
R21	A-2
R22	B-2
R23	C-2
R24	B-2
R25	A-2
R26	A-2
R27	B-2
R28	B-2
R29	A-3
R30	B-3
R31	A-3
R32	B-2
R33	A-1
R34	A-1
R35	C-1
R36	B-1
R37	B-1
R38	A-1
R39	A-1
R40	A-1
R41	A-4
R42	A-2
R43	C-1
R44	C-4
R45	C-2
R46	A-4

T

REF DESIG	GRID LOC
T1	C-3
T3	A-3
T3	A-3
T4	A-2
T5	C-2
T6	A-1
T7	C-1

Figure A25-3 Grid Reference

A25 SLIDING SPECTRUM MARKER GENERATOR ASSEMBLY (03702-7160)



A25 SLIDING SPECTRUM MARKER GENERATOR ASSEMBLY (03702-7160)

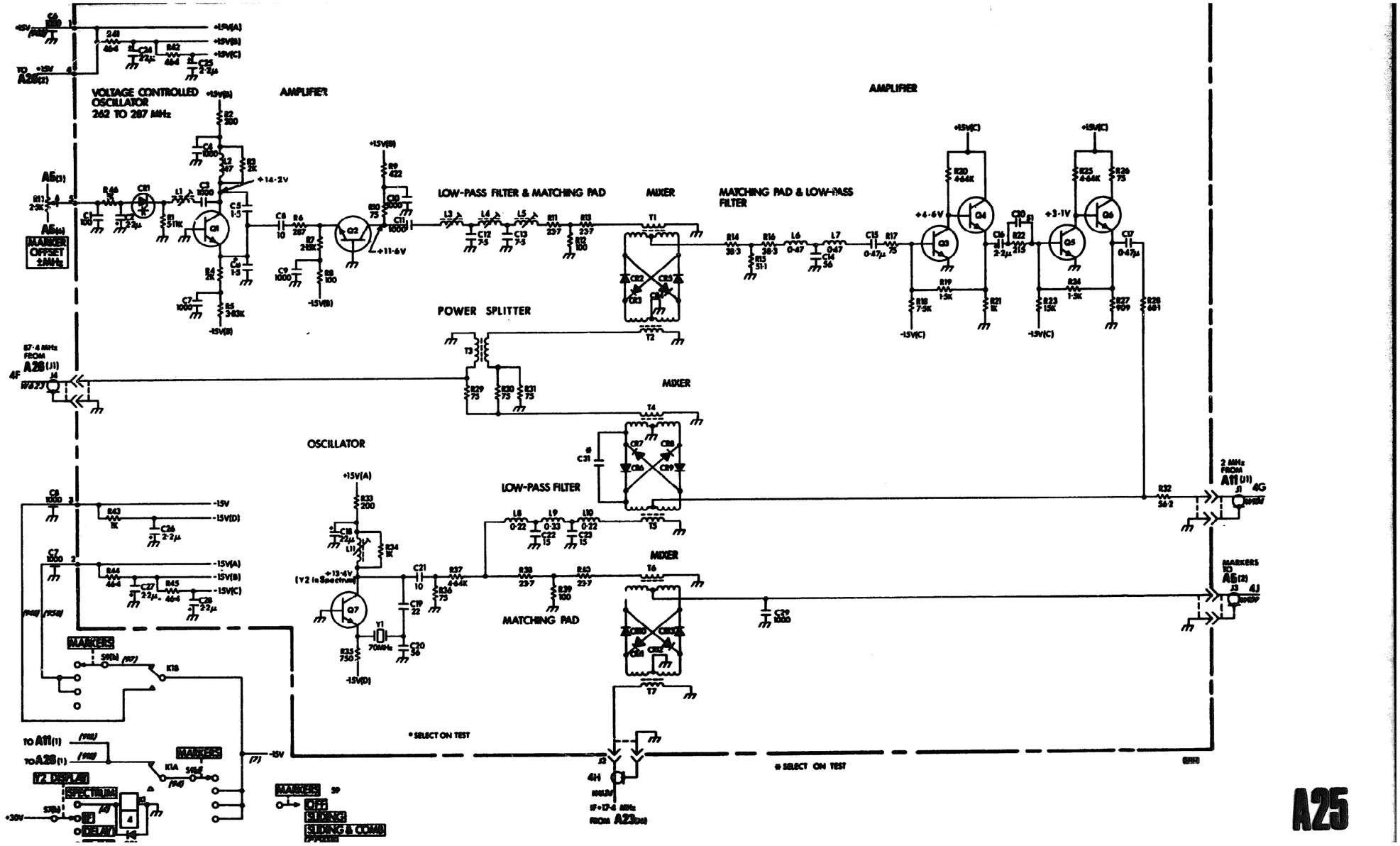
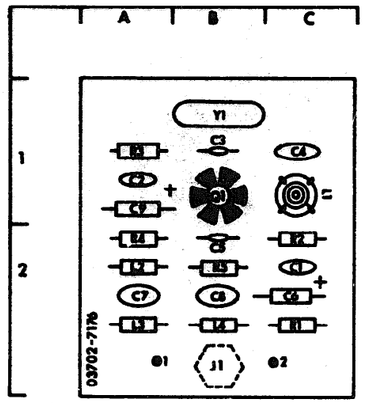
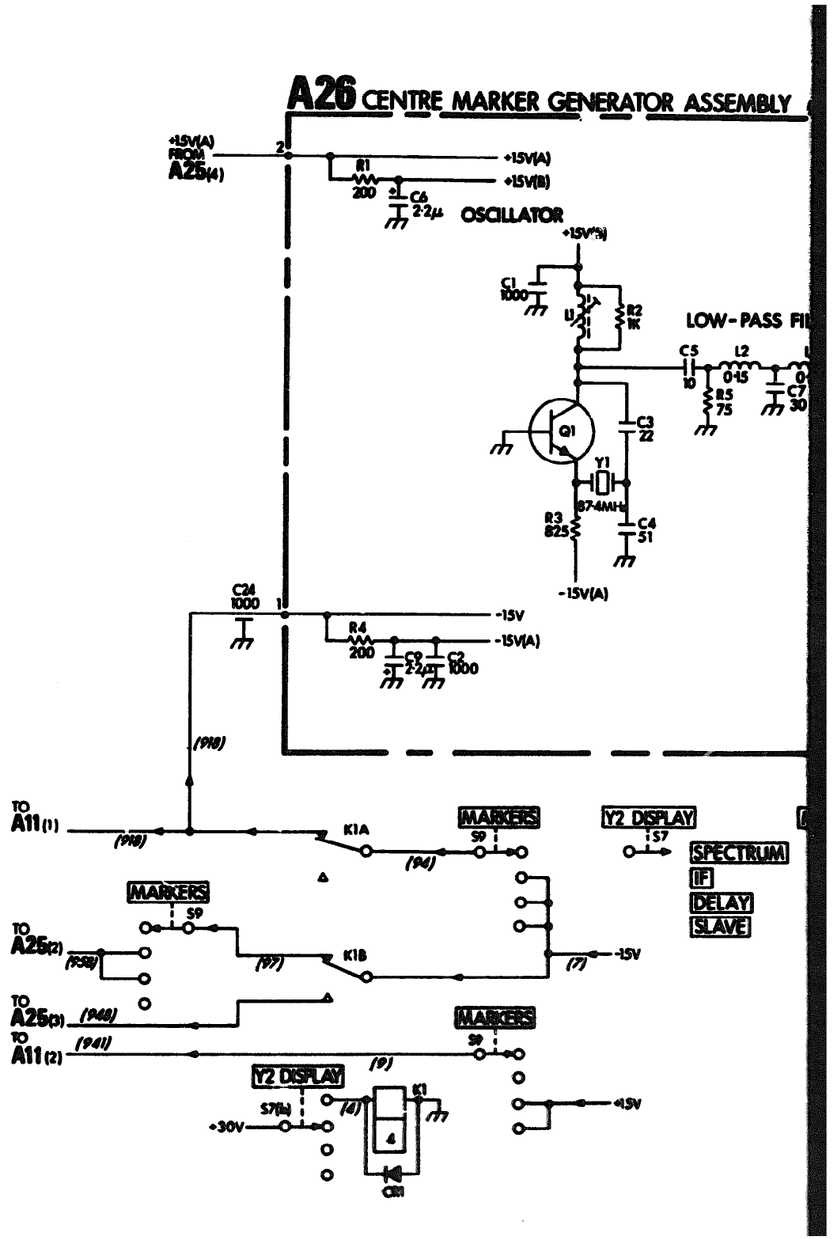


Figure A25-4 Schematic Diagram - Assembly A25

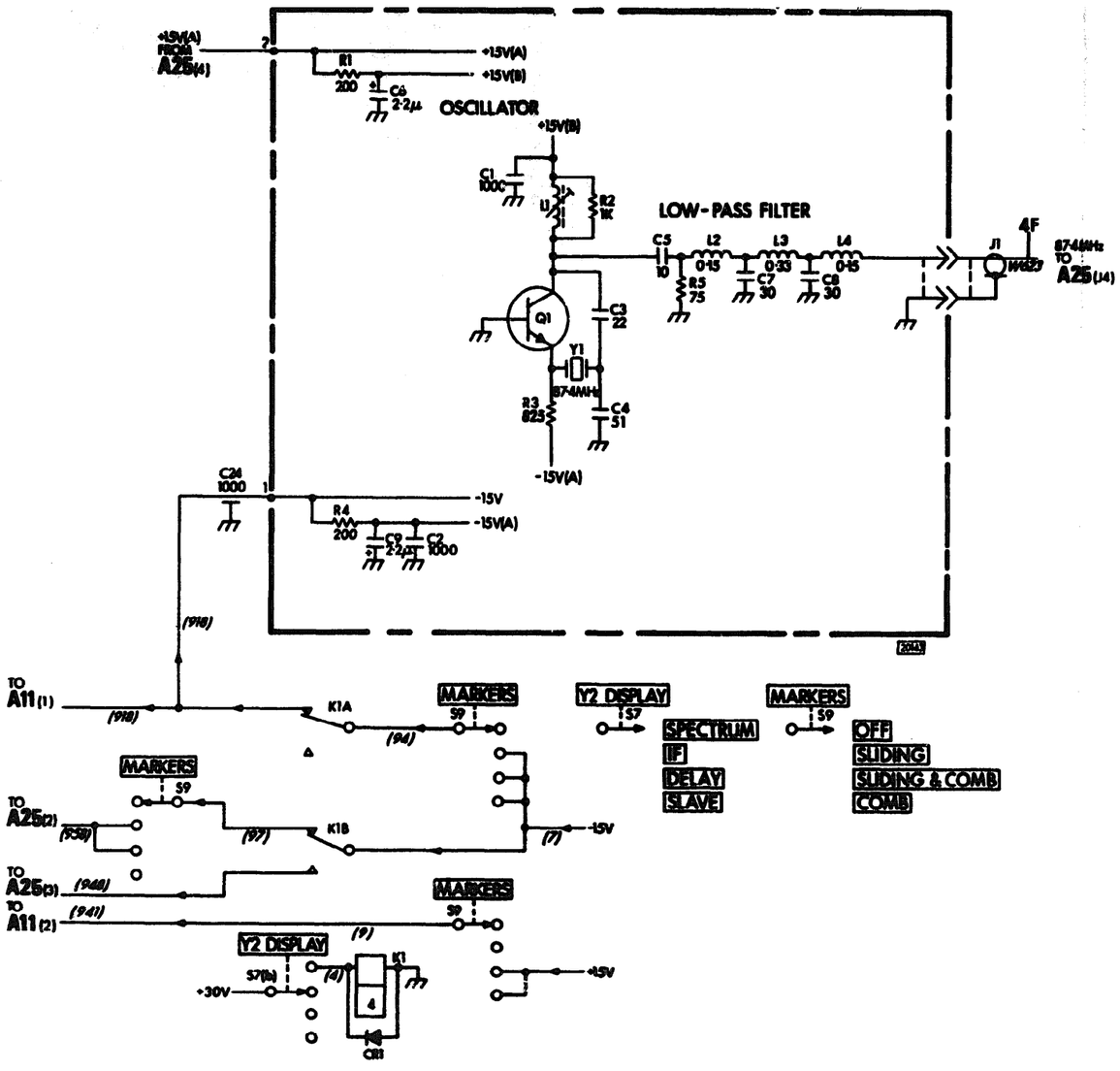


C		L		Q		Y	
REF DESIG	GRID LOC	REF DESIG	GRID LOC	REF DESIG	GRID LOC	REF DESIG	GRID LOC
C1	C-2	L1	C-1	Q1	B-1	Y1	B-1
C2	A-1	L2	A-2				
C3	B-1	L3	A-2				
C4	C-1	L4	B-2				
C5	B-2						
C6	C-2						
C7	A-2	J		R			
C8	B-2	REF DESIG	GRID LOC	REF DESIG	GRID LOC		
C9	A-1	J1	B-2	R1	C-2		
				R2	C-2		
				R3	A-1		
				R4	A-2		
				R5	B-2		

Figure A26-2 Component Location and Grid Reference



A26 CENTRE MARKER GENERATOR ASSEMBLY (03702-7176)



A26

Figure A26-3 Schematic Diagram - Assembly A26

ASSEMBLY SERVICE SHEET A27 - EHT OSCILLATOR STIMULUS

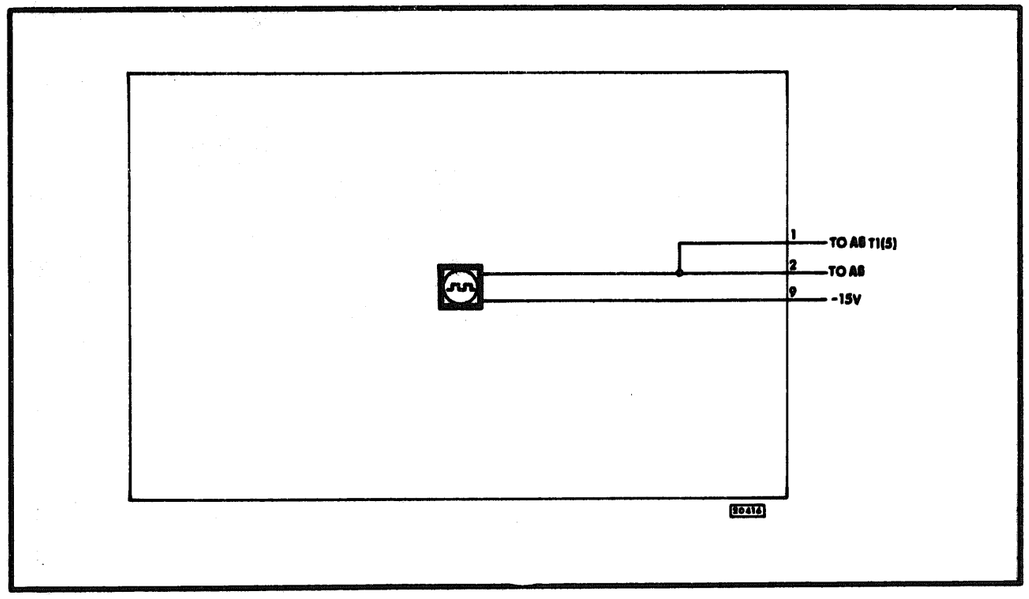
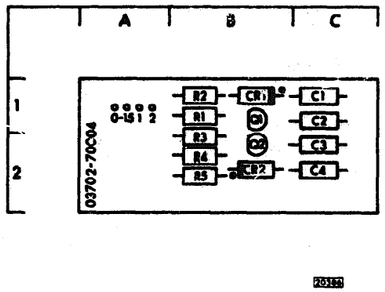


Figure A27-1 Simplified Block Diagram

A27-1 CIRCUIT DESCRIPTION

A27-2 Transistors Q1, Q2 form a free running multivibrator and C4 is a frequency control capacitor for the EHT Oscillator A6. The free running multivibrator ensures that the EHT Oscillator will start, and in the absence of EHT oscillation and period of the multivibrator is 3ms approximately. When the EHT Oscillator is running, the multivibrator will run at some sub-harmonic frequency of the EHT frequency.



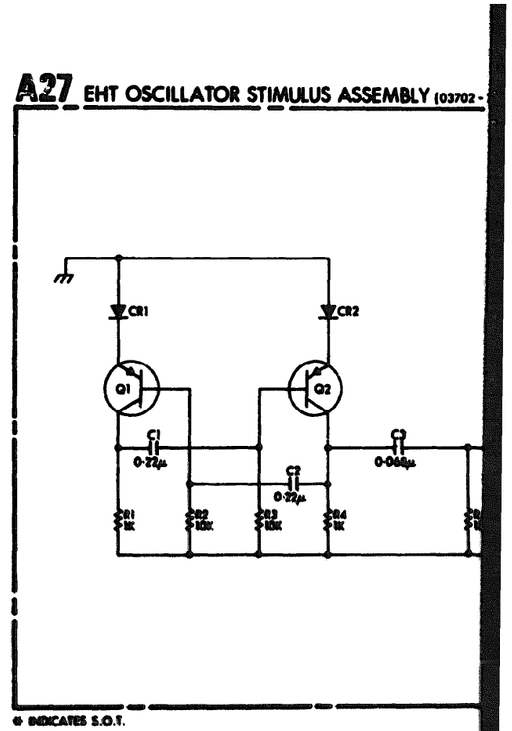
C	
REF DESIG	GRID LOC
C1	C-1
C2	C-1
C3	C-2
C4	C-2

CR	
REF DESIG	GRID LOC
CR1	B-1
CR2	B-2

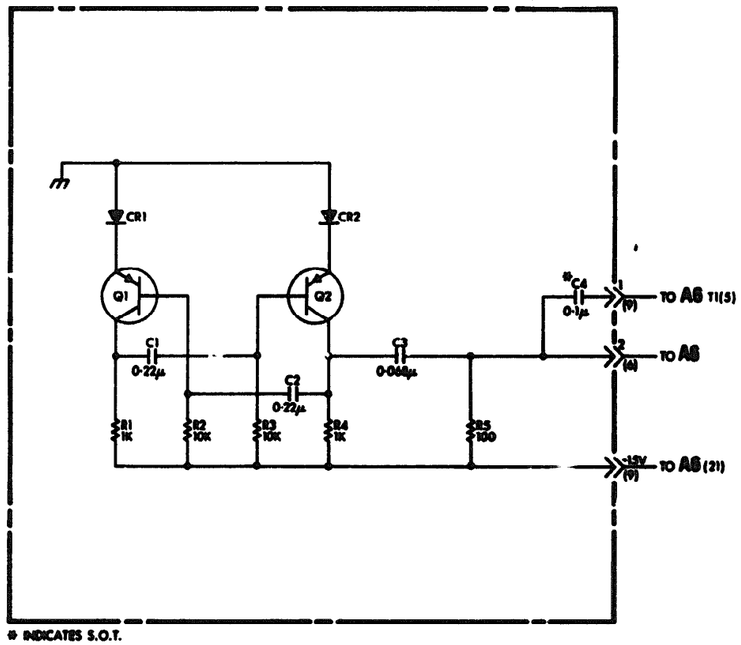
Q	
REF DESIG	GRID LOC
Q1	B-1
Q2	B-2

R	
REF DESIG	GRID LOC
R1	B-1
R2	B-1
R3	B-2
R4	B-2
R5	B-2

Figure A27-2 Component Location and Grid Reference



A27 EHT OSCILLATOR STIMULUS ASSEMBLY (03702-70004)



* INDICATES S.O.T.

