Errata

Title & Document Type: **3702B IF/BB Receiver Operating and Service Manual**

Manual Part Number: **03702-95010**

Revision Date: **November 1971**

About this Manual

We've added this manual to the Agilent website in an effort to help you support your product. This manual provides the best information we could find. It may be incomplete or contain dated information, and the scan quality may not be ideal. If we find a better copy in the future, we will add it to the Agilent website.

HP References in this Manual

This manual may contain references to HP or Hewlett-Packard. Please note that Hewlett-Packard's former test and measurement, life sciences, and chemical analysis businesses are now part of Agilent Technologies. The HP XXXX referred to in this document is now the Agilent XXXX. For example, model number HP8648A is now model number Agilent 8648A. We have made no changes to this manual copy.

Support for Your Product

Agilent no longer sells or supports this product. You will find any other available product information on the Agilent Test & Measurement website:

www.agilent.com

Search for the model number of this product, and the resulting product page will guide you to any available information. Our service centers may be able to perform calibration if no repair parts are needed, but no other support from Agilent is available.

Agilent Technologies

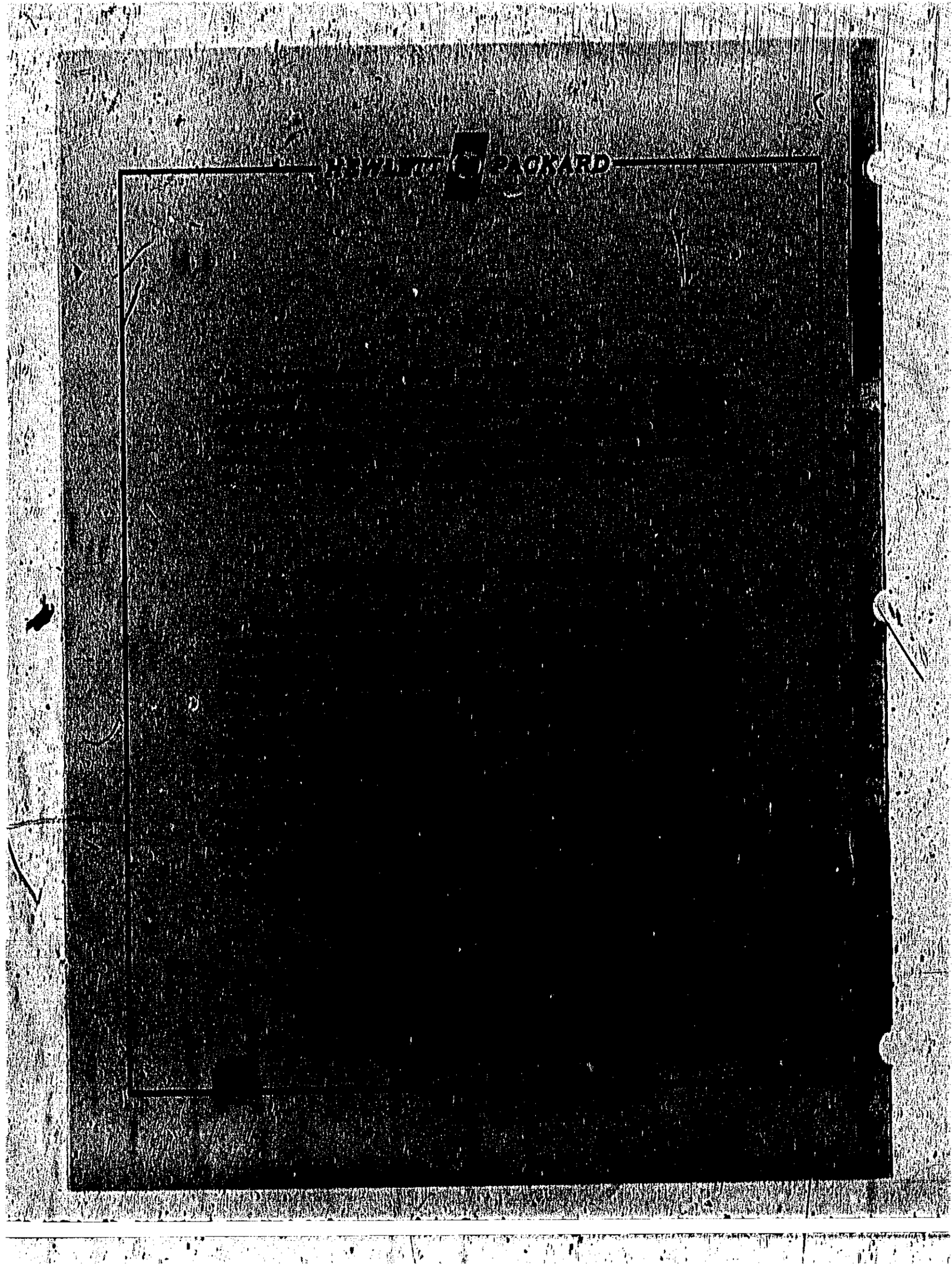
3702B
IF/BB RECEIVER

PRELIMINARY SERVICE MANUAL

[redacted]

HEWLETT PACKARD

[redacted]



HEWLETT hp PACKARD

PRELIMINARY SERVICE MANUAL

MODEL 3702B
IF/BB RECEIVER

SERIALS PREFIXED: 1136U-

For instruments with prefixes higher than 1136U-, refer to manual change sheet.

03702-95010

Printed: NOV 1971

FOREWORD

A complete set of manuals for the Microwave Link Analyzer consists of the following:

- System Service Manual
- System Operating Instructions
- Service Manual 3710A IF/BB Transmitter
- Service Manual 3715A BB Transmitter Plug-In *OR*
  3716A BB Transmitter Plug-In
- Service Manual 3702B IF/BB Receiver
- Service Manual 3703B Group Delay Detector Plug-In *OR*
  3705A Differential Phase Detector Plug-In

This preliminary manual contains the following sections:

SECTION I INTRODUCTION

General introduction and a complete specification.

SECTION II PERFORMANCE CHECKS

Not available for preliminary manual.

SECTION III CALIBRATION

Not available for preliminary manual.

SECTION IV REPLACEABLE PARTS

Parts are listed in assembly order.

SECTION V SERVICE SHEETS

General Service Sheets G1 to G5 contain the theory of operation and troubleshooting down to assembly level.

Assembly Service Sheets A1 to A26 (excluding A16 to A19 which are not assigned) each containing circuit description, component location and grid reference, and an assembly schematic.

TO RECEIVE YOUR FINAL MANUAL WHEN IT IS AVAILABLE, COMPLETE AND RETURN THE PRE-ADDRESSED CARD THAT IS TIED TO THE INSTRUMENT.

LIST OF CONTENTS

SECTION I INTRODUCTION

SECTION II PERFORMANCE CHECKS

Not available for the preliminary manual.

SECTION III CALIBRATION

Not available for the preliminary manual.

SECTION IV REPLACEABLE PARTS

SECTION V SERVICE SHEETS

Assembly Service Sheet A1 – Low Voltage Power Supply

Assembly Service Sheet A2 – Horizontal Deflection

Assembly Service Sheet A3 – Vertical Deflection

Assembly Service Sheet A4 – IF Calibrator and Spectrum Sweep

Assembly Service Sheet A5 – Motor Control and Marker Processor

Assembly Service Sheet A6 – High Voltage Power Supply

Assembly Service Sheet A7 – Return Loss Amplifier

Assembly Service Sheet A8/A9 – Impedance Converter and BB Input Switch

Assembly Service Sheet A10 – External Input Amplifier

Assembly Service Sheet A11 – Marker Comb Generator

Assembly Service Sheet A12 – Power Supply Rectifiers

Assembly Service Sheet A23 – IF Mixer and Local Oscillator

Assembly Service Sheet A24 – IF Discriminator

Assembly Service Sheet A25 – Sliding/Spectrum Marker Generator

Assembly Service Sheet A26 – Centre Marker Generator

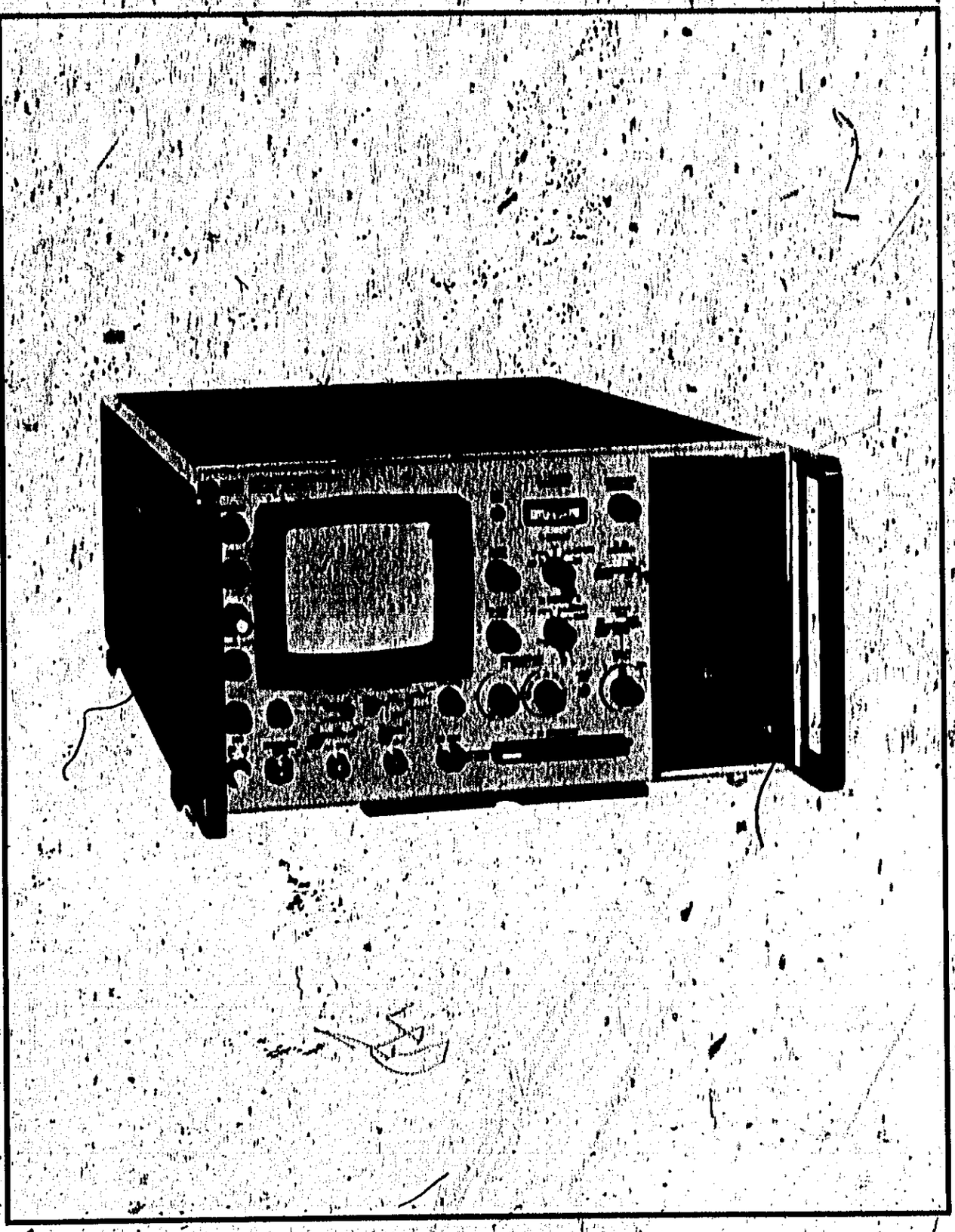


Figure 1-1 3702B IF/BB Receiver

SECTION I
SERVICE SHEETS

1-1 GENERAL

1-2 The hp Model 3702B IF/BB Receiver is the receive and display section of the Microwave Link Analyzer. The 3702B accepts BB and swept IF (45 to 95MHz) signals, and processes them to display, against a base of frequency, such characteristics as IF flatness and BB linearity of a Radio Link. A complete system comprises an IF/BB Receiver, with a group delay detector plug-in, and a Model 3710A IF/BB Transmitter with a BB Transmitter plug-in.

1-3 GROUP DELAY DETECTOR PLUG-IN

1-4 The 37030 Group Delay Detector plug-in, which measures group delay at BB frequencies of 83.3, 250 and 500kHz, is compatible with the 3710A or 3710A BB Transmitters.

1-5 The 8705A Differential Phase Detector plug-in, which measures group delay at BB frequencies of 83.3, 250 and 500kHz and differential phase at BB frequencies of 2.4, 4.43, 5.6 and 8.2MHz, is compatible with the 3710A BB Transmitter.

1-6 FEATURES

1-7 The main features of the 3702B IF/BB Receiver are listed below:

a. Dual display which enables two simultaneous measurements to be presented, assists in the optimum adjustment of the test item for interacting link parameters.

b. Automatic Gain Control provides a constant X-axis display independent of Sweep Width changes.

c. AFC LOCK lamp indicates that the internal local oscillator is locked to, and tracking with, the incoming IF signal provided that this signal passes through 70MHz, and is not swept outside the frequency range of 45 to 95MHz.

d. Frequency calibration by sliding and/or comb markers derived from the swept IF input signal.

(i) The sliding markers consist of one crystal controlled centre frequency marker at 70MHz, and two continuously variable markers, symmetrical about the centre marker, with an offset variable from 0 to 20MHz.

(ii) A crystal derived marker comb of 2MHz spacing from 45 to 95MHz.

e. Wideband, flat response discriminator which enables demodulation up to 5.6MHz.

f. Split-trace amplitude calibration provides maximum sensitivity of 0.01dB/cm for IF inputs, and 0.1%/cm for BB inputs.

g. High sensitivity return loss channel (0 to -54dBm) measures and displays return loss from 45 to 95MHz, when used with the Model 15520A Hybrid and a suitable power source such as the 3710A IF/BB Transmitter.

h. SPECTRUM facility with an accurate 70MHz crystal controlled marker for checking IF 70MHz centre frequency, FM deviation accuracy and modulator sensitivity.

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

j. Slave operation permits a remote measurement to be displayed locally. This measurement requires a Microwave Link Analyzer to be located at both the local and remote stations as well as an additional return path, which does not introduce further distortion. The simple end to end through link measurement requires that the generator be remote from the display.

k. SWEEP SOURCE switch enables the sweep applied to the CRT to be selected from the Internal IF, an external sweep source, or an external BB with either a positive or negative display.

l. In the EXT mode, the EXT. INPUT permits the use of the Y1 channel as a dc to 50kHz display, with the sweep signal from the SWEEP SOURCE switch. When a recovered sweep signal is used, frequency markers are available. Vertical calibration of this input can be 50mV, or a 10% of input, split trace.

m. IF UNCAL lamp indicates whether the IF INPUT is within the calibration limits when measuring parameters derived from the IF signal, such as return loss and BB linearity.

1-8 OPTIONS

1-9 All options are listed below and are factory installed.

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

b. OPTION 003 substitutes Stemlins type 1.6mm connectors for the standard BNC front and rear panel connectors.

c. OPTION 004 incorporates a 124Ω balanced BB input, and substitutes commercial equivalent of WECO 477B connectors for the standard BNC, front panel connectors only.

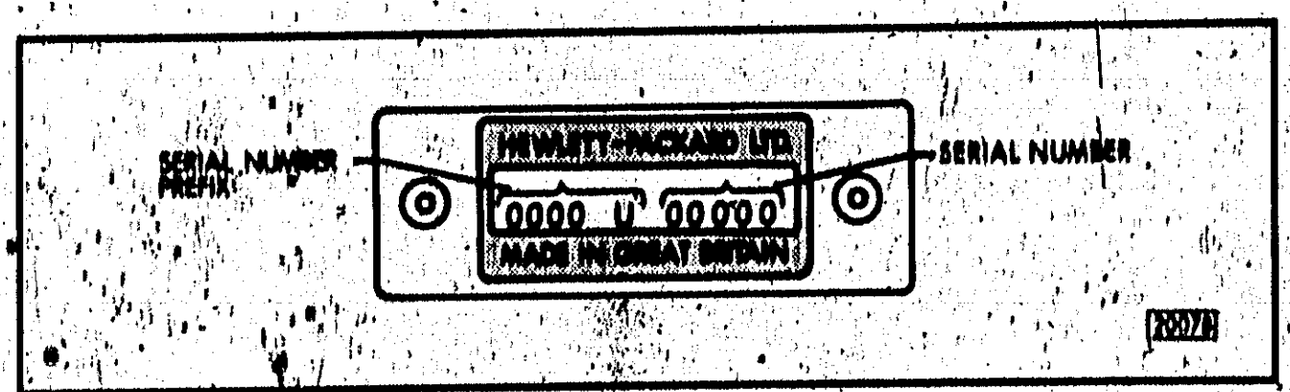


Figure 1-2 Instrument Identification

Table 1-1 /// 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 in SPECTRUM position of Y2 DISPLAY switch.

Y2 DISPLAY

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

IF CHARACTERISTICS

IF INPUT

Frequency Range:	70 ±25MHz.
AFC Capture Range:	70 ±1.3MHz.
AFC Hold-In Range:	70 ±25MHz (10 to 100Hz sweep)
Input Power Range:	+12dBm to -10; 22dB IF LEVEL attenuator compensates for power levels greater than -10dBm.
Power Measurement Accuracy:	±0.5dB
Input Impedance:	75Ω
Return Loss:	>30dB (55 to 85MHz) >20dB (45 to 95MHz)
Calibration Magnitudes:	0.1, 0.3, 1.0dB
Accuracy:	±10%
Flatness:	±0.05dB up to +5dBm; ±0.1dB from +5 to +10dBm back-to-back System check, 45 to 95MHz

FREQUENCY MARKERS

Centre Marker:	70MHz ±100kHz, crystal controlled.
Sliding Markers:	0 to 20MHz, offset.
Offset Dial Accuracy:	±1MHz.
Marker Comb:	2MHz, crystal controlled; permits points to be identified to ±200kHz.

DEMODULATOR

Frequency Range:	80kHz to 5.6MHz
Deviation Range:	5 to 500kHz rms

SPECTRUM

Use IF INPUT, AFC inoperative.

Centre Frequency:	70MHz
Scan Width:	±0.5 to ±3MHz.
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 of IF INPUT to lock AFC.

Frequency Range:	70 ±25MHz.
Flatness:	±1dB 70 ±25MHz
Input Impedance:	75Ω
Return Loss:	>20dB

BB CHARACTERISTICS

BB INPUT 75Ω

Frequency Range:	80kHz to 6.2MHz Sweep 10 to 100Hz
Input Range:	BB Power -40 to -10dBm, Sweep Voltage 600mV to 10V pk-pk, for a 10cm ±5mm trace deflection.
Measurement Accuracy:	BB Power ±0.5dB
Input Impedance:	75Ω unbalanced
Return Loss:	>20dB

CALIBRATION

Calibration Magnitudes:	1, 3, 10%
Accuracy:	±10%

BB INPUT 124Ω BALANCED (OPTION 004 ONLY)

Frequency Range:	80kHz to 6.2MHz Sweep 10 to 100Hz
Input Range:	BB Power -40 to -10dBm Sweep Voltage 600mV to 10V pk-pk, for a 10cm ±5mm trace deflection.
Measurement Accuracy:	BB Power ±0.5dB
Input Impedance:	124Ω balanced
Return Loss:	>20dB

DISPLAY CHARACTERISTICS

CRT

Post accelerator, 8kV 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:	10V pk-pk maximum
Frequency Range:	10 to 100Hz sinusoidal
Input Impedance:	5kΩ

AGC

Displayed sweep width remains constant to within 5mm for 3 to 60MHz IF Sweep Width and 600mV to 10mV to 10V pk-pk applied to BB INPUT or EXT SWEEP INPUT.

VERTICAL DEFLECTION

Y1 and Y2 controlled by respective DISPLAY switches (see Display Function table).

EXT INPUT (Y1)

Function:	Operates as a conventional oscilloscope input.
Frequency Range:	dc to 50kHz
Maximum Input:	6V
DC Offset Range:	±2V max
Calibration:	50mV ±5%
	10% ±1% relative to input split trace voltage.
Input Impedance:	10KΩ
Sensitivity:	0.5mV/cm

SLAVE

Permits the measurements 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.
Bandwidth:	4Hz to 20kHz (3dB)
Output Impedance:	2kΩ

SECTION II
PERFORMANCE CHECKS

This section is not available for the preliminary manual, but will be included in the final manual.

SECTION III
CALIBRATION

This section is not available for the preliminary manual, but will be included in the final manual.

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 given in list below).
c. Typical manufacturer of each part in a 5-digit code (refer to Code List of Manufacturers – Table 4-5).
d. Manufacturer's part number.
e. Total quantities of each part used in the instrument (refer to TQ column).

4-3 ORDERING INFORMATION

4-4 To order a replacement part, address the order or enquiry to your local Hewlett-Packard Service Office (see lists at rear of manual for addresses).

4-5 Specify the following information 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	Q	= transistor
C	= capacitor	R	= resistor
CR	= diode	S	= switch
DS	= lamp	T	= transformer
F	= fuse	V	= vacuum tube
J	= jack	W	= power cable
K	= relay	XA	= PC connector
L	= inductor	XF	= fuse holder
M	= motor	Y	= crystal
MP	= mechanical part	ZZ	= packaging material

4-8 DESCRIPTION ABBREVIATIONS

A	= ampere
ASSY	= assembly
COAX	= coaxial
CONN	= connector
F	= farad
FXD	= fixed
GE	= germanium
H	= henry
HZ	= hertz (cycles/second)
K	= kilo (10^3)
KHZ	= kilohertz (kilocycles/second)
LIN	= linear
LOG	= logarithmic
M	= milli (10^{-3})
MEG	= mega (10^6)
MHZ	= megahertz (megacycles/second)
NSR	= not separately replaceable
OBD	= order by description
PC	= printed circuit
P	= pico (10^{-12})
PIV	= peak inverse voltage
QTY	= quantity
SI	= silicon
ST	= selected on test
U(μ)	= micro (10^{-6})
V	= volts
VAR	= variable
WVDC	= dc working volts
W	= watts
W/	= with

4-9 COLOUR ABBREVIATIONS

BLK	= black	= 0
BRN	= brown	= 1
RED	= red	= 2
ORN	= orange	= 3
YEL	= yellow	= 4
GRN	= green	= 5
BLU	= blue	= 6
VIO	= violet	= 7
GRY	= grey	= 8
WHT	= white	= 9

Table 4-1 Replaceable Parts

Ref Desig	HP Part No	TQ	Description	Mfr.	Mfr Part No
	03708-90010	M	8702A SERVICE MANUAL	28480	
	5060-4409	1	CALENDOCK ASSY HD	28480	
	5060-0177	1	RACK INTO KIT (FOR 8702A)	28480	
	15532A	1	ACCESSORY KIT (FOR 8702A)	28480	
	15532A	1	HYBRID 4-PORT BNC TO DIN CONN	28480	
	15521A	1	MISMATCH 17DB BNC TO DIN CONN	28480	
	15522A	2	TERMINATION BNC TO DIN CONN	28480	
	15523A	1	ACCESSORY CBL BNC-BNC	28480	
	15523A	1	ACCESSORY CBL BNC-BNC	28480	
	15532A	1	HYBRID 4-PORT BNC TO DIN CONN	28480	
	9211-0267	1	STORAGE BOX PLASTIC	28480	
B1	3160-0209	1	FAN TUBEAXIAL	23936	4500
	5060-4408	1	FAN FILTER ASSY	28480	
C1	0160-0348	2	C FXD 1000PF 10%-10% 200WVDC	56289	D40T2B-DPF
	1920-0002		MOUNT C	28480	A-1920-0002-1
C2	0160-0635	2	C FXD 7500PF +80-10% 50(VDC	56289	D43S65
C3	0160-0635		CLAMP C	28480	CMC 22
	0160-0635		C FXD 7500PF +80-10% 50WVDC	56289	D43S65
C4	0160-0348		CLAMP C	28480	CMC 22
	1920-0002		C FXD 1000PF +80-10% 200WVDC	56289	D40T2B-DPF
C5	0160-1815	1	MOUNT C	28480	A-1920-0002-1
C6	0160-0663	21	C FXD 1.5UF 20% 20WVDC	56289	150D155X9020B2
C7	0160-0663		C FXD 100DPF (FEEDTHRU)	72982	MP800/361-102
C8	0160-0663		C FXD 100DPF (FEEDTHRU)	72982	MP800/361-102
C9	0160-0663		C FXD 100DPF (FEEDTHRU)	72982	MP800/361-102
C10	0160-0663		C FXD 100DPF (FEEDTHRU)	72982	MP800/361-102
C11	0160-0663		C FXD 100DPF (FEEDTHRU)	72982	MP800/361-102
C12	0160-0663		C FXD 100DPF (FEEDTHRU)	72982	MP800/361-102
C13	0160-0663		C FXD 100DPF (FEEDTHRU)	72982	MP800/361-102
C14	0160-0663		C FXD 100DPF (FEEDTHRU)	72982	MP800/361-102
C15	0160-0663		C FXD 100DPF (FEEDTHRU)	72982	MP800/361-102
C16	0160-0663		C FXD 100DPF (FEEDTHRU)	72982	MP800/361-102
C17	0160-0663		C FXD 100DPF (FEEDTHRU)	72982	MP800/361-102
C18	0160-0663		C FXD 100DPF (FEEDTHRU)	72982	MP800/361-102
C19	0160-0663		C FXD 100DPF (FEEDTHRU)	72982	MP800/361-102
C20	0160-0663		C FXD 100DPF (FEEDTHRU)	72982	MP800/361-102
C21	0160-0663		C FXD 100DPF (FEEDTHRU)	72982	MP800/361-102
C22	0160-0663		C FXD 100DPF (FEEDTHRU)	72982	MP800/361-102
C23	0160-0663		C FXD 100DPF (FEEDTHRU)	72982	MP800/361-102
C24	0160-0663		C FXD 100DPF (FEEDTHRU)	72982	MP800/361-102
C25	0160-0260	1	C FXD 1000PF +100-0% 200WVDC	56289	150D392X9100B2-DYS
C26	0160-0244	1	C FXD 15UF 10% 10WVDC	56289		
DS1	2140-0244	1	LAMP INCD 48V 1A	0703A	A111
	1450-0193	1	LAMPHOLDER	28480	
	1450-0812	1	LAMP LENS	28480	
	2140-0275	1	LAMP INCD 10V 27MA	28480	
	5040-0275	1	LAMP INSULATOR	28480	
	1450-0193		LAMPHOLDER	28480	
	1450-0170	1	LAMP LENS ORNGE	28480	
	2140-0329	1	LAMP INCD 10V 27MA	28480	
E1	9040-1200	1	POWER MODULE	28480	

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	HP Part No	TQ	Description	Mfr	Mfr Part No
	08702-60001	1	POWER MODULE COVER	28001	
	7124-1491	1	POWER MODULE LABEL 115-230 V	28001	
F1	2110-0321	1	FUSE SLOW BLOW 1AT 250V	71400	FDRH250V1A
F2	2110-0008	1	FUSE 250MA 250V	71400	MDX-2
F3	2110-0094	1	FUSE 1.25A 250V	75915	312001
F4	2110-0094		FUSE 1.25A 250V	75915	AGC-1-1/4
F5	2110-0008		FUSE 250MA 250V	75915	312001
	1400-0094	1	FUSEHOLDER 4-WAY	75915	357004
J1	1250-0810	4	CONN COAX RND RTO RND 75 OHM	28001	OR 37937 0-114
J2	1250-0808		CONN COAX RND RTO RND 75 OHM	28001	OR 37927
J3	1250-0810		CONN COAX RND RTO RND 75 OHM	28001	OR 37937 0-114
J4	1250-0808		CONN COAX RND RTO RND 75 OHM	28001	OR 37927
J5	1250-0808		CONN COAX RND RTO RND 75 OHM	28001	OR 37927
J6	1251-0007	1	CONN MULTI RND RTO 16-WAY	02660	24-4200-16R
K1	0490-0849	1	RLY CHANDROVER 2P	28001	HDSAII-J2-K2D
L1	9080-0408	1	COIL TRACE ALIGN	28480	
M1	1120-0816	1	MTR 0-1MA DC	A0741	0-1MA
	5000-4470		METER BEZEL MINT GREY	28001	
MP1	08702-164	1	PANEL FRONT	28001	
	9050-0508		LIGHT SHIELD BLACK	28001	
	7120-1284		PLATE TRADEMARK	28480	
	10179A		FRONT SCREEN	28001	
MP2	08702-166		FRONT PANEL EXTRUSION UPPER	28001	
MP3	08702-1664	1	FRONT PANEL EXTRUSION LOWER	28001	
MP4	9040-0730	2	FRAME ASSY SIDE	28480	
	5000-8727	2	SIDE COVER	28001	
	9040-0722	2	HANDLE ASSY SIDE	28480	
	5060-8738	2	RETAINER HANDLE ASSY	28001	
	5000-0083	2	PLATE PLATED AL	28480	
	08702-210	1	STRIP FACING SIDEFRAME	28001	
	08702-161		STAND OFF	28001	
	08702-161		STAND OFF	28001	
	08702-161		STAND OFF	28001	
	08702-162		STAND OFF	28001	
MP5	9040-0730		FRAME ASSY SIDE	28480	
	5000-8727		SIDE COVER	28001	
	9040-0722		HANDLE ASSY SIDE	28480	
	9040-8738		RETAINER HANDLE ASSY	28001	
	5000-0083		PLATE PLATED AL	28480	
MP6	08702-171	1	TOP COVER	28001	
MP7	08702-1701	1	BOTTOM COVER ASSEMBLY	28001	
MP7	08702-163	1	BOTTOM COVER	28001	
	9040-0767	8	FOOT ASSY	28001	
	9040-0767		FOOT ASSY	28001	
	9040-0767		FOOT ASSY	28001	
	9040-0767		FOOT ASSY	28001	
	9040-0767		FOOT ASSY	28001	
	1490-0030	1	STAND TILT	91640	060
MP8	08702-174	1	PANEL REAR UPPER	28001	
	08702-175	1	CNT COVER PLATE	28001	
	08702-176	1	CAT SUPPORT REAR	28001	