A27

Figure A27-3 Schematic Diagram - Assembly A27

SECTION VI

MANUAL CHANGES

6-1 MANUAL BACKDATING

6-2 This manual applies directly to the standard hp 3702B IF/BB Receiver having a serial prefix number of 1424U-----. The following modifications are required to make this manual applicable to instruments having serial numbers below 1424U 00896. Check in Table 6-1 for your instrument, serial prefix and number (0000U - 00000) and make any listed changes in this manual.

Table 6-1 Serial Numbers/Backdating Changes

Serial Number	Make Manual Changes
1136U 00101 to 1150U 00114	ALL
1150U 00115 to 1150U 00123	2 to 18
1150U 00124 to 1150U 00150	3 to 18
1201U 00151 to 1201U 00170	4 to 18
1201U 00171 to 1201U 00190	5 to 18
1205U 00191 to 1205U 00209 except 1205U 00202/203/205	6 to 18
1205U 00210	7 to 18
1205U 00239/240/248 plus 1205U 00249 to 1242U 00261 except 1245U 00256/258/260	8 to 18
1205U 00211 to 1205U 00250	9 to 18
1242U 00251 to 1245U 00270	10 to 18
1249U 00271 to 1249U 00280	11 to 18
1251U 00281 to 1251U 00290	12 to 18
1251U 00291 to 1317U 00396	13 to 18
1318U 00397 to 1318U 00435	14 to 18
1322U 00436 to 1322U 00495	15 to 18
1330U 00496 to 1330U 00525	16 to 18
1331U 00526 to 1331U 00630	17 and 18
1331U 00631 to 1331U 00775	18

CHANGE 1 Section IV Replaceable Parts List

Page 4-4
Change A23C23 to 0160-2202 C. FXD 75pF
Change A23C24 to 0160-0134 C. FXD 220pF
Change A23C25 to 0160-2307 C. FXD 47pF
Change A23C26 to 0160-0134 C. FXD 220pF
Change A23C27 to 0160-2202 C. FXD 75pF
Change A23R35 to 0757-0180 R. FXD 31.6 OHM
Change A23R36 to 0757-0180 R. FXD 31.6 OHM
Change A23R37 to 0757-0397 R. FXD 68.1 OHM
Change A23L4 to 03702-7299 IND VAR
Change A23L5 to 03702-7311 IND VAR
Change A23L6 to 03702-7301 IND VAR
Change A23L7 to 03702-7311 IND VAR
Change A23L8 to 03702-7299 IND VAR

Section V Service Sheets

Page 5-97 Schematic Diagram Figure A23-5
Change C23 to 75
Change C24 to 220
Change C25 to 47
Change C26 to 220
Change C27 to 75
Change R35 to 31.6
Change R36 to 31.6
Change R37 to 68.1

CHANGE 2 Section IV Replaceable Parts List

Page 4-4
Change A4R37 to 0757-0280 R. FXD 1K
Change A4R38 to 0757-0280 R. FXD 1K

Section V Service Sheets

Page 5-59 Schematic Diagram Figure A4-4
Change R37 to 1K
Change R38 to 1K

CHANGE 3 Section IV Replaceable Parts List

Page 4-4
Add A2C48 0180-0097 C. FXD 47uF
Add A2R97 0757-0465 R. FXD 100K
Change A2R60 to 0757-0200 R. FXD 5.62K
Change A2R92 to 0757-0442 R. FXD 10K

Section V Service Sheets

Page 5-51 Schematic Diagram, Figure A2-6 (see Figure 6-1)
Add C48 47u
Add R97 100K
Change R60 to 5.62K
Change R92 to 10K

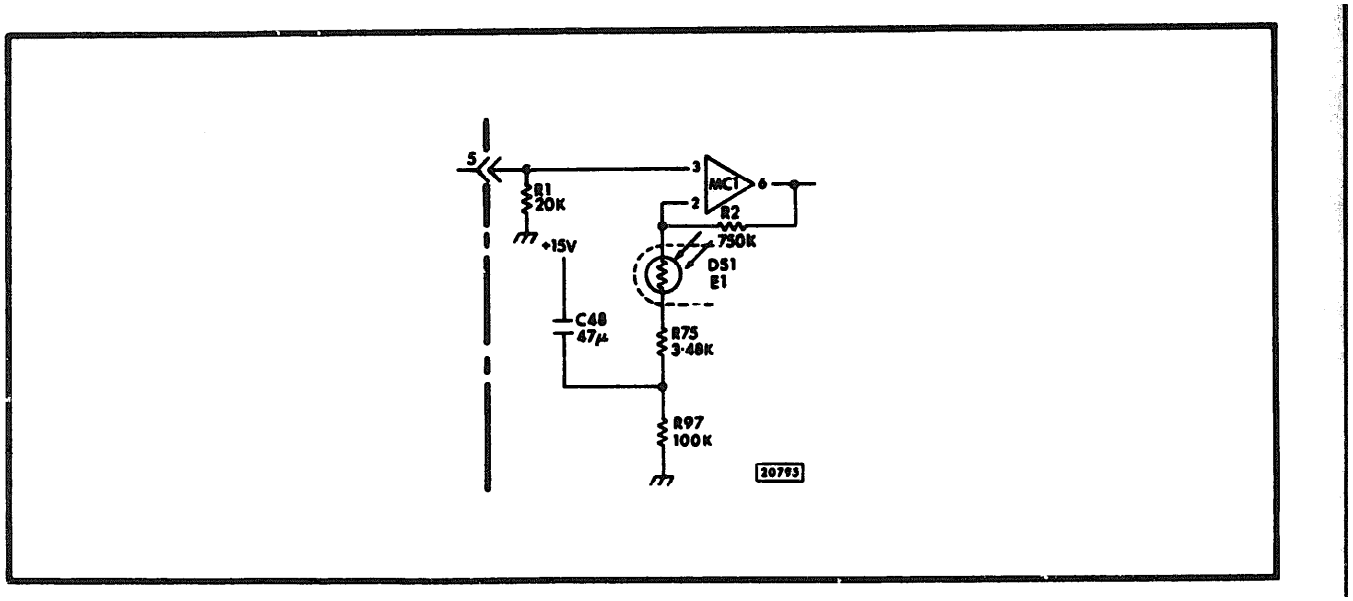


Figure 6-1 Part of Assembly A2

CHANGE 4 Section IV Replaceable Parts List

Page 4-4
Change A23C41 to 0160-0667 C. FXD 15pF
Change A23R23 to 0757-1094 R. FXD 1.47K
Change A23R41 to 0698-3154 R. FXD 4.22K
Change A23R43 to 0698-0084 R. FXD 2.15K
Change A23Q4 to 1854-0019 XSTR SI NPN

Section V Service Sheets

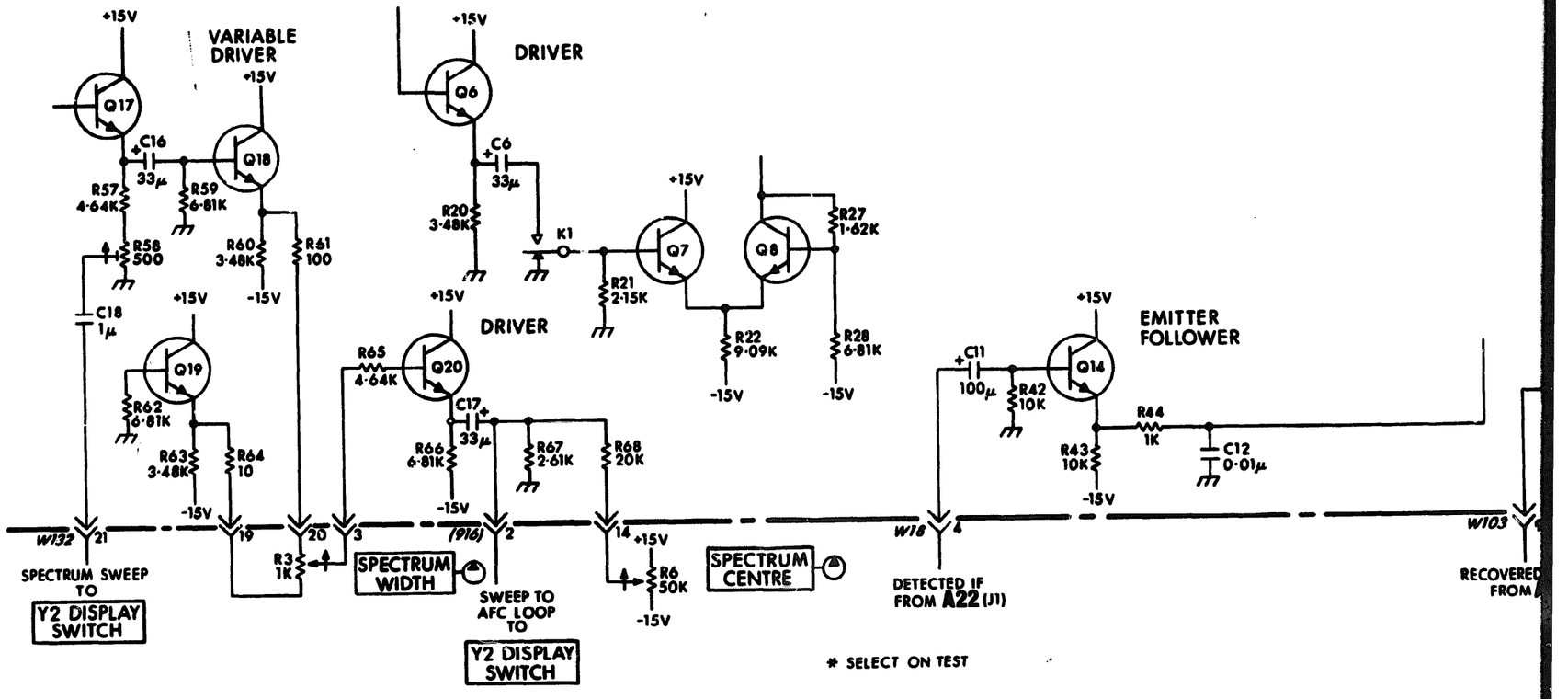
Page 5-97 Schematic Diagram Figure A23-5
Change C41 to 15
Change R23 to 1.47K
Change R41 to 4.22K
Change R43 to 2.15K

CHANGE 5 Section IV Replaceable Parts List

Page 4-4
Add C28 0160-0127 C. FXD 1uF
Add C29 0160-3740 C. FXD 0.22uF
Add L1 9140-0131 IND FXD 10mH
Add L2 9100-1673 IND FXD 6.8mH
Add A4R63 0698-3152 R. FXD 3.48K
Add A4R64 0757-0346 R. FXD 10 OHM
Add A4R65 0698-3155 R. FXD 4.64K
Add A4R66 0757-0439 R. FXD 6.81 K
Add A4R67 0698-0085 R. FXD 2.61 K
Add A4R68 0757-0449 R. FXD 20K
Add A23 03702-7320
Delete R21
Delete A4C18

Delete A4C19
Delete A4L1
Delete A4L2
Delete A4MC1
Delete A4MC2
Delete A6C9
Delete A22C34
Delete A23C39
Delete A23L11
Delete A23L12
Change R3 to 2100-3074 R. VAR 50K - 1K LIN
Change A4C16 to 0180-0229 C. FXD 33uF
Change A4C17 to 0180-0229C. FXD 33uF
Change A4R45 to 0757-0440 R. FXD 7.5K OHM
Change A4R46 to 0757-0440 R. FXD 7.5K OHM
Change A4R47 to 0698-3162 R. FXD 46.4K OHM
Change A4R57 to 0698-3155 R. FXD 4.64K OHM
Change A4R58 to 2100-2574 R. VAR 500 OHM
Change A4R59 to 0757-0439 R. FXD 6.81K OHM
Change A4R60 to 0698-3152 R. FXD 3.48K OHM
Change A4R61 to 0757-0401 R. FXD 100 OHM
Change A4R62 to 0757-0439 R. FXD 6.81K OHM
Change A6C3 to 0160-0151 C. FXD 4700pF

Section V Service Sheets
Page 5-59 Schematic Diagram, Figure A4-4 (see Figure 6-2)
Add R63, 3.48K
Add R64, 10
Add R65, 4.64K
Add R66, 6.81K
Add R67, 2.61K
Add R68, 20K
Delete C18
Delete C19
Delete L1
Delete L2
Delete MC1
Change C16 to 33u
Change C17 to 33u
Change R45 to 7.5K
Change R46 to 7.5K
Change R47 to 46.4K
Change R57 to 4.64K
Change R58 to 500
Change R59 to 6.81 K
Change R60 to 3.48K
Change R61 to 100
Change R62 to 6.81K


+15V
VARIABLE DRIVER
Q17
C16
33μ
Q18
R57
4·64K
R59
6·81K
R58
500
R60
3·48K
R61
100
-15V
C18
1μ
Q19
R62
6·81K
R63
3·48K
R64
10
W132
21
19
SPECTRUM SWEEP TO
Y2 DISPLAY SWITCH
DRIVER
Q6
C6
33μ
R20
3·48K
K1
Q20
R65
4·64K
C17
33μ
R66
6·81K
R67
2·61K
R68
20K
20
3
(916)
2
14
R3
1K
SPECTRUM WIDTH
SWEEP TO AFC LOOP TO
Y2 DISPLAY SWITCH
R6
50K
SPECTRUM CENTRE
Q7
Q8
R21
2·15K
R22
9·09K
R27
1·62K
R28
6·81K
W18
4
DETECTED IF FROM A22 (J1)
EMITTER FOLLOWER
C11
100μ
Q14
R42
10K
R43
10K
R44
1K
C12
0·01μ
W103
RECOVERED FROM
* SELECT ON TEST

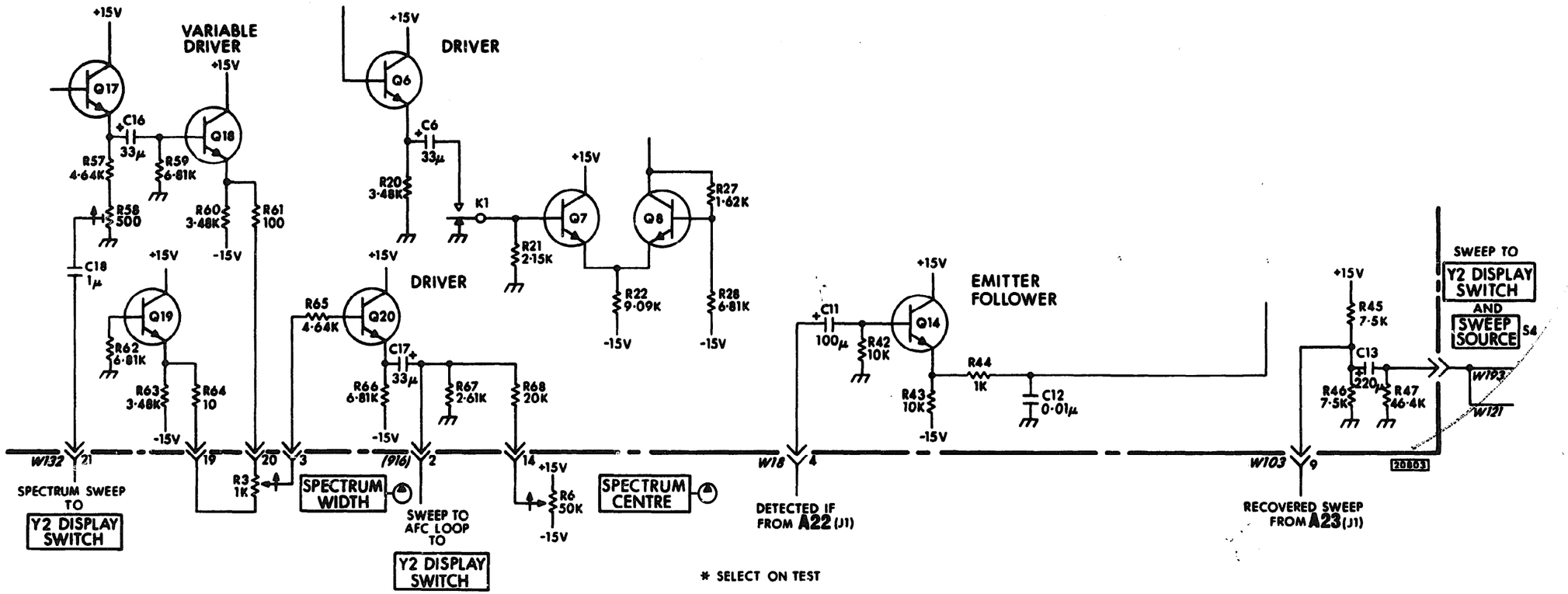


Figure 6-2. Part of Assembly A4

Page 5-67 Schematic Diagram, Figure A6-3
Delete C9
Change C3 to 4700

Page 5-91 Schematic Diagram, Figure A22-3
Delete C34

Page 5-97 Schematic Diagram, Figure A23-5 (see figure 6-3)
Add Filter Assy.
Delete C39
Delete L11
Delete L12