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	TJP Part No	TQ	Description	Mfr	Mfr Part No
	1200-0408	1	COVER SOCKET	14493	9040-5089
	7170-0607	1	PLATE SERIAL	80007	
MP9	08702-172	1	PANEL REAR LOWER	80007	
	08702-328	1	RAIL GUIDE	80007	
	08702-145	1	COVER VENT	80007	
	0380-0093	2	STANDOFF TAPPED	00000	19510
	0380-0093		STANDOFF TAPPED	00000	19510
	08702-7289	1	POWER MODULE SUPPORT	80007	
MP10	08702-171	1	DECK MAIN	80007	
	08702-160	1	BRACKET SWITCH	80007	
	08702-162	1	BRACKET POTENTIOMETER	80007	
	08702-161	1	FAN DUCT	80007	
	08702-170	1	BRACKET CASTING SUPPORT	80007	
	08702-147	1	BRACKET SECURING	80007	
	08702-352	1	PLATE ANTENNA CASTING	80007	
	0510-0774	2	RETAINER PC BD	07344	88-18-2-8-3
	0510-0774		RETAINER PC BD	07344	88-18-2-8-3
	08702-108	1	SCREEN CRT	80007	
	0090-4127	3	BLOCK GUIDE	80007	
	1754-01	3	DIMTACT CRT	80007	
	08702-10012	2	BRACKET SUPPORT IF ATTEN	80007	
	08702-10013		BRACKET SUPPORT IF ATTEN	80007	
	08702-333	1	PILLAR CASTING SUPPORT	80007	
	0090-4127		BLOCK GUIDE	80007	
	0090-4127		BLOCK GUIDE	80007	
	08702-10015	1	BRACKET STAND-OFF	80007	
	08702-10016	1	COVER SCREENING INPUT AMPLIFIER	80007	
	08702-10020	1	COVER SCREENING ATTENUATOR SPLITTER	80007	
	08702-10021	1	COVER SCREENING COMB GENERATOR	80007	
MP11	08702-143	1	HOUSING FEED-IN	80007	
	08702-169	1	BRACKET SUPPORT	80007	
	08702-149	1	WALL SCREEN	80007	
	08702-355	4	BAR SPACING	80007	
	08702-356		BAR SPACING	80007	
	08702-357		BAR SPACING	80007	
	08702-358		BAR SPACING	80007	
	08702-354	1	PANEL TRIM	80007	
MP12	08702-168	1	SWITCH SUB-PANEL LEFT	80007	
MP13	08702-167	1	SUPPORT PLATE ATTEN	80007	
	08702-336	2	PIN DOWEL	80007	
	08702-336		PIN DOWEL	80007	
MP14	08702-166	1	SWITCH SUB-PANEL RIGHT	80007	
MP15	08702-346	1	SIDE SCREENING	80007	
	08702-140	1	LID SCREENING CASTING	80007	
	08702-104	1	BRACKET HINGE FRONT	80007	
	08702-110	1	BRACKET HINGE REAR	80007	
	08702-339	2	SCR CAPTIVE	80007	
	08702-339		SCR CAPTIVE	80007	
	08702-164	1	STAY	80007	
	08702-337	1	ROLLER	80007	
	0380-0024	4	SPACER HUB	78854	2298-640
	0380-0024		SPACER HUB	78854	2298-640
MP16	1250-0097	1	CRT SHIELD	80007	
	01200-60201	1	COIL TRACE ALIGN	80007	
	01200-60702	1	CRT SHIELD SUPPORT	80007	
	01200-60701	1	CRT CLAMP, REAR	80007	

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	HP Part No	TQ	Description	Mfr	Mfr Part No
	00180-01218	2	BRACKET	80009	
	00180-01218		BRACKET	80009	
	0460-0114	1	FOAM STRIP	80009	
	1258A-01		CONTACT CRT	80009	
	1258A-01		CONTACT CRT	80009	
MP17	08708-117	1	SCREEN PLATE	80009	
	08708-198	1	SCREEN PC SUPPORT FRONT	80009	
	08708-196	1	SCREEN PC SUPPORT REAR	80009	
	0403-0133	4	GUIDE PC BOARD-BRN	14493	
	0403-0133		GUIDE PC BOARD-BRN	14493	
	0403-0133		GUIDE PC BOARD-BRN	14493	
	0403-0133		GUIDE PC BOARD-BRN	14493	
	0403-0134	4	GUIDE PC BOARD-RED	14493	
	0403-0134		GUIDE PC BOARD-RED	14493	
	0403-0134		GUIDE PC BOARD-RED	14493	
	0403-0134		GUIDE PC BOARD-RED	14493	
	0403-0135	4	GUIDE PC BOARD-ORN	14493	
	0403-0135		GUIDE PC BOARD-ORN	14493	
	0403-0135		GUIDE PC BOARD-ORN	14493	
	0403-0135		GUIDE PC BOARD-ORN	14493	
	0403-0136	4	GUIDE PC BOARD-YEL	14493	
	0403-0136		GUIDE PC BOARD-YEL	14493	
	0403-0136		GUIDE PC BOARD-YEL	14493	
	0403-0136		GUIDE PC BOARD-YEL	14493	
	0403-0137	4	GUIDE PC BOARD-GRN	14493	
	0403-0137		GUIDE PC BOARD-GRN	14493	
	0403-0137		GUIDE PC BOARD-GRN	14493	
Q1	1854-0071	1	XSTR SI NPN	07263 2N3904	
	1200-0148	1	MOUNTING BASE XSTR	28480	
	0340-0149	1	INSULATOR XSTR	76530	
Q2	1854-0043	1	XSTR SI NPN	07263 2N3906	
	1200-0041	1	MOUNTING BASE XSTR	71785 136-37-10-013	
	1200-0043	2	INSULATOR XSTR	76530 2N3011	
Q3	1854-0043		XSTR SI NPN	07263 2N3906	
	1200-0041		MOUNTING BASE XSTR	71785 136-37-10-013	
	1200-0043		INSULATOR XSTR	76530 2N3011	
Q4	1854-0071		XSTR SI NPN	07263 2N3904	
	1200-0148		MOUNTING BASE XSTR	28480	
	0340-0149		INSULATOR XSTR	76530	
R1	2100-0980	1	R VAR 500K OHM TOP 1/2W LIN	12697 47HV	
	0370-1099		KNOB	28480	
	5040-0418	1	COVER INSULATING POTENTIOMETER	28480	
R2	2100-0169	1	R VAR 1.2M OHM 20% 2W FOCUS	80009	
	0370-1099		KNOB FOCUS	28480	
	5040-0418		COVER, INSULATING POTENTIOMETER	28480	
	1410-0032	1	MOUNTING POTENTIOMETER	28480 IND	
R3	2100-0174	1	R VAR 50K-1K OHM CONCENTRATION/SPECTRUM	01121	
	0370-1100	1	KNOB CONCEN/INTEN A GAIN	80009	
	0370-1126	1	KNOB CONCEN/INTEN SPECTRUM WIDTH	80009	
R4	2100-0820	2	R VAR 50K OHM 3W 10TURN X PHASE SHIFT	80294	
	0370-1091	2	KNOB X PHASE SHIFT	80009	
R5	2100-0820		R VAR 50K OHM 3W 10TURN Y BEAM OFFSET	80294	
	0370-1091		KNOB Y BEAM OFFSET	80009	
R6	2100-2635	2	R VAR 50K OHM TOP 1/2W SPECTRUM CENTER	01121	

Abbreviations are listed in the introduction to this section

Table 6-1 Replaceable Parts (continued)

Ref Desig	HP Part No	TQ	Description	Mfr	Mfr Part No
	2950-0034	2	NUT HEX 3/8-32	28480	
	0370-1008	2	KNOB SPECTRUM LEVIAN	60007	
A7	2100-2835		R VAR 50K OHM 10% 1/2W X POSITION	01121	
	2950-0034		NUT HEX 3/8-32	28480	
	0370-1008		KNOB X POSITION	60007	
A8	2100-3110	2	R VAR 10K LOG(10K LIN Y1GAIN/POSITION	01121	
	0370-1100		KNOB CONCEN OUTER Y1 GAIN	60007	
	0370-1011	2	KNOB CONCEN INNER Y1 POSITION	60007	
A9	2100-3110		R VAR 10K LOG 10K LIN Y2GAIN/POSITION	01121	
	0370-1100		KNOB CONCEN OUTER Y2 GAIN	60007	
	0370-1011		KNOB CONCEN INNER Y2 POSITION	60007	
A10	2100-1439	1	R VAR 1K OHM 10% MARKER ZERO	60007	
	0698-0043	1	NUT HEX	60007	
	1490-0648	1	MOUNTING POTENTIOMETER	60007	
A11	2100-3117	1	R VAR 2.5K OHM SWITCH MARKER OFFSET	80294	
	0370-1011	1	KNOB DIAL MARKER OFFSET	60007	
A12	2100-0130	1	R VAR 10K OHM 20% 1/4W LIN	60007	
A13	2100-0429	1	R VAR 1M OHM 30% 1/2W LIN ASTIGMATISM	60007	
A14	2100-0134	1	R VAR 10K OHM 10% 2W INT INTENSITY	60007	
A15	0698-3154	1	R FXD 17.8K OHM 1% 1/8W	19701 MF4C1-0	
S1	3101-1398	1	SW LINE SPST	27038 83-67280	
S2	3100-0441	2	SW LVR SPDT BLANKING	76854 184	
	0370-0929		KNOB LEVER SW JADE GRAY	14493 0370-0929	
S3	3100-0440	1	SW LVR SPDT CALIBRATION	60007	
	0370-0929		KNOB LEVER SW JADE GRAY	14493 0370-0929	
S4	3100-0679	1	SW LVR SPST SWEEP SOURCE	60007	
	0370-0929		KNOB LEVER SW JADE GRAY	14493 0370-0929	
S5	3100-0441		SW LVR SPDT BR INPUT	76854 184	
	0370-0929		KNOB LEVER SW JADE GRAY	14493 0370-0929	
S6	3100-0672	1	SW ROTY PRINT SPST Y1 DISPLAY	80226	
	0370-1107	1	KNOB Y1 DISPLAY	60007	
	0370-2181	1	SHAFT EXTENDER Y1 DISPLAY	60007	
	0370-2183	1	SHAFT COUPLER	60007	
S7	3100-0672	1	SW ROTY PRINT SPST Y2 DISPLAY	80226	
	0370-1014	1	KNOB Y2 DISPLAY	14493 0370-1014	
S8	3100-0440	1	SW LVR ACTUATED ROTY SPST Y1Y2 CALIB	76854	
	0370-0929		KNOB LEVER SW JADE GRAY	14493 0370-0929	
S9	3100-0441	1	SW LVR SPDT MARKER COMB	60007	
	0370-0929		KNOB LEVER SW JADE GRAY	14493 0370-0929	
S10			SW PART OF MARKER OFFSET		
S11	3101-0957	1	SW TGL DPDT SLAVE	09353 7201	
S13	3101-0070	1	SW SLIDE DPDT MR BANDWIDTH	79727 G-176	
	0370-127	2	KNOB	60007	
S14	3101-0140	1	SW PUSHBUTTON SPDT	82389 105-1044	
T1	9100-0631	1	TRANSFORMER MAINS	60007	
V1	5083-2282	1	CRT PR PINDAMION	28480	
W1	8120-1351	1	ASSY CBL AC PWR (STANDARD)	60007	
	8120-1348	1	ASSY CBL AC PWR (UK & CANADA)	60007	
	8120-1347	1	ASSY CBL AC PWR (SCAND(NAVIA)	60007	
W2	01702-1204	1	ASSY CABLE LINE ON/OFF	60007	
W3	00140-61404	1	LEAD WIT	60007	
W100	01702-7107	1	CABLE HARNESS MAIN SIGNAL	60007	
W101	01702-7242	1	ASSY COAX CBL MAN	60007	
	1250-0810		CONN COAX RIGHT ANG BNC TO CHAS	60011 OR 07934 C-114	
W102	01702-7237	1	ASSY COAX CBL RED	60007	

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	VIP Part No	TQ	Description	Mfr.	Mfr Part No
	1250-0931	32	CONN COAX CBL MTG CONNBX	VARIAN	01-128-0000
W105	03702-7216	1	ASSY COAX CBL GRN	80007	
	1250-0931		CONN COAX CBL MTG CONNBX	VARIAN	01-128-0000
W106	03702-7214	1	ASSY COAX CBL YEL	80007	
	1250-0931		CONN COAX CBL MTG CONNBX	VARIAN	01-128-0000
	1250-0931		CONN COAX CBL MTG CONNBX	VARIAN	01-128-0000
W107	03702-7213	1	ASSY COAX CBL GRN	80007	
	1250-0931		CONN COAX CBL MTG CONNBX	VARIAN	01-128-0000
W108	03702-7215	1	ASSY COAX CBL BLU	80007	
	1250-0931		CONN COAX CBL MTG CONNBX	VARIAN	01-128-0000
	1250-0931		CONN COAX CBL MTG CONNBX	VARIAN	01-128-0000
W109	03702-7217	1	ASSY COAX CBL VIO	80007	
	1250-0931		CONN COAX CBL MTG CONNBX	VARIAN	01-128-0000
W110	03702-7218	1	ASSY COAX CBL GRY	80007	
	1250-0931		CONN COAX CBL MTG CONNBX	VARIAN	01-128-0000
W111	03702-7219	1	ASSY COAX CBL WHT	80007	
	1250-0931		CONN COAX CBL MTG CONNBX	VARIAN	01-128-0000
W112	03702-7220	1	ASSY COAX CBL BRN/BLK	80007	
W113	03702-7236	1	ASSY COAX CBL BRN/VIO	80007	
	1250-0931		CONN COAX CBL MTG CONNBX	VARIAN	01-128-0000
W114	03702-7239	1	ASSY COAX CBL BRN/GRY	80007	
	1250-0931		CONN COAX CBL MTG CONNBX	VARIAN	01-128-0000
W115	03702-7240	1	ASSY COAX CBL BRN/WHT	80007	
	1250-0931		CONN COAX CBL MTG CONNBX	VARIAN	01-128-0000
W116	03702-7241	1	ASSY COAX CBL RED/BLK	80007	
	1250-0931		CONN COAX CBL MTG CONNBX	VARIAN	01-128-0000
W121	03702-7217	1	ASSY COAX CBL RED/BRN	80007	
W126	03702-7231	1	ASSY COAX CBL RED/BLU	80007	
W127	03702-7230	1	ASSY COAX CBL RED/VIO	80007	
	1250-0931		CONN COAX CBL MTG CONNBX	VARIAN	01-128-0000
W128	03702-7219	1	ASSY COAX CBL RED/GRY	80007	
W130	03702-7223	1	ASSY COAX CBL ORN/BLK	80007	
W131	03702-7224	1	ASSY COAX CBL ORN/BRN	80007	
W132	03702-7229	1	ASSY COAX CBL ORN/RED	80007	
W134	03702-7228	1	ASSY COAX CBL ORN/YEL	80007	
W135	03702-7226	1	ASSY COAX CBL ORN/ORN	80007	
W136	03702-7225	1	ASSY COAX CBL ORN/BLU	80007	
W137	03702-7235	1	ASSY COAX CBL ORN/VIO	80007	
	1250-0931		CONN COAX CBL MTG CONNBX	VARIAN	01-128-0000
W138	03702-7219	1	ASSY COAX CBL ORN/GRY	80007	
W140	03702-7222	1	ASSY COAX CBL YEL/BLK	80007	
W141	03702-7232	1	ASSY COAX CBL YEL/BRN	80007	
W142	03702-7250	1	ASSY COAX CBL YEL/RED	80007	
W145	03702-7233	1	ASSY COAX CBL YEL/ORN	80007	
W146	03702-7234	1	ASSY COAX CBL YEL/BLU	80007	
W147	03702-7234	1	ASSY COAX CBL YEL/VIO	80007	
W148	03702-7238	1	ASSY COAX CBL YEL/GRY	80007	
W150	03702-7245	1	ASSY COAX CBL GRN/BLK	80007	
W151	03702-7246	1	ASSY COAX CBL GRN/BRN	80007	
	1250-0931		CONN COAX CBL MTG CONNBX	VARIAN	01-128-0000
W152	03702-7247	1	ASSY COAX CBL GRN/RED	80007	
	1250-0931		CONN COAX CBL MTG CONNBX	VARIAN	01-128-0000
W156	03702-7248	1	ASSY COAX CBL GRN/BLU	80007	
	1250-0931		CONN COAX CBL MTG CONNBX	VARIAN	01-128-0000
W157	03702-7249	1	ASSY COAX CBL GRN/VIO	80007	

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	HP Part No	TQ	Description	Mfr	Mfr Part No
	1250-0931		CONN COAX CBL MTG CONNEX	98291	51-121R-0000
W158	03702-7158	1	ASSY COAX CBL GRN/ORY	28007	
W159	03702-7159	1	ASSY COAX CBL BLU/BLK	28007	
W160	03702-7160	1	ASSY COAX CBL BLU/BRN	28007	
W161	03702-7154	1	ASSY COAX CBL BLU/VIO	28007	
W167	03702-7228	1	ASSY COAX CBL BLU/ORY	28007	
W168	03702-7232	1	ASSY COAX CBL WHT/GRN	28007	
W169	03702-7218	1	ASSY COAX CBL WHT/ORN	28007	
W170	03702-7230	1	CABLE HARNESS CBL	28007	
W200	03702-7194	1	SOCKET CBL TUBE	73420	9709-4
	1200-0037	1	CABLE HARNESS POWER SUPPLY PRIMARY	28007	
W300	03702-7195	1	CABLE HARNESS POWER SUPPLY SECONDARY	28007	
W301	03702-7196	1	ASSY COAX CBL BRN/BLU	28007	
	1250-0931		CONN COAX CBL MTG CONNEX	98291	51-121R-0000
	1250-0931		CONN COAX CBL MTG CONNEX	98291	51-121R-0000
W302	03702-7167	1	ASSY COAX CBL RED/RED	28007	
	1250-0931		CONN COAX CBL MTG CONNEX	98291	51-121R-0000
	1250-0931		CONN COAX CBL MTG CONNEX	98291	51-121R-0000
W303	03702-7167	1	ASSY COAX CBL RED/BRN	28007	
	1250-0931		CONN COAX CBL MTG CONNEX	98291	51-121R-0000
	1250-0931		CONN COAX CBL MTG CONNEX	98291	51-121R-0000
W304	03702-7168	1	ASSY COAX CBL RED/YEL	28007	
	1250-0931		CONN COAX CBL MTG CONNEX	98291	51-121R-0000
	1250-0931		CONN COAX CBL MTG CONNEX	98291	51-121R-0000
W305	03702-7169	1	ASSY COAX CBL RED/BRN	28007	
	1250-0931		CONN COAX CBL MTG CONNEX	98291	51-121R-0000
	1250-0931		CONN COAX CBL MTG CONNEX	98291	51-121R-0000
MA9	1251-0172	1	CONN MULTI RND MTG 22-WAY	71785	250-22-30-210
MA10	1251-0172		CONN MULTI RND MTG 22-WAY	71785	250-22-30-210
MA11	1251-0172		CONN MULTI RND MTG 22-WAY	71785	250-22-30-210
MA12	1251-0172		CONN MULTI RND MTG 22-WAY	71785	250-22-30-210
MA14	1251-0172		CONN MULTI RND MTG 22-WAY	71785	250-22-30-210
ZZ1	9211-1196	1	CARTON CORRUGATED	28007	
	9220-1221	1	CARTON FLOATER	28007	
	9220-1847	1	PAD CORRUGATED BOTTOM	28007	
	9220-1846	1	PAD CORRUGATED FRONT	28007	
	9220-1849	1	PAD CORRUGATED DOUBLE CELL	28007	
	9222-0325	1	BAG POLYTHENE	28007	
A1	03702-7203	1	ASSY LOW VOLTAGE POWER SUPPLY	28007	
	03702-3203	1	PC BD BLANK	28007	
	2040-0124	2	EXTRACTOR PC BD BRN	14293	2040-0124
A1C1	0180-0049	1	C FXD 10UF +50-10% 150WVDC	56289	300 10A5 150D106X0
A1C2	0180-0174	2	C FXD 0.47UF +80-20% 25WVDC	56289	5C11A7B-CP1
A1C3	0180-0049		C FXD 47UF +50-10% 150WVDC	73445	031-000-A500-4732
A1C4	0180-0228	2	C FXD 22UF 10% 15WVDC	56289	150D226X9015B2-DY5
A1C5	0180-0097	10	C FXD 47UF 10% 35WVDC	56289	150D476X9035B2-DY5
A1C6	0180-0174		C FXD 0.47UF +80-20% 25WVDC	56289	5C11A7B-CP1
A1C7	0180-0049		C FXD 47UF +50-10% 150WVDC	73445	031-000-A500-4732
A1C8	0180-0228		C FXD 22UF 10% 15WVDC	56289	150D226X9015B2-DY5
A1C9	0180-0097		C FXD 47UF 10% 35WVDC	56289	150D476X9035B2-DY5
A1C10	0180-0174		C FXD 0.47UF +80-20% 25WVDC	56289	5C11A7B-CP1
A1C11	0180-0196	11	C FXD 100UF +100-10% 50WVDC	56289	500D107G050DC4B1
A1C12	0160-0174		C FXD 0.47UF +80-20% 25WVDC	56289	5C11A7B-CP1

Abbreviations are listed in the introduction to this section

Table 4-1. Replaceable Parts (continued)

Ref Desig	HP Part No	TQ	Description	Mfr	Mfr Part No
A1CR1	1902-0176	1	DIO BKDN 100V 5% 1W	04713	SZ-11213-428
A1CR2	1902-0665	1	DIO BKDN 12V 5% 1W	04713	
A1CR3	1884-0012	1	DIO SCR	02735	
A1CR4	1902-3097	2	DIO BKDN 5.23V 2% 400MW	07910	CD-35-A26
A1CR5	1902-3224	2	DIO BKDN 17.8V 5% 400MV	04713	
A1CR6	1884-0073	3	DIO SCR	03877	
A1CR7	1902-3097		DIO BKDN 5.23V 2% 400MW	07910	CD-35-A26
A1CR8	1902-3224		DIO BKDN 17.8V 5% 400MV	04713	
A1CR9	1884-0073		DIO SCR	03877	
A1CR10	1902-0244	1	DIO BKDN 30.1V 5% 1W	04713	SZ-11213-270
A1CR11	1902-3311	1	DIO BKDN 38.3V 400MW	07910	CD 35874
A1CR12	1884-0073		DIO SCR	03877	
A1Q1	1854-0039	2	XSTR SI NPN	02735	2N3053
	1205-0011	2	HEAT DISSIPATOR XSTR	98978	TXBF-032-025B
A1Q2	1854-0071	9	XSTR SI NPN	01295	SKA1124
A1Q3	1854-0015	2	XSTR SI NPN DUAL	15818	SP-8172
A1Q4	1854-0039		XSTR SI NPN	02735	2N3053
	1205-0011		HEAT DISSIPATOR XSTR	98978	TXBF-032-025B
A1Q5	1854-0071		XSTR SI NPN	01295	SKA1124
A1Q6	1854-0014		XSTR SI NPN DUAL	15818	SP-8172
A1R1	0698-0088	1	R FXD FLM 825 OHM 1% 1/4W	01295	
A1R2	0757-0340	1	R FXD FLM 10K OHM 1% 1/4W	01295	
A1R3	0757-0280	40	R FXD 1K OHM 1% 1/8W	75042	CEAT-0
A1R4	0698-3699	2	R FXD FLM 2.15K OHM 1% 1/4W	01295	
A1R5	0757-0448	5	R FXD 18.2K OHM 1% 1/8W	19701	MF7C,T-0
A1R6	0698-0084	20	R FXD 2.15K OHM 1% 1/8W	19701	MF4C1-0
A1R7	0757-0421	9	R FXD 825 OHM 1% 1/8W	19701	MF4C1-0
A1R8	0757-0442	42	R FXD 10K OHM 1% 1/8W	19701	MF4C
A1R9	0698-4037	22	R FXD 46.4 OHM 1% 1/8W	75042	CEAT-0
A1R10	0757-0439	15	R FXD 6.81K OHM 1% 1/8W	19701	MF4C
A1R11	0698-4037		R FXD 46.4 OHM 1% 1/8W	75042	CEAT-0
A1R12	0757-0440	11	R FXD 7.5K OHM 1% 1/8W	19701	MF4C1-0
A1R13	2100-2633	3	R VAR 1K 10% 1/2W LIN	21030	67-224-1
A1R14	0698-3153	5	R FXD 3.83K OHM 1% 1/8W	19701	MF4C1-0
A1R15	0757-0280		R FXD 1K OHM 1% 1/8W	75042	CEAT-0
A1R16	0698-3699		R FXD FLM 2.15K OHM 1% 1/4W	01295	
A1R17	0757-0448		R FXD 18.2K OHM 1% 1/8W	19701	MF7C,T-0
A1R18	0698-0084		R FXD 2.15K OHM 1% 1/8W	19701	MF4C1-0
A1R19	0757-0421		R FXD 825 OHM 1% 1/8W	19701	MF4C1-0
A1R20	0757-0444	4	R FXD 12.1K OHM 1% 1/8W	19701	MF4C1-0
A1R21	0757-0439		R FXD 6.81K OHM 1% 1/8W	19701	MF4C
A1R22	0698-3153		R FXD 3.83K OHM 1% 1/8W	19701	MF4C1-0
A1R23	2100-2633		R VAR 1K 10% 1/2W LIN	21030	67-224-1
A1R24	0757-0440		R FXD 7.5K OHM 1% 1/8W	19701	MF4C1-0
A1R25	0757-0280		R FXD 1K OHM 1% 1/8W	75042	CEAT-0
A1R26	0758-0001	1	R FXD 3.3K OHM 5% 1/2W	19701	MF7C,T-0
A1R27	0757-0280		R FXD 1K OHM 1% 1/8W	75042	CEAT-0
A2	03707-71605	1	ASSY HORIZONTAL DEFLECTION	28480	
	03707-21605	1	PC BD BLANK	28480	
	4040-0750	8	EXTRACTOR PC BD RED	14493	5040-0113
	4040-0750		EXTRACTOR PC BD RED	14493	5040-0113
A2C1	0180-0228		C FXD 22UF 10% 15VDC	56289	150D226X9015B2-DYS
A2C3	0160-0174		C FXD 0.47UF +80-20% 25WVDC	56289	5C11N7S-CML
A2C4	0160-0174		C FXD 0.47UF +80-20% 25WVDC	56289	5C11N7S-CML