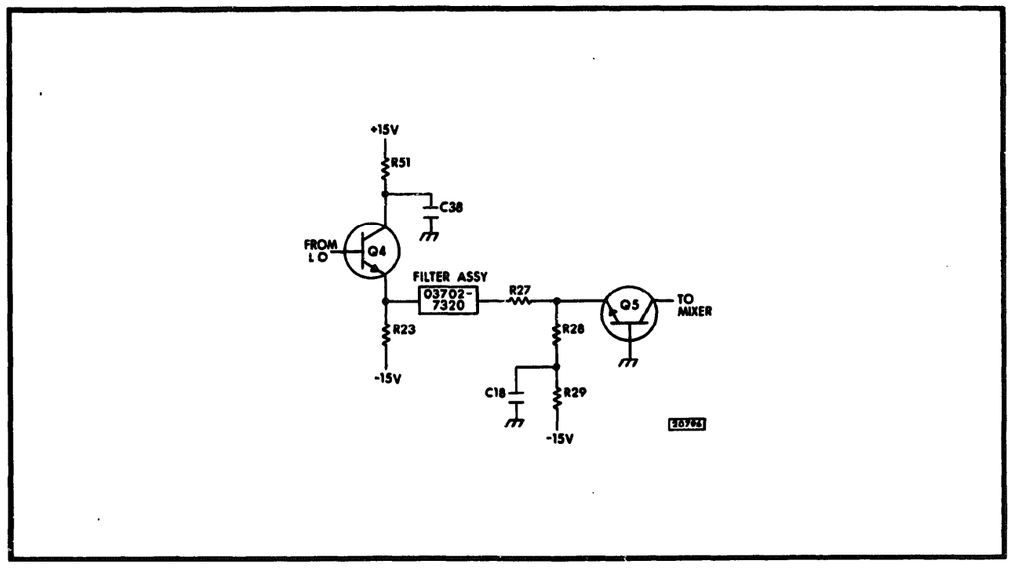


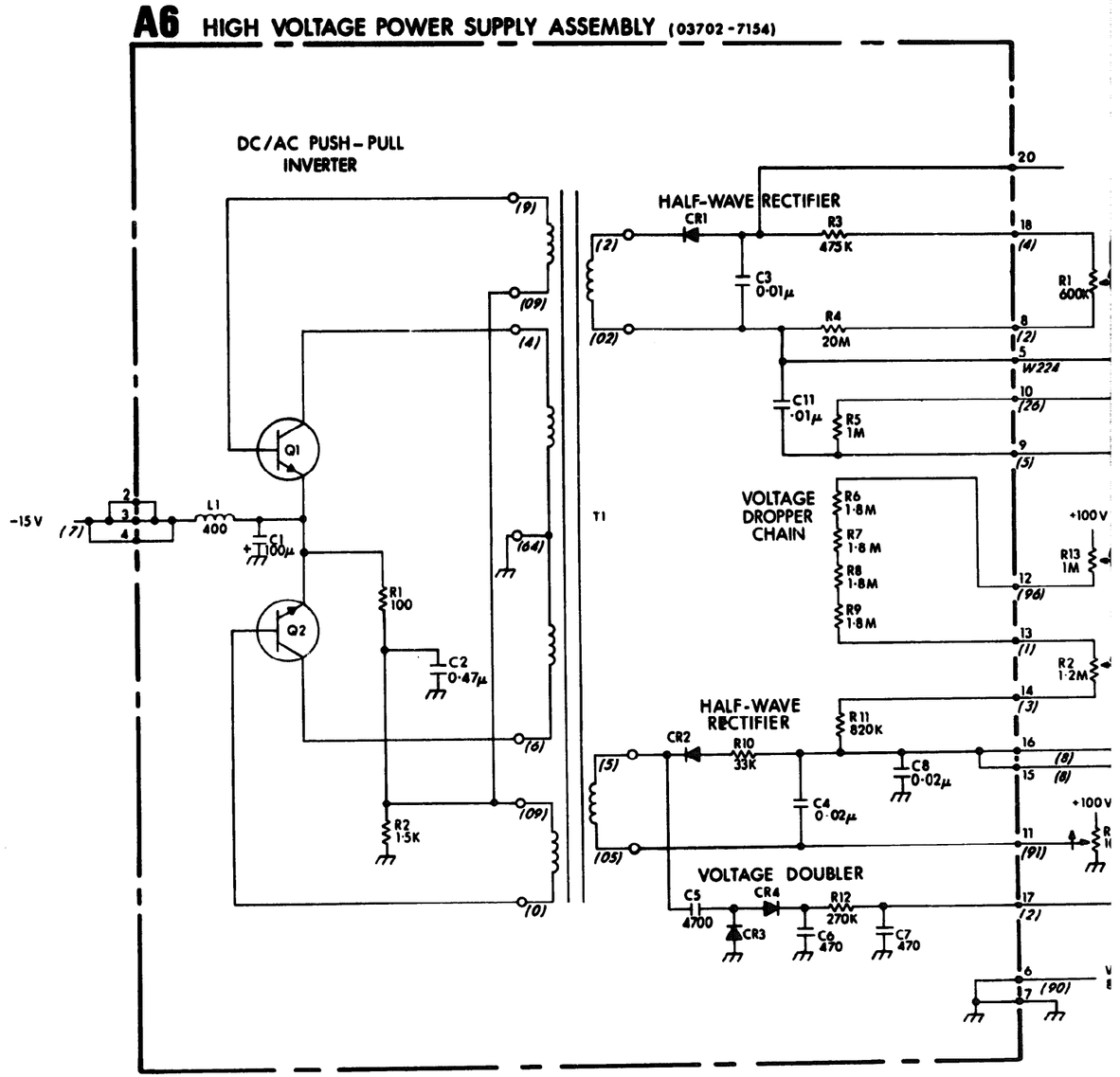
Figure 6-3 Part of Assembly A23

CHANGE 6 Section IV Replaceable Parts List
Page 4-4 **Delete L1**
Delete C5

Section V Service Sheets
Page 5-67 Schematic Diagram, Figure A6-3
Remove L1
Remove C5

Ref Desig	HP Part No	TQ	Description
A6	03702-7154	1	ASSY EHT POWER SUPPLY
	03702-3154	1	PC BD BLANK
A6C1	0180-0098		C FXD 100UF 20% 20WVDC
A6C2	0160-0174		C FXD 0.47UF +80 -20% 25WVDC
A6C3	0160-0907	2	C FXD 0.01UF 10% 5000WVDC
	5040-0401	2	SUPPORT C
A6C4	0160-3907	2	C FXD 0.02UF 10% 3000WVDC
A6C5	0160-0151		C FXD 4700PF +80 -20% 4000WVDC
	5040-0401		SUPPORT C
A6C6	0150-0036	2	C FXD 4700PF 20% 6000WVDC
	5040-0400	2	SUPPORT C
A6C7	0150-0036		C FXD 4700PF 20% 6000WVDC
	5040-0400		SUPPORT C
A6C8	0160-3907		C FXD 0.02UF 10% 3000WVDC
A6C11	0160-3907		C FXD 0.01UF 10% 5000WVDC
A6CR1	1901-0142	4	DIO SI 7500PIV 50MA
A6CR2	1901-0142		DIO SI 7500PIV 50MA
A6CR3	1901-0142		DIO SI 7500PIV 50MA
A6CR4	1901-0142		DIO SI 7500PIV 50MA
A6L1	9140-0051	1	IND FXD 400UH 5%
A6MP1	2360-0015	1	SCR 6-32X1-1/8
A6MP2	2420-0003	1	NUT NEX 6-32
A6MP3	2190-0018	1	WASHER LOCK HEL NO 6
A6MP4	2260-0001	1	NUT HEX 4-40
A6MP5	2190-0003	1	WASHER LOCK HEL NO 4
A6MP6	2390-0007	1	SCR 6-32X5/16
A6MP7	0360-0042	1	TERMINAL LUG
A6MP8	2360-0131	1	SCREW (QTY 1)
A6MP8	0380-0003	1	SPACER (QTY 4)
A6Q1	1854-0072		XSTR SI NPN
A6Q2	1854-0072		XSTR SI NPN
A6R1	0758-0024	1	R FXD 100 OHM 5% 1/4W
A6R2	0758-0017	1	R FXD 1.5K OHM 5% 1/4W
A6R3	0757-0374	1	R FXD 475K OHM 1% 1/2W
A6R4	0836-0006	1	R FXD 20M OHM 10% 1W
A6R5	0757-0059	1	R FXD 1M OHM 1% 1/2W
A6R6	0689-1855	4	R FXD 1.8M OHM 5% 1W
A6R7	0689-1855		R FXD 1.8M OHM 5% 1W
A6R8	0689-1855		R FXD 1.8M OHM 5% 1W
A6R9	0689-1855		R FXD 1.8M OHM 5% 1W
A6R10	0758-0049	1	R FXD 33K OHM 5% 1/4W
A6R11	0686-8245	1	R FXD 820K OHM 5% 1/2W
A6R12	0758-0102	1	R FXD 270K OHM 5% 1/4W
A6T1	03702-7121	1	XFMR

A6 HIGH VOLTAGE POWER SUPPLY ASSEMBLY (03702-7154)



A6 HIGH VOLTAGE POWER SUPPLY ASSEMBLY (03702-7154)

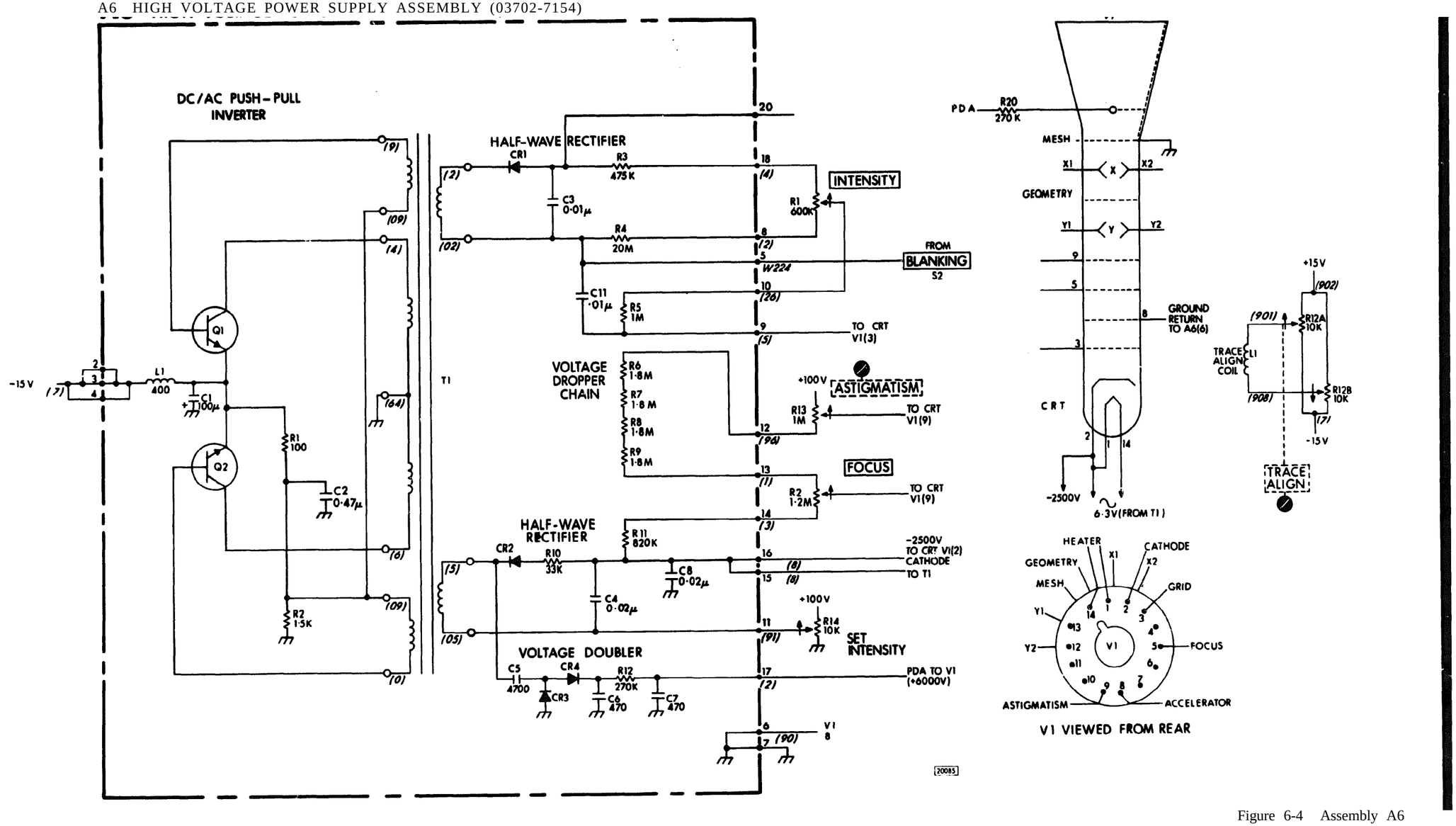


Figure 6-4 Assembly A6

Table 6-2 Parts List for Assembly A6

Ref Desig	HP Part No	TQ	Description
A6	03702-7154	1	ASSY EHT POWER SUPPLY
	03702-3154	1	PC BD BLANK
A6C1	0180-0088		C FXD 100UF 20% 20WVDC
A6C2	0180-0174		C FXD 0.47UF +80 -20% 25WVDC
A6C3	0160-0907	2	C FXD 0.01UF 10% 5000WVDC
	5040-0401	2	SUPPORT C
A6C4	0160-3807	2	C FXD 0.02UF 10% 3000WVDC
A6C5	0160-0151		C FXD 4700PF +80 -20% 4000WVDC
	5040-0401		SUPPORT C
A6C6	0150-0036	2	C FXD 4700PF 20% 6000WVDC
	5040-0400	2	SUPPORT C
A6C7	0150-0036		C FXD 4700PF 20% 6000WVDC
	5040-0400		SUPPORT C
A6C8	0160-3907		C FXD 0.02UF 10% 3000WVDC
A6C11	0160-3907		C FXD 0.01UF 10% 5000WVDC
A6CR1	1901-0142	4	DIO SI 7500PIV 50MA
A6CR2	1901-0142		DIO SI 7500PIV 50MA
A6CR3	1901-0142		DIO SI 7500PIV 50MA
A6CR4	1901-0142		DIO SI 7500PIV 50MA
A6L1	9140-0051	1	IND FXD 400UH 5%
A6MP1	2360-0015	1	SCR 6-32X1-1/8
A6MP2	2420-0003	1	NUT NEX 6-32
A6MP3	2190-0018	1	WASHER LOCK HEL NO 6
A6MP4	2260-0001	1	NUT HEX 4-40
A6MP5	2190-0003	1	WASHER LOCK HEL NO 4
A6MP6	2390-0007	1	SCR 6-32X5/16
A6MP7	0360-0042	1	TERMINAL LUG
A6MP8	2360-0131	1	SCREW (QTY 1)
A6MP8	0380-0003	1	SPACER (QTY 4)
A6Q1	1854-0072		XSTR SI NPN
A6Q2	1854-0072		XSTR SI NPN
A6R1	0758-0024	1	R FXD 100 OHM 5% 1/4W
A6R2	0758-0017	1	R FXD 1.5K OHM 5% 1/4W
A6R3	0757-0374	1	R FXD 475K OHM 1% 1/2W
A6R4	0836-0006	1	R FXD 20M OHM 10% 1W
A6R5	0757-0059	1	R FXD 1M OHM 1% 1/2W
A6R6	0689-1855	4	R FXD 1.8M OHM 5% 1W
A6R7	0689-1855		R FXD 1.8M OHM 5% 1W
A6R8	0683-1855		R FXD 1.8M OHM 5% 1W
A6R9	0689-1855		R FXD 1.8M OHM 5% 1W
A6R10	0758-0049	1	R FXD 33K OHM 5% 1/4W
A6R11	0686-8245	1	R FXD 820K OHM 5% 1/2W
A6R12	0758-0102	1	R FXD 270K OHM 5% 1/4W
A6T1	03702-7121	1	XFMR

A6 HIGH VOLTAGE POWER SUPPLY ASSEMBLY (03702-7154)

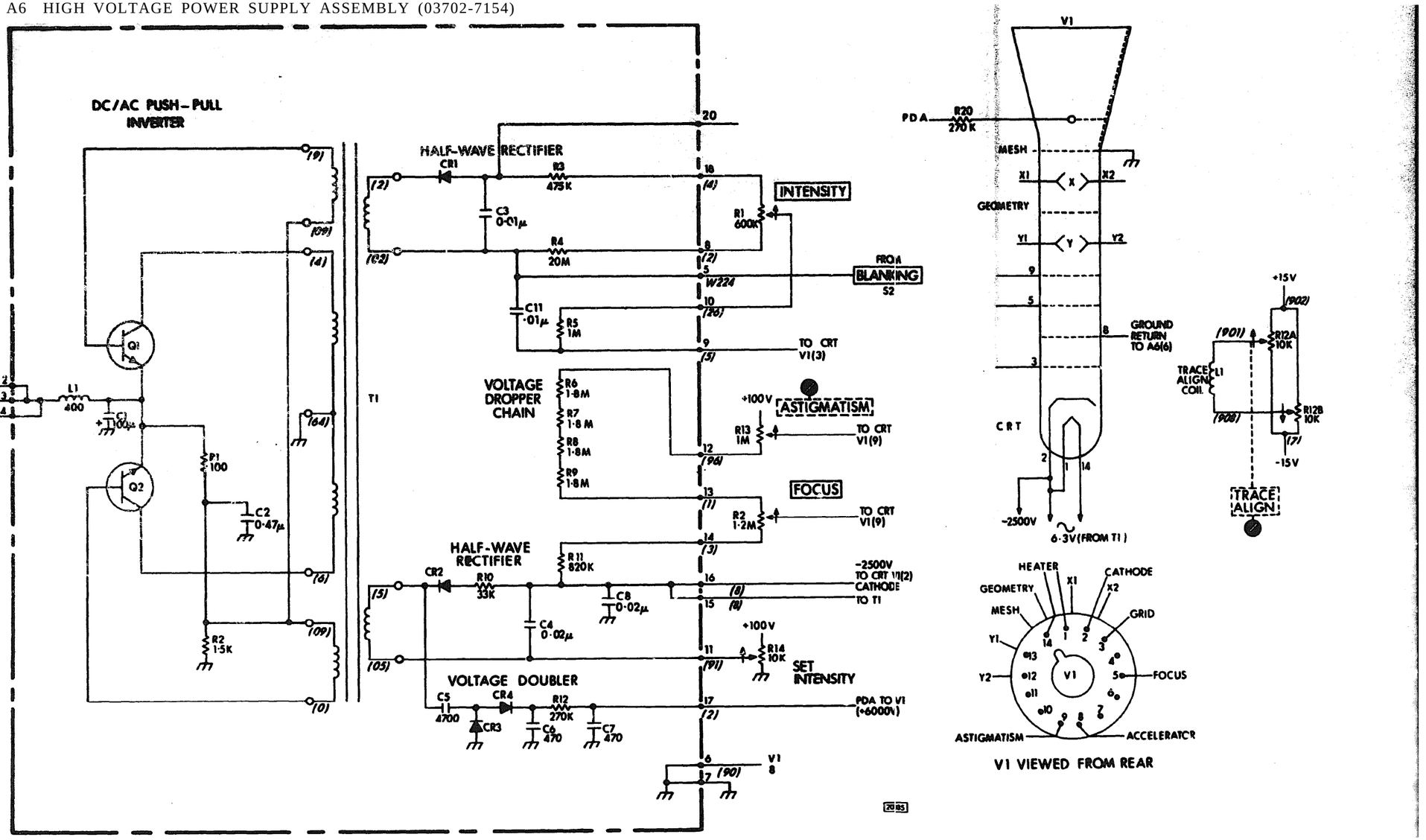


Figure 6-4 Assembly A6

Section IV Replaceable Parts List
Page 4-4 Delete R46
Change C1 to 0160-0050 C. FXD 1000pF

section V Service Sheets
Page 5-105 Schematic Diagram, Figure A25-4
Remove R46
Change C1 to 1000

CHANGE 8 Section IV Replaceable Parts List
Page 4-4 Delete C31
Delete A27 ASSY EHT OSC. STIM.
Change A6 to 03702-7154 (see Table 6-2)

Section V Service Sheets
Page 5-67 Schematic Diagram, Figure A6-3
Change A6 to 03702-7154
(see Schematic Diagram, Figure 6-4).

Page 5-108 Remove Assembly Service Sheet A27

CHANGE 9 Section IV Replaceable Parts List
Page 4-4 Delete A2C29
Delete A2C49
Delete A2R27
Delete A2R74
Delete A2R98
Delete A2CR6
Delete A2CR11
Delete A4R71
Delete A25C30
Add A2C47 0150-0096 C. FXD 0.05uF
Add A2CR7 1902-3182 DIO SI 12V
Add A4R8 0698-0084 R. FXD 2.15K OHM
Add ML L1 9140-0137 IND 1mH
Add ML C5 0150-0093 C. FXD 0.01uF
Change A2C14 to 0180-1746 C. FXD 15uF
Change A2R69 to 0757-0465 R. FXD 100K
Change A2R70 to 0757-0465 R. FXD 100K
Change A2R72 to 0757-0280 R. FXD 1K
Change A2R73 to 2100-2516 R. VAR 100K
Change A4R1 to 0698-3155 R. FXD 4.64K
Change A4R3 to 0757-0442 R. FXD 10K
Change A4R4 to 0698-3162 R. FXD 46.4K
Change A4R12 to 0757-0442 R. FXD 10K
Change A4R13 to 0698-3162 R. FXD 46.4K
Change A4Q1 to 1854-0071 XSTR
Change A4 to 03702-7173

Change A25C5 to 0160-0666 C. FXD 8.2pF
Change A25C6 to 0160-0629 C. FXD 6.8pF
Change A25L1 to 03701-726 IND.

Section V Service Sheets

Page 5-51 Schematic Diagram, Figure A2-6 (see Figure 6-5)

Remove C29
Remove C49
Remove R27
Remove R74
Remove R98
Remove CR6
Remove CR11
Add C47 0.05u
Add CR7 12V
Change R69 to 100K
Change R70 to 100K
Change R72 to 1K
Change R73 to 100K

Page 5-59 Schematic Diagram, Figure A4-4 (see Figure 6-6)

Remove R71
Add R8
Change A4 Assy. No. to 03702-7173
Change R1 to 4.64K
Change R3 to 10K
Change R4 to 46.4K
Change R12 to 10K
Change R13 to 46.4K

Page 5-67 Schematic Diagram, Figure A6-3 (see Figure 6-7)

Add ML L1 1mH
Add ML C5 0.01u

Page 5-105 Schematic Diagram, Figure A25-4

Remove C30
Change C5 to 8.2
Change C6 to 6.8

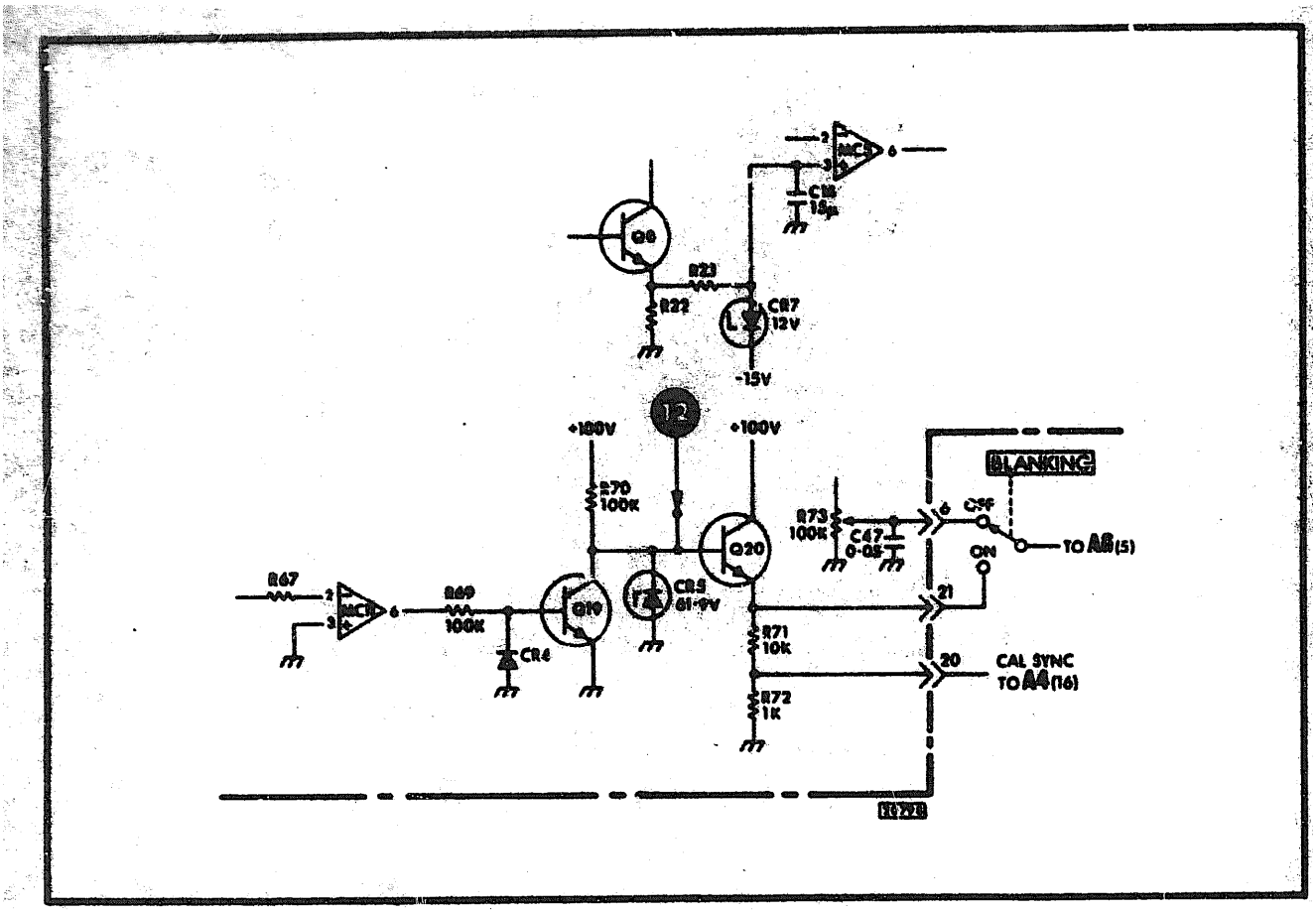


Figure 6-5 Part of Assembly A2

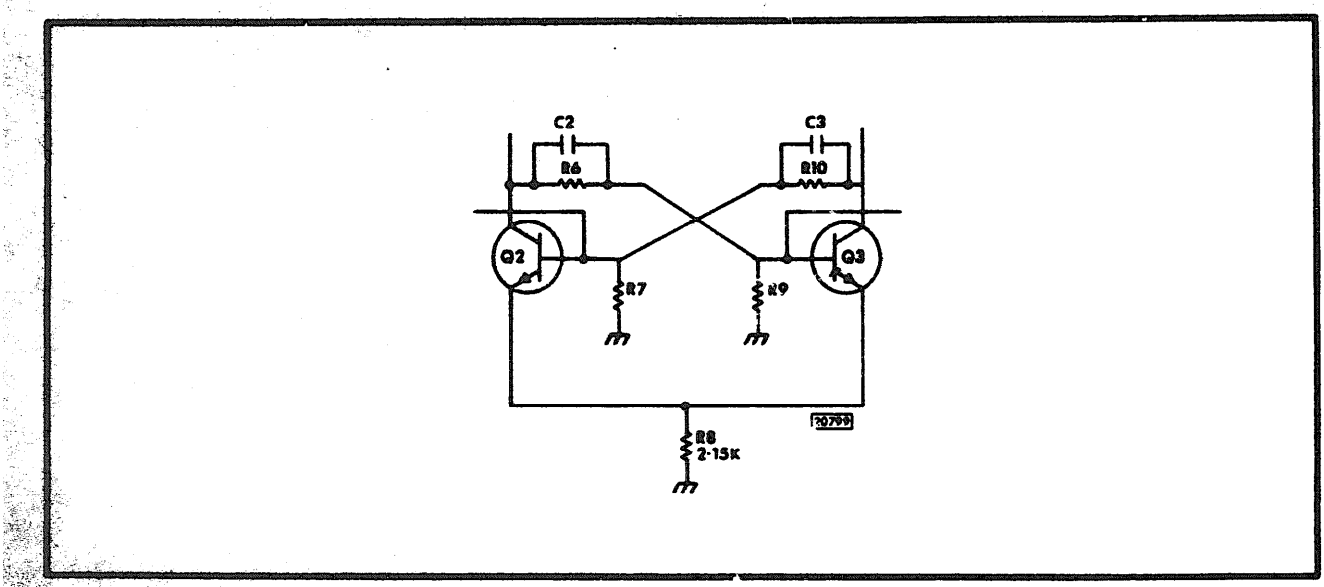


Figure 6-6 Part of Assembly A4

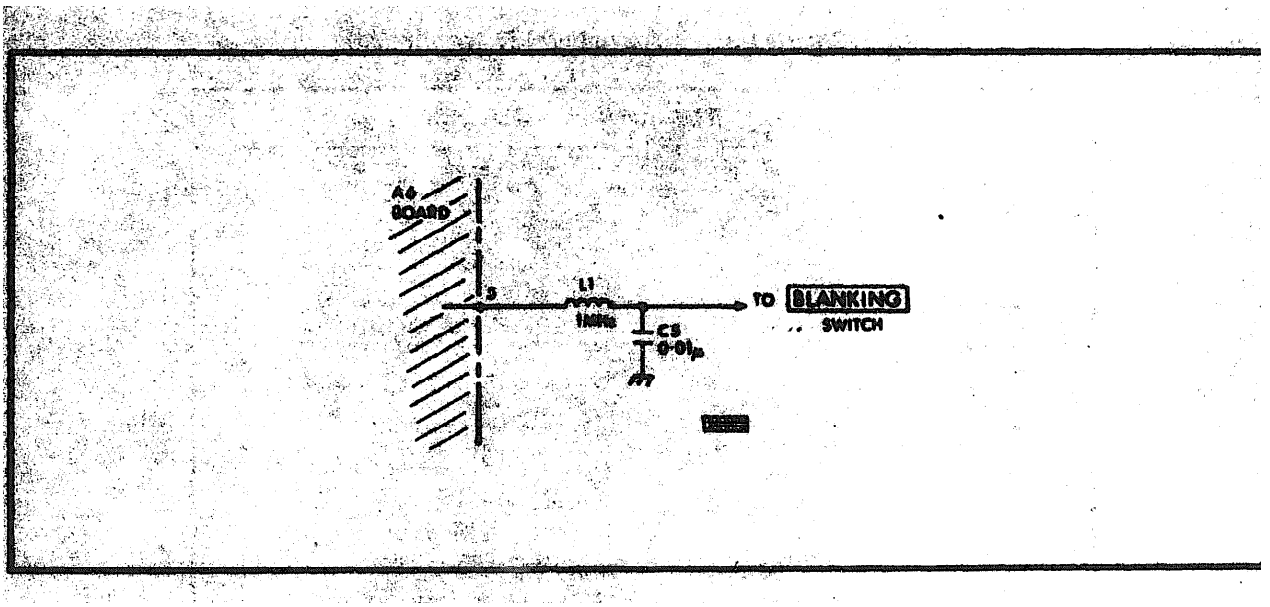


Figure 6-7 Part of Assembly A6

CHANGE 10 Section IV Replaceable Parts List

Page 4-4 **Delete MLCR1**
Change A4R15 to 0757-0427 R. FXD 1.5K
Change A4R16 to 0757-0444 R. FXD 12.1 OHM
Change A4R17 to 0757-0277 R. FXD 49.9 OHM

Section V Service Sheets

Page 5-59 **Schematic Diagram, Figure A4-4**
Change R15 to 1.5K
Change R16 to 12.1
Change R17 to 49.9

CHANGE 11 Section IV Replaceable Parts List & Section V Service Sheets

Pages 4-4 & 5-97 **Change A23 to 03702-7170 IF MIXER & L.O.**
(see attached Schematic Diagram, Figure 6-8 & Material List Table 6-3)

Table 6-3 Parts List for Assembly A23

Ref Desig	HP Part No	TQ	Description
A23	03702-7170	1	ASSY IF MIXER & LOCAL OSCILLATOR
	03702-3170	1	PC BD BLANK
A23C1	0140-0195	2	C FXD 130PF 5% 300WVDC
A23C2	0140-0195		C FXD 130PF 5% 300WVDC
A23C3	0160-2199		C FXD 30PF 5% 300WVDC
A23C4	0180-0097		C FXD 47UF 10% 35WVDC
A23C5	0150-0050		C FXD 1000PF +80 -20% 1000WVDC
A23C6	0150-0050		C FXD 1000PF +80 -20% 1000WVDC
A23C7	0160-0155		C FXD 2.2UF 20% 20WVDC
A23C8	0150-0050		C FXD 1000PF +80 -20% 1000WVDC
A23C9	0180-0155		C FXD 2.2UF 20% 20WVDC
A23C10	0160-2265	1	C FXD 22PF 5% 500WVDC
A23C11	0160-2200		C FXD 43PF 5% 300WVDC

Table 6-3 Parts List for Assembly A23 (continued)

Ref Desig	HP Part No	TQ	Description
A23C12	0150-0050		C FXD 1000PF +80 -20% 1000WVDC
A23C13	0150-0050		C FXD 1000PF +80 -20% 1000WVDC
A23C14	0160-2264	4	C FXD 20PF 5% 300WVDC
A23C16	0150-0050		C FXD 1000PF +80 -20% 1000WVDC
A23C18	0150-0050		C FXD 1000PF +80 -20% 1000WVDC
A23C19	0150-0050		C FXD 1000PF +80 -20% 1000WVDC
A23C20	0150-0050		C FXD 1000PF +80 -20% 1000WVDC
A23C21	0150-0093		C FXD 0.01UF +80-10% 100WVDC
A23C22	0180-0291	1	C FXD 1UF +10% 35WVDC
A23C23	0160-0134		C FXD 220PF 5% 300WVDC
A23C24	0160-0134	2	C FXD 220PF 5% 300WVDC
A23C25	0160-2307	1	C FXD 47PF 5% 300WVDC
A23C26	0160-0134		C FXD 220PF 5% 300WVDC
A23C27	0160-0134		C FXD 220PF 5% 300WVDC
A23C28	0180-0155		C FXD 2.2UF 20% 20WVDC
A23C29	0180-0155		C FXD 2.2UF 20% 20WVDC
A23C30	0150-0093		C FXD 0.01UF +80-10% 100WVDC
A23C31	0180-0155		C FXD 2.2UF 20% 20WVDC
A23C32	0180-0155		C FXD 2.2UF 20% 20WVDC
A23C33	0160-0665	2	C FXD 5.6PF 5% 30WVDC
A23C34	0160-0665		C FXD 5.6PF 5% 30WVDC
A23C35	0150-0093		C FXD 0.01UF +80-10% 100WVDC
A23C36	0140-0197	1	C FXD 180PF 5% 300WVDC
A23C37	0160-0174		C FXD 0.47UF +80 10% 25WVDC
A23C38	0150-0080		C FXD 1000PF +80 20% 1000WVDC
A23CR1	1901-0040		DIO SI
A23CR2	1901-0040		DIO SI
A23CR3	0122-0602	1	C VOLT VAR
A23CR4	1901-0545	4	DIO SI SCHOTTKY BARRIER MATCHED QUAD
A23CR5	1901-0545		DIO SI SCHOTTKY BARRIER MATCHED QUAD
A23CR6	1901-0545		DIO SI SCHOTTKY BARRIER MATCHED QUAD
A23CR7	1901-0545		DIO SI SCHOTTKY BARRIER MATCHED QUAD
A23J1	1250-0932		CONN COAX PC BD MTG CONNEX
A23J2	1250-0932		CONN COAX PC BD MTG CONNEX
A23J3	1250-0932		CONN COAX PC BD MTG CONNEX
A23J4	1250-0932		CONN COAX PC BD MTG CONNEX
A23J5	1250-0932		CONN COAX PC BD MTG CONNEX
A23J6	1250-0932		CONN COAX PC BD MTG CONNEX
A23L1	03702-728	1	IND VAR
A23L2	9140-0144		IND FXD 4.7UH 10%
A23L3	9100-1691	1	IND FXD 750UH 5%
A23L4	03702-7299	2	IND VAR
A23L5	03702-7300	2	IND VAR
A23L6	03702-7301	1	IND VAR
A23L7	03702-7300		IND VAR
A23L8	03702-7299		IND VAR
A23L9	9100-2247	3	IND FXD 0.1UH 10%
A23L10	9100-2247		IND FXD 0.1UH 10%
A23MC1	1820-0477		IC OP AMP
A23Q1	1854-0019		XSTR SI NPN
A23Q2	1854-0019		XSTR SI NPN
A23Q3	1854-0019		XSTR SI NPN
A23Q4	1854-0019		XSTR SI NPN
A23Q5	1854-0019		XSTR SI NPN
A23Q6	1854-0092		XSTR SI NPN
A23Q7	1854-0092		XSTR SI NPN
A23Q8	1854-0071		XSTR SI NPN
A23R1	0757-0442		R FXD 10K OHM 1% 1/8W

Table C-3 Parts List for Assembly A23 (continued)

Ref Desig	HP Part No	TQ	Description
A23R3	0757-0446		R FXD 15K OHM 1% 1/8W
A23R4	0757-0446		R FXD 15K OHM 1% 1/8W
A23R5	0683-4477	1	R FXD 470K OHM 10% 1/8W
A23R6	0757-0439		R FXD 6.81K OHM 1% 1/8W
A23R7	2100-2591	2	R VAR 25K OHM 10% 1/2W
A23R8	0698-0730		R FXD 68.1K OHM 1% 1/8W
A23R9	0757-0442		R FXD 10K OHM 1% 1/8W
A23R10	2100-0587		R VAR 5K OHM 10% 1/2W W
A23R11	0757-0442		R FXD 10K OHM 1% 1/8W
A23R12	2100-1738	1	R VAR 10K OHM 10% 1/2W
A23R13	0757-0288		R FXD 1K OHM 1% 1/8W
A23R14	0757-0424		R FXD 1.1K OHM 1% 1/8W
A23R15	0698-0082		R FXD 464 OHM 1% 1/8W
A23R16	0757-0317	2	R FXD 1.33K OHM 1% 1/8W
A23R17	0757-0402		R FXD 121 OHM 1% 1/8W
A23R18	0757-0280		R FXD 1K OHM 1% 1/8W
A23R19	0757-0401		R FXD 100 OHM 1% 1/8W
A23R20	0757-0401		R FXD 100 OHM 1% 1/8W
A23R21	0698-3435	3	R FXD 38.3 OHM 1% 1/8W
A23R22	0757-0398		R FXD 75 OHM 1% 1/8W
A23R23	0757-0401		R FXD 100 OHM 1% 1/8W
A23R24	0757-1094	2	R FXD 1.47K OHM 1% 1/4W
A23R25	0757-0180		R FXD 31.6 OHM 1% 1/8W
A23R26	0757-0180		R FXD 31.6 OHM 1% 1/8W
A23R27	0757-0397		R FXD 68.1 OHM 1% 1/8W
A23R28	0757-0344	2	R FXD 10 OHM 1% 1/8W
A23R29	0698-3443		R FXD 287 OHM 1% 1/8W
A23R30	0757-0284		R FXD 150 OHM 1% 1/8W
A23R31	0698-4037		R FXD 46.4 OHM 1% 1/8W
A23R32	0698-3441		R FXD 215 OHM 1% 1/8W
A23R33	2100-2591		R VAR 25K OHM 10% 1/2W
A23R34	0757-0446		R FXD 15K OHM 1% 1/8W
A23R35	0757-0180		R FXD 31.6 OHM 1% 1/8W
A23R36	0757-0180		R FXD 31.6 OHM 1% 1/8W
A23R37	0757-0397		R FXD 68.1 OHM 1% 1/8W
A23R38	0757-0401		R FXD 100 OHM 1% 1/8W
A23R39	0698-4037		R FXD 46.4 OHM 1% 1/8W
A23R40	0757-0274		R FXD 1.21K OHM 1% 1/8W
A23R41	0698-8084		R FXD 2.15K OHM 1% 1/8W
A23R42	0757-0180		R FXD 31.6 OHM 1% 1/8W
A23R43	0757-0280		R FXD 1K OHM 1% 1/8W
A23R44	0757-0419		R FXD 681 OHM 1% 1/8W
A23R45	2100-1986	1	R VAR 1K OHM 10% 1/2W LIN
A23R46	0698-3430		R FXD 21.5 OHM 1% 1/8W
A23R47	0698-3430		R FXD 21.5 OHM 1% 1/8W
A23R48	0757-1094		R FXD 1.47K OHM 1% 1/4W
A23R49	0757-0279		R FXD 3.16K OHM 1% 1/8W
A23R50	0698-3441		R FXD 215 OHM 1% 1/8W
A23R51	0757-0401		R FXD 100 OHM 1% 1/8W
A23T1	03710-7023	2	XFMR
A23T2	03710-7024	2	XFMR
A23T3	03710-7024		XFMR
A23T4	03710-7023		XFMR