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	HP Part No	TQ	Description	Mfr	Mfr Part No
A2C5	0160-0740	3	C FXD 0.22UF 5% 100WVDC	80709	FMAD,22J100
A2C6	0160-0849	3	C FXD 0.15UF 5% 100WVDC	80709	FMAD,15J100
A2C7	0160-0459	8	C FXD 30PF 5% 300WVDC	72982	
A2C8	0160-2197	4	C FXD 10PF 5% 200WVDC	72136	RDM15C100J3C
A2C9	0160-3156	4	C FXD 5.3PF 5% 300VDC	20946	
A2C10	0160-0093	19	C FXD 0.01UF +80-10% 100WVDC	91418	
A2C11	0160-2197		C FXD 10PF 5% 200WVDC	72136	RDM15C100J3C
A2C12	0160-0137	5	C FXD 100UF 20% 20WVDC	56289	
A2C13	0160-0121	5	C FXD 0.1UF +80-20% 50WVDC	56289	5C50B15-CML
A2C14	0160-1146	5	C FXD 15UF 10% 20WVDC	56289	150D156X9020B2-DYS
A2C15	0160-0459		C FXD 30PF 5% 300VDC	72982	
A2C16	0160-0574	8	C FXD 100F 10% 20WVDC	56289	150D106X9020B2-DYS
A2C17	0160-0442	3	C FXD 33PF 5% 30WVDC	72982	8131-029
A2C18	0160-3136		C FXD 3.3PF 5% 30WVDC	20946	
A2C19	0160-0228		C FXD 22UF 10% 15WVDC	56289	150D226X9015B2-DYS
A2C20	0160-0442		C FXD 33PF 5% 30WVDC	72982	8131-029
A2C21	0160-3136		C FXD 3.3PF 5% 30WVDC	20946	
A2C22	0160-2144	3	C FXD 0.022UF +80-20% 100WVDC	91418	TA
A2C23	0160-2134		C FXD 0.022UF +80-20% 100WVDC	91418	TA
A2C24	0160-0128		C FXD 68UF 10% 10WVDC	56289	150D686X9010B2-DYS
A2C25	0160-2158	2	C FXD 100PF 5% 200WVDC	91418	TA
A2C26	0160-2158		C FXD 100PF 5% 300WVDC	72136	RDM15F101J3C
A2C27	0160-0159	66	C FXD 2.2UF 20% 20WVDC	56289	150D225X0020A2-DYS
A2C28	0160-0104	1	C FXD 47UF 20% 6WVDC	56289	150D476X0006A2-DYS
A2C30	0160-0476		C FXD 0.15UF 10% 50WVDC	56289	
A2C31	0160-0104		C FXD 47UF 20% 6WVDC	56289	150D476X0006A2-DYS
A2C32	0160-0097		C FXD 470F 10% 35WVDC	56289	150D471X9035B2-DYS
A2C33	0160-0442		C FXD 33PF 5% 30WVDC	72982	8131-029
A2C34	0160-3136		C FXD 3.3PF 5% 30WVDC	20946	
A2C35	0160-0094	3	C FXD 0.05UF +80-20% 100WVDC	91418	TA
A2C36	0160-0157		C FXD 100UF 20% 20WVDC	56289	
A2C37	0160-0174		C FXD 0.47UF +80-20% 25WVDC	56289	5C11A75-CML
A2C38	0160-0137		C FXD 100UF 20% 20WVDC	56289	
A2C39	0160-0174		C FXD 0.47UF +80-20% 25WVDC	56289	5C11A75-CML
A2C40	0160-0228		C FXD 22UF 10% 15WVDC	56289	150D226X9015B2-DYS
A2C41	0160-0174		C FXD 0.47UF +80-20% 25WVDC	56289	5C11A75-CML
A2C42	0160-0229		C FXD 33UF 10% 10WVDC	56289	150D336X9010B2-DYS
A2C43	0160-0174		C FXD 0.47UF +80-20% 25WVDC	56289	5C11A75-CML
A2C44	0160-0161	1	C FXD 3.3UF 20% 35WVDC	56289	150D335X0035B2-DYS
A2C45	0160-0459		C FXD 30PF 5% 30WVDC	72982	
A2C46	0160-1745	1	C FXD 1.5UF 10% 20WVDC	56289	150D155X9020A2-DYS
A2C47	0160-0094		C FXD 0.05UF +80-20% 100WVDC	91418	TA
A2CR1	1901-0040	11	DIO SI	12040	500090
A2CR2	1902-3082	3	DIO ZNDN 4.64V 5% 400MW	07910	CD3864D
A2CR3	1901-0040		DIO SI	12040	500090
A2CR4	1901-0040		DIO SI	12040	500090
A2CR5	1902-3049	1	DIO ZNDN 61.9V 5% 400MW	07910	CD3899A
A2CR7	1902-3102	2	DIO ZNDN 12.1V 5% 400MW	07910	CD3873D
A2CR8	1902-3102		DIO ZNDN 12.1V 5% 400MW	07910	CD3873D
A2E1	0380-0588	4	VOLTAGE CONTROL RESISTOR	80009	
A2E2	0380-0588		VOLTAGE CONTROL RESISTOR	80009	
A2E3	0380-0588		VOLTAGE CONTROL RESISTOR	80009	
A2E4	0380-0588		VOLTAGE CONTROL RESISTOR	80009	
A2MC1	1820-0817	2	IC OP AMP	07263	SL4042
A2MC2	1820-0108	1	IC OP AMP	80009	

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	HP Part No	TQ	Description	Mfr	Mfr Part No
A2MC3	1820-0477	8	IC OP AMP	01295	SN10731
A2MC4	1820-0098	7	IC OP AMP	13715	SL21434
A2MC5	1820-0477		IC OP AMP	01295	SN10731
A2MC6	1820-0098		IC OP AMP	13715	SL21434
A2MC7	1820-0098		IC OP AMP	13715	SL21434
A2MC8	1820-0094	1	IC QUAD 2-I/P NAND GATE	00001	SN5402
A2MC9	1820-0098		IC OP AMP	13715	SL21434
A2MC10	1820-0217		IC OP AMP	07263	SL04427
A2MC11	1820-0098		IC OP AMP	13715	SL21434
A2Q2	1854-0071		NSIR SI NPN	01295	SKA1124
A2Q3	1854-0071		NSIR SI NPN	01295	SKA1124
A2Q4	1854-0071		NSIR SI NPN	01295	SKA1124
A2Q5	1854-0071		NSIR SI NPN	01295	SKA1124
A2Q6	1855-0090	6	NSIR FET N-CHANNEL	21845	F1191
A2Q7	1854-0071		NSIR SI NPN	01295	SKA1124
A2Q8	1854-0071		NSIR SI NPN	01295	SKA1124
A2Q9	1853-0015	4	NSIR SI PNP	07263	2N3640
A2Q10	1854-0232	4	NSIR SI NPN	03508	
A2Q11	1854-0071		NSIR SI NPN	01295	SKA1124
A2Q12	1854-0232		NSIR SI NPN	03508	
A2Q13	1854-0071		NSIR SI NPN	01295	SKA1124
A2Q14	1854-0071		NSIR SI NPN	01295	SKA1124
A2Q15	1854-0071		NSIR SI NPN	01295	SKA1124
A2Q16	1854-0071		NSIR SI NPN	01295	SKA1124
A2Q17	1854-0071		NSIR SI NPN	01295	SKA1124
A2Q18	1854-0071		NSIR SI NPN	01295	SKA1124
A2Q19	1854-0232		NSIR SI NPN	03508	
A2Q20	1854-0232		NSIR SI NPN	03508	
A2Q21	1854-0071		NSIR SI NPN	01295	SKA1124
A2Q22	1854-0071		NSIR SI NPN	01295	SKA1124
A2R1	0757-0449	9	R FXD 20K OHM 1% 1/8W	19701	MF4C1-0
A2R2	0757-0419	1	R FXD 475 OHM 1% 1/8W	19701	MF4C 1-0
A2R3	0757-0461	2	R FXD 68.1K OHM 1% 1/8W	19701	MF4C
A2R4	0757-0448	13	R FXD 100K OHM 1% 1/8W	19701	MF4C1-0
A2R5	0757-0470	2	R FXD 162K OHM 1% 1/8W	19701	MF4C1-0
A2R6	0698-0085	4	R FXD 2.61K OHM 1% 1/8W	19701	MF4C1-0
A2R7	0698-0085		R FXD 2.61K OHM 1% 1/8W	19701	MF4C1-0
A2R8	0698-0085		R FXD 2.61K OHM 1% 1/8W	19701	MF4C1-0
A2R9	0698-0085		R FXD 2.61K OHM 1% 1/8W	19701	MF4C1-0
A2R10	0698-3481	5	R FXD 133K OHM 1% 1/8W	19701	MF4C1-0
A2R11	0757-0148	1	R FXD 750K OHM 1% 1/4W	01295	
A2R12	0757-0442	1	R FXD 10K OHM 1% 1/8W	19701	MF4C
A2R13	0757-0469	7	R FXD 150K OHM 1% 1/8W	19701	MF4C1-0
A2R14	0757-0416	7	R FXD 511 OHM 1% 1/8W	19701	MF4C1-0
A2R15	0757-0458	8	R FXD 51.1K OHM 1% 1/8W	19701	MF4C1-0
A2R16	0757-0442		R FXD 10K OHM 1% 1/8W	19701	MF4C
A2R17	0757-0465		R FXD 100K OHM 1% 1/8W	19701	MF4C1-0
A2R18	0698-3160	2	R FXD 31.6K OHM 1% 1/8W	19701	MF4C1-0
A2R19	0698-3490	2	R FXD 42.2K OHM 1% 1/8W	19701	MF4C 1-0
A2R20	0757-0470		R FXD 162K OHM 1% 1/8W	19701	MF4C1-0
A2R21	0757-0467	3	R FXD 121K OHM 1% 1/8W	19701	MF4C1-0
A2R22	0757-0442	13	R FXD 10K OHM 1% 1/8W	19701	MF4C
A2R23	0698-3450		R FXD 42.2K OHM 1% 1/8W	19701	MF4C 1-0
A2R24	0757-0440		R FXD 7.5K OHM 1% 1/8W	19701	MF4C1-0
A2R25	0757-0398	23	R FXD 75 OHM 1% 1/8W	19701	MF4C

Abbreviations are listed in the introduction to this section.

Table 4-1 Replaceable Parts (continued)

Ref Desig	HP Part No	TQ	Description	Mfr	Mfr Part No
A2R26	0757-0444		R FXD 12.1K OHM 1% 1/8W	19701	MFACT-0
A2R27	0757-0398		R FXD 75 OHM 1% 1/8W	19701	MFAC
A2R28	0757-0199	6	R FXD 21.5K OHM 1% 1/8W	19701	MFACT-0
A2R29	0757-0278	7	R FXD 1.78K OHM 1% 1/8W	75042	CEAT-0
A2R30	0757-0274	12	R FXD 1.21K OHM 1% 1/8W	19701	MFACT-0
A2R31	0757-0199		R FXD 21.5K OHM 1% 1/8W	19701	MFACT-0
A2R32	0757-0278		R FXD 1.78K OHM 1% 1/8W	75042	CEAT-0
A2R33	0757-0449		R FXD 20K OHM 1% 1/8W	19701	MFACT-0
A2R34	0757-0280		R FXD 1K OHM 1% 1/8W	75042	CEAT-0
A2R35	0757-0200	6	R FXD 8.06K OHM 1% 1/8W	19701	MFAC
A2R36	0698-0085		R FXD 2.61K OHM 1% 1/8W	19701	MFACT-0
A2R37	2100-2516	3	R VAR 100K OHM 1% 1/2W	21030	
A2R38	0757-0465		R FXD 100K OHM 1% 1/8W	19701	MFACT-0
A2R39	0757-0465		R FXD 100K OHM 1% 1/8W	19701	MFACT-0
A2R40	0757-0458		R FXD 51.1K OHM 1% 1/8W	19701	MFACT-0
A2R41	0757-0458		R FXD 51.1K OHM 1% 1/8W	19701	MFACT-0
A2R42	0757-0467		R FXD 121K OHM 1% 1/8W	19701	MFACT-0
A2R43	0757-0438	12	R FXD 5.11K OHM 1% 1/8W	19701	MFACT-0
A2R44	0757-0416		R FXD 511 OHM 1% 1/8W	19701	MFACT-0
A2R45	0757-0438		R FXD 5.11K OHM 1% 1/8W	19701	MFACT-0
A2R46	0757-0442		R FXD 10K OHM 1% 1/8W	19701	MFAC
A2R47	0757-0729	1	R FXD 681 OHM 1% 1/4W	01295	
A2R48	0757-0442		R FXD 10K OHM 1% 1/8W	19701	MFAC
A2R49	0757-0416		R FXD 511 OHM 1% 1/8W	19701	MFACT-0
A2R50	0757-0442		R FXD 10K OHM 1% 1/8W	19701	MFAC
A2R51	0698-3457	1	R FXD 316K OHM 1% 1/8W	19701	MFACT-0
A2R52	0757-0458	9	R FXD 51.1K OHM 1% 1/8W	19701	MFACT-0
A2R53	0757-0441	2	R FXD 8.25K OHM 1% 1/8W	19701	MFACT-0
A2R54	0757-0427	14	R FXD 1.5K OHM 1% 1/8W	19701	MFACT-0
A2R55	0757-0438		R FXD 5.11K OHM 1% 1/8W	19701	MFACT-0
A2R57	0757-0279	16	R FXD 3.16K OHM 1% 1/8W	75042	CEAT-0
A2R58	0757-0465		R FXD 100K OHM 1% 1/8W	19701	MFACT-0
A2R59	0698-3451		R FXD 133K OHM 1% 1/8W	19701	MFACT-0
A2R60	0757-0439		R FXD 6.81K OHM 1% 1/8W	19701	MFAC
A2R61	0757-0438		R FXD 5.11K OHM 1% 1/8W	19701	MFACT-0
A2R62	0757-0716	1	R FXD 162K OHM 1% 1/4W	01295	
A2R63	0757-0472	4	R FXD 200K OHM 1% 1/8W	19701	MFACT-0
A2R64	0757-0440		R FXD 6.5K OHM 1% 1/8W	19701	MFACT-0
A2R65	0757-0440		R FXD 6.5K OHM 1% 1/8W	19701	MFACT-0
A2R66	0757-0449		R FXD 20K OHM 1% 1/8W	19701	MFACT-0
A2R67	0757-0465		R FXD 100K OHM 1% 1/8W	19701	MFACT-0
A2R68	0757-0467		R FXD 121K OHM 1% 1/8W	19701	MFACT-0
A2R69	0757-0465		R FXD 100K OHM 1% 1/8W	19701	MFACT-0
A2R70	0757-0465		R FXD 100K OHM 1% 1/8W	19701	MFACT-0
A2R71	0757-0442		R FXD 10K OHM 1% 1/8W	19701	MFAC
A2R72	0757-0280		R FXD 1K OHM 1% 1/8W	75042	CEAT-0
A2R73	2100-2516		R VAR 100K OHM 1% 1/2W	21030	
A2R74	0698-0085		R FXD 2.61K OHM 1% 1/8W	19701	MFACT-0
A2R75	0698-3152	4	R FXD 3.48K OHM 1% 1/8W	19701	MFACT-0
A2R76	0757-0458		R FXD 51.1K OHM 1% 1/8W	19701	MFACT-0
A2R77	0757-0464	2	R FXD 90.9K OHM 1% 1/8W	01295	
A2R78	0698-3449	1	R FXD 20.7K OHM 1% 1/8W	19701	MFACT-0
A2R79	0698-3158	4	R FXD 23.7K OHM 1% 1/8W	19701	MFACT-0
A2R80	0757-0443	1	R FXD 11K OHM 1% 1/8W	19701	MFACT-0
A2R81	0757-0472		R FXD 200K OHM 1% 1/8W	19701	MFACT-0
A2R82	0757-0444		R FXD 12.1K OHM 1% 1/8W	19701	MFACT-0

Abbreviations are listed in the Introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	HP Part No	TQ	Description	Mfr	Mfr Part No
A3R83	0757-0416		R FXD 511 OHM 1% 1/8W	19701	MF4C1-0
A3R84	0757-0464		R FXD 90.9K OHM 1% 1/8W	01295	
A3R85	0757-0442		R FXD 10K OHM 1% 1/8W	19701	MF4C
A3R86	0757-0442		R FXD 10K OHM 1% 1/8W	19701	MF4C
A3R87	0757-0438		R FXD 6.11K OHM 1% 1/8W	19701	MF4C1-0
A3R88	0698-3439	1	R FXD 383K OHM 1% 1/8W	01295	
A3R89	0757-0123	3	R FXD 34.8K OHM 1% 1/8W	19701	MF4C1-0
A3R90	0757-0199		R FXD 21.5K OHM 1% 1/8W	19701	MF4C1-0
A3R91	0757-0462	1	R FXD 75K OHM 1% 1/8W		
A3R92	0757-0442		R FXD 10K OHM 1% 1/8W	19701	MF4C
A3R93	0757-0465		R FXD 100K OHM 1% 1/8W	19701	MF4C1-0
A3R94	0757-0465		R FXD 100K OHM 1% 1/8W	19701	MF4C1-0
A3R95	0757-0280		R FXD 1K OHM 1% 1/8W	75042	CEAT-0
A3	03703-7464	1	ASSY VERTICAL DEFLECTION	80007	
	03703-3164	1	PC BD BLANK	80007	
	4040-0781	2	EXTRACTOR PC BD ORN	14493	5040-5114
	4040-0781		EXTRACTOR PC BD ORN	14493	5040-5114
A3C1	0160-0939	5	C FXD 430PF 5% 300WVDC	72136	RDM19F431J3C
A3C2	0160-2197		C FXD 10PF 5% 300WVDC	72136	RDM19C100J3C
A3C3	0160-2204	2	C FXD 100PF 5% 300WVDC	72136	RDM19F101J3C
A3C4	0180-0098	3	C FXD 100UF 20% 20WVDC	56289	150D107X9020B2-DYS
A3C5	0160-0939		C FXD 430PF 5% 300WVDC	72136	RDM19F431J3C
A3C6	0160-2197		C FXD 10PF 5% 300WVDC	72136	RDM19C100J3C
A3C7	0160-2204		C FXD 100PF 5% 300WVDC	72136	RDM19F101J3C
A3C8	0160-2222	2	C FXD 1500PF 5% 300WVDC	72136	RDM19F152J3C
A3C9	0160-2222		C FXD 1500PF 5% 300WVDC	72136	RDM19F152J3C
A3C10	0160-0174		C FXD 0.47UF +80-20% 25WVDC	56289	3C11075-CNL
A3C12	0160-2199	5	C FXD 30PF 5% 300WVDC	72136	RDM19E300J3C
A3C13	0160-3849		C FXD [illegible]UF 5% 100WVDC	80798	PNA0.1K100
A3C14	0160-3741	1	C FXD [illegible]8UF 5% 100WVDC	80798	PNA0.068J100
A3C15	0160-3887	1	C FXD 0.015UF 10% 250WVDC	80798	PNA0.015K250
A3C16	0160-3888	1	C FXD 0.033UF 10% 400WVDC	80798	PNA0.033K250
A3C17	0160-0168	1	C FXD 0.10F 10% 400WVDC	56289	192P10492-PT6
A3C18	0180-1746		C FXD 15UF 10% 20WVDC	56289	150D156X9020B2-DYS
A3C19	0180-1746		C FXD 15UF 10% 20WVDC	56289	150D156X9020B2-DYS
A3C20	0180-1746		C FXD 15UF 10% 20WVDC	56289	150D156X9020B2-DYS
A3C22	0180-1746		C FXD 15UF 10% 20WVDC	56289	150D156X9020B2-DYS
A3C23	0121-0105	2	C VAR 9-35PF	20946	538-0040-9-35
A3C24	0121-0105		C VAR 9-35PF	20946	538-0040-9-35
A3CR1	1901-0040		DIO SI	12065	5G6050
A3CR2	1901-0040		DIO SI	12065	5G6050
A3CR3	1902-3070	4	DIO ZNDN 4.22V 5% 400MW	07910	CD35598
A3CR4	1902-3070		DIO ZNDN 4.22V 5% 400MW	07910	CD35598
A3CR5	1902-3070		DIO ZNDN 4.22V 5% 400MW	07910	CD35598
A3CR6	1902-3070		DIO ZNDN 4.22V 5% 400MW	07910	CD35598
A3MC1	1820-0058		IC OP AMP	13715	SL21434
A3MC2	1820-0058		IC OP AMP	13715	SL21434
A3MC3	1820-0477		IC OP AMP	01295	SN19231
A3Q1	1854-0019	20	XSTR SI NPN	13715	S-6516
A3Q2	1854-0019		XSTR SI NPN	13715	S-6516
A3Q3	1855-0020		XSTR FET N-CHANNEL	21845	F1151
A3Q4	1853-0015		XSTR SI PNP	07263	2N3640
A3Q5	1855-0020		XSTR FET N-CHANNEL	21845	F1151
A3Q6	1855-0020		XSTR FET N-CHANNEL	21845	F1151

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	HP Part No	TQ	Description	Mfr	Mfr Part No
A3U7	1854-0018		NSTR SI PNP	07263 FN3640	
A3U8	1854-0020		NSTR SI DUAL	01295 SN72709	
A3U9	1854-0019		NSTR SI NPN	13715 S-0910	
A3U10	1854-0022		NSTR SI NPN	03877 SI 1097	
A3U11	1854-0022		NSTR SI NPN	03877 SI 1097	
A3U12	1854-0019		NSTR SI NPN	13715 S-0910	
A3U13	1854-0071		NSTR SI NPN	01295 SN4124	
A3U14	1853-0015		NSTR SI PNP	07263 FN3640	
A3U15	1854-0071		NSTR SI NPN	01295 SN4124	
A3R1	0757-0442		R FXD 10K OHM 1% 1/8W	19701 MFAC	
A3R2	0757-0469		R FXD 150K OHM 1% 1/8W	19701 MFAC1=0	
A3R3	0757-0469		R FXD 100K OHM 1% 1/8W	19701 MFAC1=0	
A3R4	0757-0280		R FXD 1K OHM 1% 1/8W	75042 CEA1=0	
A3R5	0698-3451		R FXD 133K OHM 1% 1/8W	19701 MFAC1=0	
A3R6	0757-0442		R FXD 10K OHM 1% 1/8W	19701 MFAC	
A3R7	0757-0472		R FXD 200K OHM 1% 1/8W	19701 MFAC1=0	
A3R8	0757-0427		R FXD 1.5K OHM 1% 1/8W	19701 MFAC1=0	
A3R9	0757-0739		R FXD 2K OHM 1% 1/8W	19701 MFAC1=0	
A3R10	0757-0442		R FXD 10K OHM 1% 1/8W	19701 MFAC	
A3R11	0757-0442	4	R FXD 511K OHM 1% 1/8W	19701 MFAC1=0	
A3R12	0757-0442		R FXD 10K OHM 1% 1/8W	19701 MFAC	
A3R13	0757-0442		R FXD 10K OHM 1% 1/8W	19701 MFAC	
A3R14	0757-0442		R FXD 10K OHM 1% 1/8W	19701 MFAC	
A3R15	0757-0469		R FXD 150K OHM 1% 1/8W	19701 MFAC1=0	
A3R16	0757-0442		R FXD 10K OHM 1% 1/8W	19701 MFAC	
A3R17	0757-0280		R FXD 1K OHM 1% 1/8W	75042 CEA1=0	
A3R18	0698-3451		R FXD 133K OHM 1% 1/8W	19701 MFAC1=0	
A3R19	0757-0442		R FXD 10K OHM 1% 1/8W	19701 MFAC	
A3R20	0757-0472		R FXD 200K OHM 1% 1/8W	19701 MFAC1=0	
A3R21	0757-0427		R FXD 1.5K OHM 1% 1/8W	19701 MFAC1=0	
A3R22	0757-0739		R FXD 2K OHM 1% 1/8W	19701 MFAC1=0	
A3R23	0757-0442		R FXD 10K OHM 1% 1/8W	19701 MFAC	
A3R24	0757-0442		R FXD 511K OHM 1% 1/8W	19701 MFAC1=0	
A3R25	0757-0442		R FXD 10K OHM 1% 1/8W	19701 MFAC	
A3R26	0757-0442		R FXD 10K OHM 1% 1/8W	19701 MFAC	
A3R27	0757-0414	10	R FXD 681 OHM 1% 1/8W	19701 MFAC1=0	
A3R28	0698-3444	8	R FXD 316 OHM 1% 1/8W	19701 MFAC1=0	
A3R29	0757-0440		R FXD 19K OHM 1% 1/8W	19701 MFAC	
A3R30	0757-0440		R FXD 19K OHM 1% 1/8W	19701 MFAC	
A3R31	0757-0419		R FXD 681 OHM 1% 1/8W	19701 MFAC1=0	
A3R32	0698-3444		R FXD 316 OHM 1% 1/8W	19701 MFAC1=0	
A3R33	0698-3243	3	R FXD 178K OHM 1% 1/8W	19701	
A3R34	0698-8490	7	R FXD 2K OHM 1% 1/8W	91637 CMF-1/10-3721-F	
A3R35	0761-0038	2	R FXD 5.62K OHM 5% 1W	16299	
A3R36	0698-3104	1	R FXD 1.33K OHM 1% 1/4W	01295	
A3R37	0698-0084		R FXD 2.15K OHM 1% 1/8W	19701 MFAC1=0	
A3R38	0761-0038		R FXD 5.62K OHM 5% 1W	16299	
A3R39	0698-8490		R FXD 2K OHM 1% 1/8W	91637 CMF-1/10-3721-F	
A3R40	0757-0449		R FXD 20K OHM 1% 1/8W	19701 MFAC1=0	
A3R41	0757-0439		R FXD 6.81K OHM 1% 1/8W	19701 MFAC	
A3R43	0698-3150		R FXD 23.7K OHM 1% 1/8W	19701 MFAC1=0	
A3R44	0698-3243		R FXD 178K OHM 1% 1/8W	19701	
A3R45	0757-0449		R FXD 20K OHM 1% 1/8W	19701 MFAC1=0	
A3R46	0757-0472		R FXD 511K OHM 1% 1/8W	19701 MFAC1=0	
A3R47	0757-0440		R FXD 19K OHM 1% 1/8W	19701 MFAC	
A3R48	0757-0442		R FXD 10K OHM 1% 1/8W	19701 MFAC	

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	HP Part No	TQ	Description	Mfr	Mfr Part No
A3R50	0698-0084		R FXD 2.15K OHM 1% 1/8W	19701	MF4C1-0
A3R51	0757-0436		R FXD [illegible] OHM 1% 1/8W	19701	MF4C1-0
A3R52	0757-0438		R FXD 5.11K OHM 1% 1/8W	19701	MF4C1-0
A3R53	0698-0083	1	R FXD 1.96K OHM 1% 1/8W	19701	MF4C1-0
A3R54	0757-0280		R FXD 1K OHM 1% 1/8W	75042	CEAT-0
A3R55	0757-0438		R FXD 5.11K OHM 1% 1/8W	19701	MF4C1-0
A3R56	0698-3442	2	R FXD 237 OHM 1% 1/8W	19701	MF4C1-0
A3R57	0757-0180	15	R FXD 31.6 OHM 1% 1/8W	75042	CEAT-0
A3R58	0757-0400	9	R FXD 121 OHM 1% 1/8W	19701	MF4C1-0
A3R59	0757-0180		R FXD 31.6 OHM 1% 1/8W	75042	CEAT-0
A3R61	0757-[illegible]	1	R FXD [illegible] OHM 1% 1/8W	28480	
A3R62	0698-[illegible]		R VAR 12K OHM 1% 1/8W	51030	
A3R63	2100-[illegible]		R VAR 100K OHM 1% 1/8W		
A3R64	0757-0446		R FXD 15K OHM 1% 1/8W	19701	MF4C
A3R65	0757-[illegible]		R FXD 681 OHM 1% 1/8W	19701	MF4C1-0
A3R66	0757-0280		R FXD 1K OHM 1% 1/8W	75042	CEAT-0
A3R67	0757-0199		R FXD [illegible]K OHM 1% 1/8W	19701	MF4C1-0
A4	03702-[illegible]	1	ASSY IF CALIBRATOR	28480	
	03702-[illegible]		PC BD BLANK	28480	
	4040-0752	2	EXTRACTOR PC BD YEL	[illegible]	4040-[illegible]
	4040-0752		EXTRACTOR PC BD YEL	[illegible]	4040-[illegible]
A4C1	0150-0093		C FXD 0.01UF +80-10% 100WVDC	91418	
A4C2	0160-0155	4	C FXD 3300PF 10% 200WVDC	56289	192P33292-PTS
A4C3	0160-0155		C FXD 3300PF 10% 200WVDC	56289	192P33292-PTS
A4C4	0150-0093		C FXD 0.01UF +80-10% 100WVDC	91418	
A4C5	0180-0159	4	C FXD 220UF 20% 10WVDC	56289	150D227X0010S2-DYS
A4C6	0180-1940	2	C FXD 33UF 10% 15WVDC	56289	150D336X9015S2-DYS
A4C7	0180-0159		C FXD 220UF 20% 10WVDC	56289	150D227X0010S2-DYS
A4C8	0180-[illegible]		C FXD 33UF 10% 10WVDC	56289	150D336X9010B2-DYS
A4C9	0180-[illegible]		C FXD 33UF 10% 10WVDC	56289	150D336X9010B2-DYS
A4C10	0180-0159		C FXD 220UF 20% 10WVDC	56289	150D227X0010S2-DYS
A4C11	0180-0098		C FXD 100UF 20% 20WVDC	56289	150D107X0020S2-DYS
A4C12	0150-0093		C FXD 0.01UF +80-10% 100WVDC	91418	
A4C13	0180-0159		C FXD 220UF 20% 10WVDC	56289	150D227X0010S2-DYS
A4C14	0160-[illegible]		C FXD 0.1UF 10% 100WVDC	28480	[illegible]
A4C15	0160-[illegible]		C FXD 0.1UF 10% 100WVDC	28480	[illegible]
A4C16	0180-1940		C FXD 33UF 10% 15WVDC	56289	150D336X9015S2-DYS
A4C17	0180-[illegible]		C FXD 33UF 10% 10WVDC	56289	150D336X9010B2-DYS
A4C18	0180-[illegible]	2	C FXD 10UF 20% 20WVDC	56289	[illegible]
A4CR1	1901-0050		DIO SI	[illegible]	[illegible]
A4CR2	1901-0050		DIO SI	[illegible]	[illegible]
A4CR3	1902-[illegible]	2	DIO BKDN 10V 400MW	07910	[illegible]
A4CR4	1902-[illegible]	3	DIO BKDN 13.3V 5% 400MW	07910	[illegible]
A4CR5	1902-0064	3	DIO BKDN 7.5V 400MW	07910	CD35670
A4CR6	1902-0064		DIO BKDN 7.5V 400MW	07910	CD35670
A4CR7	1902-0064		DIO BKDN 7.5V 400MW	07910	CD35670
A4K1	0490-[illegible]	3	RLY CHANGEOVER 2P	28480	0490-[illegible]
A4K2	5080-[illegible]		RLY, REED	28480	
A4K3	5080-[illegible]		RLY, REED	28480	
A4Q1	1854-0071		XSTR SI NPN	01295	SKA1124
A4Q2	1854-0071		XSTR SI NPN	01295	SKA1124
A4Q3	1854-0071		XSTR SI NPN	01295	SKA1124
A4Q4	1854-0071		XSTR SI NPN	01295	SKA1124
A4Q5	1853-0036		XSTR SI PNP	04713	(2N3906) SPS-3612
A4Q6	1854-0071		XSTR SI NPN	01295	SKA1124

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	TIP Part No	TQ	Description	Mfr	Mfr Part No
A4Q7	1854-0071		SILICON NPN	01295	SPA|24
A4Q8	1854-0071		SILICON NPN	01295	SPA|24
A4Q9	1854-0071		SILICON NPN	01295	SPA|24
A4Q10	1854-0071		SILICON NPN	01295	SPA|24
A4Q11	1854-0071		SILICON NPN	01295	SPA|24
A4Q12	1854-0071		SILICON NPN	01295	SPA|24
A4Q13	1854-0071		SILICON NPN	01295	SPA|24
A4Q14	1854-0071		SILICON NPN	01295	SPA|24
A4Q15	1854-0071		SILICON NPN	01295	SPA|24
A4Q16	1854-0071		SILICON NPN	01295	SPA|24
A4Q17	1854-0071		SILICON NPN	01295	SPA|24
A4Q18	1854-0071		SILICON NPN	01295	SPA|24
A4Q19	1854-0071		SILICON NPN	01295	SPA|24
A4Q20	1854-0071		SILICON NPN	01295	SPA|24
A4R1	0698-8195	2	R FXD 4.64K OHM 1% 1/8W	19701	MFA01=0
A4R2	0698-8195		R FXD 4.64K OHM 1% 1/8W	19701	MFA01=0
A4R3	0757-0442		R FXD 10K OHM 1% 1/8W	19701	MFA01=0
A4R4	0698-8165		R FXD 46.4K OHM 1% 1/8W	19701	MFA01=0
A4R5	0757-0280		R FXD 1K OHM 1% 1/8W	75042	CEA1=0
A4R6	0698-8195		R FXD 4.64K OHM 1% 1/8W	19701	MFA01=0
A4R7	0698-8165		R FXD 46.4K OHM 1% 1/8W	19701	MFA01=0
A4R8	0698-8165		R FXD 46.4K OHM 1% 1/8W	19701	MFA01=0
A4R9	0698-8195		R FXD 4.64K OHM 1% 1/8W	19701	MFA01=0
A4R10	0698-8195		R FXD 4.64K OHM 1% 1/8W	19701	MFA01=0
A4R11	0757-0280		R FXD 1K OHM 1% 1/8W	75042	CEA1=0
A4R12	0757-0442		R FXD 10K OHM 1% 1/8W	19701	MFA01=0
A4R13	0698-8165		R FXD 46.4K OHM 1% 1/8W	19701	MFA01=0
A4R14	0757-0427		R FXD 1.5K OHM 1% 1/8W	19701	MFA01=0
A4R15	0757-0464		R FXD 12.1K OHM 1% 1/8W	19701	MFA01=0
A4R16	0757-0277		R FXD 49.9 OHM 1% 1/8W	75042	CEA1=0
A4R17	0698-8162		R FXD 26.1K OHM 1% 1/8W	19701	MFA01=0
A4R18	0698-8155		R FXD 2.61K OHM 1% 1/8W	19701	MFA01=0
A4R19	0698-8155		R FXD 2.61K OHM 1% 1/8W	19701	MFA01=0
A4R20	0698-8084		R FXD 2.15K OHM 1% 1/8W	19701	MFA01=0
A4R21	0757-0438		R FXD 3.01K OHM 1% 1/8W	75042	CEA1=0
A4R22	0757-0420		R FXD 150 OHM 1% 1/8W	19701	MFA01=0
A4R23	0757-0349		R FXD 82.5 OHM 1% 1/8W	19701	MFA01=0
A4R24	2100-2474	2	R,VAR 500 OHM 10% LIN	01030	
A4R25	0757-0419		R FXD 681 OHM 1% 1/8W	19701	MFA01=0
A4R26	0757-0438		R FXD 3.01K OHM 1% 1/8W	19701	MFA01=0
A4R27	0757-0434		R FXD 2.21K OHM 1% 1/8W	19701	MFA01=0
A4R28	0698-8154		R FXD 2.61K OHM 1% 1/8W	19701	MFA01=0
A4R29	0757-0430		R FXD 1.82K OHM 1% 1/8W	19701	MFA01=0
A4R30	0757-0249		R FXD 210 OHM 1% 1/8W	75042	CEA1=0
A4R31	0757-0287		R FXD 27.4 OHM 1% 1/8W	19701	MFA01=0
A4R32	0757-0401		R FXD 100 OHM 1% 1/8W	19701	MFA01=0
A4R33	0757-0442		R FXD 10K OHM 1% 1/8W	19701	MFA01=0
A4R34	0757-0274		R FXD 1.21K OHM 1% 1/8W	19701	MFA01=0
A4R35	0698-8155		R FXD 2.61K OHM 1% 1/8W	19701	MFA01=0
A4R36	0757-0280		R FXD 1K OHM 1% 1/8W	75042	CEA1=0
A4R37	0757-0280		R FXD 1K OHM 1% 1/8W	75042	CEA1=0
A4R38	0698-8155		R FXD 2.61K OHM 1% 1/8W	19701	MFA01=0
A4R39	0757-0280		R FXD 1K OHM 1% 1/8W	75042	CEA1=0
A4R40	0698-8162		R FXD 26.1K OHM 1% 1/8W	19701	MFA01=0
A4R41	0757-0442		R FXD 10K OHM 1% 1/8W	19701	MFA01

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	HP Part No	TQ	Description	Mfr	Mfr Part No
A6R43	0757-0442		R FXD 10K OHM 1% 1/8W	19701 MFAG	
A6R44	0757-0280		R FXD 1K OHM 1% 1/8W	19701 MFAG1=0	
A6R45	0757-0440		R FXD 7.5K OHM 1% 1/8W	19701 MFAG1=0	
A6R46	0757-0440		R FXD 7.5K OHM 1% 1/8W	19701 MFAG1=0	
A6R47	0698-3162		R FXD 46.4K OHM 1% 1/8W	19701 MFAG1=0	
A6R48	0698-3150		R FXD 2.37K OHM 1% 1/8W	19701 MFAG1=0	
A6R49	0698-3150		R FXD 2.37K OHM 1% 1/8W	19701 MFAG1=0	
A6R50	0698-3150		R FXD 2.37K OHM 1% 1/8W	19701 MFAG1=0	
A6R51	0757-0274		R FXD 1.21K OHM 1% 1/8W	19701 MFAG1=0	
A6R52	0757-0417		R FXD 562 OHM 1% 1/8W	19701 MFAG1=0	
A6R53	2100-2574		R VAR 500 OHM 10% 1W	21030	
A6R54	0757-0274		R FXD 1.21K OHM 1% 1/8W	19701 MFAG1=0	
A6R55	0757-0438		R FXD 5.11K OHM 1% 1/8W	19701 MFAG1=0	
A6R56	0698-3150		R FXD 2.37K OHM 1% 1/8W	19701 MFAG1=0	
A6R57	0698-3155		R FXD 4.64K OHM 1% 1/8W	19701 MFAG1=0	
A6R58	2100-2574		R VAR 500 OHM 10% 1W	21030	
A6R59	0757-0439		R FXD 6.81K OHM 1% 1/8W	19701 MFAG	
A6R60	0757-0439		R FXD 6.81K OHM 1% 1/8W	19701 MFAG	
A6R61	0698-0084		R FXD 2.15K OHM 1% 1/8W	19701 MFAG1=0	
A6R62	0757-0439		R FXD 6.81K OHM 1% 1/8W	19701 MFAG	
A6R63	0757-0439		R FXD 6.81K OHM 1% 1/8W	19701 MFAG	
A6R64	0757-0395		R FXD 36.5 OHM 1% 1/8W	19701 MFAG1=0	
A6R65	0698-3156		R FXD 4.64K OHM 1% 1/8W	19701 MFAG1=0	
A6R66	0757-0439		R FXD 6.81K OHM 1% 1/8W	19701 MFAG	
A6R67	0757-0438		R FXD 5.11K OHM 1% 1/8W	19701 MFAG1=0	
A6R68	0757-0442		R FXD 10K OHM 1% 1/8W	19701 MFAG1=0	
A6R69	0757-0274		R FXD 1.21K OHM 1% 1/8W	19701 MFAG1=0	
A6R70	0757-0274		R FXD 1.21K OHM 1% 1/8W	19701 MFAG1=0	
A6	03702-7117A	1	ASSY METER CONTROL & MARKER PROCESSOR	28007	
	03702-8117	1	PC BD BLANK	28007	
	4040-0743		EXTRACTOR PC BD GRN	14443 5040-8118	
	4040-0743		EXTRACTOR PC BD GRN	14443 5040-8118	
A6C1	0160-0174		C FXD 0.47UF +80-20% 25WVDC	56289 5C11D36-CWL	
A6C2	0160-0161		C FXD 0.10F +80-20% 50WVDC	56289 5C50B15-CWL	
A6C3	0160-0093		C FXD 0.010F +80-20% 100WVDC	91418	
A6C4	0160-0093		C FXD 0.010F +80-20% 100WVDC	91418	
A6C5	0160-2145		C FXD 5000PF +80-20% 100WVDC	91418 1A	
A6C7	0160-0096		C FXD 0.050F +80-20% 100WVDC	91418 1A	
A6C8	0160-0050		C FXD 1000PF +80-20% 100WVDC	91418	
A6C9	0160-0096		C FXD 0.050F +80-20% 100WVDC	91418 1A	
A6C10	0160-0050		C FXD 1000PF +80-20% 100WVDC	91418	
A6C11	0160-0096		C FXD 0.050F +80-20% 100WVDC	91418 1A	
A6C12	0180-0199		C FXD 2.2UF 20% 20WVDC	56289 150D225X0020A2-DYS	
A6C13	0160-0093		C FXD 0.010F +80-20% 100WVDC	91418	
A6C14	0160-0093		C FXD 0.010F +80-20% 100WVDC	91418	
A6C15	0160-0087		C FXD 10F 10% 100WVDC	28009 PMA 1.0K10D	
A6C16	0160-0087		C FXD 10F 10% 100WVDC	28009 PMA 1.0K10D	
A6C17	0160-3849		C FXD 0.1UF 5% 100WVDC	80745 PMAU.1K10D	
A6C18	0160-7199		C FXD 500PF 5% 300WVDC	72136 MDM15H301J3C	
A6C19	0160-0093		C FXD 10000PF +80 -20% 100WVDC	91418	
A6CR1	1902-3182		DIO ZNR 12.1V 5% 400MW	07910 GD35730	
A6CR2	1902-0049		DIO ZNR 6.19V 400MW	07910 GD35646	
A6CR3	1910-0030		DIO SI	80726 0646	
A6CR4	1910-0030		DIO SI	80726 0646	
A6CR5	1902-0071		DIO ZNR 9.0V 5%	17856 D1303f00	
A6CR6	1902-0071		DIO ZNR 9.0V 5%	17856 D1303f00	

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	HP Part No	TQ	Description	Mfr	Mfr Part No
A9MP1	1820-0817	1	IC OP AMP	07263	5L0042
A9MP2	1820-0815	1	IC DUAL COMPARATOR	07263	5L2143B
A9MP3	1820-0478	1	IC OP AMP	27014	5L0074
A9Q1	1854-0071	1	XSTR SI NPN	01295	SKA1124
A9Q4	1854-0071	1	XSTR SI NPN	01295	SKA1124
A9Q5	1853-0036	1	XSTR SI PNP	04713	(2N3906) SPS-3617
A9Q6	1854-0071	1	XSTR SI NPN	01295	SKA1124
A9Q7	1854-0071	1	XSTR SI NPN	01295	SKA1124
A9Q8	1854-0071	1	XSTR SI NPN	01295	SKA1124
A9Q9	1854-0071	1	XSTR SI NPN	01295	SKA1124
A9Q10	1853-0036	1	XSTR SI PNP	04713	(2N3906) SPS-3617
A9Q11	1853-0036	1	XSTR SI PNP	04713	(2N3906) SPS-3617
A9Q12	1853-0036	1	XSTR SI PNP	04713	(2N3906) SPS-3617
A9Q13	1853-0036	1	XSTR SI PNP	04713	(2N3906) SPS-3617
A9Q14	1854-0071	1	XSTR SI NPN	01295	SKA1124
A9Q15	1853-0036	1	XSTR SI PNP	04713	(2N3906) SPS-3617
A9Q16	1854-0071	1	XSTR SI NPN	01295	SKA1124
A9Q17	1854-0071	1	XSTR SI NPN	01295	SKA1124
A9Q18	1853-0036	1	XSTR SI PNP	04713	(2N3906) SPS-3617
A9R1	2100-2021	1	R VAR 2K OHM 10% 1/2W LIN	73138	62P-202-1
A9R2	0698-3440	1	R FXD 2K OHM 1% 1/8W	91637	CMF-1/10-321-F
A9R3	2100-2033	1	R VAR 10K OHM 10% 1/2W LIN	73138	62P-203-1
A9R4	0757-0438	1	R FXD 5.11K OHM 1% 1/8W	19701	MFAC1-0
A9R5	0757-0442	1	R FXD 10K OHM 1% 1/8W	19701	MFAC
A9R6	0698-3260	1	R FXD 464K OHM 1% 1/8W	19701	MFAC1-0
A9R7	0698-3158	1	R FXD 33.7K OHM 1% 1/8W	19701	MFAC1-0
A9R8	0698-3158	1	R FXD 33.7K OHM 1% 1/8W	19701	MFAC1-0
A9R9	0757-0442	1	R FXD 10K OHM 1% 1/8W	19701	MFAC
A9R10	0698-3691	1	R FXD 133K OHM 1% 1/8W	19701	MFAC1-0
A9R11	0757-0398	1	R FXD 75 OHM 1% 1/8W	19701	MFAC
A9R12	0757-0280	1	R FXD 1K OHM 1% 1/8W	75042	CEA1-0
A9R13	0757-0439	1	R FXD 6.81K OHM 1% 1/8W	19701	MFAC
A9R14	0698-0082	1	R FXD 464 OHM 1% 1/8W	19701	MFAC1-0
A9R15	2100-2033	1	R VAR 1K 10% 1/2W LIN	81036	62P-204-1
A9R16	0698-3155	1	R FXD 4.64K OHM 1% 1/8W	19701	MFAC1-0
A9R17	0757-0280	1	R FXD 1K OHM 1% 1/8W	75042	CEA1-0
A9R18	0757-0398	1	R FXD 75 OHM 1% 1/8W	19701	MFAC
A9R19	0698-3155	1	R FXD 4.64K OHM 1% 1/8W	19701	MFAC1-0
A9R20	0757-0449	1	R FXD 7.5K OHM 1% 1/8W	19701	MFAC1-0
A9R21	0698-3155	1	R FXD 4.64K OHM 1% 1/8W	19701	MFAC1-0
A9R22	0757-0274	1	R FXD 3.16K OHM 1% 1/8W	75042	CEA1-0
A9R23	0757-0398	1	R FXD 75 OHM 1% 1/8W	19701	MFAC
A9R24	0698-3155	1	R FXD 4.64K OHM 1% 1/8W	19701	MFAC1-0
A9R25	0757-0440	1	R FXD 7.5K OHM 1% 1/8W	19701	MFAC1-0
A9R26	0698-8490	1	R FXD 2K OHM 1% 1/8W	91637	CMF-1/10-321-F
A9R27	0757-0274	1	R FXD 3.16K OHM 1% 1/8W	75042	CEA1-0
A9R28	0757-0280	1	R FXD 1K OHM 1% 1/8W	75042	CEA1-0
A9R29	0757-0395	1	R FXD 90.9 OHM 1% 1/8W	19701	MFAC1-0
A9R30	0698-3155	1	R FXD 4.64K OHM 1% 1/8W	19701	MFAC1-0
A9R31	0757-0395	1	R FXD 90.9 OHM 1% 1/8W	19701	MFAC1-0
A9R32	0757-0280	1	R FXD 1K OHM 1% 1/8W	75042	CEA1-0
A9R33	0698-3155	1	R FXD 4.64K OHM 1% 1/8W	19701	MFAC1-0
A9R34	0698-3155	1	R FXD 4.64K OHM 1% 1/8W	19701	MFAC1-0
A9R35	0757-0449	1	R FXD 20K OHM 1% 1/8W	19701	MFAC1-0
A9R36	0757-0289	1	R FXD 13.3K OHM 1% 1/8W	75042	CEA1-0

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	HP Part No	TQ	Description	Mfr	Mfr Part No
A9R37	0757-0433	1	R FXD 3.32K OHM 1% 1/8W	19701	MFAC1=0
A9R38	0757-0439	1	R FXD 33.2K OHM 1% 1/8W	19701	MFAC1=0
A9R39	0757-0453	1	R FXD 27.4K OHM 1% 1/8W	19701	MFAC1=0
A9R40	0698-3449	1	R FXD 34R OHM 1% 1/8W	19701	MFAC1=0
A9R41	0698-3155		R FXD 4.64K OHM 1% 1/8W	19701	MFAC1=0
A9R42	0698-3150		R FXD 2.37K OHM 1% 1/8W	19701	MFAC1=0
A9R43	0757-0347	10	R FXD 68.1 OHM 1% 1/8W	19701	MFAC1=0
A9R44	0757-0279		R FXD 3.16K OHM 1% 1/8W	75042	CEA1=0
A9R45	0757-0427		R FXD 1.8K OHM 1% 1/8W	19701	MFAC1=0
A9R46	0757-0278		R FXD 1.78K OHM 1% 1/8W	75042	CEA1=0
A9R47	0757-0278		R FXD 1.78K OHM 1% 1/8W	75042	CEA1=0
A9R48	0757-0200		R FXD 6.49K OHM 1% 1/8W	19701	MFAC
A9R49	0757-0347		R FXD 68.1 OHM 1% 1/8W	19701	MFAC1=0
A9R50	0757-0347		R FXD 68.1 OHM 1% 1/8W	19701	MFAC1=0
A9R51	0698-3490		R FXD 2K OHM 1% 1/8W	91637	CMF=1/10=321=2
A9R52	0757-0442		R FXD 10K OHM 1% 1/8W	19701	MFAC
A9R53	0698-3154	2	R FXD 4.22K OHM 1% 1/8W	19701	MFAC1=0
A9R54	2100-2921		R VAR 2K OHM 10% 1/2W LIN	73138	62=223=1
A9R55	0757-0421		R FXD 1.5K OHM 1% 1/8W	19701	MFAC1=0
A9R56	0757-0442		R FXD 10K OHM 1% 1/8W	19701	MFAC
A9R57	2100-2822		R VAR 10K OHM 10% 1/2W LIN	73138	62=227=1
A9R58	0757-0401	6	R FXD 100 OHM 1% 1/8W	19701	MFAC
A9R59	0698-0083	1	R FXD 5.23K OHM 1% 1/8W	19701	MFAC1=0
A9R60	2100-2974		R VAR 500 OHM 10% 1W	01030	
A9R61	0757-0420		R FXD 750 OHM 1% 1/8W	19701	MFAC1=0
A9R62	0757-0465		R FXD 100K OHM 1% 1/8W	19701	MFAC1=0
A9R63	0757-0461		R FXD 68.1K OHM 1% 1/8W	19701	MFAC
A9R64	0698-3266	2	R FXD 237K OHM 1% 1/8W	01296	
A9R65	0757-0446		R FXD 15K OHM 1% 1/8W	19701	MFAC
A9R66	0757-0394	7	R FXD 91.1 OHM 1% 1/8W	19701	MFAC1=0
A9R67	0757-0394		R FXD 91.1 OHM 1% 1/8W	19701	MFAC1=0
A9R68	0757-0446		R FXD 15K OHM 1% 1/8W	19701	MFAC
A9R69	0757-0280		R FXD 1K OHM 1% 1/8W	75042	CEA1=0
A9R70	0698-3449		R FXD 34R OHM 1% 1/8W	19701	MFAC1=0
A9R71	0757-0438		R FXD 9.11K OHM 1% 1/8W	19701	MFAC1=0
A9R72	0757-0280		R FXD 1K OHM 1% 1/8W	75042	CEA1=0
A9	03702-7184	1	ASSY 8MT POWER SUPPLY	00007	
	03702-3184	1	PC BD BLANK	00007	
A9C1	0180-0098		C FXD 100UF 20% 20WVDC	56289	196D107X0020U2=DYS
A9C2	0160-0174		C FXD 0.47UF +80-20% 25WVDC	56289	5C11075-CR0
A9C3	0160-0181	2	C FXD 47000PF +80-20% 4000WVDC	71590	2DDM1764727AA
	9040-0401	2	SUPPORT C	28480	
A9C4	0160-2054	2	C FXD 0.01UF 10% 3000WVDC	71436	PME193-3M5
A9C5A	0160-0181		C FXD 47000PF +80-20% 4000WVDC	71590	2DDM1764727AA
	9040-0401		SUPPORT C	28480	
A9C6	0160-0036	2	C FXD 47000PF 20% 4000WVDC	91418	1200X0KV47U20X
	9040-0400	2	SUPPORT C	28480	
A9C7	0160-0036		C FXD 47000PF 20% 4000WVDC	91418	1200X0KV47U20X
	9040-0400		SUPPORT C	28480	
A9C8	0160-2054		C FXD 0.01UF 10% 3000WVDC	71436	PME193-3M5
A9CR1	1901-0142	4	DIO SI 75000PIV 50MA	14099	5575
A9CR2	1901-0142		DIO SI 75000PIV 50MA	14099	5575
A9CR3	1901-0142		DIO SI 75000PIV 50MA	14099	5575
A9CR4	1901-0142		DIO SI 75000PIV 50MA	14099	5575
A9L1	9140-0093	1	IND FXD 400UH 5%	00007	

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	RP Part No	TQ	Description	Mfr	Mfr Part No
A6MP1	2360-0115		SCR 6-32X1-1/8	80120	
A6MP2	2360-0008		NUT DEX 6-32	80120	
A6MP3	2190-0016		WASHER LOCK INT NO 6	73734	
A6MP4	2360-0001		NUT HEX 4-40	80120	
A6MP5	2190-0003		WASHER LOCK INT NO 4	80120	000
A6MP6	2340-0007		SCR 6-32X9/16	00007	
A6MP7	0380-0042		TERMINAL LUG	79963	
A6MP8	2360-0131		SCREW (QTY 1)	00007	
A6MP9	0380-0003		SPACER (QTY 4)	00007	
A6Q1	1854-0072		XSTR SI NPN	02735	2N3054
A6Q2	1854-0072		XSTR SI NPN	02735	2N3054
A6R1	0758-0074		R FXD 100 OHM 5% 1/4W	16299	CB
A6R2	0757-0017		R FXD 1.5K OHM 5% 1/4W	16299	CB
A6R3	0757-0134		R FXD 475K OHM 1% 1/2W	01295	
A6R4	0698-0006		R FXD 20M OHM 10% 1W	77764	OARM
A6R5	0757-0099		R FXD 1M OHM 1% 1/2W	01295	
A6R6	0699-1855		R FXD 1.8M OHM 5% 1W	01121	CB1855
A6R7	0699-1855		R FXD 1.8M OHM 5% 1W	01121	CB1855
A6R8	0699-1855		R FXD 1.8M OHM 5% 1W	01121	CB1855
A6R9	0699-1855		R FXD 1.8M OHM 5% 1W	01121	CB1855
A6R10	0758-0049		R FXD 33K OHM 5% 1/4W	16299	CB
A6R11	0698-8249		R FXD 820K OHM 5% 1/2W	01121	CB8249
A6R12	0758-0107		R FXD 270K OHM 5% 1/4W	80006	1R5
A6T1	03702-7121		XFMR	00007	
AT	03702-7261		ASSY CAL RETURN LOSS	00007	
A7C1	0160-0663		C FXD 1000PF (+80-20%)100V	72982	MR600/361-102
A7C2	0160-0663		C FXD 1000PF (+80-20%)100V	72982	MR600/361-102
A7MP1	03702-331		BOX SCREENING	00007	
A7MP2	2360-0001		NUT HEX 3/8-32	73734	4000
A7MP3	2360-0002		NUT HEX 10-32	73734	4001
A7MP4	2190-0011		WASHER LOCK INT NO 10	78452	1022
A7R1	2100-0796		R VAR 250 OHM 20% 1/2W LIN ROT LOSS C	71450	VA-49
A7A1	03702-7208		ASSY RETURN LOSS AMPLIFIER	00007	
	03702-3208		PC BD BLANK	00007	
A7A1C1	0180-0093		C FXD 0.01UF +80-20% 100WVDC	91418	
A7A1C2	0180-0199		C FXD 2.2UF 20% 20WVDC	56289	150D225X0020A2-DY5
A7A1C3	0180-0199		C FXD 2.2UF 20% 20WVDC	56289	150D225X0020A2-DY5
A7A1C4	0180-0093		C FXD 0.01UF +80-20% 100WVDC	91418	
A7A1C5	0180-0199		C FXD 2.2UF 20% 20WVDC	56289	150D225X0020A2-DY5
A7A1C6	0180-0199		C FXD 2.2UF 20% 20WVDC	56289	150D225X0020A2-DY5
A7A1C7	0180-0199		C FXD 2.2UF 20% 20WVDC	56289	150D225X0020A2-DY5
A7A1C8	0180-0199		C FXD 2.2UF 20% 20WVDC	56289	150D225X0020A2-DY5
A7A1C9	0180-0199		C FXD 2.2UF 20% 20WVDC	56289	150D225X0020A2-DY5
A7A1J1	1250-0932	30	CONN COAX PC BD RTG CONNEX	98291	81-181-0000
A7A1J2	1250-0932		CONN COAX PC BD RTG CONNEX	98291	81-181-0000
A7A1Q1	1854-0092	22	XSTR SI NPN	07263	2N3563
A7A1Q2	1854-0092		XSTR SI NPN	07263	2N3563
A7A1Q3	1854-0092		XSTR SI NPN	07263	2N3563
A7A1Q4	1854-0092		XSTR SI NPN	07263	2N3563
A7A1Q5	1854-0092		XSTR SI NPN	07263	2N3563
A7A1R1	0757-0400		R FXD 90.9 OHM 1% 1/8W	19701	MFSC1-0

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	HP Part No	TQ	Description	Mfr	Mfr Part No
A7A1R2	0698-3442		R FXD 237 OHM 1% 1/8W	19701	MF4C1=0
A7A1R3	0757-0274		R FXD 1.21K OHM 1% 1/8W	19701	MF4C1=0
A7A1R4	0698-0084		R FXD 2.15K OHM 1% 1/8W	19701	MF4C1=0
A7A1R5	0698-3150		R FXD 4.64K OHM 1% 1/8W	19701	MF4C1=0
A7A1R6	0698-0085		R FXD 2.61K OHM 1% 1/8W	19701	MF4C1=0
A7A1R7	0757-0439		R FXD 6.81K OHM 1% 1/8W	19701	MF4C
A7A1R8	0698-3447		R FXD 422 OHM 1% 1/8W	19701	MF4C1=0
A7A1R9	0698-0084		R FXD 2.15K OHM 1% 1/8W	19701	MF4C1=0
A7A1R10	0698-0084		R FXD 2.15K OHM 1% 1/8W	19701	MF4C1=0
A7A1R11	0698-3150		R FXD 4.64K OHM 1% 1/8W	19701	MF4C1=0
A7A1R12	0757-0178		R FXD 1.78K OHM 1% 1/8W	75042	CRA1=0
A7A1R13	0757-0197		R FXD 68.1 OHM 1% 1/8W	19701	MF4C1=0
A7A1R14	0698-4037		R FXD 46.4 OHM 1% 1/8W	75042	CRA1=0
A7A1R15	0698-4037		R FXD 46.4 OHM 1% 1/8W	75042	CRA1=0
A7A1R16	0698-4037		R FXD 46.4 OHM 1% 1/8W	75042	CRA1=0
A7A1R17	0698-4037		R FXD 46.4 OHM 1% 1/8W	75042	CRA1=0
A7A1R18	0698-4037		R FXD 46.4 OHM 1% 1/8W	75042	CRA1=0
A10	03702-7163	1	ASSY INTERNAL INPUT AMPLIFIER	80009	
	03702-3163	1	PC BD BLANK	80009	
A10C1	0180-0174		C FXD 0.47UF +80-20% 25WVDC	56289	9C13W75=CWL
A10C2	0180-0159		C FXD 2.2UF 20% 20WVDC	56289	150D225X0020A2=DYB
A10CR1	1901-0040		DIO SI	17856	5082-2810
A10J1	1250-0932		CONN COAX PC BD RTG CONNEX	98291	31-151-0000
A10J2	1250-0932		CONN COAX PC BD RTG CONNEX	98291	31-151-0000
A10J3	1250-0932		CONN COAX PC BD RTG CONNEX	98291	31-151-0000
A10MP1	1826-0082	1	IC OP AMP	24355	LM301AH
A10Q1	1855-0068	1	XSTR FET N-CHANNEL	17856	2N5397
A10R1	0757-0173		R FXD 34.8K OHM 1% 1/8W	01245	RL32-3482-F
A10R2	0757-0173		R FXD 34.8K OHM 1% 1/8W	01245	RL32-3482-F
A10R3	0757-0442		R FXD 10K OHM 1% 1/8W	19701	MF4C
A10R4	0757-0442		R FXD 10K OHM 1% 1/8W	19701	MF4C
A10R5	0757-0280		R FXD 1K OHM 1% 1/8W	75042	CRA1=0
A10R6	0757-0465		R FXD 100K OHM 1% 1/8W	19701	MF4C1=0
A10R7	0698-3266		R FXD 464K OHM 1% 1/8W	01245	RL32-4643-F
A11	03702-3177	1	ASSY MARKER COMB GENERATOR	80009	
	03702-3177	1	PC BD BLANK	80009	
A11C1	0121-0044		C VAR 9-35PF	72982	538-014-V5P0-040
A11C2	0140-0198		C FXD 200PF 5% 300WVDC	72136	DM15F201J3C
A11C3	0140-0640		C FXD 100PF 5% 300VDC	20946	025-P111
A11C4	0140-0192		C FXD 4700PF 5% 300VDC	72136	DM15E472J3C
A11C5	0180-0097		C FXD 47UF 10% 35WVDC	56289	150D476X9035B2=DYB
A11C6	0180-0097		C FXD 47UF 10% 35WVDC	56289	150D476X9035B2=DYB
A11C7	0180-0097		C FXD 47UF 10% 35WVDC	56289	150D476X9035B2=DYB
A11C8	0180-0097		C FXD 47UF 10% 35WVDC	56289	150D476X9035B2=DYB
A11J1	1250-0932		CONN COAX PC BD RTG CONNEX	98291	31-151-0000
A11Q1	1854-0019		XSTR SI NPN	13715	2-A814
A11Q2	1854-0019		XSTR SI NPN	13715	2-A814
A11Q3	1853-0034		XSTR SI PNP	04713	SNB197
A11Q4	1854-0019		XSTR SI NPN	13715	2-A814
A11R1	0757-0278		R FXD 3.74K OHM 1% 1/8W	75042	CRA1=0