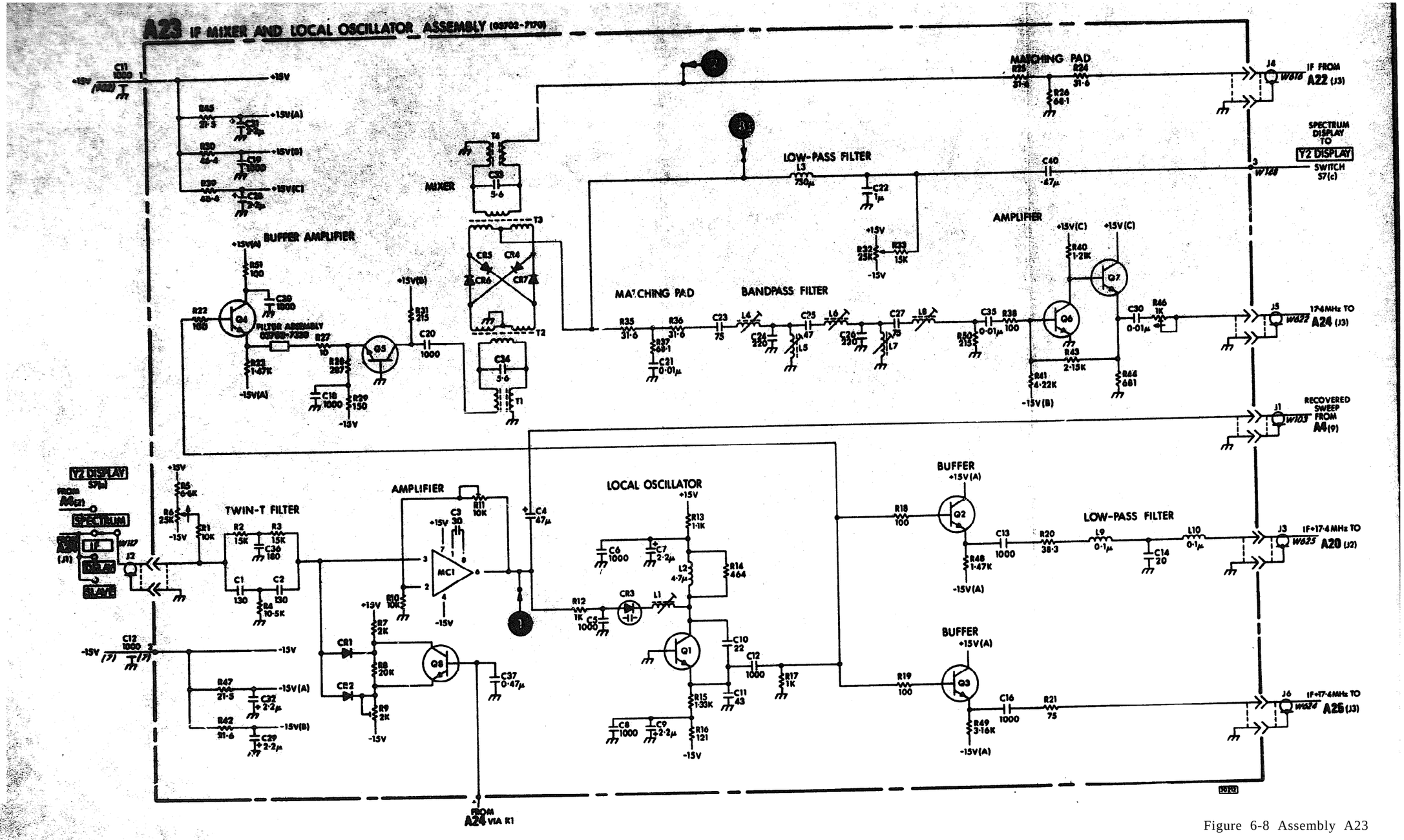


Figure 6-8 Assembly A23

CHANGE 12 Section IV Replaceable Parts List

Page 4-4

Change A5R66 to 0757-0394 R. FXD 51.1 OHM
Change A5R67 to 0757-0394 R. FXD 51.1 OHM
Change A4C14 to 0160-3367 C. FXD 0.68uF
Change A4C15 to 0160-3367 C. FXD 0.68uF

Section V Service Sheets

Page 5-59 Schematic Diagrams, Figures A5-4 & A4-4

& 5-63

Change A5R66 to 51.1
Change A5R67 to 51.1
Change A4C14 to 0.68uF
Change A4C15 to 0.68uF

CHANGE 13 Section IV Replaceable Parts List & Section V Service Sheets

Pages 4-4 & 5-101

Change A24 to 03702-7171 IF DISC.
Change ML MP15 to 03702-190 LID
(see attached Schematic Diagram, Figure 6-9 and Material List Table 6-4)
Delete A23C27
Delete A23C28
Delete A23L8
Delete A23L9
Change A23C20 to 0180-0134 C. FXD 220p
Change A23C21 to 0140-0198 C. FXD 200p
Change A23C22 to 0140-0192 C. FXD 68p
Change A23C23 to 0140-0198 C. FXD 200p
Change A23C24 to 0160-0134 C. FXD 220p
Change A23L3 to 03802-7182
Change A23L4 to 03702-7300
Change A23L5 to 03702-7316
Change A23L6 to 03702-7300
Change A23L7 to 03702-7182

Table 6-4 Parts List for Assembly A24

Ref Desig	HP Part No	TQ	Description
A24	03702-7171	1	ASSY IF DISCRIMINATOR
	03702-3171	1	PC BD BLANK
A24C1	0150-0050		C FXD 1000PF +80 -20% 1000WVDC
A24C2	0180-0155		C FXD 2.2UF 20% 20WVDC
A24C4	160-2145		C FXD 5000PF +80-20% 100WVDC
A24C5	0160-2145		C FXD 5000PF +80-20% 100WVDC
A24C6	0160-0939		C FXD 430PF 5% 300WVDC
A24C7	0160-0163	1	C FXD 0.033UF 10% 200WVDC
A24C8	0160-0939		C FXD 430PF 5% 300WVDC
A24C9	0160-0659		C FXD 30PF 5% 35WVDC
A24C10	0160-0155		C FXD 3300PF 10% 200WVDC
A24C11	0160-0939		C FXD 430PF 5% 300WVDC
A24C12	0160-2145		C FXD 5000PF +80-20% 100WVDC
A24C13	0160-2145		C FXD 5000PF +80-20% 100WVDC

Ref Desig	TM Part No	TQ	Description
A24Q5	1854-0019		XSTR SI NPN
A24Q6	1853-0050	1	XSTR SI PNP
A24Q7	1854-0022		XSTR SI NPN
A24Q8	1854-0019		XSTR SI NPN
A24Q9	1854-0019		XSTR SI NPN
A24Q10	1853-0034		XSTR SI PNP
A24Q11	1853-0034		XSTR SI PNP
A24Q12	1854-0019		XSTR SI NPN
A24Q13	1853-0034		XSTR SI PNP
A24Q14	1854-0019		XSTR SI NPN
A24Q15	1854-0019		XSTR SI NPN
A24Q16	1854-0019		XSTR SI NPN
A24R1	0757-0401		R FXD 100 OHM 1% 1/8W
A24R2	0698-3430		R FXD 21.5 OHM 1% 1/8W
A24R3	0757-0401		R FXD 100 OHM 1% 1/8W
A24R4	0757-0280		R FXD 1K OHM 1% 1/8W
A24R5	0757-0401		R FXD 100 OHM 1% 1/8W
A24R6	0698-0084		R FXD 2.15K OHM 1% 1/8W
A24R7	0757-0401		R FXD 100 OHM 1% 1/8W
A24R8	0757-0200		R FXD 5.62K OHM 1% 1/8W
A24R9	0698-0085		R FXD 2.61K OHM 1% 1/8W
A24R10	0757-0427		R FXD 1.5K OHM 1% 1/8W
A24R11	0757-0283	2	R FXD 2K OHM 1% 1/8W
A24R12	0757-0442		R FXD 10K OHM 1% 1/8W
A24R13	0757-0458		R FXD 51.1K OHM 1% 1/8W
A24R14	0698-3136		R FXD 17.8K 1% 1/8W
A24R15	0757-0449		R FXD 20K OHM 1% 1/8W
A24R16	0698-0082		R FXD 464 OHM 1% 1/8W
A24R17	0757-0458		R FXD 51.1K OHM 1% 1/8W
A24R18	0698-3132		R FXD 261 OHM 1% 1/8W
A24R19	0698-3136		R FXD 17.8K 1% 1/8W
A24R20	0757-0280		R FXD 1K OHM 1% 1/8W
A24R21	0757-0279		R FXD 3.16K OHM 1% 1/8W
A24R22	0757-0416		R FXD 511 OHM 1% 1/8W
A24R23	0757-0279		R FXD 3.16K OHM 1% 1/8W
A24R24	0757-0401		R FXD 100 OHM 1% 1/8W
A24R25	0698-3151	1	R FXD 2.87K OHM 1% 1/8W
A24R26	0757-0280		R FXD 1K OHM 1% 1/8W
A24R27	0757-0283		R FXD 2K OHM 1% 1/8W
A24R30	0757-0439		R FXD 6.81K OHM 1% 1/8W
A24R31	0757-0200		R FXD 5.62K OHM 1% 1/8W
A24R32	0757-0815	1	R FXD 562 OHM 1% 1/2W
A24R33	0757-0200		R FXD 5.62K OHM 1% 1/8W
A24R34	0757-0280		R FXD 1K OHM 1% 1/8W
A24R35	0698-3430		R FXD 21.5 OHM 1% 1/8W
A24R36	0698-3155		R FXD 4.64K OHM 1% 1/8W
A24R37	0757-0419		R FXD 681 OHM 1% 1/8W
A24R38	2100-2061	1	R VAR 200 OHM 10% 1/2W
A24R39	0757-0418		R FXD 619 OHM 1% 1/8W
A24R40	0757-0280		R FXD 1K OHM 1% 1/8W
A24R41	0968-3132		R FXD 261 OHM 1% 1/8W
A24R42	0698-3446	1	R FXD 383 OHM 1% 1/8W
A24R43	2100-1788	2	R VAR 500 OHM 10% 1/2W LIN
A24R44	0757-0427		R FXD 1.5K OHM 1% 1/8W
A24R45	0757-0427		R FXD 1.5K OHM 1% 1/8W

Table 6-4 Parts List for Assembly A24 (continued)

Ref Desig	HP Part No	TQ	Description
A24C15	0150-0093		C FXD 0.01UF +80-10% 100WVDC
A24C16	0180-0155		C FXD 2.2UF 20% 20WVDC
A24C17	0180-0155		C FXD 2.2UF 20% 20WVDC
A24C18	0180-0155		C FXD 2.2UF 20% 20WVDC
A24C19	0180-0155		C FXD 2.2UF 20% 20WVDC
A24C20	0150-0093		C FXD 0.01UF +80-10% 100WVDC
A24C21	0140-0205	1	C FXD 62PF 5% 300WVDC
A24C22	0150-0093		C FXD 0.01UF +80-10% 100WVDC
A24C23	0180-0155		C FXD 2.2UF 20% 20WVDC
A24C24	0160-2200		C FXD 43PF 5% 300WVDC
A24C25	0160-2254	3	C FXD 7.5PF 0.25PF 500WVDC
A24C26	0160-0155		C FXD 2.2UF 20% 20WVDC
A24C27	0180-0155		C FXD 2.2UF 20% 20WVDC
A24C28	0150-0093		C FXD 0.01UF +80-10% 100WVDC
A24C29	0160-2150	2	C FXD 33PF 5% 300WVDC
A24C30	0150-0121		C FXD 0.1UF +80-20% 50WVDC
A24C31	0160-0174		C FXD 0.47UF +80-20% 25WVDC
A24C32	0140-0200	2	C FXD 390PF 5% 300WVDC
A24C33	0160-2214	1	C FXD 680PF 5% 300WVDC
A24C34	0140-0200		C FXD 390PF 5% 300WVDC
A24C35	0160-0300	2	C FXD 0.0027UF 10% 300WVDC
A24C36	0160-2251	2	C FXD 5.6PF 0.25PF 500WVDC
A24C37	0160-0160	1	C FXD 8200PF 10% 200WVDC
A24C38	0160-0300		C FXD 0.0027UF 10% 300WVDC
A24C39	0160-2251		C FXD 5.6PF 0.25PF 500WVDC
A24C40	0160-0155		C FXD 3300PF 10% 200WVDC
A24C41	0160-0659		C FXD 30PF 5% 35WVDC
A24C42	0180-0155		C FXD 2.2UF 20% 20WVDC
A24C43	0180-0155		C FXD 2.2UF 20% 20WVDC
A24C44	0180-0155		C FXD 2.2UF 20% 20WVDC
A24C45	0180-0155		C FXD 2.2UF 20% 20WVDC
A24C46	0160-2150		C FXD 33PF 5% 300WVDC
A24CR1	1901-0639	1	DIO PIN 1MHZ/1GHZ
A24CR2	1901-0347		DIO HOT CARRIER
A24CR3	1902-0041	1	DIO BKDN 5.11V 5% 400MW
A24CR5	1902-3036	1	DIO BKDN 3.16V 5% 400MW
A24CR6	1901-0347		DIO HOT CARRIER
A24CR7	1901-0347		DIO HOT CARRIER
A24J1	1250-0932		CONN COAX PC BD MTG CONHEX
A24J2	1250-0932		CONN COAX PC BD MTG CONHEX
A24J3	1250-0932		CONN COAX PC BD MTG CONHEX
A24L1	03702-7186	1	IND VAR
A24L2	03702-7284	1	IND VAR
A24L3	03702-7185	3	IND VAR
A24L4	03702-7185		IND VAR
A24L5	03702-7185		IND VAR
A24MC1	1820-0477		IC OP AMP
A24MC2	1820-0145	1	IC OP AMP
A24MC3	1820-0477		IC OP AMP
A24MC4	1820-0477		IC OP AMP
A24MC5	1820-0477		IC OP AMP
A24Q1	1854-0071		XSTR SI NPN
A24Q2	1854-0019		XSTR SI NPN
A24Q3	1854-0019		XSTR SI NPN
A24Q4	1854-0019		XSTR SI NPN

Table 6-4 Parts List for Assembly A24 (continued)

Ref Desig	HP Part No	TQ	Description
A24R46	0757-0398		R FXD 75 OHM 1% 1/8W
A24R47	0757-0398		R FXD 75 OHM 1% 1/8W
A24R48	0757-0422	2	R FXD 909 OHM 1% 1/8W
A24R49	0757-0427		R FXD 1.5K OHM 1% 1/8W
A24R50	0757-0419		R FXD 681 OHM 1% 1/8W
A24R51	0757-0290		R FXD 6.19K OHM 1% 1/8W
A24R52	0757-0290		R FXD 6.19K OHM 1% 1/8W
A24R53	2100-1788		R VAR 500 OHM 10% 1/2W LIN
A24R54	0757-0419		R FXD 681 OHM 1% 1/8W
A24R55	0757-0346		R FXD 10 OHM 1% 1/8W
A24R56	0757-0401		R FXD 100 OHM 1% 1/8W
A24R57	0757-0416		R FXD 511 OHM 1% 1/8W
A24R58	0698-0084		R FXD 2.15K OHM 1% 1/8W
A24R59	0698-0084		R FXD 2.15K OHM 1% 1/8W
A24R60	0757-0280		R FXD 1K OHM 1% 1/8W
A24R61	0757-0280		R FXD 1K OHM 1% 1/8W
A24R62	0757-0398		R FXD 75 OHM 1% 1/8W
A24R63	0757-0460	2	R FXD 61.9K OHM 1% 1/8W
A24R64	0757-0486	2	R FXD 750K OHM 1% 1/8W
A24R65	0698-3152		R FXD 3.48K OHM 1% 1/8W
A24R66	0757-0280		R FXD 1K OHM 1% 1/8W
A24R67	0757-0317		R FXD 1.33K OHM 1% 1/8W
A24R68	0698-0086		R FXD 2.15K OHM 1% 1/8W
A24R69	0757-0460		R FXD 61.9K OHM 1% 1/8W
A24R70	0757-0486		R FXD 750K OHM 1% 1/3W
A24R71	0757-0484	1	R FXD 619K OHM 1% 1/8W
A24R72	0757-0401		R FXD 100 OHM 1% 1/8W
A24R73	0698-3132		R FXD 261 OHM 1% 1/8W
A24R74	0757-0401		R FXD 100 OHM 1% 1/8W
A24R75	0698-3430		R FXD 21.5 OHM 1% 1/8W

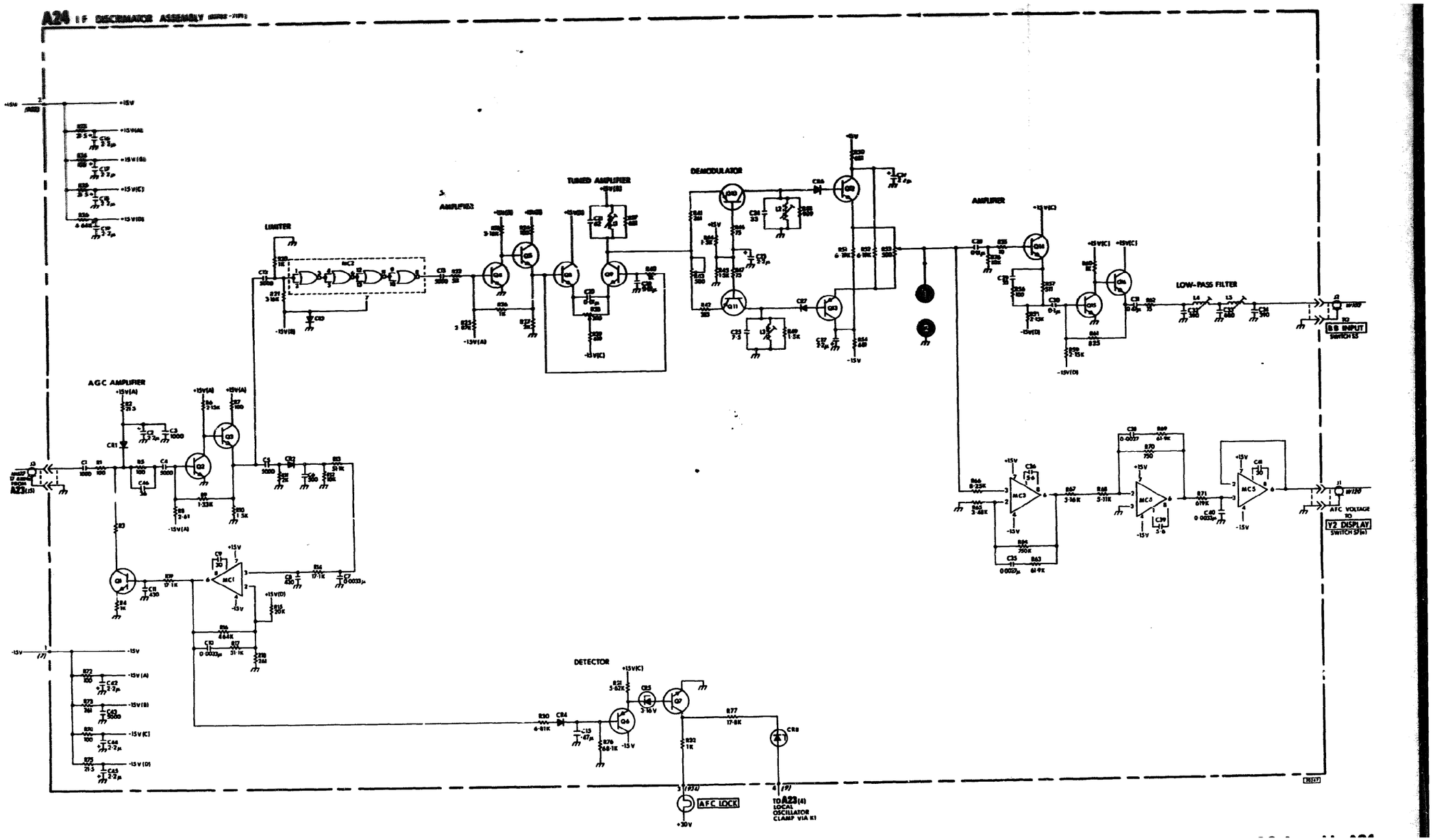


Figure 6-9 Assembly A24

CHANGE 14 Section IV Replaceable Parts List
Page 4-4 **Delete A8R30**
Delete A8CR2

Section V Service Sheets
Page 5-71 Schematic Diagram, Figure A8-3
Remove R30
Remove CR2

Page 5-71 Component Location, Figure A8-2
Delete R30
Delete CR2

CHANGE 15 Section IV Replaceable Parts List
Page 4-4 **Delete MLR23**
Add MLR21 0757-0472 1.5K
Change A4 to 03702-70005
(see attached Schematic Diagram, Figure 6-10 & Material List Table 6-5)

Table 6-5 Parts List for Assembly A4

Ref Desig	HP Part No.	TQ	Description
A4	03702-70005	1	ASSY IF CALIBRATOR
	03702-3173	1	PC BOARD BLANK
	03702-10033	1	LABEL
A4C1	0160-2146	2	C FXD 0.02UF 100WVDC
A4C2	0160-0155	2	C FXD 0.0033UF 200WVDC
A4C3	0160-0155		C FXD 0.0033UF 200WVDC
A4C4	0160-2146		C FXD 0.02UF 100WVDC
A4C5	0180-0159	4	C FXD 220UF 10WVDC
A4C6	0180-0229	2	C FXD 33UF 10WVDC
A4C7	0180-0159		C FXD 220UF 10WVDC
A4C8	0180-0229		C FXD 33UF 10WVDC
A4C9	0180-1940	1	C FXD 33UF 15WVDC
A4C10	0180-0159		C FXD 220UF 10WVDC
A4C11	0180-0098	2	C FXD 100UF 20WVDC
A4C12	0150-0093	1	C FXD 0.01UF 100WVDC
A4C13	0180-0159		C FXD 220UF 10WVDC
A4C14	0160-0627	2	C FXD 1UF 100WVDC
A4C15	0160-0627		C FXD 1UF 100WVDC
A4CR1	1901-0040	2	DIO SI
A4CR2	1901-0040		DIO SI
A4CR3	1902-1264	1	DIO SI 10V
A4CR4	1902-0626	1	DIO SI 13V
A4CR5	1902-1263	3	DIO SI 7.5V
A4CR6	1902-1263		DIO SI 7.5V
A4CR7	1902-1263		DIO SI 7.5V
A4K1	0490-0804	3	RELAY
A4K2	0490-0804		RELAY
A4K3	0490-0804		RELAY
A4L1	9140-0131	1	IND FXD 10MH
A4L2	9100-1673	1	IND FXD 6.8MH

Table 6-5 Parts List for Assembly A4 (continued)

Ref Desig	HP Part No.	TQ	Description
A4U1C1	1820-0477	2	IC LIN OPER AMPL
A4U1C2	1820-0477		IC LIN OPER AMPL
A4Q1	1853-0036	2	XSTR SI PNP
A4Q2	1854-0071	14	XSTR SI NPN
A4Q3	1854-0071		XSTR SI NPN
A4Q4	1854-0071		XSTR SI NPN
A4Q5	1853-0036		XSTR SI PNP
A4Q6	1854-0071		XSTR SI NPN
A4Q7	1854-0071		XSTR SI NPN
A4Q8	1854-0071		XSTR SI NPN
A4Q9	1854-0071		XSTR SI NPN
A4Q10	1854-0071		XSTR SI NPN
A4Q11	1854-0071		XSTR SI NPN
A4Q12	1854-0071		XSTR SI NPN
A4Q13	1854-0071		XSTR SI NPN
A4Q14	1854-0071		XSTR SI NPN
A4Q15	1854-0071		XSTR SI NPN
A4Q16	1854-0071		XSTR SI NPN
A4R1	0757-0439	2	R FXD 6.81KOHM 1%
A4R2	0686-3155	5	R FXD 4.64KOHM 1%
A4R3	0688-3138	6	R FXD 17.8KOHM 1%
A4R4	0688-3136		R FXD 17.8KOHM 1%
A4R5	0757-0280	4	R FXD 1KOHM 1% 1/8W
A4R6	0688-3136		R FXD 17.8KOHM 1%
A4R7	0688-3162	4	R FXD 46.4KOHM 1%
A4R8			NOT ASSIGNED
A4R9	0688-3162		R FXD 46.4KOHM 1%
A4R10	0688-3136		R FXD 17.8KOHM 1%
A4R11	0757-0280		R FXD 1KOHM 1% 1/8W
A4R12	0688-3136		R FXD 17.8KOHM 1%
A4R13	0688-3136		R FXD 17.8KOHM 1%
A4R14	0757-0428	2	R FXD 1.62KOHM 1%
A4R15	0888-3444	1	R FXD 316OHM 1% 1/8W
A4R16	0757-0445	1	R FXD 13.3KOHM 1% 1/8W
A4R17	0757-0394	1	R FXD 51.1OHM 1%
A4R18	0898-3162		R FXD 46.4KOHM 1%
A4R19	0898-3155		R FXD 4.64KOHM 1%
A4R20	0698-3152	2	R FXD 3.48KOHM 1%
A4R21	0698-0084	1	R FXD 2.15KOHM 1%
A4R22	0757-0288	1	R FXD 9.09KOHM 1%
A4R23	0757-0420	1	R FXD 750 OHM 1% 1/8W
A4R24	0698-3434	1	R FXD 34.8OHM 1%
A4R25	2100-2574	2	R VAR 500 OHM
A4R26	0757-0419	1	R FXD 681 OHM 1% 1/8W
A4R27	0757-0428		R FXD 1.62KOHM 1%
A4R28	0757-0439		R FXD 6.81KOHM 1%
A4R29	0698-3155		R FXD 4.64KOHM 1%
A4R30	0757-0430	1	R FXD 2.21KOHM 1%
A4R31	0757-0269	1	R FXD 270 OHM 1% 1/8W
A4R32	0757-0387	1	R FXD 27.4OHM 1%
A4R33	0757-0401	1	R FXD 100 OHM 1% 1/8W
A4R34	0757-0442	3	R FXD 10KOHM 1% 1/8W
A4R35	0757-0274	4	R FXD 1.21KOHM 1%
A4R36	0698-3155		R FXD 4.64KOHM 1%
A4R37	0698-0082	2	R FXD 464OHM 1% 1/8W
A4R38	0698-0082		R FXD 464OHM 1% 1/8W
A4R39	0698-3155		R FXD 4.64KOHM 1%

Table 6-5 Parts List for Assembly A4 (continued)

Ref Desig	HP Part No.	TQ	Description
A4R40	0757-0280		R FXD 1KOHM 1% 1/8W
A4R41	0698-3162		R FXD 46.4KOHM 1%
A4R42	0757-0442		R FXD 10KOHM 1% 1/8W
A4R43	0757-0442		R FXD 10K OHM 1% 1/8W
A4R44	0757-0200		R FXD 1KOHM 1% 1/8W
A4R45	0757-0462	2	R FXD 75KOHM 1% 1/8W
A4R46	0757-0462		R FXD 75KOHM 1% 1/8W
A4R47	068-3152		R FXD 3.48KOHM 1%
A4R48	0698-3150	4	R FXD 2.37KOHM 1%
A4R49	0698-3150		R FXD 2.37KOHM 1%
A4R50	0698-3150		R FXD 2.37KOHM 1%
A4R51	0757-0274		R FXD 1.21KOHM 1%
A4R52	0757-0417	1	R FXD 562OHM 1% 1/8W
A4R53	2100-2574		R VAR 500 OHM
A4R54	0757-0274		R FXD 1.21KOHM 1%
A4R55	0757-0438	1	R FXD 5.11KOHM 1%
A4R56	0698-3150		R FXD 2.37KOHM 1%
A4R57	0757-0485	2	R FXD 100KOHM 1% 1/8W
A4R58	0757-0487	1	R FXD 825KOHM 1% 1/8W
A4R59	0757-0465		R FXD 100KOHM 1% 1/8W
A4R60	0757-0458	2	R FXD 5l.IKOHM 1%
A4R61	0757-0458		R FXD 51.1KOHM1%
A4R69	0757-0348	1	R FXD 10 OHM 1% 1/8W
A4R70	0757-0274		R FXD 1.21KOHM 1% 1/8W
A4R71	0757-0427	1	R FXD 1.5KOHM 1% 1/8W

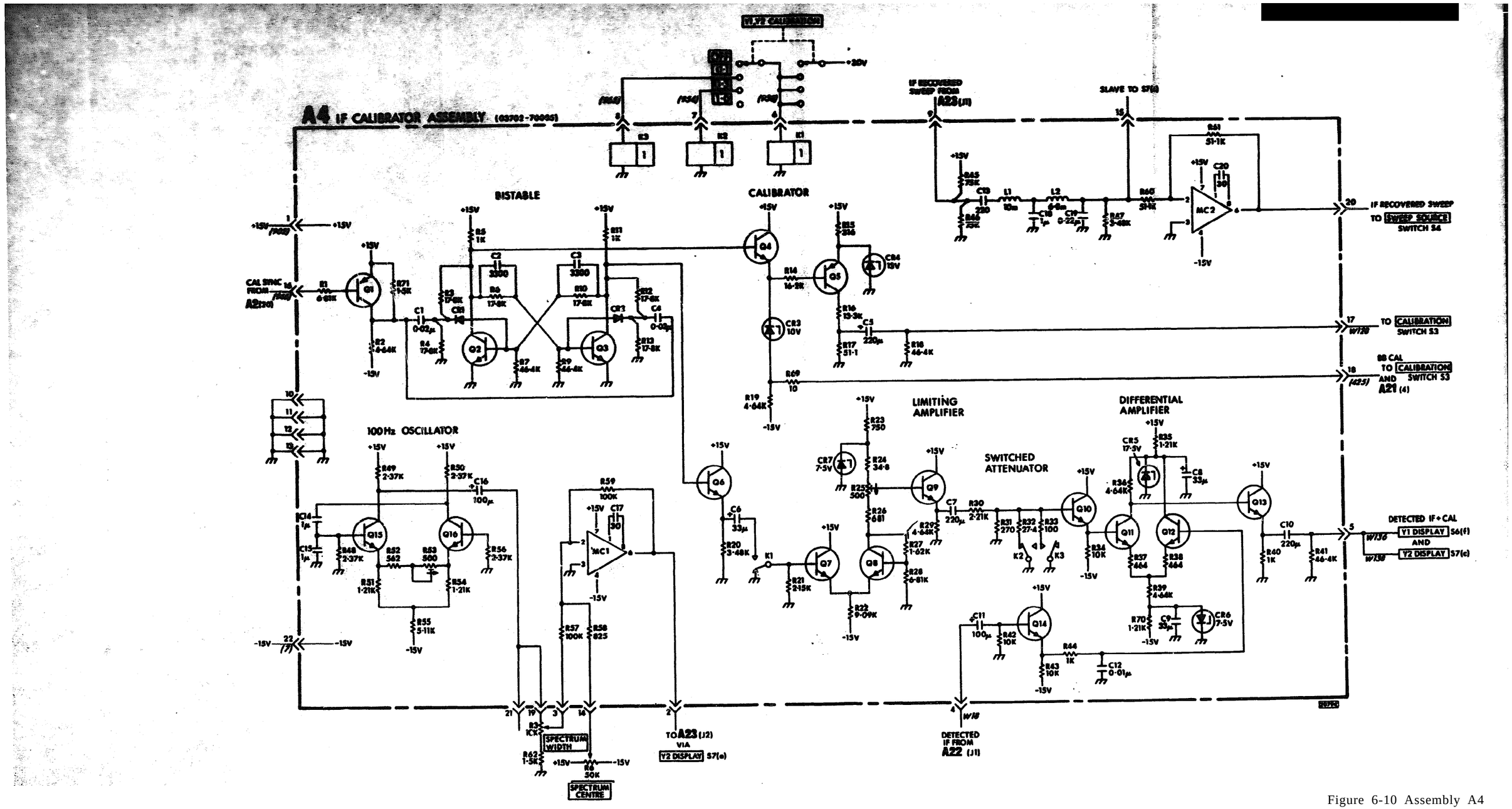


Figure 6-10 Assembly A4

CHANGE 16 Section IV Replaceable Parts List
Page 4-4 Change E1 to 03702-50001

Section V Service Sheets
Page 5-77 Schematic Diagram, Figure A12-3
Replace E1 LINE MODULE with circuit shown in Figure 6-11.

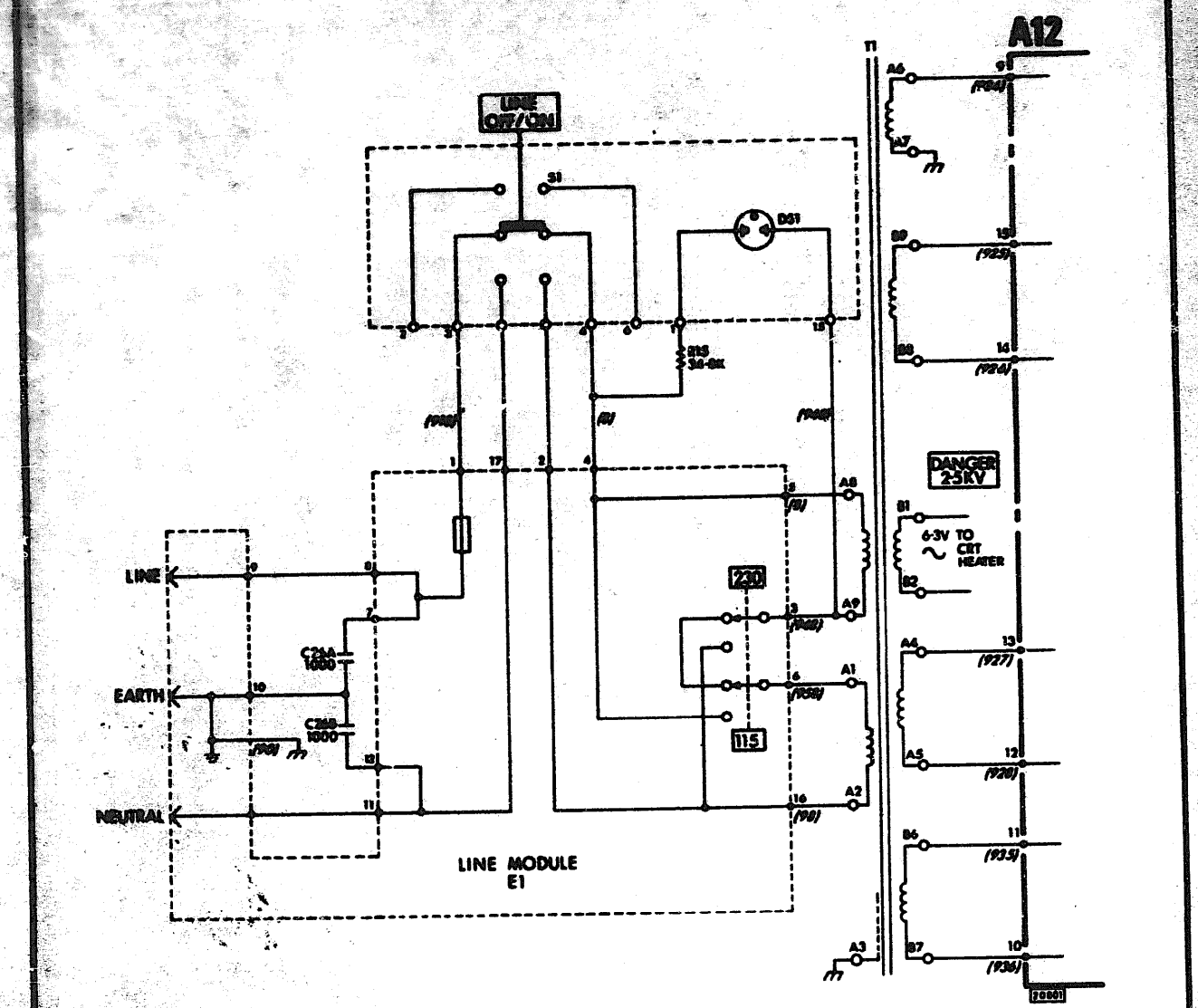


Figure 6-11 Part of Assembly A12

CHANGE 17 Section IV Replaceable Parts List

Page 4-4 **Change A4R32 to 0757-0416 R. FXD 511**
Change A4R33 to 0698-0084 R. FXD 2.15K
Change A4R40 to 0757-0399 R. FXD 82.5

Section V Service Sheets

Page 5-59 Schematic Diagram, figure A4-4

Change R32 to 511
Change R33 to 2.15K
Change R40 to 82.5

CHANGE 18 Section IV Replaceable Parts List

Page 4-4 **Add MLR19 0757-0853 R. FXD 51.1K**
Delete A12R1

Section V Service Sheets

Page 5-77 Schematic Diagram, Figure A12-3 (see Figure 6-12)