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	HP Part No	TQ	Description	Mfr	Mfr Part No
A11R2	0698-3150		R FXD 2.87K OHM 1% 1/8W	19701 MFA01=0	
A11R3	0757-0280		R FXD 1K OHM 1% 1/8W	75042 CEA1=0	
A11R4	0698-3443		R FXD 287 OHM 1% 1/8W	19701 MFA01=0	
A11R5	0757-0279		R FXD 511K OHM 1% 1/8W	75042 CEA1=0	
A11R6	0757-0442		R FXD 10K OHM 1% 1/8W	19701 MFA0	
A11R7	0698-3443		R FXD 287 OHM 1% 1/8W	19701 MFA01=0	
A11R8	0698-3443		R FXD 287 OHM 1% 1/8W	19701 MFA01=0	
A11R9	0698-3443		R FXD 287 OHM 1% 1/8W	19701 MFA01=0	
A11R10	0757-0394		R FXD 61.9 OHM 1% 1/8W	19701 MFA01=0	
A11R11	0757-0180		R FXD 31.6 OHM 1% 1/8W	75042 CEA1=0	
A11R12	0757-0394		R FXD 61.9 OHM 1% 1/8W	19701 MFA01=0	
A11R13	0757-0180		R FXD 31.6 OHM 1% 1/8W	75042 CEA1=0	
A11Y1	0410-0409		XTAL QUARTZ 2MHZ	80009 AAAAATAA	
	1200-0444		XTAL HOLDER HORIZONTAL	80007	
A12	03702-7210		ASSY POWER SUPPLY RECTIFIERS	80007	
	03702-3210		PC BD BLANK	80007	
A12CR1	1901-0474		DIO SI 200PIV 3A	04713 1N5003	
A12CR2	1901-0416		DIO SI 200PIV 3A	04713 SR1846=10	
A12CR3	1901-0416		DIO SI 200PIV 3A	04713 SR1846=10	
A12CR5	1901-0416		DIO SI 200PIV 3A	04713 SR1846=10	
A12CR6	1901-0416		DIO SI 200PIV 3A	04713 SR1846=10	
A12CR7	1901-0416		DIO SI 200PIV 3A	04713 SR1846=10	
A12CR8	1901-0416		DIO SI 200PIV 3A	04713 SR1846=10	
A12CR9	1901-0416		DIO SI 200PIV 3A	04713 SR1846=10	
A12CR10	1901-0416		DIO SI 200PIV 3A	04713 SR1846=10	
A12CR11	1901-0416		DIO SI 200PIV 3A	04713 SR1846=10	
A12CR12	1901-0416		DIO SI 200PIV 3A	04713 SR1846=10	
A12CR13	1901-0416		DIO SI 200PIV 3A	04713 SR1846=10	
A12R1	0757-0438		R FXD 91.1K OHM 1% 1/8W	19701 MFA01=0	
A12R2	0757-0442		R FXD 10K OHM 1% 1/8W	19701 MFA0	
A12R3	0757-0442		R FXD 10K OHM 1% 1/8W	19701 MFA0	
A12R4	0698-3267		R FXD 1K OHM 5% 1W	19701 C32	
A12R5	0698-3160		R FXD 51.0K OHM 1% 1/8W	19701 MFA01=0	
A12R6	0698-3420		R FXD 100 OHM 5% 2W	19701 C42G	
A13	03701-7167		ASSY 60 ATTENUATOR	80007	
A13HP1	5040-4406		HOUSING ATTEN	80007	
A13A1	03702-7191		ASSY PC BD 60 ATTENUATOR	80007	
	03702-3191		PC BD BLANK	80007	
A13A1J1	1250-0932		CONN COAX PC BD MTG CONNER	98291 51-191-0000	
A13A1J2	1250-0932		CONN COAX PC BD MTG CONNER	98291 51-191-0000	
A13A1S1	3100-0479		SW ASSY ROTARY 2POS	80009	
	03702-350		KNOB DIAL TENS 60 ATTENUATOR	80007	
A13A1S2	3100-0476		SW ASSY ROTARY 2POS	80009	
	03702-350		KNOB DIAL UNITS 60 ATTENUATOR	80007	
A13A1Z1	0960-0119		ATTEN PAD 10DB 0.1DB	80009 0024D011	
A13A1Z2	0960-0120		ATTEN PAD 20DB 0.2DB	80009 0024D012	
A13A1Z3	0960-0121		ATTEN PAD 30DB 0.2DB	80009 0024D013	
A13A1Z4	0960-0122		ATTEN PAD 40DB 0.2DB	80009 0024D014	
A13A1Z5	0960-0123		ATTEN PAD 50DB 0.2DB	80009 0024D015	
A13A1Z6	0960-0124		ATTEN PAD 60DB 0.2DB	80009 0024D016	

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	HP Part No	TQ	Description	Mfr	Mfr Part No
A13A1Z7	0960-0128	1	ATTEN PAD 70N 0.2DB	80009	0824-0017
A13A1Z8	0960-0128		ATTEN PAD 70N 0.2DB	80009	0824-0017
A13A1Z9	0960-0127	1	ATTEN PAD 100R 0.2DB	80009	0824-0018
A13A1Z10	0960-0124	1	ATTEN PAD 100R 0.2DB	80009	0824-0020
A13A1Z11	0960-0128		ATTEN PAD 100R 0.2DB	80009	0824-0020
A13A1Z12	0960-0128		ATTEN PAD 100R 0.2DB	80009	0824-0022
	0370A-10010	2	SHIELD	80009	
	0370A-10010		SHIELD	80009	
A14	08702-7211	1	ASSY IF ATTENUATOR	80009	
A14MP3	08702-3201	1	PIN SCREENING	80009	
A14MP4	08702-3210	1	SPACER CAPTIVE	80009	
	08702-3210		SPACER CAPTIVE	80009	
A14MP5	0380-0044	1	SCR 4-40X1/2" W/LOCK (QTY=2)	78189	1204-61-50
A14MP6	0380-0011	1	SCR 2.56X5/16 (QTY 4)	80009	
A14MP7	0590-0118	1	WASHER LOCK (QTY 4)	07238	
A14MP8	08702-3208	1	KNOB PUSH J=GREY NUMERAL 1	80009	
A14MP9	08702-3209	1	KNOB PUSH J=GREY NUMERAL 9	80009	
A14MP10	0840-0010	1	KNOB PUSH J=GREY NUMERAL 0	80009	
A14MP11	0840-0014	1	KNOB PUSH J=GREY NUMERAL 10	80009	
A14MP12	0840-0014		KNOB PUSH J=GREY NUMERAL 10	80009	
A14A1	08702-7282	1	ASSY RADIATOR	80009	
	08702-3282	1	PC BD BLANK	80009	
A14A1R1	0698-7010	1	R FXD 4.3 OHM 0.5% 1/4W	80012	4031A
A14A1R2	0698-7014	1	R FXD 430 OHM 0.5% 1/4W	80012	4023
A14A1R3	0698-7010		R FXD 4.3 OHM 0.5% 1/4W	80012	4031A
A14A1R4	0698-7009	1	R FXD 3.0 OHM 0.5% 1/4W	80012	4031A
A14A1R5	0698-7011	1	R FXD 332 OHM 0.5% 1/4W	80012	4023
A14A1R6	0698-7010		R FXD 4.3 OHM 0.5% 1/4W	80012	4031A
A14A1R7	0698-7001	1	R FXD 10 OHM 0.5% 1/4W	80012	4023
A14A1R8	0698-7010	1	R FXD 110 OHM 0.5% 1/4W	80012	4023
A14A1R9	0698-7001		R FXD 10 OHM 0.5% 1/4W	80012	4023
A14A1R10	0698-7009	2	R FXD 84.9 OHM 0.5% 1/4W	80012	4023
A14A1R11	0698-7007	1	R FXD 100 OHM 0.5% 1/4W	80012	4023
A14A1R12	0698-7009	1	R FXD 84.9 OHM 0.5% 1/4W	80012	4023
A14A1R13	0698-7009		R FXD 84.9 OHM 0.5% 1/4W	80012	4023
A14A1R14	0698-7008	1	R FXD 100.0 OHM 0.5% 1/4W	80012	4023
A14A1R15	0698-7009	1	R FXD 84.2 OHM 0.5% 1/4W	80012	4023
A14A1S1	3101-0409	1	SW ASSY 8 INDEPENDENT PUSHBUTTON	80009	
A14A1W929	08702-7761	1	ASSY COAX CBL 4&D/WHT	80009	
	1250-0911		CONN COAX CBL MTG CONNEX	98291	81-12A-0000
	08702-3458	2	CONN	80009	
A14A1W930	08702-7762	1	ASSY COAX CBL DRN/BLK	80009	
	1250-0810		CONN CONX MINI MTG BNC 75 OHM	80011	OR 07899 C-114
	08702-3458		CONN	80009	
A15	08702-7284	1	ASSY BROADBAND SPLITTER	80009	
	08702-3284	1	PC BD BLANK	80009	
A15C1	0160-3740		C FXD 0.22UF 5% 100WVDC	80709	PMAQ,22J100
A15C2	0160-3740		C FXD 0.22UF 5% 100WVDC	80709	PMAQ,22J100
A15C3	0160-0097		C FXD 470F 10% 25WVDC	56289	150D471X9025B2-DYS
A15C4	0160-0097		C FXD 470F 10% 25WVDC	56289	150D471X9025B2-DYS
A15C5	0160-0127		C FXD 10F 20% 25WVDC	56289	5C1DC5-CAL
A15C6	0160-0228		C FXD 22UF 10% 15WVDC	56289	150D226X9015B2-DYS

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	HP Part No	TQ	Description	Mfr	Mfr Part No
A19C7	0160-0174		C FXD 0.47UF +80-20% 25WVDC	56289	5C11B7S-CML
A19C8	0160-0174		C FXD 0.47UF +80-20% 25WVDC	56289	5C11B7S-CML
A19CR1	1902-3193		DIO BRDN 13.3V 5% 400MW	07910	CD35742
A19CR2	1902-3193		DIO BRDN 13.3V 5% 400MW	07910	CD35742
A19L1	9100-1650	1	IND FXD [illegible] UH 5%	99800	2500-20
A19L2	9100-1653		IND FXD 2.2UH 5%	28480	
A19L3	9100-1653		IND FXD 2.2UH 5%	28480	
A19Q1	1854-0019		XSTR SI NPN	[illegible]	[illegible]
A19Q2	1854-0071		XSTR SI NPN	01295	SKA1124
A19Q3	1854-0071		XSTR SI NPN	01295	SKA1124
A19Q4	1855-0020		XSTR FET N-CHANNEL	[illegible]	[illegible]
A19R1	0757-0198		R FXD 75 OHM 1% 1/8W	19701	MF4C
A19R2	0757-0276		R FXD [illegible] OHM 1% 1/8W	19701	MF4C
A19R3	0757-0416		R FXD 511 OHM 1% 1/8W	19701	MF4C1-0
A19R4	0698-3453		R FXD [illegible] OHM 1% 1/8W	19701	MF4C1-0
A19R5	0698-3433	1	R FXD 28.7 OHM 1% 1/8W	19701	MF4C T-0
A19R6	0698-4037		R FXD 46.4 OHM 1% 1/8W	[illegible]	[illegible]
A19R7	0757-0442		R FXD 10K OHM 1% 1/8W	19701	MF4C
A19R8	0757-0280		R FXD 1K OHM 1% 1/8W	[illegible]	[illegible]
A19R9	0757-0280		R FXD 1K OHM 1% 1/8W	[illegible]	[illegible]
A19R10	0757-0439		R FXD 6.81K OHM 1% 1/8W	19701	MF4C
A19R11	0757-0440		R FXD 7.5K OHM 1% 1/8W	19701	MF4C1-0
A19R12	[illegible]		R FXD [illegible] OHM 1% 1/8W	19701	[illegible]
A19R13	[illegible]		R FXD [illegible] OHM 1% 1/8W	19701	MF4C1-0
A19R14	[illegible]		R FXD [illegible] OHM 1% 1/8W	19701	MF4C1-0
A20	08702-[illegible]	1	ASSY RETURN LOSS MIXER	28480	
	08702-[illegible]		PC BD BLANK	28480	
A20C1	0150-0050		C FXD 1000PF +80 -20% 1000WVDC	91418	
A20C2	0150-0050		C FXD 1000PF +80 -20% 1000WVDC	91418	
A20C3	0121-[illegible]	1	C VAR 1.4-9PF 50WVDC	28480	A09-05002
A20C4	0150-0050		C FXD 1000PF +80 -20% 1000WVDC	91418	
A20C5	0150-0050		C FXD 1000PF +80 -20% 1000WVDC	91418	
A20C6	0160-2200	2	C FXD 43PF 5% 300WVDC	72136	RDM15E430J3C
A20C7	0160-[illegible]	1	C FXD 12PF 5% 300WVDC	72982	
A20C8	0160-[illegible]		C FXD 6.8PF 5% 300WVDC	72982	
A20C9	0160-2200		C FXD 43PF 5% 300WVDC	72136	RDM15E430J3C
A20C10	0160-[illegible]		C FXD 6.8PF 5% 300WVDC	72982	
A20C11	0160-2209		C FXD 12PF 5% 300WVDC	72982	
A20C12	0160-2200		C FXD 43PF 5% 300WVDC	72136	RDM15E430J3C
A20C13	0180-0155		C FXD 2.2UF 20% 20VDC	56289	150D225X0020A2-DYS
A20C14	0180-0155		C FXD 2.2UF 20% 20VDC	56289	150D225X0020A2-DYS
A20C15	0180-0155		C FXD 2.2UF 20% 20VDC	56289	150D225X0020A2-DYS
A20C16	0180-0155		C FXD 2.2UF 20% 20VDC	56289	150D225X0020A2-DYS
A20CR1	1901-0047	4	DIO HOT CARRIER	28480	5082-2350
A20CR2	1901-0047		DIO HOT CARRIER	28480	5082-2350
A20CR3	1901-0047		DIO HOT CARRIER	28480	5082-2350
A20CR4	1901-0047		DIO HOT CARRIER	28480	5082-2350
A20J1	1250-[illegible]		CONN COAX PC BD MTG CONHEX	98291	51-151-0000
A20J2	1250-[illegible]		CONN COAX PC BD MTG CONHEX	98291	51-151-0000
A20J3	1250-[illegible]		CONN COAX PC BD MTG CONHEX	98291	51-151-0000
A20L1	08702-[illegible]	3	IND VAR	28480	
A20L2	08702-[illegible]		IND VAR	28480	
A20L3	08702-[illegible]		IND VAR	28480	

Abbreviations are listed in the Introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	HP Part No	TQ	Description	Mfr	Mfr Part No
A20D1	1854-0092		DIODE SI NPN	07263	2N3963
A20D2	1854-0092		DIODE SI NPN	07263	2N3963
A20D3	1854-0092		DIODE SI NPN	07263	2N3963
A20D4	1854-0092		DIODE SI NPN	07263	2N3963
A20R1	0757-0180		R FXD 31.6 OHM 1% 1/8W	19701	MFACT=0
A20R2	0757-0397		R FXD 46.4 OHM 1% 1/8W	19701	MFACT=0
A20R3	0757-0440		R FXD 100 OHM 1% 1/8W	19701	MFACT=0
A20R4	0757-0274		R FXD 1.21K OHM 1% 1/8W	19701	MFACT=0
A20R5	0698-0084		R FXD 2.15K OHM 1% 1/8W	19701	MFACT=0
A20R6	0757-0417		R FXD 562 OHM 1% 1/8W	19701	MFACT=0
A20R7	0698-3155		R FXD 4.64K OHM 1% 1/8W	19701	MFACT=0
A20R8	0698-0085		R FXD 2.61K OHM 1% 1/8W	19701	MFACT=0
A20R9	0757-0395		R FXD 75 OHM 1% 1/8W	19701	MFACT
A20R10	0757-0442		R FXD 10K OHM 1% 1/8W	19701	MFACT
A20R11	0757-0395		R FXD 75 OHM 1% 1/8W	19701	MFACT
A20R12	0698-3439	3	R FXD 178 OHM 1% 1/8W	19701	MFACT=0
A20R13	0757-0274		R FXD 1.21K OHM 1% 1/8W	19701	MFACT=0
A20R14	0698-0084		R FXD 2.15K OHM 1% 1/8W	19701	MFACT=0
A20R15	0698-3155		R FXD 4.64K OHM 1% 1/8W	19701	MFACT=0
A20R16	0757-0279		R FXD 3.16K OHM 1% 1/8W	75042	CRA1=0
A20R17	0757-0397		R FXD 46.4 OHM 1% 1/8W	19701	MFACT=0
A20R18	0698-4037		R FXD 46.4 OHM 1% 1/8W	75042	CRA1=0
A20R19	0698-4037		R FXD 46.4 OHM 1% 1/8W	75042	CRA1=0
A20R20	0698-4037		R FXD 46.4 OHM 1% 1/8W	75042	CRA1=0
A20R21	0698-4037		R FXD 46.4 OHM 1% 1/8W	75042	CRA1=0
A20T1	08702-736	A	XFMR	80007	
A20T2	08702-736		XFMR	80007	
A21	08702-7177		ASSY RH AMPLIFIER	80007	
	08702-3177		PC BD BLANK	80007	
A21C1	0170-0071	2	C FXD 0.33UF 20% 50WVDC	84411	60F
A21C2	0170-0071		C FXD 0.33UF 20% 50WVDC	84411	60F
A21C3	0140-0196	2	C FXD 1800PF 5% 300WVDC	72136	DDM15F182J3C
A21C4	0140-0196		C FXD 1800PF 5% 300WVDC	72136	DDM15F182J3C
A21C5	0160-2140		C FXD 0.02UF +80-20% 100WVDC	91418	1A
A21C6	0180-0374		C FXD 10UF 10% 20WVDC	56289	150D106X9020B2-DYS
A21C7	0180-0199		C FXD 2.2UF 20% 20WVDC	56289	150D225X9020A2-DYS
A21C8	0160-0174		C FXD 0.47UF +80-20% 25WVDC	56289	SC118Z5-CML
A21C9	0160-0174		C FXD 0.47UF +80-20% 25WVDC	56289	SC118Z5-CML
A21C10	0180-0199		C FXD 2.2UF 20% 20WVDC	56289	150D225X9020A2-DYS
A21C11	0160-0181		C FXD 0.1UF +80-20% 50WVDC	56289	SC50B15-CML
A21C12	0121-0046		C VAR 4-50PF	72982	538-011-B2P0-Y4R
A21C13	0180-1738	1	C FXD 0.22UF 10% 35WVDC	56289	150D224X9035A2-DYS
A21C14	0160-0181		C FXD 0.1UF +80-20% 50WVDC	56289	SC50B15-CML
A21C15	0180-1743	1	C FXD 0.1UF 10% 35WVDC	56289	150D104X9035A2-DYS
A21C16	0180-0376	1	C FXD 0.47UF 10% 35WVDC	56289	150D474X9035A2-DYS
A21C17	0160-0174		C FXD 0.47UF +80-20% 25WVDC	56289	SC118Z5-CML
A21C18	0180-0199		C FXD 2.2UF 20% 20WVDC	56289	150D225X9020A2-DYS
A21C19	0180-0199		C FXD 2.2UF 20% 20WVDC	56289	150D225X9020A2-DYS
A21C20	0180-0199		C FXD 2.2UF 20% 20WVDC	56289	150D225X9020A2-DYS
A21C21	0160-0174		C FXD 0.47UF +80-20% 25WVDC	56289	SC118Z5-CML
A21C22	0180-0199		C FXD 2.2UF 20% 20WVDC	56289	150D225X9020A2-DYS
A21C23	0180-0199		C FXD 2.2UF 20% 20WVDC	56289	150D225X9020A2-DYS
A21C24	0180-0199		C FXD 2.2UF 20% 20WVDC	56289	150D225X9020A2-DYS
A21C25	0180-0199		C FXD 2.2UF 20% 20WVDC	56289	150D225X9020A2-DYS

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	HP Part No	TQ	Description	Mfr	Mfr Part No
A21CR6	0180-0155		C FXD 2.2UF 20% 20WVDC	56289	150D225X0020A2-DY5
A21CR7	0180-0155		C FXD 2.2UF 20% 20WVDC	56289	150D225X0020A2-DY5
A21CR8	0180-0155		C FXD 2.2UF 20% 20WVDC	56289	150D225X0020A2-DY5
A21CR9	0180-0155		C FXD 2.2UF 20% 20WVDC	56289	150D225X0020A2-DY5
A21CR1	1901-0047	6	DIO SI	28106	D3738
A21CR2	1901-0047		DIO SI	28106	D3738
A21CR3	1901-0047		DIO SI	28106	D3738
A21CR4	1901-0047		DIO SI	28106	D3738
A21CR5	1901-0047		DIO SI	28106	D3738
A21CR6	1901-0047		DIO SI	28106	D3738
A21CR7	1902-3139	1	DIO BKDN 6.25V 5% 400MW	07910	CD35682
A21CR8	1902-3082		DIO BKDN 4.64V 5% 400MW	07910	CD35610
A21CR9	1902-3082		DIO BKDN 4.64V 5% 400MW	07910	CD35610
A21CR10	1902-3193		DIO BKDN 13.3V 5% 400MW	07910	CD35742
A21J1	1250-0932		CONN COAX PC RD RTG CONNEX	98291	51-151-0000
A21J2	1250-0932		CONN COAX PC RD RTG CONNEX	98291	51-151-0000
A21L1	9100-1662	1	IND FXD 820UH 5%	99800	2800-24
A21L2	03702-741	1	IND VAR	80007	
A21L3	9140-0137	1	IND FXD 1MH 5%	99800	1537-28
A21Q1	1854-0019		XSTR SI NPN	13715	S-6816
A21Q2	1854-0092		XSTR SI NPN	07263	2N3563
A21Q3	1854-0092		XSTR SI NPN	07263	2N3563
A21Q4	1854-0092		XSTR SI NPN	07263	2N3563
A21Q5	1854-0092		XSTR SI NPN	07263	2N3563
A21Q6	1854-0092		XSTR SI NPN	07263	2N3563
A21Q7	1854-0092		XSTR SI NPN	07263	2N3563
A21Q8	1854-0071		XSTR SI NPN	01295	SKA1124
A21Q9	1854-0071		XSTR SI NPN	01295	SKA1124
A21Q10	1853-0034		XSTR SI PNP	04713	SN3147
A21Q11	1854-0022		XSTR SI NPN	03877	SI 1657
A21R1	0757-0381	2	R FXD 15 OHM 1% 1/8W	80007	
A21R2	0698-3439		R FXD 178 OHM 1% 1/8W	19701	MFACT-0
A21R3	0757-0381		R FXD 15 OHM 1% 1/8W	80007	
A21R4	0757-0398		R FXD 75 OHM 1% 1/8W	19701	MFAC
A21R5	0757-0279		R FXD 3.16K OHM 1% 1/8W	75042	CEAT-0
A21R6	0757-0394		R FXD 51.1 OHM 1% 1/8W	19701	MFACT-0
A21R7	0757-0394		R FXD 51.1 OHM 1% 1/8W	19701	MFACT-0
A21R8	0757-0200		R FXD 5.62K OHM 1% 1/8W	19701	MFAC
A21R9	0757-0274		R FXD 1.21K OHM 1% 1/8W	19701	MFACT-0
A21R10	0757-0279		R FXD 3.16K OHM 1% 1/8W	75042	CEAT-0
A21R11	0757-0279		R FXD 3.16K OHM 1% 1/8W	75042	CEAT-0
A21R12	0757-0407		R FXD 200 OHM 1% 1/8W	19701	MFAC
A21R13	0757-0407		R FXD 200 OHM 1% 1/8W	19701	MFAC
A21R14	0698-0084		R FXD 2.15K OHM 1% 1/8W	19701	MFACT-0
A21R15	0698-3154		R FXD 4.22K OHM 1% 1/8W	19701	MFACT-0
A21R16	0698-3155		R FXD 4.64K OHM 1% 1/8W	19701	MFACT-0
A21R17	0757-0278		R FXD 1.78K OHM 1% 1/8W	75042	CEAT-0
A21R18	0757-0280		R FXD 1K OHM 1% 1/8W	75042	CEAT-0
A21R19	0698-3444		R FXD 316 OHM 1% 1/8W	19701	MFACT-0
A21R20	0757-0290	4	R FXD 6.19K OHM 1% 1/8W	75042	CEA
A21R21	0757-0274		R FXD 1.21K OHM 1% 1/8W	19701	MFACT-0
A21R22	0757-0279		R FXD 3.16K OHM 1% 1/8W	75042	CEAT-0
A21R23	0757-0280		R FXD 1K OHM 1% 1/8W	75042	CEAT-0
A21R24	0757-0427		R FXD 1.5K OHM 1% 1/8W	19701	MFACT-0
A21R25	0757-0280		R FXD 1K OHM 1% 1/8W	75042	CEAT-0

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	HP Part No	TQ	Description	Mfr	Mfr Part No
A21R26	0757-0419		R FXD 681 OHM 1% 1/8W	19701	MFACT-D
A21R27	0757-0199		R FXD 21.5K OHM 1% 1/8W	19701	MFACT-D
A21R28	0757-0280		R FXD 6.19K OHM 1% 1/8W	75042	CEA
A21R29	0757-0199		R FXD 21.5K OHM 1% 1/8W	19701	MFACT-D
A21R30	0698-0082		R FXD 464 OHM 1% 1/8W	19701	MFACT-D
A21R31	0757-0732	2	R FXD 909 OHM 1% 1/4W	19701	MFSRCT-D
A21R32	0757-0732		R FXD 909 OHM 1% 1/4W	19701	MFSRCT-D
A21R33	0698-3446		R FXD 348 OHM 1% 1/8W	19701	MFACT-D
A21R34	0757-0279		R FXD 3.16K OHM 1% 1/8W	75042	CEAT-D
A21R35	0757-0403		R FXD 162 OHM 1% 1/8W	19701	MFACT-D
A21R36	0757-0728	2	R FXD 619 OHM 1% 1/4W	19701	MFSRCT-D
A21R37	0698-3443		R FXD 287 OHM 1% 1/8W	19701	MFACT-D
A21R38	0698-3439		R FXD 178 OHM 1% 1/8W	19701	MFACT-D
A21R39	0757-0728		R FXD 619 OHM 1% 1/4W	19701	MFSRCT-D
A21R40	0757-0280		R FXD 1K OHM 1% 1/8W	75042	CEAT-D
A21R41	0757-0419	2	R FXD 619 OHM 1% 1/8W	19701	MFACT-D
A21R42	0698-3155		R FXD 4.64K OHM 1% 1/8W	19701	MFACT-D
A21R44	0698-4037		R FXD 46.4 OHM 1% 1/8W	75042	CEAT-D
A21R45	0698-4037		R FXD 46.4 OHM 1% 1/8W	75042	CEAT-D
A21R46	0698-4037		R FXD 46.4 OHM 1% 1/8W	75042	CEAT-D
A21R47	0698-4037		R FXD 46.4 OHM 1% 1/8W	75042	CEAT-D
A21R48	0698-4037		R FXD 46.4 OHM 1% 1/8W	75042	CEAT-D
A21R49	0698-4037		R FXD 46.4 OHM 1% 1/8W	75042	CEAT-D
A21R50	0698-4037		R FXD 46.4 OHM 1% 1/8W	75042	CEAT-D
A21R51	0698-3155		R FXD 4.64K OHM 1% 1/8W	19701	MFACT-D
A22	07070-7212	1	ASSY IF AMPLIFIER & DETECTOR	80007	
	07070-3212	1	PC BD BLANK	80007	
A22C1	0150-0093		C FXD 0.01UF +80-10% 100WVDC	91418	
A22C2	0160-0662	2	C FXD 51PF 5% 30WVDC	20946	023-0131
A22C3	0150-0050		C FXD 1000PF +80-20% 1000WVDC	91418	
A22C4	0180-0155		C FXD 2.2UF 20% 20WVDC	56289	150D225X0020AR-DY5
A22C5	0180-0229		C FXD 33UF 10% 10WVDC	56289	150D336X9010DR-DY5
A22C6	0180-0155		C FXD 2.2UF 20% 20WVDC	56289	150D225X0020AR-DY5
A22C7	0160-0662		C FXD 51PF 5% 30WVDC	20946	023-0131
A22C8	0150-0050		C FXD 1000PF +80-20% 1000WVDC	91418	
A22C9	0150-0050		C FXD 1000PF +80-20% 1000WVDC	91418	
A22C10	0150-0050		C FXD 1000PF +80-20% 1000WVDC	91418	
A22C11	0150-0050		C FXD 1000PF +80-20% 1000WVDC	91418	
A22C12	0180-0155		C FXD 2.2UF 20% 20WVDC	56289	150D225X0020AR-DY5
A22C13	0150-0050		C FXD 1000PF +80-20% 1000WVDC	91418	
A22C14	0150-0050		C FXD 1000PF +80-20% 1000WVDC	91418	
A22C15	0180-0155		C FXD 2.2UF 20% 20WVDC	56289	150D225X0020AR-DY5
A22C16	0150-0050		C FXD 1000PF +80-20% 1000WVDC	91418	
A22C17	0150-0050		C FXD 1000PF +80-20% 1000WVDC	91418	
A22C18	0180-0155		C FXD 2.2UF 20% 20WVDC	56289	150D225X0020AR-DY5
A22C19	0150-0050		C FXD 1000PF +80-20% 1000WVDC	91418	
A22C20	0150-0050		C FXD 1000PF +80-20% 1000WVDC	91418	
A22C21	0180-0155		C FXD 2.2UF 20% 20WVDC	56289	150D225X0020AR-DY5
A22C22	0150-0050		C FXD 1000PF +80-20% 1000WVDC	91418	
A22C23	0150-0050		C FXD 1000PF +80-20% 1000WVDC	91418	
A22C24	0150-0050		C FXD 1000PF +80-20% 1000WVDC	91418	
A22C25	0150-0050		C FXD 1000PF +80-20% 1000WVDC	91418	
A22C26	0150-0093		C FXD 0.01UF +80-10% 100WVDC	91418	
A22C27	0121-0602		C VAR 1.4-9PF 50WVDC	80009	0121-0602
A22C28	0160-0662	1	C FXD 51PF 5% 30WVDC	20946	0131-025
A22C29	0180-0155		C FXD 2.2UF 20% 20WVDC	56289	150D225X0020AR-DY5