Remove A12R1
Add MLR19

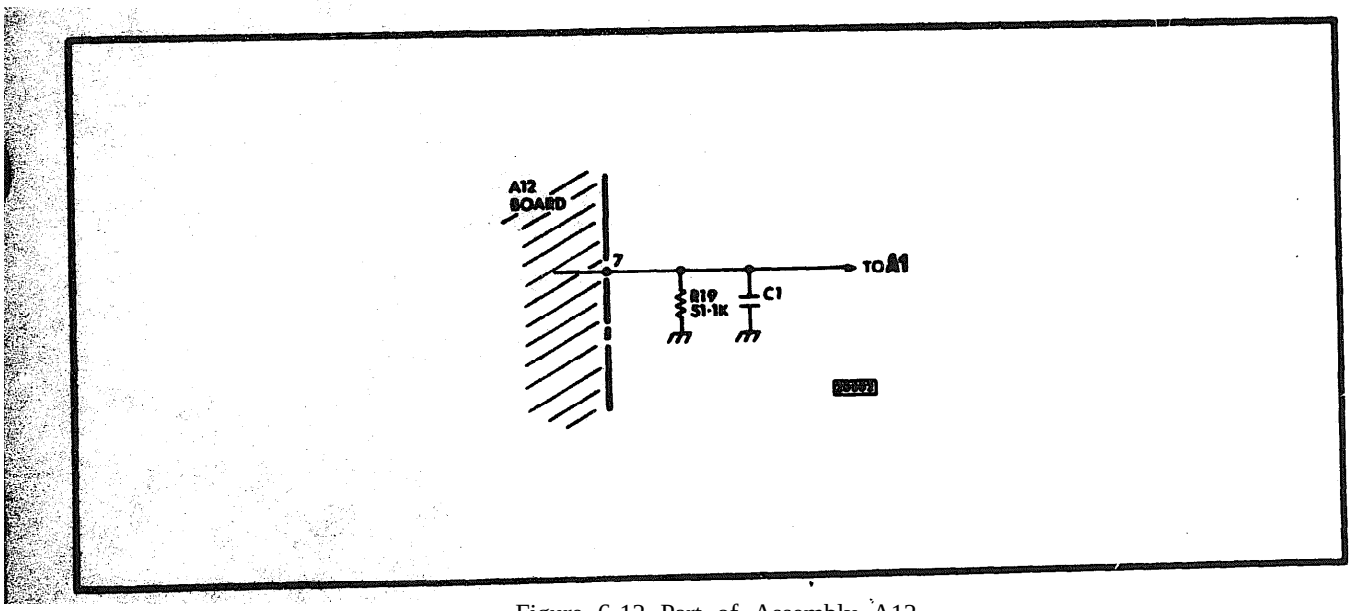
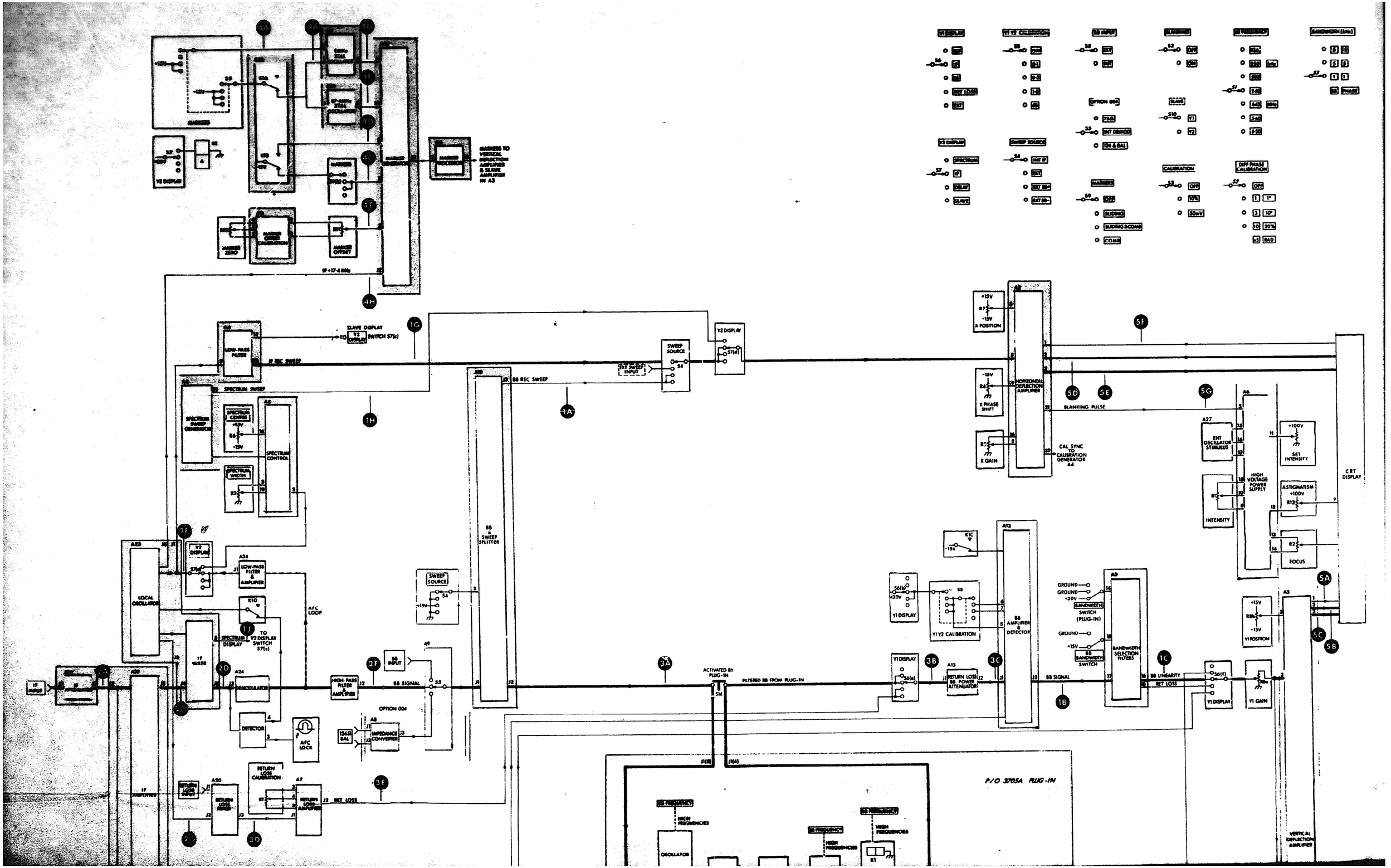
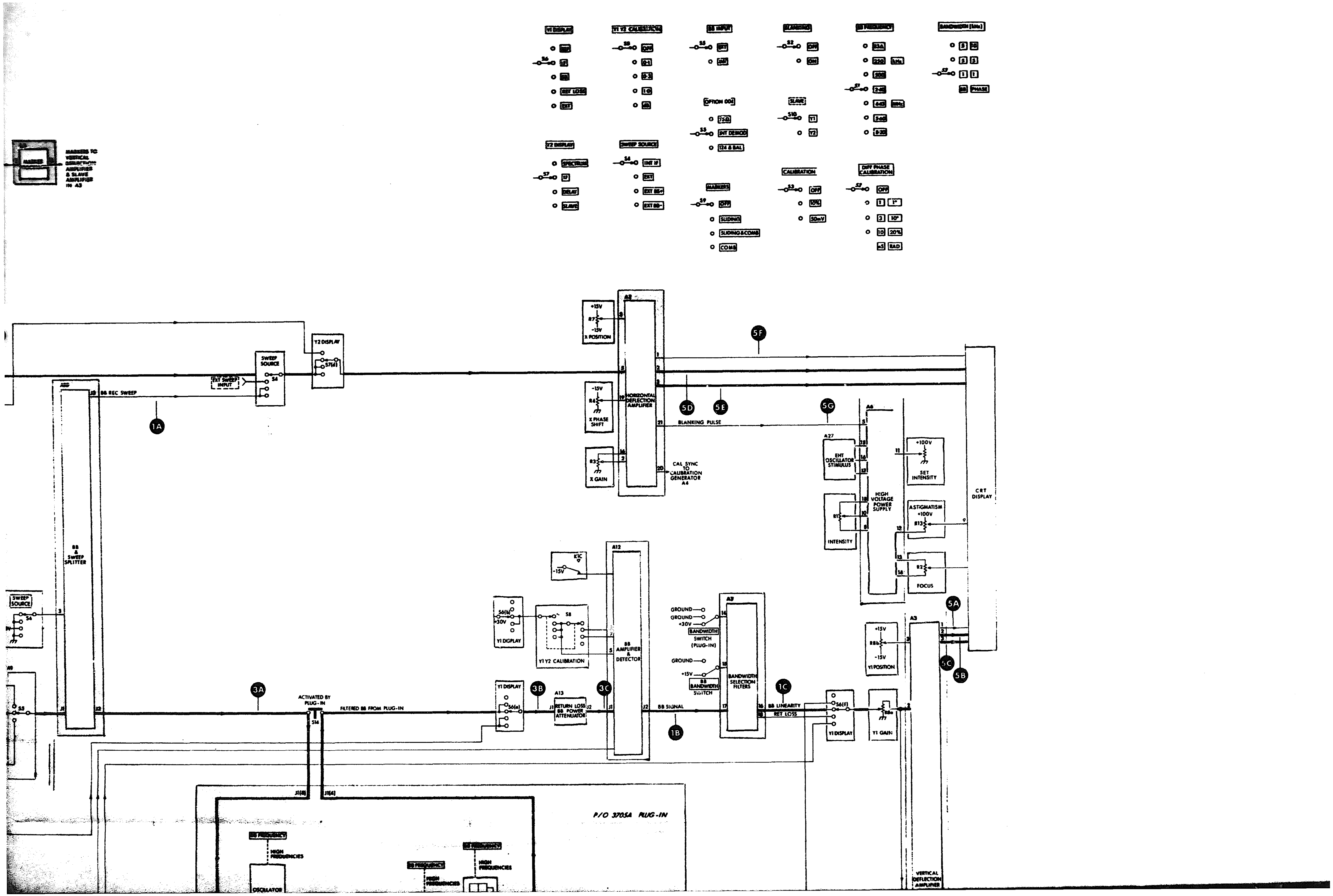
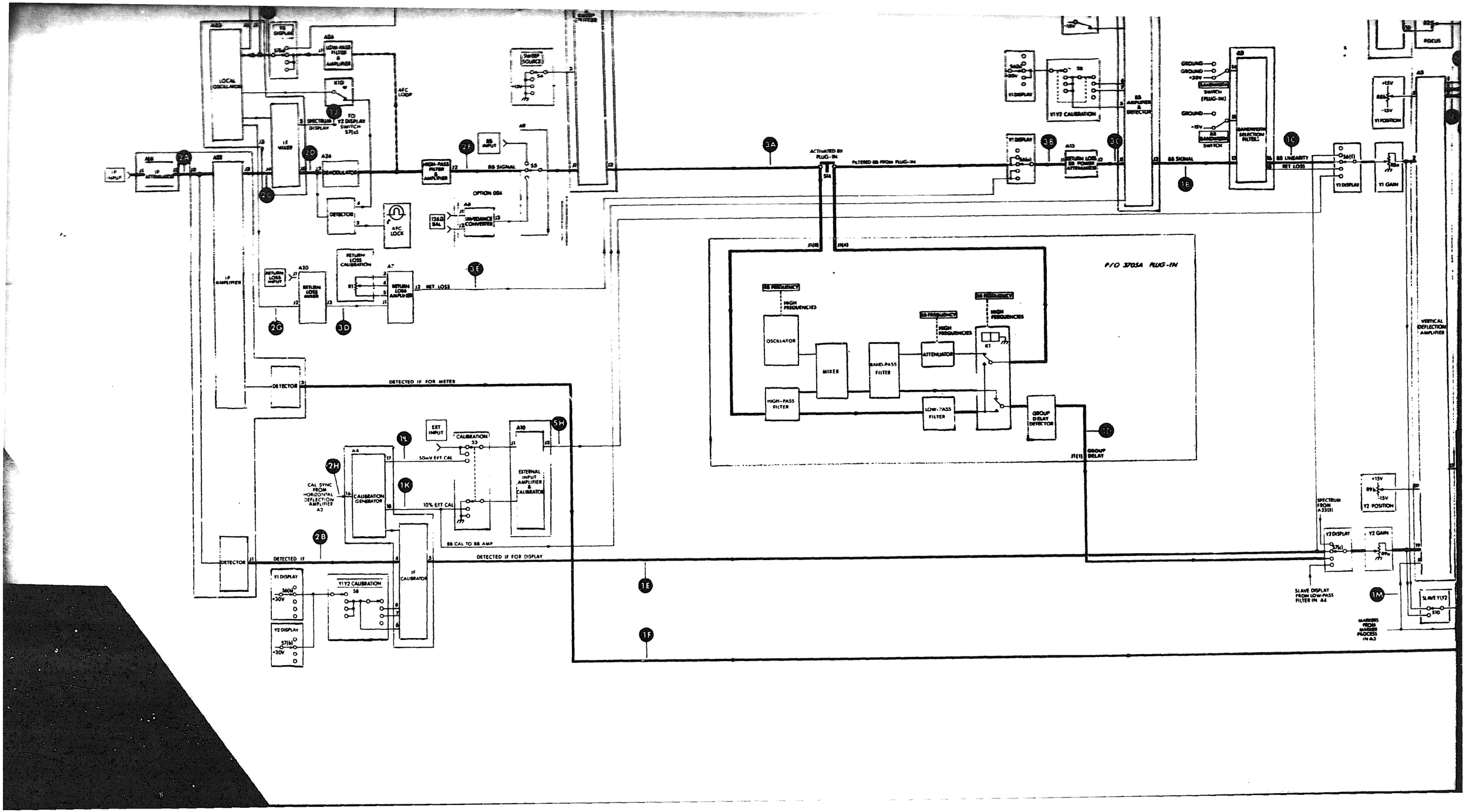


Figure 6-12 Part of Assembly A12


Y1 DISPLAY
Y1 Y2 CALIBRATION
BB INPUT
BLANKING
BB FREQUENCY
BANDWIDTH (MHz)
OPTION 003
SLAVE
CALIBRATION
DIFF PHASE CALIBRATION
Y2 DISPLAY
SWEEP SOURCE
MARKERS
MARKERS TO VERTICAL DEFLECTION AMPLIFIER & SLAVE AMPLIFIER IN A3
SLAVE DISPLAY TO Y2 DISPLAY SWITCH S7(c)
LOW-PASS FILTER
IF REC SWEEP
SPECTRUM SWEEP
SPECTRUM SWEEP GENERATOR
SPECTRUM CONTROL
SPECTRUM WIDTH
SPECTRUM CENTRE
BB REC SWEEP
EXT SWEEP INPUT
SWEEP SOURCE
Y2 DISPLAY
BB & SWEEP SPLITTER
+15V R7 -15V X POSITION
-15V R4 X PHASE SHIFT
R2 X GAIN
HORIZONTAL DEFLECTION AMPLIFIER
BLANKING PULSE
CAL SYNC TO CALIBRATION GENERATOR A4
EXT OSCILLATOR STIMULUS
HIGH VOLTAGE POWER SUPPLY
+100V SET INTENSITY
ASTIGMATISM +100V R13
INTENSITY R15
R2 FOCUS
CRT DISPLAY
LOCAL OSCILLATOR
IF MIXER
IF AMPLIFIER
A24 DEMODULATOR
DETECTOR
AFC LOOP
AFC LOCK
K1C -15V
K1D
TO SPECTRUM DISPLAY
TO Y2 DISPLAY SWITCH S7(c)
HIGH-PASS FILTER & AMPLIFIER
BB INPUT
BB SIGNAL
OPTION 004
124Ω BAL
IMPEDANCE CONVERTER
RETURN LOSS CALIBRATION
RETURN LOSS BRIDGE
RETURN LOSS AMPLIFIER
RET LOSS
ACTIVATED BY PLUG-IN
FILTERED BB FROM PLUG-IN
S1(B) S1(A)
P/O 3705A PLUG-IN
HIGH FREQUENCIES
OSCILLATOR
K1
Y1 DISPLAY
Y1 Y2 CALIBRATION
RETURN LOSS BB POWER ATTENUATOR
BB AMPLIFIER & DETECTOR
GROUND
+30V
BANDWIDTH SWITCH (PLUG-IN)
BB BANDWIDTH SWITCH
BANDWIDTH SELECTION FILTERS
BB LINEARITY
RET LOSS
Y1 GAIN
+15V R84 -15V Y1 POSITION
VERTICAL DEFLECTION AMPLIFIER


BB REC SWEEP
SWEEP SOURCE
Y2 DISPLAY
EXT SWEEP INPUT
+15V
-15V
X POSITION
X PHASE SHIFT
X GAIN
HORIZONTAL DEFLECTION AMPLIFIER
BLANKING PULSE
CAL SYNC TO CALIBRATION GENERATOR A4
EHT OSCILLATOR STIMULUS
HIGH VOLTAGE POWER SUPPLY
SET INTENSITY
INTENSITY
ASTIGMATISM
FOCUS
CRT DISPLAY
BB & SWEEP SPLITTER
Y1 DISPLAY
Y1 Y2 CALIBRATION
BB AMPLIFIER & DETECTOR
GROUND
BANDWIDTH SWITCH (PLUG-IN)
BB BANDWIDTH SWITCH
BANDWIDTH SELECTION FILTERS
Y1 POSITION
Y1 GAIN
ACTIVATED BY PLUG-IN
FILTERED BB FROM PLUG-IN
RETURN LOSS BB POWER ATTENUATOR
BB SIGNAL
BB LINEARITY
RET LOSS
P/O 370SA PLUG-IN
HIGH FREQUENCIES
OSCILLATOR
VERTICAL DEFLECTION AMPLIFIER


P/O 3705A PLUG-IN
RF FREQUENCY
HIGH FREQUENCIES
OSCILLATOR
MIXER
BAND-PASS FILTER
ATTENUATOR
HIGH-PASS FILTER
LOW-PASS FILTER
GROUP DELAY DETECTOR
GROUP DELAY
IF INPUT
IF ATTENUATOR
IF AMPLIFIER
IF MIXER
LOCAL OSCILLATOR
AFC LOOP
SWEEP SOURCE
SPECTRUM DISPLAY
Y2 DISPLAY SWITCH
HIGH-PASS FILTER & AMPLIFIER
BB INPUT
BB SIGNAL
OPTION 004
IMPEDANCE CONVERTER
124Ω BAL
AFC LOCK
DEMODULATOR
DETECTOR
RETURN LOSS INPUT
RETURN LOSS BRIDGE
RETURN LOSS CALIBRATION
RETURN LOSS AMPLIFIER
RET LOSS
DETECTED IF FOR METER
DETECTED IF
DETECTED IF FOR DISPLAY
EXT INPUT
CALIBRATION
50mV EXT CAL
10% EXT CAL
CAL SYNC FROM HORIZONTAL DEFLECTION AMPLIFIER A2
CALIBRATION GENERATOR
EXTERNAL INPUT AMPLIFIER & CALIBRATOR
BB CAL TO BB AMP
IF CALIBRATOR
Y1 DISPLAY
Y1 Y2 CALIBRATION
Y2 DISPLAY
ACTIVATED BY PLUG-IN
FILTERED BB FROM PLUG-IN
RETURN LOSS BB POWER ATTENUATORS
BB AMPLIFIER & DETECTOR
BB BANDWIDTH SWITCH (PLUG-IN)
BB BANDWIDTH SELECTION FILTERS
BB SIGNAL
BB LINEARITY
RET LOSS
Y1 GAIN
Y1 POSITION
FOCUS
VERTICAL DEFLECTION AMPLIFIER
Y2 GAIN
Y2 POSITION
SPECTRUM FROM A23(5)
SLAVE DISPLAY FROM LOW-PASS FILTER IN A4
SLAVE Y1,Y2
MARKERS FROM MARKER PROCESS IN A5