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	HP Part No	TQ	Description	Mfr	Mfr Part No
A2R130	0180-0159		C FXD 2.2UF 20% 20WVDC	56289	150D225X0020A2-DYS
A2R131	0180-0159		C FXD 2.2UF 20% 20WVDC	56289	150D225X0020A2-DYS
A2R132	0180-0159		C FXD 2.2UF 20% 20WVDC	56289	150D225X0020A2-DYS
A2R133	0180-0159		C FXD 2.2UF 20% 20WVDC	56289	150D225X0020A2-DYS
A2R1R1	1901-0347		DIO PWR CARRIER	28480	5082-3350
A2R1R2	1901-0040		DIO SI	12969	5082-0350
A2R1R3	1901-0347		DIO PWR CARRIER	28480	5082-3350
A2R1R4	1902-0029		DIO ZENER 10V 5%10MW	07910	CD957DA
A2R1J1	1250-0932		CONN COAX PC RA MTG CONNEX	98291	51-151-0000
A2R1J2	1250-0932		CONN COAX PC RA MTG CONNEX	98291	51-151-0000
A2R1J3	1250-0932		CONN COAX PC RA MTG CONNEX	98291	51-151-0000
A2R1L1	9170-1726	3	IND VAR	80007	
A2R1L2	9140-0144	4	IND FXD 4.7UH 10%	99800	1025-26
A2R1L3	9140-0144		IND FXD 4.7UH 10%	99800	1025-26
A2R1L4	9170-1726		IND VAR	80007	
A2R1L5	9170-1730	1	IND VAR	80007	
A2R1Q1	1854-0071		XSTR SI NPN	01295	SKA1124
A2R1Q2	1854-0071		XSTR SI NPN	01295	SKA1124
A2R1Q3	1854-0325	1	XSTR SI NPN	07263	2N3563
A2R1Q4	1854-0283	4	XSTR SI NPN	07263	2N3866
	1205-0008	4	HEAT DISSIPATOR XSTR	07366	3AL-63B-2R
A2R1Q5	1854-0283		XSTR SI NPN	07263	2N3866
	1205-0008		HEAT DISSIPATOR XSTR	07366	3AL-63B-2R
A2R1Q6	1854-0283		XSTR SI NPN	07263	2N3866
	1205-0008		HEAT DISSIPATOR XSTR	07366	3AL-63B-2R
A2R1Q7	1854-0283		XSTR SI NPN	07263	2N3866
	1205-0008		HEAT DISSIPATOR XSTR	07366	3AL-63B-2R
A2R1Q8	1854-0097		XSTR SI NPN	07263	2N3903
A2R1R1	0698-0084		R FXD 2.15K OHM 1% 1/8W	19701	MFA01-0
A2R1R2	0757-0442		R FXD 10K OHM 1% 1/8W	19701	MFA0
A2R1R3	0757-0442		R FXD 10K OHM 1% 1/8W	19701	MFA0
A2R1R4	0757-0469		R FXD 150K OHM 1% 1/8W	19701	MFA01-0
A2R1R5	0757-0469		R FXD 150K OHM 1% 1/8W	19701	MFA01-0
A2R1R6	0757-0279		R FXD 3.16K OHM 1% 1/8W	75042	CEA1-0
A2R1R7	0757-0279		R FXD 3.16K OHM 1% 1/8W	75042	CEA1-0
A2R1R8	0698-3444		R FXD 316 OHM 1% 1/8W	19701	MFA01-0
A2R1R9	0698-3444		R FXD 316 OHM 1% 1/8W	19701	MFA01-0
A2R1R10	0757-0289		R FXD 13.3K OHM 1% 1/8W	75042	CEA1-0
A2R1R11	0757-0469		R FXD 150K OHM 1% 1/8W	19701	MFA01-0
A2R1R12	0757-0469		R FXD 150K OHM 1% 1/8W	19701	MFA01-0
A2R1R13	0757-0442		R FXD 10K OHM 1% 1/8W	19701	MFA0
A2R1R14	0757-0442		R FXD 10K OHM 1% 1/8W	19701	MFA0
A2R1R15	0757-0394		R FXD 75 OHM 1% 1/8W	19701	MFA0
A2R1R16	0757-0280		R FXD 1K OHM 1% 1/8W	75042	CEA1-0
A2R1R17	0757-0424		R FXD 1.1K OHM 1% 1/8W	19701	MFA01-0
A2R1R18	0698-3430	12	R FXD 21.5 OHM 1% 1/8W	19701	MFA01-0
A2R1R19	0698-3444		R FXD 316 OHM 1% 1/8W	19701	MFA01-0
A2R1R20	0757-0419		R FXD 681 OHM 1% 1/8W	19701	MFA01-0
A2R1R21	0698-3444		R FXD 316 OHM 1% 1/8W	19701	MFA01-0
A2R1R22	0698-3430		R FXD 21.5 OHM 1% 1/8W	19701	MFA01-0
A2R1R23	0757-0402	1	R FXD 100 OHM 1% 1/8W	19701	MFA01-0
A2R1R24	0757-0417		R FXD 562 OHM 1% 1/8W	19701	MFA01-0
A2R1R25	0698-3441	4	R FXD 215 OHM 1% 1/8W	19701	MFA01-0
A2R1R26	0698-3132	5	R FXD 261 OHM 1% 1/8W	19701	MFA01-0

Abbreviations are listed in the Introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	HP Part No	TQ	Description	Mfr	Mfr Part No
A22R27	0757-0403		R FXD 12.1 OHM 1% 1/8W	19701	MF4C1=0
A22R28	0698-3215		R FXD 330 OHM 5% 1W	01121	CB 3315
A22R29	0698-3430		R FXD 21.5 OHM 1% 1/8W	19701	MF4C1=0
A22R30	0698-3704		R FXD 178 OHM 1% 1/8W	19701	MF4C1=0
A22R31	0757-0284		R FXD 150 OHM 1% 1/8W	75042	CEAT=0
A22R32	0699-2215		R FXD 220 OHM 5% 1W	01121	GB 2215
A22R33	0698-3430		R FXD 21.5 OHM 1% 1/8W	19701	MF4C1=0
A22R34	0757-0419		R FXD 287 OHM 1% 1/8W	19701	MF4C1=0
A22R35	0698-3443		R FXD 287 OHM 1% 1/8W	19701	MF4C1=0
A22R36	0757-0199		R FXD 21.5K OHM 1% 1/8W	19701	MF4C1=0
A22R37	0757-0280		R FXD 1K OHM 1% 1/8W	75042	CEAT=0
A22R38	0757-0199		R FXD 21.5K OHM 1% 1/8W	19701	MF4C1=0
A22R39	0757-0180		R FXD 2.15K OHM 1% 1/8W	75042	CEAT=0
A22R40	0757-0397		R FXD 681 OHM 1% 1/8W	19701	MF4C1=0
A22R41	0757-0180		R FXD 2.15K OHM 1% 1/8W	75042	CEAT=0
A22R42	0698-3439		R FXD 21.5 OHM 1% 1/8W	19701	MF4C1=0
A22R43	0757-0180		R FXD 2.15K OHM 1% 1/8W	19701	MF4C1=0
A22R44	0757-0180		R FXD 2.15K OHM 1% 1/8W	75042	CEAT=0
A22R45	0698-3430		R FXD 21.5 OHM 1% 1/8W	19701	MF4C1=0
A22R46	0698-3132		R FXD 261 OHM 1% 1/8W	19701	MF4C1=0
A22T1	08701-735		XFMR	00007	
A22T2	08701-735		XFMR	00007	
A22T3	08701-735		XFMR	00007	
A22T4	08701-735		XFMR	00007	
A22T5	08701-735		XFMR	00007	
A22T6	08701-735		XFMR	00007	
A23	08708-3170		ASSY IF RIBBON & LOCAL OSCILLATOR	00007	
	08708-3170		PC BD BLANK	00007	
A23C1	0160-0195	C	FXD 1500PF 5% 300WVDC	72136	RDM15F152J3C
A23C2	0160-0195	C	FXD 1500PF 5% 300WVDC	72136	RDM15F152J3C
A23C3	0160-0195	C	FXD 1500PF 5% 300WVDC	72136	RDM15F152J3C
A23C4	0160-0097	C	FXD 470PF 10% 35WVDC	56289	150D471A9003B2-DYS
A23C5	0160-0050	C	FXD 1000PF +80 -20% 1000WVDC	91418	
A23C6	0160-0050	C	FXD 1000PF +80 -20% 1000WVDC	91418	
A23C7	0160-0155	C	FXD 0.20UF 20% 20WVDC	56289	150D225X0020A2-DYS
A23C8	0160-0050	C	FXD 1000PF +80 -20% 1000WVDC	91418	
A23C9	0160-0155	C	FXD 0.20UF 20% 20WVDC	56289	150D225X0020A2-DYS
A23C10	0160-2204	C	FXD 220PF 5% 300WVDC	72136	501-000-C0J0-221J
A23C11	0160-2200	C	FXD 43PF 5% 300WVDC	72136	RDM15E430J3C
A23C12	0160-0050	C	FXD 1000PF +80 -20% 1000WVDC	91418	
A23C13	0160-0050	C	FXD 1000PF +80 -20% 1000WVDC	91418	
A23C14	0160-2202	C	FXD 750PF 5% 300WVDC	72136	RDM15E751J3C
A23C15	0160-2202	C	FXD 750PF 5% 300WVDC	72136	RDM15E751J3C
A23C16	0160-0050	C	FXD 1000PF +80 -20% 1000WVDC	91418	
A23C17	0160-0050	C	FXD 1000PF +80 -20% 1000WVDC	91418	
A23C18	0160-0050	C	FXD 1000PF +80 -20% 1000WVDC	91418	
A23C19	0160-0050	C	FXD 1000PF +80 -20% 1000WVDC	91418	
A23C20	0160-0050	C	FXD 1000PF +80 -20% 1000WVDC	91418	
A23C21	0160-0093	C	FXD 0.01UF +80-10% 100WVDC	91418	
A23C22	0160-0291	C	FXD 1UF +10% 35WVDC	56289	150D105X0035A2-DYS
A23C23	0160-2202	C	FXD 750PF 5% 300WVDC	72136	RDM15E751J3C
A23C24	0160-0154	C	FXD 22UPF 5% 300WVDC	14655	RDM15F221J3C
A23C25	0160-2207	C	FXD 470PF 5% 300WVDC	72136	RDM15E471J3C
A23C26	0160-0154	C	FXD 22UPF 5% 300WVDC	14655	RDM15F221J3C

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	HP Part No	TQ	Description	Mfr	Mfr Part No
A23C27	0160-0207		C FXD 150P 5% 300WVDC	72136	DD015E151J3C
A23C28	0160-0155		C FXD 2.2UF 20% 20WVDC	56289	150D225X0020A2-DYS
A23C29	0160-0155		C FXD 2.2UF 20% 20WVDC	56289	150D225X0020A2-DYS
A23C30	0160-0093		C FXD 0.01UF 100=10% 100WVDC	91418	
A23C31	0160-0155		C FXD 2.2UF 20% 20WVDC	56289	150D225X0020A2-DYS
A23C32	0160-0155		C FXD 2.2UF 20% 20WVDC	56289	150D225X0020A2-DYS
A23C33	0160-0165		C FXD 5.6PF 5% 300WVDC	72136	DD050E[illegible]
A23C34	0160-0165		C FXD 5.6PF 5% 300WVDC	72136	DD050E[illegible]
A23C35	0160-0093		C FXD 0.01UF 100=10% 100WVDC	91418	
A23C36	0160-0197		C FXD 180PF 5% 300WVDC	72136	DD[illegible]
A23CR1	1901-0040		DIO SI	12969	5082-0040
A23CR2	1901-0040		DIO SI	12969	5082-0040
A23CR3	0122-0003		C VOL VAR	80009	
A23CR4	1901-0545		DIO SI SCHOTTKY BARRIER MATCHED QUAD	28480	5082-0545
A23CR5	1901-0545		DIO SI SCHOTTKY BARRIER MATCHED QUAD	28480	5082-0545
A23CR6	1901-0545		DIO SI SCHOTTKY BARRIER MATCHED QUAD	28480	5082-0545
A23CR7	1901-0545		DIO SI SCHOTTKY BARRIER MATCHED QUAD	28480	5082-0545
A23J1	1250-0932		CONN COAX PC RD RTG CONNEX	98291	01-151-0000
A23J2	1250-0932		CONN COAX PC RD RTG CONNEX	98291	01-151-0000
A23J3	1250-0932		CONN COAX PC RD RTG CONNEX	98291	01-151-0000
A23J4	1250-0932		CONN COAX PC RD RTG CONNEX	98291	01-151-0000
A23J5	1250-0932		CONN COAX PC RD RTG CONNEX	98291	01-151-0000
A23J6	1250-0932		CONN COAX PC RD RTG CONNEX	98291	01-151-0000
A23L1	09702-7200	1	IND VAR	80007	
A23L2	9140-0144		IND FXD 2.2UH 10%	99800	1026-36
A23L3	9100-1681	1	IND FXD 750UH 5%	80007	
A23L4	09702-7200	1	IND VAR	80007	
A23L5	09702-7300	1	IND VAR	80007	
A23L6	09702-7301	1	IND VAR	80007	
A23L7	09702-7300		IND VAR	80007	
A23L8	09702-7299		IND VAR	80007	
A23L9	9100-2849	3	IND FXD 0.1UH 10%	12969	09-4416-38
A23MC1	1820-0477		IC OP AMP	01295	SN19731
A23Q1	1854-0019		XSTR SI NPN	13719	5-6916
A23Q2	1854-0019		XSTR SI NPN	13719	5-6916
A23Q3	1854-0019		XSTR SI NPN	13719	5-6916
A23Q4	1854-0019		XSTR SI NPN	13719	5-6916
A23Q5	1854-0019		XSTR SI NPN	13719	5-6916
A23Q6	1854-0092		XSTR SI NPN	07263	2N3963
A23Q7	1854-0092		XSTR SI NPN	07263	2N3963
A23R1	0757-0442		R FXD 10K OHM 1% 1/8W	19701	MFAC
A23R2	0757-0442		R FXD 10K OHM 1% 1/8W	19701	MFAC
A23R3	0757-0442		R FXD 10K OHM 1% 1/8W	19701	MFAC
A23R4	0698-4477	1	R FXD 10.5K OHM 1% 1/8W	80009	
A23R5	0757-0439		R FXD 6.81K OHM 1% 1/8W	19701	MFAC
A23R6	2100-2691	2	R VAR 20K OHM 10% 1/2W	21030	62-211-1
A23R7	0698-3152		R FXD 3.48K OHM 1% 1/8W	19701	MFAC1-D
A23R8	0757-0442		R FXD 10K OHM 1% 1/8W	19701	MFAC
A23R9	0757-0427		R FXD 1.0K OHM 1% 1/8W	19701	MFAC1-D
A23R10	0757-0442		R FXD 10K OHM 1% 1/8W	19701	MFAC
A23R11	2100-1738	1	R VAR 10K OHM 10% 1/2W	21030	62-209-1
A23R12	0757-0441		R FXD 9.09K OHM 1% 1/8W	19701	MFAC1-D
A23R13	0757-0424		R FXD 1.1K OHM 1% 1/8W	19701	MFAC1-D

Abbreviations are listed in the introduction to this section

Table 4-1. Replaceable Parts (continued)

Ref Desig	HP Part No.	TQ	Description	Mfr	Mfr Part No
A23R14	0698-0082		R FXD 604 OHM 1% 1/8W	19701 MFAGT=0	
A23R15	0757-0377		R FXD 1.33K OHM 1% 1/8W	75042 CEAT=0	
A23R16	0757-0403		R FXD 121 OHM 1% 1/8W	19701 MFAGT=0	
A23R17	0757-0280		R FXD 1K OHM 1% 1/8W	75042 CEAT=0	
A23R18	0757-0401		R FXD 100 OHM 1% 1/8W	19701 MFAGT=0	
A23R19	0757-0401		R FXD 100 OHM 1% 1/8W	19701 MFAGT=0	
A23R20	0698-3439	3	R FXD 38.3 OHM 1% 1/8W	19701 MFAGT=0	
A23R21	0757-0398		R FXD 75 OHM 1% 1/8W	19701 MFAG	
A23R22	0757-0401		R FXD 100 OHM 1% 1/8W	19701 MFAGT=0	
A23R23	0757-1094		R FXD 1.47K OHM 1% 1/4W	19701 MFAGT=0	
A23R24	0757-0180		R FXD 31.6 OHM 1% 1/8W	75042 CEAT=0	
A23R25	0757-0180		R FXD 31.6 OHM 1% 1/8W	75042 CEAT=0	
A23R26	0757-0397		R FXD 681 OHM 1% 1/8W	19701 MFAGT=0	
A23R27	0757-0346		R FXD 10 OHM 1% 1/8W	75042 CEA	
A23R28	0698-3443		R FXD 287 OHM 1% 1/8W	19701 MFAGT=0	
A23R29	0757-0284		R FXD 150 OHM 1% 1/8W	75042 CEAT=0	
A23R30	0698-4037		R FXD 46.4 OHM 1% 1/8W	75042 CEAT=0	
A23R31	0698-3441		R FXD 215 OHM 1% 1/8W	19701 MFAGT=0	
A23R32	2100-2591		R VAR 25K OHM 10% 1/2W	71030 82-2111-1	
A23R33	0757-0446		R FXD 19K OHM 1% 1/8W	19701 MFAG	
A23R34	0698-3446		R FXD 316 OHM 1% 1/8W	19701 MFAGT=0	
A23R35	0757-0180		R FXD 31.6 OHM 1% 1/8W	75042 CEAT=0	
A23R36	0757-0180		R FXD 31.6 OHM 1% 1/8W	75042 CEAT=0	
A23R37	0757-0397		R FXD 681 OHM 1% 1/8W	19701 MFAGT=0	
A23R38	0757-0401		R FXD 100 OHM 1% 1/8W	19701 MFAGT=0	
A23R39	0698-4037		R FXD 46.4 OHM 1% 1/8W	75042 CEAT=0	
A23R40	0757-0419		R FXD 1.21K OHM 1% 1/8W	19701 MFAGT=0	
A23R41	0698-0084		R FXD 2.15K OHM 1% 1/8W	19701 MFAGT=0	
A23R42	0757-0180		R FXD 31.6 OHM 1% 1/8W	75042 CEAT=0	
A23R43	0757-0280		R FXD 1K OHM 1% 1/8W	75042 CEAT=0	
A23R44	0757-0419		R FXD 681 OHM 1% 1/8W	19701 MFAGT=0	
A23R45	2100-1980	1	R VAR 1K OHM 10% 1/2W LIN	71030 82-200-1	
A23R46	0698-3430		R FXD 21.5 OHM 1% 1/8W	19701 MFAGT=0	
A23R47	0698-3430		R FXD 21.5 OHM 1% 1/8W	19701 MFAGT=0	
A23R48	0757-1094		R FXD 1.47K OHM 1% 1/4W	19701 MFAGT=0	
A23R49	0757-0279		R FXD 3.16K OHM 1% 1/8W	75042 CEAT=0	
A23R50	0698-3441		R FXD 215 OHM 1% 1/8W	19701 MFAGT=0	
A23T1	03710-7023	2	XFMR	80007	
A23T2	03710-7024	2	XFMR	80007	
A23T3	03710-7024		XFMR	80007	
A23T4	03710-7023		XFMR	80007	
A24	03702-7171	1	ASSY IF DISCRIMINATOR	80007	
	03702-3171	1	PC BD BLANK	80007	
A24C1	0160-0050		C FXD 1000PF +80-20% 1000WVDC	91418	
A24C2	0180-0195		C FXD 22UF 20% 20WVDC	56289 150D226X0020A2-DY5	
A24C4	0160-2145		C FXD 6800PF +80-20% 100WVDC	91418 1A	
A24C5	0160-2145		C FXD 6800PF +80-20% 100WVDC	91418 1A	
A24C6	0160-0939		C FXD 430PF 5% 300WVDC	72136 RDM15FA431J3C	
A24C7	0160-0163	1	C FXD 0.033UF 10% 200WVDC	56289	
A24C8	0160-0939		C FXD 430PF 5% 300WVDC	72136 RDM15FA431J3C	
A24C9	0160-0059		C FXD 30PF 5% 35WVDC	72982	
A24C10	0160-0156		C FXD 33000PF 10% 200WVDC	56289 192P33392-DY5	
A24C11	0160-0939		C FXD 430PF 5% 300WVDC	72136 RDM15FA431J3C	
A24C12	0160-2145		C FXD 6800PF +80-20% 100WVDC	91418 1A	
A24C13	0160-2145		C FXD 6800PF +80-20% 100WVDC	91418 1A	

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	HP Part No	TQ	Description	Mfr	Mfr Part No
A24C15	0150-0093		C FXD 0.01UF +80-10% 100WVDC	91418	
A24C16	0180-0155		C FXD 2.2UF 20% 20WVDC	56289	150D225X0020A2-DYS
A24C17	0180-0155		C FXD 2.2UF 20% 20WVDC	56289	150D225X0020A2-DYS
A24C18	0180-0155		C FXD 2.2UF 20% 20WVDC	56289	150D225X0020A2-DYS
A24C19	0180-0155		C FXD 2.2UF 20% 20WVDC	56289	150D225X0020A2-DYS
A24C20	0150-0093		C FXD 0.01UF +80-10% 100WVDC	91418	
A24C21	0140-0205	1	C FXD 6800PF 5% 300WVDC	14655	
A24C22	0150-0093		C FXD 0.01UF +80-10% 100WVDC	91418	
A24C23	0180-0155		C FXD 2.2UF 20% 20WVDC	56289	150D225X0020A2-DYS
A24C24	0140-2200		C FXD 4300PF 5% 300WVDC	72136	DDM15GA430J3C
A24C25	0160-0294	3	C FXD 7.5PF 0.25PF 500WVDC	20946	301-000-7.5P
A24C26	0180-0155		C FXD 2.2UF 20% 20WVDC	56289	150D225X0020A2-DYS
A24C27	0180-0155		C FXD 2.2UF 20% 20WVDC	56289	150D225X0020A2-DYS
A24C28	0150-0093		C FXD 0.01UF +80-10% 100WVDC	91418	
A24C29	0140-2150	2	C FXD 33PF 5% 300WVDC	14655	
A24C30	0150-0121		C FXD 0.1UF +80-20% 50WVDC	56289	5C50B15-CML
A24C31	0160-0174		C FXD 0.47UF +80-20% 25WVDC	56289	5C11D75-CML
A24C32	0140-0200	2	C FXD 3900PF 5% 300WVDC	72136	DDM15D391J3C
A24C33	0160-2214	1	C FXD 680PF 5% 300WVDC	72136	DDM15D681J3C
A24C34	0140-0200		C FXD 3900PF 5% 300WVDC	72136	DDM15D391J3C
A24C35	0160-0300	2	C FXD 0.0027UF 10% 300WVDC	56289	
A24C36	0160-2281	2	C FXD 5.6PF 0.25PF 500WVDC	20946	301-000-C0N0-5R6D
A24C37	0160-0160	1	C FXD 82000PF 10% 200WVDC	56289	192P82292-P15
A24C38	0160-0300		C FXD 0.0027UF 10% 300WVDC	56289	
A24C39	0160-2251		C FXD 5.6PF 0.25PF 500WVDC	20946	301-000-C0N0-5R6D
A24C40	0160-0159		C FXD 330000PF 10% 200WVDC	56289	192P33292-P15
A24C41	0160-0099		C FXD 30PF 5% 35WVDC	72982	
A24C42	0180-0155		C FXD 2.2UF 20% 20WVDC	56289	150D225X0020A2-DYS
A24C43	0180-0155		C FXD 2.2UF 20% 20WVDC	56289	150D225X0020A2-DYS
A24C44	0180-0155		C FXD 2.2UF 20% 20WVDC	56289	150D225X0020A2-DYS
A24C45	0180-0155		C FXD 2.2UF 20% 20WVDC	56289	150D225X0020A2-DYS
A24C46	0160-2150		C FXD 33PF 5% 300WVDC	14655	
A24CR1	1901-0039	1	DIO PIN 1N82/1GHZ	28480	
A24CR2	1901-0347		DIO HOT CARRIER	28480	5082-2350
A24CR3	1902-0041	1	DIO ZNDN 5.11V 5% 400MW	07910	CD5562Z
A24CR5	1902-3036	1	DIO ZNDN 5.10V 5% 400MW	04713	
A24CR6	1901-0347		DIO HOT CARRIER	28480	5082-2350
A24CR7	1901-0347		DIO HOT CARRIER	28480	5082-2350
A24J1	1250-0932		CONN COAX PC RD RTG CONREC	98291	51-151-0000
A24J2	1250-0932		CONN COAX PC RD RTG CONREC	98291	51-151-0000
A24J3	1250-0932		CONN COAX PC RD RTG CONREC	98291	51-151-0000
A24L1	09702-7186	1	IND VAR	80007	
A24L2	09702-7184	1	IND VAR	80007	
A24L3	09702-7185	3	IND VAR	80007	
A24L4	09702-7185		IND VAR	80007	
A24L5	09702-7185		IND VAR	80007	
A24MC1	1820-0477		IC OP AMP	01295	SN19231
A24MC2	1820-0148	1	IC OP AMP	04713	
A24MC3	1820-0477		IC OP AMP	01295	SN19231
A24MC4	1820-0477		IC OP AMP	01295	SN19231
A24MC5	1820-0477		IC OP AMP	01295	SN19231
A24Q1	1854-0071		XSTR SI NPN	01295	SKA112A
A24Q2	1854-0019		XSTR SI NPN	13715	S-6916
A24Q3	1854-0019		XSTR SI NPN	13715	S-6916
A24Q4	1854-0019		XSTR SI NPN	13715	S-6916

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	HP Part No	TQ	Description	Mfr	Mfr Part No
A24Q8	1854-0019		XSTR SI NPN	13719	S-6916
A24Q9	1853-0050	1	XSTR SI PNP	04713	SST107
A24Q7	1854-0028		XSTR SI NPN	03877	SI-1697
A24Q8	1854-0019		XSTR SI NPN	13719	S-6916
A24Q9	1854-0019		XSTR SI NPN	13719	S-6916
A24Q10	1853-0034		XSTR SI PNP	04713	SN3197
A24Q11	1853-0034		XSTR SI PNP	04713	SN3197
A24Q12	1854-0019		XSTR SI NPN	13719	S-6916
A24Q13	1853-0034		XSTR SI PNP	04713	SN3197
A24Q14	1854-0019		XSTR SI NPN	13719	S-6916
A24Q15	1854-0019		XSTR SI NPN	13719	S-6916
A24Q16	1854-0019		XSTR SI NPN	13719	S-6916
A24R1	0757-0401		R FXD 100 OHM 1% 1/8W	19701	MFACT-D
A24R2	0698-3430		R FXD 21.5 OHM 1% 1/8W	19701	MFACT-D
A24R3	0757-0401		R FXD 100 OHM 1% 1/8W	19701	MFACT-D
A24R4	0757-0280		R FXD 1K OHM 1% 1/8W	75042	CEAT-D
A24R5	0757-0401		R FXD 100 OHM 1% 1/8W	19701	MFACT-D
A24R6	0698-0084		R FXD 2.49K OHM 1% 1/8W	19701	MFACT-D
A24R7	0757-0401		R FXD 100 OHM 1% 1/8W	19701	MFACT-D
A24R8	0757-0800		R FXD 10.00K OHM 1% 1/8W	19701	MFAC
A24R9	0698-0085		R FXD 2.61K OHM 1% 1/8W	19701	MFACT-D
A24R10	0757-0427		R FXD 1.5K OHM 1% 1/8W	19701	MFACT-D
A24R11	0757-0283	2	R FXD 2K OHM 1% 1/8W	80009	
A24R12	0757-0442		R FXD 10K OHM 1% 1/8W	19701	MFAC
A24R13	0757-0458		R FXD 61.9K OHM 1% 1/8W	19701	MFACT-D
A24R14	0698-3136		R FXD 17.8K 1% 1/8W	19701	MFACT-D
A24R15	0757-0449		R FXD 20K OHM 1% 1/8W	19701	MFACT-D
A24R16	0698-0082		R FXD 464 OHM 1% 1/8W	19701	MFACT-D
A24R17	0757-0458		R FXD 61.9K OHM 1% 1/8W	19701	MFACT-D
A24R18	0698-3132		R FXD 261 OHM 1% 1/8W	19701	MFACT-D
A24R19	0698-3136		R FXD 17.8K 1% 1/8W	19701	MFACT-D
A24R20	0757-0280		R FXD 1K OHM 1% 1/8W	75042	CEAT-D
A24R21	0757-0279		R FXD 3.16K OHM 1% 1/8W	75042	CEAT-D
A24R22	0757-0418		R FXD 511 OHM 1% 1/8W	19701	MFACT-D
A24R23	0757-0279		R FXD 3.16K OHM 1% 1/8W	75042	CEAT-D
A24R24	0757-0401		R FXD 100 OHM 1% 1/8W	19701	MFACT-D
A24R25	0698-3151	1	R FXD 2.87K OHM 1% 1/8W	19701	MFACT-D
A24R26	0757-0280		R FXD 1K OHM 1% 1/8W	75042	CEAT-D
A24R27	0757-0283		R FXD 2K OHM 1% 1/8W	80009	
A24R30	0757-0439		R FXD 6.81K OHM 1% 1/8W	19701	MFAC
A24R31	0757-0200		R FXD 5.62K OHM 1% 1/8W	19701	MFAC
A24R32	0757-0815	1	R FXD 562 OHM 1% 1/8W	80009	
A24R33	0757-0200		R FXD 5.62K OHM 1% 1/8W	19701	MFAC
A24R34	0757-0280		R FXD 1K OHM 1% 1/8W	75042	CEAT-D
A24R35	0698-3430		R FXD 21.5 OHM 1% 1/8W	19701	MFACT-D
A24R36	0698-3155		R FXD 4.64K OHM 1% 1/8W	19701	MFACT-D
A24R37	0757-0419		R FXD 681 OHM 1% 1/8W	19701	MFACT-D
A24R38	2100-2061	1	R VAR 200 OHM 10% 1/2W	21030	
A24R39	0757-0418		R FXD 619 OHM 1% 1/8W	19701	MFACT-D
A24R40	0757-0280		R FXD 1K OHM 1% 1/8W	75042	CEAT-D
A24R41	0698-3132		R FXD 261 OHM 1% 1/8W	19701	MFACT-D
A24R42	0698-3446	1	R FXD 383 OHM 1% 1/8W	19701	MFACT-D
A24R43	2100-1788	2	R VAR 500 OHM 10% 1/2W LIN	21030	62-205-1
A24R44	0757-0427		R FXD 1.5K OHM 1% 1/8W	19701	MFACT-D
A24R45	0757-0427		R FXD 1.5K OHM 1% 1/8W	19701	MFACT-D

Abbreviations are listed in the Introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	HP Part No	TQ	Description	Mfr	Mfr Part No
A24R46	0757-0398		R FXD 75 OHM 1% 1/8W	19701	MFAG
A24R47	0757-0398		R FXD 75 OHM 1% 1/8W	19701	MFAG
A24R48	0757-0422	2	R FXD 909 OHM 1% 1/8W	19701	MFAG1-0
A24R49	0757-0427		R FXD 1.5K OHM 1% 1/8W	19701	MFAG1-0
A24R50	0757-0419		R FXD 681 OHM 1% 1/8W	19701	MFAG1-0
A24R51	0757-0290		R FXD 6.19K OHM 1% 1/8W	75042	CEA
A24R52	0757-0290		R FXD 6.19K OHM 1% 1/8W	75042	CEA
A24R53	2100-1788		R VAR 500 OHM 10% 1/2W LIN	21030	62-P09-1
A24R54	0757-0419		R FXD 681 OHM 1% 1/8W	19701	MFAG1-0
A24R55	0757-0346		R FXD 10 OHM 1% 1/8W	75042	CEA
A24R56	0757-0401		R FXD 100 OHM 1% 1/8W	19701	MFAG1-0
A24R57	0757-0416		R FXD 511 OHM 1% 1/8W	19701	MFAG1-0
A24R58	0698-0084		R FXD 2.19K OHM 1% 1/8W	19701	MFAG1-0
A24R59	0698-0084		R FXD 2.19K OHM 1% 1/8W	19701	MFAG1-0
A24R60	0757-0280		R FXD 1K OHM 1% 1/8W	75042	CEA1-0
A24R61	0757-0280		R FXD 1K OHM 1% 1/8W	75042	CEA1-0
A24R62	0757-0398		R FXD 75 OHM 1% 1/8W	19701	MFAG
A24R63	0757-0460	2	R FXD 61.9K OHM 1% 1/8W	19701	MFAC1-0
A24R64	0757-0446	2	R FXD 750K OHM 1% 1/8W	75042	CEA 1-0
A24R65	0698-3152		R FXD 3.48K OHM 1% 1/8W	19701	MFAC1-0
A24R66	0757-0280		R FXD 1K OHM 1% 1/8W	75042	CEA1-0
A24R67	0757-0317		R FXD 1.33K OHM 1% 1/8W	75042	CEA1-0
A24R68	0698-0084		R FXD 2.19K OHM 1% 1/8W	19701	MFAC1-0
A24R69	0757-0460		R FXD 61.9K OHM 1% 1/8W	19701	MFAC1-0
A24R70	0757-0446		R FXD 750K OHM 1% 1/8W	75042	CEA 1-0
A24R71	0757-0444	1	R FXD 619K OHM 1% 1/8W	91637	
A24R72	0757-0401		R FXD 100 OHM 1% 1/8W	19701	MFAC1-0
A24R73	0698-3132		R FXD 261 OHM 1% 1/8W	19701	MFAC1-0
A24R74	0757-0401		R FXD 100 OHM 1% 1/8W	19701	MFAC1-0
A24R75	0698-3430		R FXD 21.5 OHM 1% 1/8W	19701	MFAC1-0
A25	03702-7160	1	ASSY MARKER GENERATOR	00007	
	03702-3160	1	PC BD BLANK	00007	
A25C1	0150-0050		C FXD 1000PF +80 -20% 1000WVDC	91418	
A25C2	0180-0135		C FXD 2.2UF 20% 20WVDC	56289	150D225X0020A2-DY6
A25C3	0150-0050		C FXD 1000PF +80 -20% 1000WVDC	91418	
A25C4	0150-0050		C FXD 1000PF +80 -20% 1000WVDC	91418	
A25C5	0160-0066	1	C FXD 6.8PF 5% 300WVDC	20946	026-8111
A25C6	0160-0069	1	C FXD 6.8PF 5% 300WVDC	72982	8111-026
A25C7	0150-0050		C FXD 1000PF +80 -20% 1000WVDC	91418	
A25C8	0160-0040		C FXD 10PF 5% 300WVDC	20946	026-8111
A25C9	0150-0050		C FXD 1000PF +80 -20% 1000WVDC	91418	
A25C10	0150-0050		C FXD 1000PF +80 -20% 1000WVDC	91418	
A25C11	0150-0050		C FXD 1000PF +80 -20% 1000WVDC	91418	
A25C12	0160-2254		C FXD 7.5PF 0.25PF 500WVDC	20946	301-NP0-7.5PF
A25C13	0160-2254		C FXD 7.5PF 0.25PF 500WVDC	20946	301-NP0-7.5PF
A25C14	0160-0024	2	C FXD 56PF 5% 300VDC	00024	8131-026
A25C15	0160-0174		C FXD 0.47UF +80-20% 25WVDC	56289	5C11075-CNL
A25C16	0180-0135		C FXD 2.2UF 20% 20WVDC	56289	150D225X0020A2-DY6
A25C17	0160-0174		C FXD 0.47UF +80-20% 25WVDC	56289	5C11075-CNL
A25C18	0180-0135		C FXD 2.2UF 20% 20WVDC	56289	150D225X0020A2-DY6
A25C19	0160-0041	2	C FXD 22PF 5% 300WVDC	20946	026-8111
A25C20	0160-0024		C FXD 56PF 5% 300WVDC	00024	8131-026
A25C21	0160-0040		C FXD 10PF 5% 300WVDC	20946	026-8111
A25C22	0160-2261	2	C FXD 15PF 5% 500WVDC	20946	301-000-C0G0-150J
A25C23	0160-2261		C FXD 15PF 5% 500WVDC	20946	301-000-C0G0-150J

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	HP Part No	TQ	Description	Mfr	Mfr Part No
A25C24	0180-0155		C FXD 2.2UF 20% 20VDC	56289	150D225X0020A2-DY5
A25C25	0180-0155		C FXD 2.2UF 20% 20VDC	56289	150D225X0020A2-DY5
A25C26	0180-0155		C FXD 2.2UF 20% 20VDC	56289	150D225X0020A2-DY5
A25C27	0180-0155		C FXD 2.2UF 20% 20VDC	56289	150D225X0020A2-DY5
A25C28	0180-0155		C FXD 2.2UF 20% 20VDC	56289	150D225X0020A2-DY5
A25CR1	0122-0401	1	D VOLT VAR	28480	0122-0401
A25CR2	1901-0347		DIO HOT CARRIER	28480	5082-9350
A25CR3	1901-0347		DIO HOT CARRIER	28480	5082-9350
A25CR4	1901-0347		DIO HOT CARRIER	28480	5082-9350
A25CR5	1901-0347		DIO HOT CARRIER	28480	5082-9350
A25CR6	1901-0347		DIO HOT CARRIER	28480	5082-9350
A25CR7	1901-0347		DIO HOT CARRIER	28480	5082-9350
A25CR8	1901-0347		DIO HOT CARRIER	28480	5082-9350
A25CR9	1901-0347		DIO HOT CARRIER	28480	5082-9350
A25CR10	1901-0347		DIO HOT CARRIER	28480	5082-9350
A25CR11	1901-0347		DIO HOT CARRIER	28480	5082-9350
A25CR12	1901-0347		DIO HOT CARRIER	28480	5082-9350
A25CR13	1901-0347		DIO HOT CARRIER	28480	5082-9350
A25J1	1250-0938		CONN COAX PC RD MTG CONNEX	98291	51-161-0000
A25J2	1250-0938		CONN COAX PC RD MTG CONNEX	98291	51-161-0000
A25J3	1250-0938		CONN COAX PC RD MTG CONNEX	98291	51-161-0000
A25J4	1250-0938		CONN COAX PC RD MTG CONNEX	98291	51-161-0000
A25L1	09708-7290	1	IND VAR	80007	
A25L2	9140-0144		IND FXD 4.7UH 10%	99800	1025-36
A25L3	09701-726		IND VAR	80007	
A25L4	09701-731	1	IND VAR	80007	
A25L5	09701-726		IND VAR	80007	
A25L6	9140-0199		IND FXD 0.47UH 20%	70926	14703
A25L7	9140-0199		IND FXD 0.47UH 20%	70926	14703
A25L8	9100-2486	2	IND FXD 0.22UH 5%	82142	4418-RJ
A25L9	9100-2486	1	IND FXD 0.33UH 5%	82142	4492-RJ
A25L10	9100-2486		IND FXD 0.22UH 5%	82142	4418-RJ
A25L11	09708-726	1	IND VAR	80007	
A25Q1	1854-0323	1	XSTR SI NPN	04713	2N2857
A25Q2	1854-0219	1	XSTR SI NPN	03508	2N3563
A25Q3	1854-0092		XSTR SI NPN	07263	2N3563
A25Q4	1854-0092		XSTR SI NPN	07263	2N3563
A25Q5	1854-0092		XSTR SI NPN	07263	2N3563
A25Q6	1854-0092		XSTR SI NPN	07263	2N3563
A25Q7	1854-0019		XSTR SI NPN	13719	5-6616
A25R1	0757-0438		R FXD 5.11K OHM 1% 1/8W	19701	MFACT-0
A25R2	0757-0407		R FXD 200 OHM 1% 1/8W	19701	MFAC
A25R3	0698-8490		R FXD 2K OHM 1% 1/8W	91637	CMF-1/10-321-2
A25R4	0698-8490		R FXD 2K OHM 1% 1/8W	91637	CMF-1/10-321-2
A25R5	0698-3153		R FXD 3.83K OHM 1% 1/8W	19701	MFACT-0
A25R6	0698-3443		R FXD 287 OHM 1% 1/8W	19701	MFACT-0
A25R7	0698-0084		R FXD 2.15K OHM 1% 1/8W	19701	MFACT-0
A25R8	0757-0401		R FXD 100 OHM 1% 1/8W	19701	MFACT-0
A25R9	0698-3447		R FXD 422 OHM 1% 1/8W	19701	MFAC
A25R10	0757-0398		R FXD 75 OHM 1% 1/8W	80007	
A25R11	0698-3431	1	R FXD 23.7 OHM 1% 1/8W	19701	MFACT-0
A25R12	0757-0401		R FXD 100 OHM 1% 1/8W	80007	
A25R13	0698-3431		R FXD 23.7 OHM 1% 1/8W	19701	MFACT-0
A25R14	0698-3435		R FXD 38.3 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	Mfr	Mfr Part No
A25R15	0757-0396		R FXD 91.1 OHM 1% 1/8W	19701	MF4C1-0
A25R16	0698-3435		R FXD 30.3 OHM 1% 1/8W	19701	MF4C1-0
A25R17	0757-0398		R FXD 75 OHM 1% 1/8W	19701	MF4C
A25R18	0757-0440		R FXD 7.5K OHM 1% 1/8W	19701	MF4C1-0
A25R19	0757-0427		R FXD 1.5K OHM 1% 1/8W	19701	MF4C1-0
A25R20	0698-3155		R FXD 4.64K OHM 1% 1/8W	19701	MF4C1-0
A25R21	0757-0280		R FXD 1K OHM 1% 1/8W	75042	CEAT-0
A25R22	0698-3441		R FXD 215 OHM 1% 1/8W	19701	MF4C1-0
A25R23	0757-0446		R FXD 15K OHM 1% 1/8W	19701	MF4C
A25R24	0757-0427		R FXD 1.5K OHM 1% 1/8W	19701	MF4C1-0
A25R25	0698-3155		R FXD 4.64K OHM 1% 1/8W	19701	MF4C1-0
A25R26	0757-0398		R FXD 75 OHM 1% 1/8W	19701	MF4C
A25R27	0757-0422		R FXD 909 OHM 1% 1/8W	19701	MF4C1-0
A25R28	0757-0397		R FXD 60.4 OHM 1% 1/8W	19701	MF4C1-0
A25R29	0757-0398		R FXD 75 OHM 1% 1/8W	19701	MF4C
A25R30	0757-0398		R FXD 75 OHM 1% 1/8W	19701	MF4C
A25R31	0757-0398		R FXD 75 OHM 1% 1/8W	19701	MF4C
A25R32	0757-0395		R FXD 56.2 OHM 1% 1/8W	19701	MF4C1-0
A25R33	0757-0407		R FXD 200 OHM 1% 1/8W	19701	MF4C
A25R34	0757-0280		R FXD 1K OHM 1% 1/8W	75042	CEAT-0
A25R35	0757-0420		R FXD 750 OHM 1% 1/8W	19701	MF4C1-0
A25R36	0757-0398		R FXD 75 OHM 1% 1/8W	19701	MF4C
A25R37	0698-3155		R FXD 4.64K OHM 1% 1/8W	19701	MF4C1-0
A25R38	0698-3431		R FXD 23.7 OHM 1% 1/8W	80009	
A25R39	0757-0401		R FXD 100 OHM 1% 1/8W	19701	MF4C1-0
A25R40	0698-3431		R FXD 23.7 OHM 1% 1/8W	80009	
A25R41	0698-4037		R FXD 46.4 OHM 1% 1/8W	75042	CEAT-0
A25R42	0698-4037		R FXD 46.4 OHM 1% 1/8W	75042	CEAT-0
A25R43	0757-0280		R FXD 1K OHM 1% 1/8W	75042	CEAT-0
A25R44	0698-4037		R FXD 46.4 OHM 1% 1/8W	75042	CEAT-0
A25R45	0698-4037		R FXD 46.4 OHM 1% 1/8W	75042	CEAT-0
A25T1	03702-736		XFMR	80009	
A25T2	03702-736		XFMR	80009	
A25T3	03701-738	1	XFMR	80009	
A25T4	03702-736		XFMR	80009	
A25T5	03702-736		XFMR	80009	
A25T6	03702-736		XFMR	80009	
A25T7	03702-736		XFMR	80009	
A25Y1	0410-0602	1	*XTAL QUARTZ 70MHZ	60002	
A26	03702-7176	1	ASSY CENTER MARKER GENERATOR	80009	
	03702-3176	1	PC BD BLANK	80009	
A26C1	0150-0050		C FXD 1000PF +80 -20% 1000WVDC	91418	
A26C2	0150-0050		C FXD 1000PF +80 -20% 1000WVDC	91418	
A26C3	0160-0641		C FXD 220PF 5% 300WVDC	28480	0160-0111
A26C4	0160-0642		C FXD 51PF 5% 300WVDC	28480	0160-0131
A26C5	0160-0640		C FXD 10PF 5% 300WVDC	28480	0160-0111
A26C6	0180-0155		C FXD 2.2UF 20% 20WVDC	56289	150D225X0020A2-DYS
A26C7	0160-2199		C FXD 30PF 5% 300WVDC	72136	DDM15E300J3C
A26C8	0160-2199		C FXD 30PF 5% 300WVDC	72136	DDM15E300J3C
A26C9	0180-0155		C FXD 2.2UF 20% 20WVDC	56289	150D225X0020A2-DYS
A26J1	1250-0932		CONN COAX PC BD RTA CONNER	98291	81-101-0000
A26L1	08702-739	1	IND VAR.	80009	
A26L2	9100-2264		IND FXD 0.150UH 10%	12505	09-4416-38

Abbreviations are listed in the introduction to this section

Table 4-1 Replaceable Parts (continued)

Ref Desig	HP Part No	TQ	Description	Mfr	Mfr Part No
A26L3	9100-0811	1	IND FXD 0.330UH 10%	99800	1025-08
A26L4	9100-2749		IND FXD 0.150UH 10%	12505	09-4416-38
A26Q1	1854-0019		XSTR SI NPN	13715	5-6914
	1205-0037	1	HEAT DISSIPATOR XSTR	98978	1205-014-0750
A26R1	0757-0407		R FXD 200 OHM 1% 1/4W	19701	MF4C
A26R2	0757-0280		R FXD 1K OHM 1% 1/8W	75042	CEA1-0
A26R3	0757-0420		R FXD 750 OHM 1% 1/8W	19701	MF4C1-0
A26R4	0757-0280		R FXD 1K OHM 1% 1/8W	75042	CEA1-0
A26R5	0757-0398		R FXD 75 OHM 1% 1/8W	19701	MF4C
A26Y1	0410-0428	1	XTAL ASSEMBLY	00007	

Abbreviations are listed in the introduction to this section

Table 4-8 Replaceable Parts OPTION 002

Ref Desig	HP Part No	TQ	Description	Mfr	Mfr Part No
A1			OPTION 002 FRONT PANEL CONNECTORS (ARGE SIEMENS USE STANDARD REPLACEABLE PARTS LIST WITH THE FOLLOWING ADDITIONS OR (REPLACEMENTS)		
HP1	03702-10010		PANEL FRONT (REPLACES 03702-1041)		
HP9	03702-10028	1	PANEL REAR COVER (REPLACES 03702-1721)	28007	
W101	03702-7292	1	ASSY COAX CBL 40IN	28007	
	1250-0931	1	CONN-COAX CBL MTG CONNEX	98291	81-120-0000
	1250-1083	2	CONN,COAX BHD MTG	28022	HP/2,5/6/BNAB;KA/1/1)101
A14	03702-7294		ASSY IF ATTENUATOR (IDENTICAL TO 03702-7211 EXCEPT FOR THE FOLLOWING CABLE)		
A14W903	03702-7296	1	ASSY COAX CBL 40IN/CONN (REPLACES 03702-7211)	28007	
	1250-1083		CONN COAX BHD MTG (REPLACES 1250-0808)	28022	HP/2,5/6/BNAB;KA/1/1)101
	03702-348	1	CONN	28007	
	1999DA)P002	1	ASSY ACCESSORY KIT (REPLACES 1999DA)	28007	

Abbreviations are listed in the introduction to this section

Table 4-3 Replaceable Parts OPTION 003

Ref Desig	HP Part No	TQ	Description	Mfr	Mfr Part No
A1			OPTION 003 FRONT PANEL CONNECTORS SMALL SIEMENS USE STANDARD REPLACEABLE PARTS LIST WITH THE FOLLOWING ADDITIONS OR (REPLACEMENTS)		
HP1	03702-10009	1	PANEL FRONT (REPLACES 03702-1041)	60007	
HP9	03702-10023		PANEL REAR LOWER (REPLACES 03702-1721)		
W101	03707-1293	1	ASSY COAX CBL RED	60007	
	1250-0931	1	CONN COAX CBL RTG CONNEX	98291	91-128-0000
	1250-1077	2	CONN COAX RND RTG	60007	HP1250-1077
A14	03702-7295	1	ASSY IF ATTENUATOR (IDENTICAL TO 03702-7211 EXCEPT FOR THE FOLLOWING CABLE)	60007	
A14W903	03702-7297	1	ASSY COAX CBL RND/RCK (REPLACES 03702-72031)	60007	
	1250-1077		CONN COAX RND RTG (REPLACES 1250-0508)	60007	HP1250-1077
	03702-348	1	CONN	60007	
	19950A0P003	1	ASSY ACCESSORY KIT (REPLACES 19950A)	60007	

Abbreviations are listed in the introduction to this section

Table 4-4 Replaceable Parts OPTION 004

Ref Desig	HP Part No	TQ	Description	Mfr	Mfr Part No
A1			OPTION 004 FRONT PANEL CONNECTORS-MECO 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 03702-1041)	00007	
MP14	03702-10003	1	PANEL SUB MECO (REPLACES 03702-186 AND 187)	00007	
	03702-10004	1	BRACKET SUPPORT MECO	00007	
MP16	03702-10006	1	BRACKET BOX SUPPORT	00007	
W100	03702-7269	1	CABLE HARNESS MAIN SIGNAL (SAME AS 03702-7187 EXCEPT FOR THE FOLLOWING CABLES)	00007	
W101	03702-7279	1	ASSY COAX CBL BRN (REPLACES 03702-7242)	00007	
	1250-0082	6	CONN COAX PNL MTG MECO (REPLACES 1250-0610)	70674 CJ-1000	
W102	03702-7272	1	ASSY COAX CBL RED	00007	
W114	03702-7276	1	ASSY COAX CBL BRN/YEL	00007	
	1250-0082		CONN COAX PNL MTG MECO	70674 CJ-1000	
W127	03702-7270	1	ASSY COAX CBL RED/VIO (REPLACES 03702-7238)	00007	
W137	03702-7281	1	ASSY COAX CBL ORN/VIO (REPLACES 03702-7239)	00007	
W918	03702-7277	1	ASSY COAX CBL BRN/GRN	00007	
	1250-0082		CONN COAX PNL MTG MECO	70674 CJ-1000	
W917	03702-7273	1	ASSY COAX CBL BRN/VIO	00007	
	1250-0931	4	CONN COAX CBL MTG CONNEX	98291 51-128-0000	
W918	03702-7274	1	ASSY COAX CBL BRN/GRY	00007	
	1250-0931		CONN COAX CBL MTG CONNEX	98291 51-128-0000	
W978	03702-7276	4	ASSY COAX CBL VIO/GRY	00007	
	1250-0082		CONN COAX PNL MTG MECO	70674 CJ-1000	
	1250-0931		CONN COAX CBL MTG CONNEX	98291 51-128-0000	
W979	03702-7275	1	ASSY COAX CBL VIO/WHT	00007	
	1250-0082		CONN COAX PNL MTG MECO	70674 CJ-1000	
	1250-0931		CONN COAX CBL MTG CONNEX	98291 51-128-0000	
A8	03702-7101	1	ASSY BAL TO UNBAL CONVERTER	00007	
	03702-3217	1	BOX SCREENING	00007	
A8A1	03702-7209	1	PC BD ASSY	00007	
	03702-3209	1	PC BD BLANK	00007	
A8A1C1	0170-0070	04	C FXD 0.22UF 20% 50WVDC	84411 602	
A8A1C2	0170-0070		C FXD 0.22UF 20% 50WVDC	84411 602	
A8A1C3	0170-0070		C FXD 0.22UF 20% 50WVDC	84411 602	
A8A1C4	0170-0070		C FXD 0.22UF 20% 50WVDC	84411 602	
A8A1C5	0160-2280	1	C FXD 5.1PF +-.25PF 500WVDC	72982 301-000-COH0-519C	
A8A1C6	0160-0197	1	C FXD 1800PF 5% 300WVDC	72136 RDM15F182J3C	
A8A1C7	0121-0105	1	C VAR 9-35PF	20946 538-0060-4-35	

Abbreviations are listed in the introduction to this section

Table 4-4 Replaceable Parts OPTION 004 (CONTINUED)

Ref Desig	HR Part No	TQ	Description	Mfr	Mfr Part No
A8A1C8	0180-0155	3	C FXD 2.2UF 20% 20WVDC	56289	150D225X0020A2-DY5
A8A1C9	0160-0127	3	C FXD 1UF 20% 25WVDC	56289	9C13C5-CNL
A8A1C10	0160-0127		C FXD 1UF 20% 25WVDC	56289	9C13C5-CNL
A8A1C11	0180-0228	1	C FXD 82UF 10% 15WVDC	56289	150D826X9015B2-DY5
A8A1C12	0180-0155		C FXD 2.2UF 20% 20WVDC	56289	150D225X0020A2-DY5
A8A1C13	0180-0155		C FXD 2.2UF 20% 20WVDC	56289	150D225X0020A2-DY5
A8A1C14	0180-0097	1	C FXD 47UF 10% 35WVDC	56289	150D476X0035B2-DY5
A8A1C15	0160-0127		C FXD 1UF 20% 25WVDC	56289	9C13C5-CNL
A8A1CR1	1902-3193	1	DIO BKDN 13.3V 5% 400MW	07910	CD38742
A8A1J1	1250-0932	4	CONN COAX RC BD NTG CONNEX	98291	51-151-0000
A8A1J2	1250-0932		CONN COAX RC BD NTG CONNEX	98291	51-151-0000
A8A1J3	1250-0932		CONN COAX RC BD NTG CONNEX	98291	51-151-0000
A8A1J4	1250-0932		CONN COAX RC BD NTG CONNEX	98291	51-151-0000
A8A1J5	1250-0608	1	CONN COAX BHD NTG BNC,75 OHM	80011	DE-37627
A8A1L1	9140-0137	1	IND FXD 1MH 5%	99800	1537-28
A8A1L2	9100-1662	4	IND FXD 2.4NH 5%	28480	
A8A1L3	9100-1662		IND FXD 2.4NH 5%	28480	
A8A1L4	9100-1662		IND FXD 2.4NH 5%	28480	
A8A1L5	9100-1662		IND FXD 2.4NH 5%	28480	
A8A1Q1	1854-0019	5	XSTR SI NPN	13715	5-6516
A8A1Q2	1854-0019		XSTR SI NPN	13715	5-6516
A8A1Q3	1854-0019		XSTR SI NPN	13715	5-6516
A8A1Q4	1854-0833	1	XSTR SI NPN	02735	2N3866
A8A1Q5	1853-0036	1	XSTR SI PNP	04713	(2N3906) SPS-8612
A8A1R1	0757-0416	2	R FXD 511 OHM 1% 1/8W	19701	MF4CT-0
A8A1R2	0698-3441	2	R FXD 215 OHM 1% 1/8W	19701	MF4CT-0
A8A1R3	0698-3430	2	R FXD 21.5 OHM 1% 1/8W	19701	MF4CT-0
A8A1R4	0698-3430		R FXD 21.5 OHM 1% 1/8W	19701	MF4CT-0
A8A1R5	0757-0416		R FXD 511 OHM 1% 1/8W	19701	MF4CT-0
A8A1R6	0698-3441		R FXD 215 OHM 1% 1/8W	19701	MF4CT-0
A8A1R7	0757-0397	4	R FXD 60.1 OHM 1% 1/8W	19701	MF4CT-0
A8A1R8	0757-0397		R FXD 60.1 OHM 1% 1/8W	19701	MF4CT-0
A8A1R9	0757-0418	4	R FXD 619 OHM 1% 1/8W	19701	MF4CT-0
A8A1R10	0757-0407	2	R FXD 200 OHM 1% 1/8W	19701	MF4C
A8A1R11	0757-0394	4	R FXD 51.1 OHM 1% 1/8W	19701	MF4CT-0
A8A1R12	0757-0419	1	R FXD 681 OHM 1% 1/8W	19701	MF4CT-0
A8A1R13	0757-0407		R FXD 200 OHM 1% 1/8W	19701	MF4C
A8A1R14	0757-0394		R FXD 51.1 OHM 1% 1/8W	19701	MF4CT-0
A8A1R15	0757-0418		R FXD 619 OHM 1% 1/8W	19701	MF4CT-0
A8A1R16	0698-3153	2	R FXD 3.83K OHM 1% 1/8W	19701	MF4CT-0
A8A1R17	0698-3153		R FXD 3.83K OHM 1% 1/8W	19701	MF4CT-0
A8A1R18	0757-0398	1	R FXD 75 OHM 1% 1/8W	19701	MF4C
A8A1R19	0757-0394		R FXD 51.1 OHM 1% 1/8W	19701	MF4CT-0
A8A1R20	0757-0397		R FXD 60.1 OHM 1% 1/8W	19701	MF4CT-0
A8A1R21	0757-0397		R FXD 60.1 OHM 1% 1/8W	19701	MF4CT-0
A8A1R22	0757-0418		R FXD 619 OHM 1% 1/8W	19701	MF4CT-0
A8A1R23	0757-0418		R FXD 619 OHM 1% 1/8W	19701	MF4CT-0
A8A1R24	0757-0421	1	R FXD 825 OHM 1% 1/8W	19701	MF4CT-0
A8A1R25	0698-3440	1	R FXD 383 OHM 1% 1/8W	19701	MF4CT-0
A8A1R26	0757-0438	1	R FXD 5.11K OHM 1% 1/8W	19701	MF4CT-0
A8A1R27	0757-0317	1	R FXD 1.33K OHM 1% 1/8W	75042	CEA-0
A8A1R28	0757-0346	1	R FXD 10 OHM 1% 1/8W	75042	CEA
A8A1R29	0757-0394		R FXD 51.1 OHM 1% 1/8W	19701	MF4CT-0
A9	03702-7208	1	ASSY RB INPUT SWITCH	80007	
A9MP6	03702-360	1	CLAMP CBL	80007	

Abbreviations are listed in the introduction to this section

Table 4-4 Replaceable Parts OPTION 004 (CONTINUED)

Ref Desig	HP Part No	TQ	Description	Mfr	Mfr Part No
A4NP2	03702-10007	1	PLATE SUPPORT CBL	80007	
A4S1	3100-0608	1	SW LVR ACTUATED RTRY 4P3T (REPLACES 5B 3100-0691)	80007	
A14	03702-7201	1	ASSY IF ATTENUATOR (IDENTICAL TO 03702-7211 EXCEPT FOR THE FOLLOWING CABLE)	80007	
A14W929	03702-7200	1	ASSY COAX CBL ORN/BLK (REPLACES 03702-7263)	80007	
	1250-0852		CONN COAX PNL MTG MICRO (REPLACES 1250-0931)	70674	C-1000
	18660ADP004	1	ASSY ACCESSORY KIT (REPLACES 18660A)	80007	

Abbreviations are listed in the introduction to this section

Table 4-5 Code List of Manufacturers

The following code numbers are from the Federal Supply Code for Manufacturers Cataloging Handbooks H4-1 (Name to Code) and H4-2 (Code to Name). Alphabetical codes have been arbitrarily assigned to suppliers not appearing in the H4 handbooks.