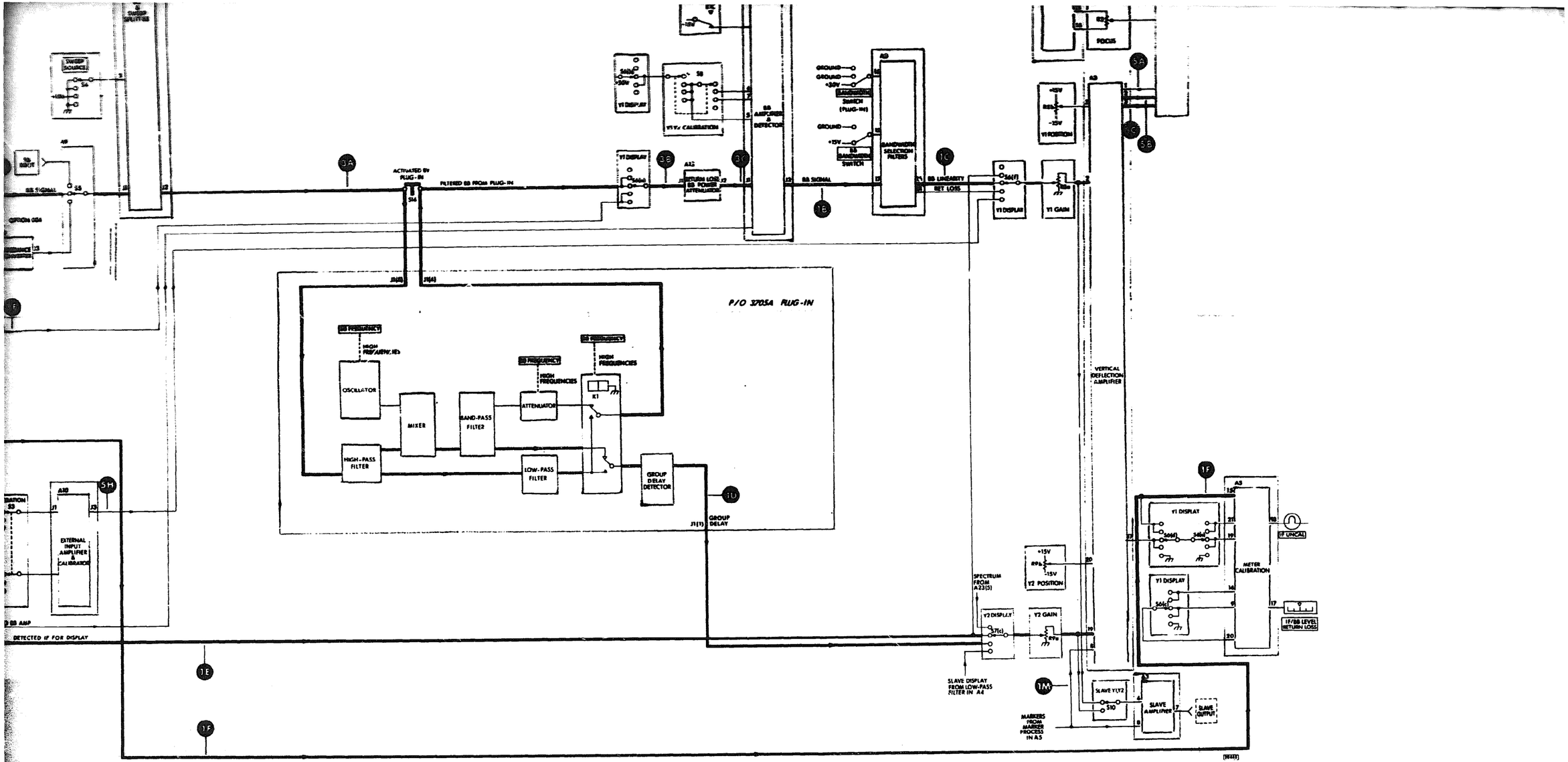


Figure 6-13 3702B IF/BB Receiver Block Diagram

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APPENDIX A

REFERENCES

DA Pam 310-4	Index of Technical Manuals, Technical Bulletins, Supply Manuals (Types 7, 8, and 9), Supply Bulletins, and Lubrication Orders.
DA Pam 310-7	US Army Equipment Index of Modification Work Orders.
TB 43-180	Calibration Requirements for the Maintenance of Army Materiel.
TM 38-750	The Army Maintenance Management System (TAMMS)
TM 750-244-2	Procedures for Destruction of Electronics Materiel to Prevent Enemy Use (Electronics Command).

APPENDIX B

COMPONENTS OF END ITEM LIST

Section I. INTRODUCTION

B-1 Scope

This appendix lists integral components of and basic issue items for the R-2049 (V)1/U to help you inventory items required for safe and efficient operation.

B-2 General

This Components of End Item List is divided into the following sections:

a. Section II. Integral Components of the End Item. These items, when assembled, comprise the R-2049 (V)1/U and must accompany it whenever it is transferred or turned in. The illustrations will help you identify these items.

b. Section III. Basic Issue Items. Not applicable.

B-3 Explanation of Columns

a. Illustration. This column is divided as follows:

(1) *Figure number.* Indicates the figure number of the illustration on which the item is shown.

(2) *Item number.* The number used to identify item called out in the illustration.

b. National Stock Number. Indicates the National stock number assigned to the item and which will be used for requisitioning.

c. Description. Indicates the Federal item name and, if required, a minimum description to identify the item. The part number indicates the primary number used by the manufacturer, which controls the design and characteristics of the item by means of its engineering drawings, specifications, standards, and inspection requirements to identify an item or range of items. Following the part number, the Federal Supply Code for Manufacturers (FSCM) is shown in parentheses.

d. Location. The physical location of each item listed is given in this column. The lists are designed to inventory all items in one area of the major item before moving on to an adjacent area.

e. Usable on Code. Not applicable.

f. Quantity Required (Qty Reqd). This column lists the quantity of each item required for a complete major item.

g. Quantity. This column is left blank for use during an inventory. Under the Rcvd column, list the quantity you actually receive on your major item. The Date columns are for your use when you inventory the major item.

Section II

Integral Components of End Item

ICOKIL

1 each IF/BB Receiver
R-2049(V)1/U (Hewlett Packard Model 3702B) 6625-00-520-5023

AAL

Plug-In Phase Detector PL-1394/U (HP Model 3705A)

ES&ML

N/A

APPENDIX C

ADDITIONAL AUTHORIZATION LIST

Section I. INTRODUCTION

C-1. Scope

This appendix lists additional items you are authorized for the support of the IF/BB Receiver R-2049(V) 1/U (HP Model 3702B).

C-2. General

This list identifies items that do not have to accompany the IF/BB Receiver R-2049(V)1/U, (HP 3702B) and that do not have to be turned in with it. These items are all authorized to you by CTA, MTOE, TDA, or JTA.

C-3. Explanation of Listing.

National stock numbers, descriptions, and quantities are provided to help you identify and request the additional items you require to support this equipment. If the item you require differs between serial numbers of the same model, effective serial numbers are shown in the last line of the description. If item required differs for different models of this equipment, the model is shown under the "Usable on" heading in the description column.

TABLE OF ADDITIONAL AUTHORIZATION LIST

NATIONAL STOCK NUMBER	PART NUMBER AND FSCM	USABLE ON CODE	QTY AUTH
6625-520-5055	HP-3705A 28480	Plug-In	1

APPENDIX D

MAINTENANCE ALLOCATION

section I. INTRODUCTION

D-1. General

This appendix provides a summary of the maintenance operations for R-2049 (V)1/U. It authorizes categories of maintenance for specific maintenance functions on repairable items and components and the tools and equipment required to perform each function. This appendix may be used as an aid in planning maintenance operations.

D-2. Maintenance Function

Maintenance functions will be limited to and defined as follows:

a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination.

b. Test. To verify serviceability and to detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. Operations required periodically to keep an item in proper operating condition, i.e., to clean (decontaminate), to preserve, to drain, to paint, or to replenish fuel, lubricants, hydraulic fluids, or compressed air supplies.

d. Adjust. To maintain, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to the specified parameters.

e. Align. To adjust specified variable elements of an item to bring about optimum or desired performance.

f. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or test measuring and diagnostic equipments used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. Install. The act of emplacing, seating, or fixing into position an item, part, module (component or assembly) in a manner to allow the proper functioning of the equipment or system.

h. Replace. The act of substituting a serviceable like type part, subassembly, or module (component or assembly) for an unserviceable counterpart.

i. Repair. The application of maintenance services (inspect, test, service, adjust, align, calibrate, replace) or other maintenance actions (welding, grinding, riveting, straightening, facing, remachining, or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

j. Overhaul. That maintenance effort (service/action) necessary to restore an item to a completely serviceable/operational condition as prescribed by maintenance standards (i.e., DMWR) in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

k. Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours, miles, etc.) considered in classifying Army equipments/components.

D-3 Column Entries

a. Column 1, Group Number. Column 1 lists group numbers, the purpose of which is to identify components, assemblies, subassemblies, and modules with the next higher assembly.

b. Column 2, Component/Assembly. Column 2 contains the noun names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. Column 3, Maintenance Functions. Column 3 lists the functions to be performed on the item listed in column 2. When items are listed without maintenance functions, it is solely for purpose of having the group numbers in the MAC and RPSTL coincide.

d. Column 4, Maintenance Category. Column 4 specifies, by the listing of a "worktime" figure in the appropriate subcolumn(s), the lowest level of maintenance authorized to perform the function listed in column 3. This figure represents the active time required to perform that maintenance function at the indicated category of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance categories, appropriate "worktime" figures will be shown for each category. The number of task-hours specified by the "worktime" figure represents the average time required to restore an item (assembly, subassembly, component, module, end item or system) to a serviceable condition under typical field operating conditions.- This time includes preparation time, troubleshooting time, and quality assurance/ quality control time in addition to the time required to perform the. specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. Subcolumns of column 4 are as follows:

C—Operator/Crew
O-Organizational
F—Direct Support
H-General Support
D— Depot

e. Column 5, Tools and Equipment. Column 5 specifies by code, those common tool sets (not individual tools) and special tools, test, and support equipment required to perform the designated function.

D-4. Tool and test Equipment Requirements (Sec III)

a. Tool or Test *Equipment Reference Code.* The numbers in this column coincide with the numbers used in the tools and equipment column of the MAC. The numbers indicate the applicable tool or test equipment for the maintenance functions.

b. Maintenance Category. The codes in this column indicate the maintenance category allocated the tool or test equipment.

c. Nomenclature. This column lists the noun name and nomenclature of the tools and 'test equipment required to perform the maintenance functions.

d. National/NATO Stock Number. This column lists the National/NATO stock number of the specific tool or test equipment.

e. Tool Number. This column lists the manufacturer's part number of the tool 'followed by the Federal Supply Code for manufacturers (5-digit) in parentheses.

D-5. Remarks (Sec IV)

a Reference Code. This code refers to the appropriate item in section II, column 6.

b. Remarks. This column provides the required explanatory information necessary to clarify items appearing in section II.

SECTION II MAINTENANCE ALLOCATION CHART
FOR
IF/BB Receiver HP 3702B

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT.	(6) REMARKS
00	Receiver HP 3702B	Inspect		0.2				Visual, external	
		Test		0.3				Simple operational	
		Test				0.6		1 thru 10	
		Adjust				0.6		1 thru 10	
		Install		0.1				16	
		Replace		0.1				16	
		Repair				0.5		10	
		Overhaul					3.0	1 thru 15	
01	Low Voltage Pwr Supply Assy A1	Test				0.4		1 thru 9	
		Replace				0.3		10	
02	Horiz Deflectn Assy A2	Test				0.4		1 thru 9	
		Replace				0.3		10	
03	Vert Deflectn Assy A3	Test				0.4		1 thru 9	
		Replace				0.3		10	
04	IF Calibrator Assy A4	Test				0.4		1 thru 9	
		Replace				0.3		10	
05	MTR Comtr and Mrkr Assy A5	Test				0.4		1 thru 9	
		Replace				0.3		10	
06	Eht Pwr Supply Assy A6	Test				0.4		1 thru 9	
		Replace				0.3		10	
07	Cal Return Loss Assy A7	Test				0.4		1 thru 9	
		Replace				0.3		10	
08	Ext Input Amp Assy A10	Test				0.4		1 thru 9	
		Replace				0.3		10	
09	Mrkr Comb Gen Assy A11	Test				0.4		1 thru 9	
		Replace				0.3		10	
10	Pwr Supply Rect Assy A12	Test				0.4		1 thru 9	
		Replace				0.3		10	
11	BB Atten Assy A13	Test				0.4		1 thru 9	
		Replace				0.3		10	
12	IF Atten Assy A14	Test				0.4		1 thru 9	
		Replace				0.3		10	
13	BB and Sweep Splitter Assy A15	Test				0.4		1 thru 9	
		Replace				0.3		10	

SECTION II MAINTENANCE ALLOCATION CHART
FOR
IF/BB Receiver HP 3702B

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
14	Return Loss MXR Assy A20	Test Replace				0.4 0.3		1 thru 9 10	
15	BB Amp Assy A21	Test Replace				0.4 0.3		1 thru 9 10	
16	IF Amp and Detector Assy A22	Test Replace				0.4 0.3		1 thru 9 10	
17	IF Mxr & Loc Osc Assy A23	Test Replace				0.4 0.3		1 thru 9 10	
18	IF Discriminator Assy A24	Test Replace				0.4 0.3		1 thru 9 10	
19	Mrkr Gen Assy A25	Test Replace				0.4 0.3		1 thru 9 10	
20	Center Mrkr Gen Assy A26	Test Replace				0.4 0.3		1 thru 9 10	
21	Eht Osctr Stimulus Assy A27	Test Replace				0.4 0.3		1 thru 9 10	
	All subassemblies are tested as part of end item.								

SECTION III TOOL AND TEST EQUIPMENT REQUIREMENTS
FOR

IF/BB Receiver HP 3702B

TOOL OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
1	H,D	Analyzer, Spectrum IP-1216/PGR	6625-00-424-4370	
2	H,D	Plug-In PL-1388/U	6625-00-431-9339	
3	H,D	Plug-In PL-1399/U	6625-00-432-5055	
4	H,D	Counter, Electronic AN/USM-207	6625-00-044-3228	
5	H,D	Generator, Signal AN/USM-205	6625-00-788-9672	
6	H,D	Generator, Sweep AN/USM-203	6625-00-148-8185	
7	H,D	Oscilloscope AN/USM-281C	6625-00-106-9622	
8	H,D	Voltmeter AN/GSM-64	6625-00-022-7894	
9	H,D	Wattmeter AN/URM-98	6625-00-566-4990	
10	H,D	Tool Kit TK-100/G	5180-00-605-0079	
11	D	Accessory Kit HP 15550A		
12	D	Attenuator Texscan RA-73 or equal		
13	D	Voltmeter (RMS) HP 3400A		
14	D	Millivoltmeter HP 411		
15	D	Cables (2 ea) HP 15539A		
16	O	Common tools necessary for the performance of this maintenance function are available to maintenance personnel for the maintenance category listed.		

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL MANUALS

SOMETHING WRONG WITH THIS MANUAL?

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Stateside Army Depot
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Stateside, N.J. 07703

DATE 4 April 1978

PUBLICATION NUMBER	DATE	TITLE
TM 11-5840-340-14&P	23 Jan 74	Radar Set AN/PLC-76

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PAGE NO.	PARAGRAPH	FIGURE NO.	TABLE NO.
2-25	2-28		
3-10	3-3		3-1
5-6	5-8		
E-5			
E-8		E-3	
E-9			

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

Recommend that the installation antenna alignment procedure be changed throughout to specify a 2° IFF antenna lag rather than 1°.

REASON: Experience has shown that with only a 1° lag, the antenna servo system is too sensitive to wind gusting in excess of 5 knots, and has a tendency to rapidly accelerate and decelerate as it hunts, causing strain to the drive train. Hunting is minimized by adjusting the lag to 2° without degradation of operation.

Item 5, Function column. Change "2 db" to "3db."

REASON: The adjustment procedure for the TRANS POWER FAULT indicator calls for a 3 db (500 watts) adjustment to light the TRANS POWER FAULT indicator.

Add new step f.1 to read, "Replace cover plate removed in step e.1, above."

REASON: To replace the cover plate.

For item 2, change the NSN to read: 5835-00-134-9186.

REASON: Accuracy.

Identify the cover on the junction box (item no. 5).

REASON: It is a separate item and is not called out on figure 19.

Add the cover of the junction box as an item in the listing for figure 19.

REASON: Same as above.

TYPED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER
SSG I. M. DeSpiritof 999-1776

SIGN HERE: SSG I. M. DeSpiritof

DA FORM 1 AUG 74 2028-2

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DATE

PUBLICATION NUMBER	DATE	TITLE
TM 11-6625-2917-24&P-5	22 Nov 79	IF/BB Receiver R-2049(V)1/U

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SAAD (30)
TOAD (14)
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USA Dep (1)
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29-136 (1)
29-207 (2)
29-610 (2)

NG: None
USAR: None
For explanation of abbreviations used see, AR 310-50.

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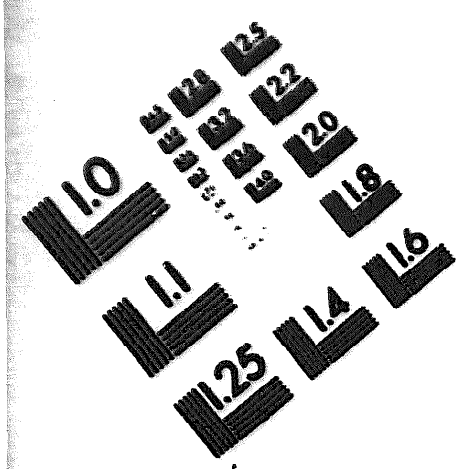

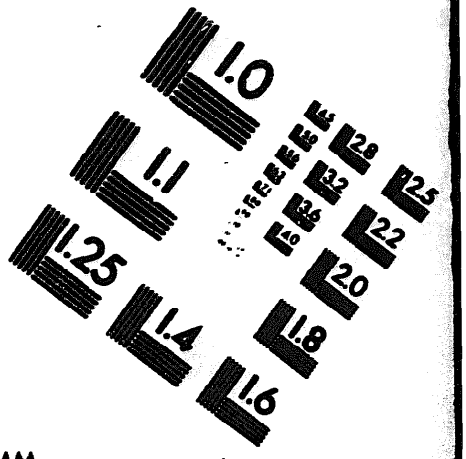

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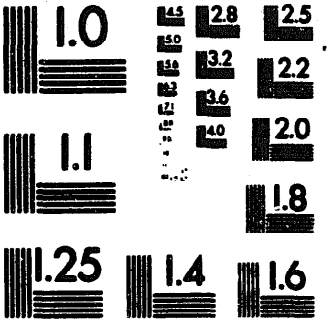

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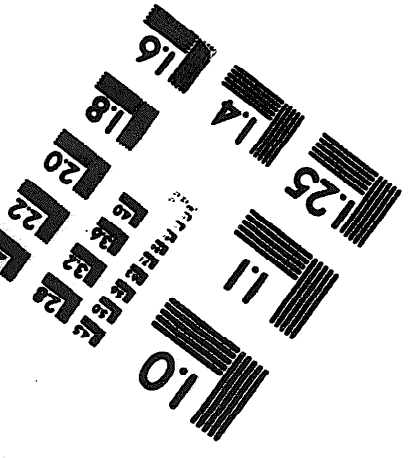

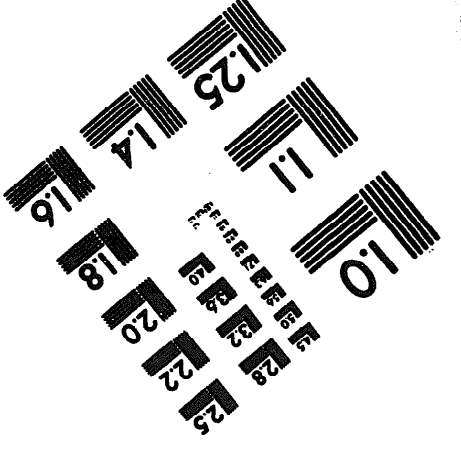

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