Code No	Manufacturer	Address
00000	ODE ENGINEERING CO, INC.	CITY OF INDUSTRY CALIF.
01121	ALLEN BRADLEY CO.	MILLWAUKEE WIS.
01295	TEXAS INSTRUMENTS INC.	DALLAS TEXAS
02660	AMPHENOL CORP.	BROADVIEW ILL.
02735	R.C.A. SEMICONDUCTOR DIV.	SOMERVILLE N.J.
03508	GENERAL ELECTRIC CO.	SYRACUSE N.Y.
03877	TRANSITRON ELEC. CORP.	WAKEFIELD MASS.
04713	MOTOROLA SEMI. CON. INC.	PHOENIX ARIZ.
07236	NATIONAL LOCKWASHER CO.	MILWAUKEE WIS.
07263	FAIRCHILD C & I CORP.	MTN. VIEW CALIF.
07344	BIRCHER CO. INC.	ROCHESTER N.Y.
07623	ECK AND KREBS INC.	LONG ISLAND N.Y.
07910	CONTINENTIAL DEVICE CORP.	HAWTHORNE CALIF.
09353	C & K COMPONENTS INC.	NEWTON MASS
12005	TRANSITRON ELEC. CORP.	BOSTON MASS.
12505	ARCO PLASTICS CO.	MORRISTOWN N.J.
12697	CLAROSTAT MFG. CO. INC.	DOVER N.H.
13715	FAIRCHILD C & I CORP.	SAN RAFAEL CALIF.
14009	SEMTECH CORP.	NEWBURY PARK CALIF.
14493	HEWLETT-PACKARD CO.	LOVELAND COLO
16299	CORNING GLASS WORKS	RALEIGH N.C.
17856	SILICONIX INC.	SUNNYVALE CALIF.
18701	ELECTRA MFG. CO.	INDEPENDENCE KANS.
20940	ERIE MFG. CO.	MILWAUKEE WIS.
21030	BECKMAN INSTR. INC.	TORONTO ONTARIO
21845	SOLITRON DEVICES INC.	RIVIERA BEACH FLA.
22070	G.M. NAMEPLATE INC.	SEATTLE WASH.
22753	U.I.D. ELECTRONICS CORP.	HOLLYWOOD FLA.
23936	PAMOTOR INC.	SAN FRANSISCO CALIF.
24355	ANALOG DEVICES	NORWOOD MASS.
28100	SYLVANIA ELEC. PROD. INC.	BURLINGTON IOWA
28480	HEWLETT-PACKARD CO.	PALO ALTO CALIF.
28480	TEXBERRY CONTAINER CO.	HOUSTON TEXAS
56137	SPAULDING FIBRE CO. INC.	TONAWANDA N.Y.
56289	SPRAGUE ELECTRIC CO.	ADAMS MASS.
60741	TRIPLETT ELECT. INSTR. CO.	BLUFFTON OHIO.
70074	ADC PRODUCTS INC.	MINNEAPPOLIS
71400	BUSSMAN MFG. DIV. OF McGRAW-EDISON CO.	ST. LOUIS MO.
71436	CHICAGO CONDENSER CORP.	CHICAGO ILL.
71590	CENTRALAB DIV. OF GLOBE	MILWAUKEE WIS.
71785	CINCH MFG. CO.	CHICAGO ILL.
72136	ELECTRO MOTIVE MFG. CO.	WILLIMANTIC CONN.
72825	EBY HUGH H INC.	PHILADELPHIA PA.
72962	ERIE TECH. PRODUCTS INC.	ERIE PA.
73138	BECKMAN INSTRUMENTS INC.	FULLERTON CALIF.
73734	FEDERAL SCREW PRODUCTS INC.	CHICAGO ILL.
75042	I.R.C. DIV. OF TRW INC.	PHILADELPHIA PA.
75915	LITTLEFUSE INC.	PLAINES ILL.
76530	CINCH – MONADOCK DIV. OF UNITED-CARR INC. CALIF.	CITY OF INDUSTRY
76854	OAK MFG. CO.	CRYSTAL LAKE ILL.
77764	RESISTANCE PRODUCTS CO.	HARRISBURG PA.
78189	ILLINOIS TOOL WORKS INC.	ELGIN ILL.
78727	CONTINENTAL-WIRT ELECTRONICS CORP.	PHILADELPHIA PA.
79963	ZIERICK MFG. CORP.	NEW ROCHELLE N.Y.
80120	SCHNITZER ALLOY PRODS. CO.	ELIZABETH N.J.
80294	BOURNS INC.	RIVERSIDE CALIF.
80795	INTERNATIONAL TELEPHONE & TELEGRAPH CORP.	NEW YORK N.Y.
82142	JEFFERS ELECTRONICS DIV. OF SPEER CARBON CO.	DU BOIS PA.
82389	SWITCHCRAFT INC.	CHICAGO ILL.
84411	TRW CAPACITOR DIV.	OGALLALA NEBR
87034	MARCO-OAK INDUSTRIES A DIV. OF OAK ELECTRO/NETICS CORP.	ANAHEIM CALIF.
91260	CONNOR SPRING MFG.	SAN FRANCISCO CALIF.
91418	RADIO MATERIALS CO.	CHICAGO ILL.
91637	DALE ELECTRONICS INC.	COLUMBUS NEBR.
95291	SEALECTRO CORP.	MAMARONECK NY.
99800	DELEVAN ELECTRONICS CORP.	EAST AURORA NY.
E0001	TEXAS INSTRUMENTS LTD.	BEDFORD BEDS
E0002	MULLARD LTD	LONDON W.C.1
E0004	ELECTRONIC PROD LTD	LONDON W.C.1
E0006	ELECTROSIL LTD.	CO. DURHAM.
E0007	HEWLETT-PACKARD LTD.	SOUTH QUEENSFERRY WEST LOTHIAN
E0009	STANDARD TELEPHONES & CABLES LTD	PAIGNTON DEVON
E0011	GREENPAR ENGINEERING LTD	HARLOW ESSEX
E0012	WELWYN ELECTRIC	BEDLINGTON
E0017	W.E.L. COMPONENTS LTD	READING BERKS
E0021	HELLERMAN DEUTCH.	EAST GRINSTEAD SUSSEX
E0022	HP GMBH	WURTTEMBURG, W. GER.
E0024	ERIE ELECTRONICS LTD	GT. YARMOUTH NORFOLK.
E0026	PLESSEY LTD	TITCHFIELD HAMPS.

3702B
IF/BB RECEIVER

PRELIMINARY SERVICE MANUAL

HEWLETT hp PACKARD

HEWLETT hp PACKARD

CERTIFICATION

The Hewlett-Packard Company certifies that this instrument was thoroughly tested and inspected and found to meet its published specifications when it was shipped from the factory. The Hewlett-Packard Company further certifies that its calibration measurements are traceable to the U.S. National Bureau of Standards to the extent allowed by the Bureau's calibration facility.

WARRANTY AND ASSISTANCE

All Hewlett-Packard products are warranted against defects in materials and workmanship. This warranty applies for one year from the date of delivery, or, in the case of certain major components listed in the operating manual, for the specified period. We will repair or replace products which prove to be defective during the warranty period provided they are returned to Hewlett-Packard. No other warranty is expressed or implied. We are not liable for consequential damages.

Service contracts or customer assistance agreements are available for Hewlett-Packard products that require maintenance and repair on-site.

For any assistance, contact your nearest Hewlett-Packard Sales and Service Office. Addresses are provided at the back of this manual.

HEWLETT hp PACKARD

PRELIMINARY SERVICE MANUAL

MODEL 3702B
IF/BB RECEIVER

SERIALS PREFIXED: 1136U

For instruments with prefixes higher than 1136U, refer to manual change sheet

03702-90010

Printed NOV 1971

SECTION V
SERVICE SHEETS

5-1 INTRODUCTION

5-2 This section includes the following:

a. General Service Sheets **G1** to **G5** which contain the theory of operation as well as procedures for troubleshooting the 3702B down to assembly level. Routing between service sheets is indicated by the general service sheet number followed by the appropriate assembly number and pin or connector number.

b. Assembly Service Sheets **A1** to **A26** (excluding A16 to A19 which are not assigned) contain circuit descriptions, component locations together with a grid reference and an assembly schematic.

Routing between service sheets is indicated by the assembly number followed by the appropriate pin or connector number.

5-3 Where 'select on test' components are used, they are indicated on the schematics by an asterisk (*) and only the average value shown. If a 'select on test' component is replaced, then the appropriate adjustment procedure should be performed.

5-4 For the complete reference designation of a component within an assembly, add the assembly number as a prefix to the component reference.

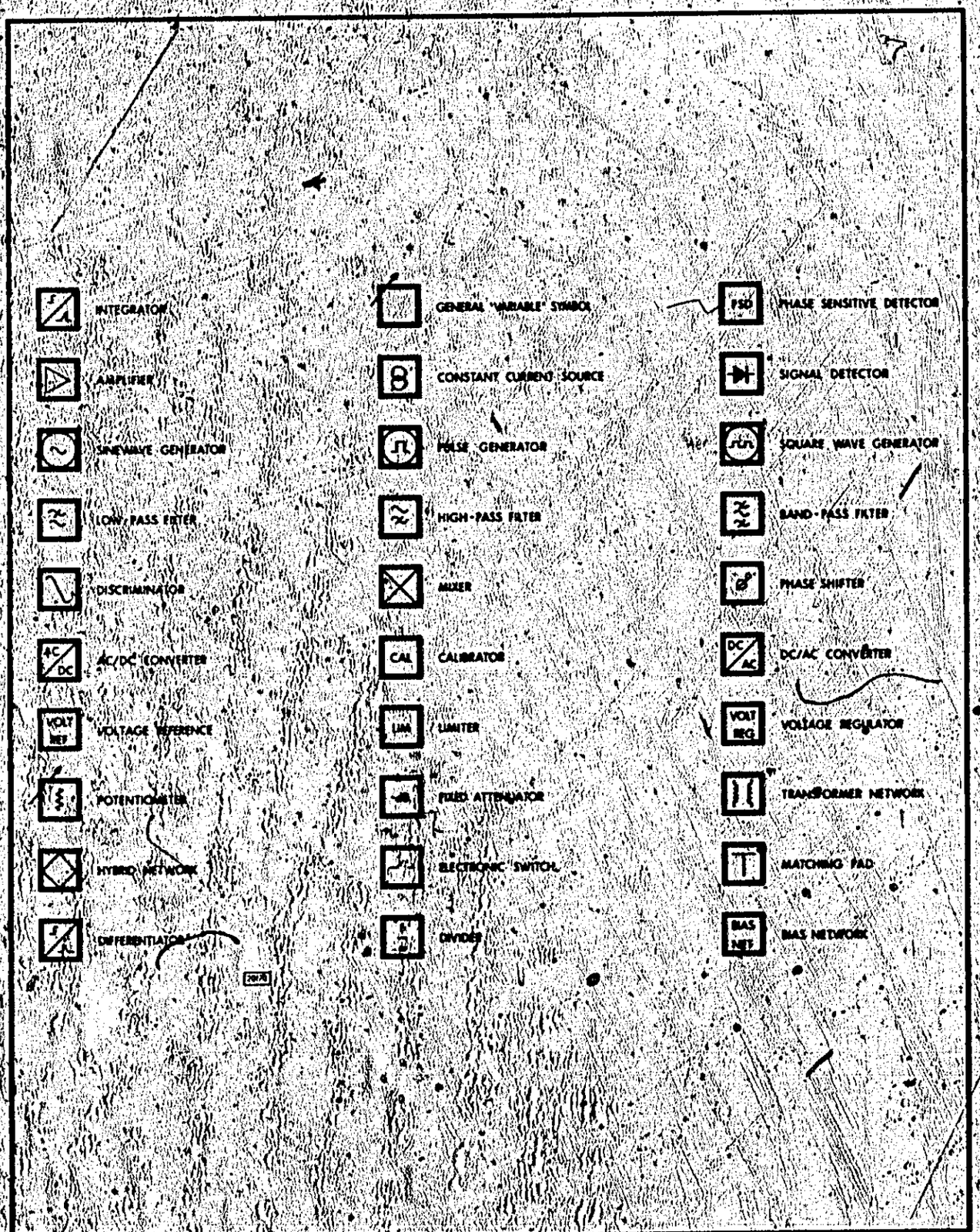


Figure 5-1 Symbology and Schematic Notes

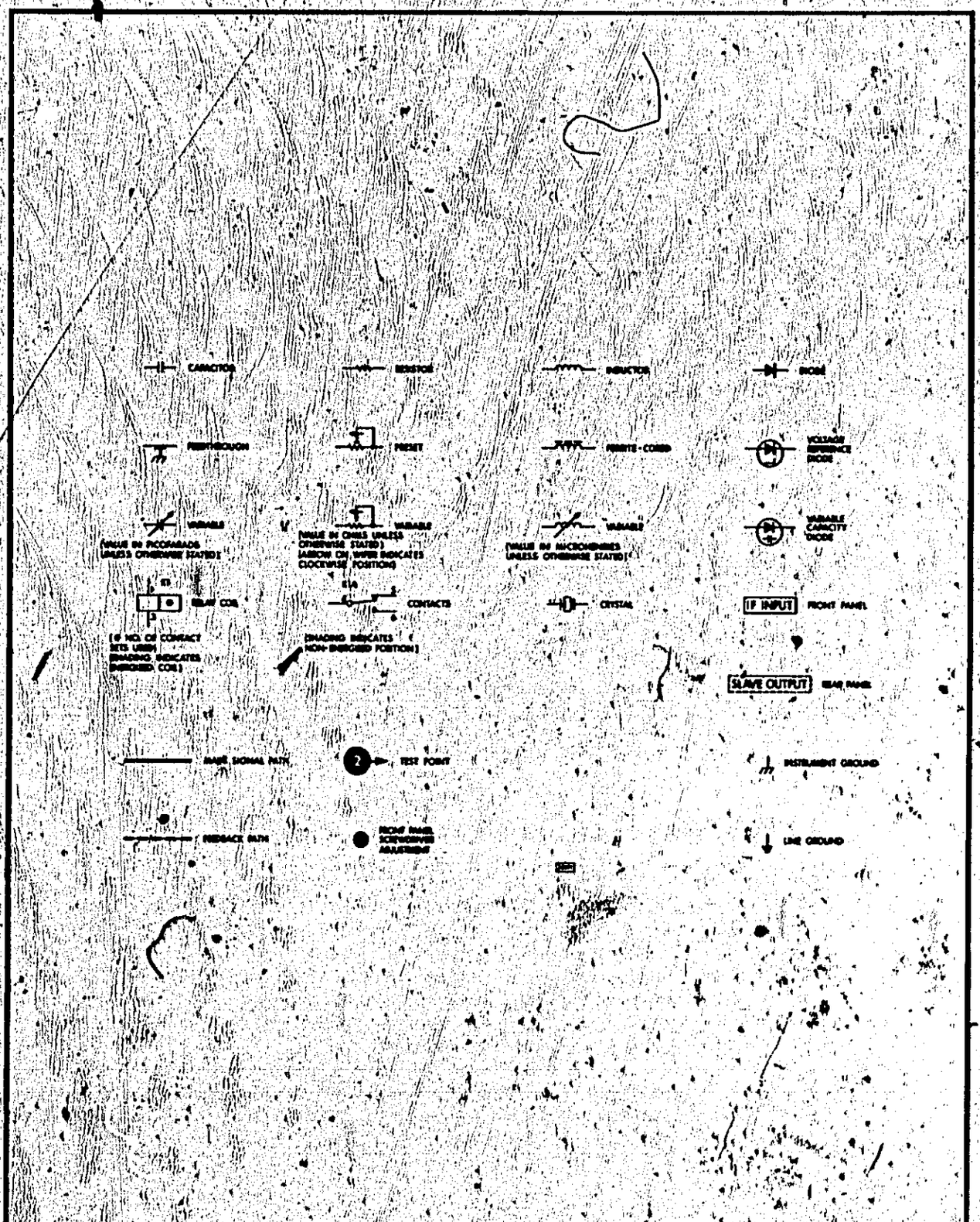


Figure 5-2 Symbology and Schematic Notes

GENERAL SERVICE SHEET G1

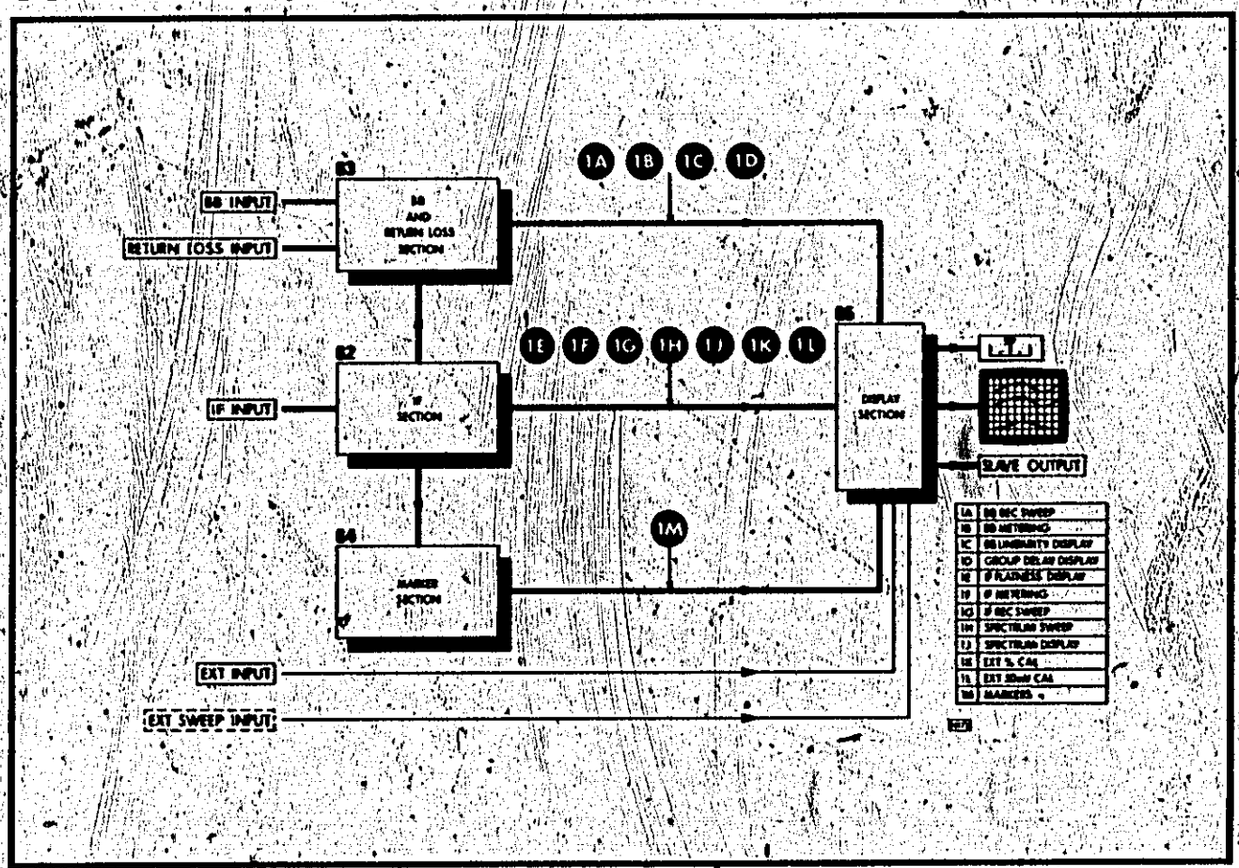


Figure G1-1 Simplified Block Diagram

G1-1 MODE OF OPERATION

G1-2 The 3702B IF/BB Receiver is the *hp* MLA receive and display unit,containing FM detection and measurement circuits. The outputs from the detection and measurement circuits are internally routed to the inbuilt CRT display. Metering of the IF and BB inputs allows absolute level measurement to be made and also indicates when the input signal to the IF detector or BB amplifier has been adjusted to the correct operating level. Two interacting parameters such as IF amplitude response and group delay can be simultaneously displayed on the CRT thus facilitating the optimum adjustment of the test item.

G1-3 Two types of frequency marker are available on the horizontal deflection, i.e., a 2MHz marker comb over the range 45 to 95MHz and a pair of sliding markers which are continuously variable from 0 to 26MHz about a crystal derived 70MHz marker.

G1-4 The Y1/Y2 CALIBRATION switch provides a calibrated 'split' trace CRT display. The vertical distance between the 'split' traces can be adjusted by the Y1 and Y2 GAIN controls and is equivalent to the calibration step selected. The calibration signal can be selected in steps of 0.1, 0.3 and 1.0dB for IF measurements and in steps of 1, 3 and 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 can be 50mV, or a 10% of input, split trace.

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 371DA IF/BB Transmitter.

G1-6 TROUBLESHOOTING

G1-7 General

G1-8 Troubleshooting procedure should *always* begin with reference to the SYSTEM SERVICE MANUAL. The SYSTEM SERVICE MANUAL indicates the conditions under which signals are present.

G1-9 A malfunction within the 3702B IF/BB Receiver will be located to the 3702B from the SYSTEM SERVICE MANUAL, which will also reference the GENERAL SERVICE SHEET and, where possible, the test point. From the Simplified Block Diagram, test point information and location within the GENERAL SERVICE SHEET, the malfunction will then be isolated to the appropriate ASSEMBLY SERVICE SHEET, which should then be consulted.

G1-10 The simplified block diagram, Figure G1-1, indicates the principal troubleshooting test points and divides the instrument into four main blocks:

1. IF Section.
2. BB Section (including return loss).
3. Marker Section.
4. Display Section.

G1-11 The Y1 DISPLAY and Y2 DISPLAY switches control the operation and interfacing of these sections.

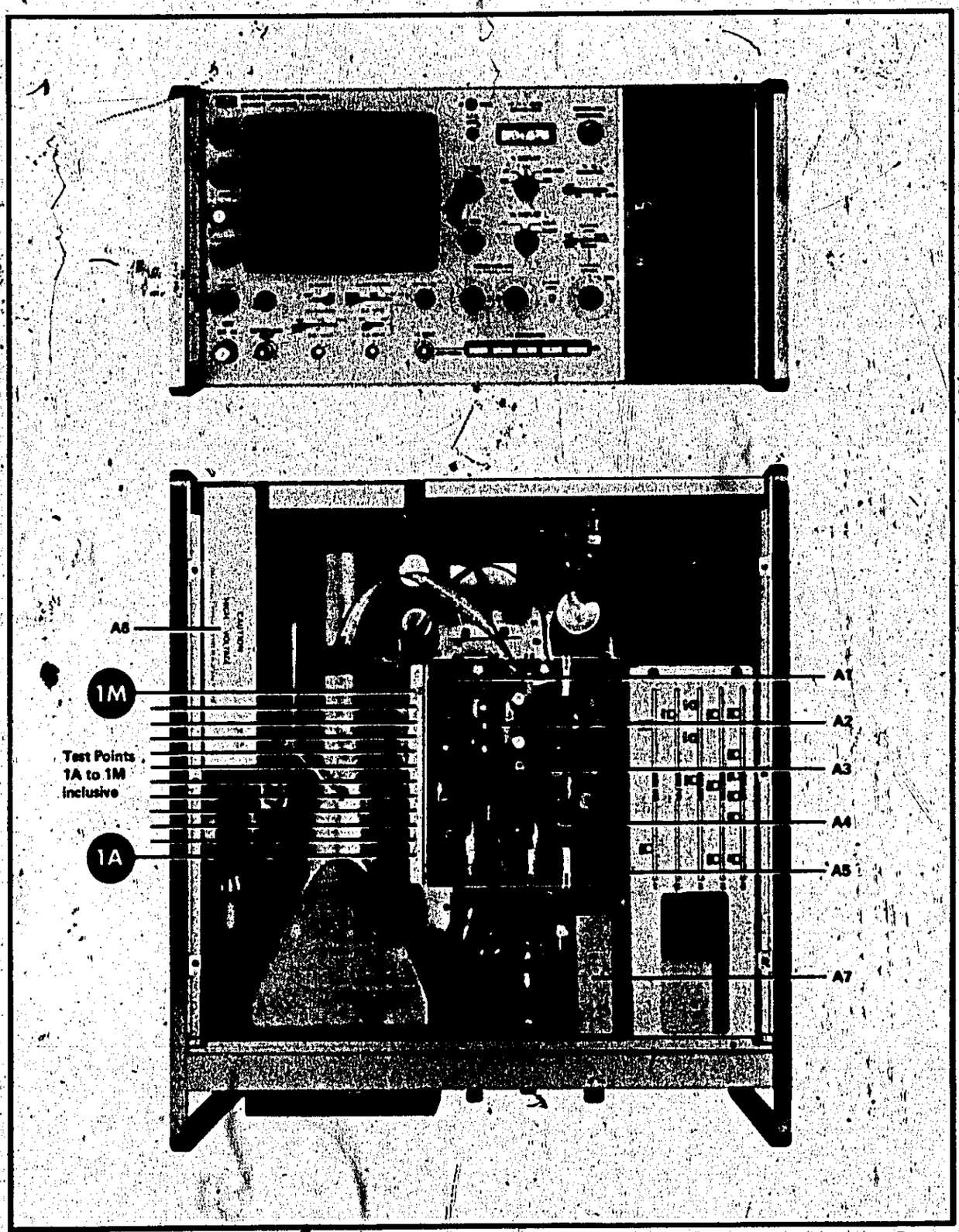


Figure G1-2 Assembly Locations – Front and Top Views of 3702B

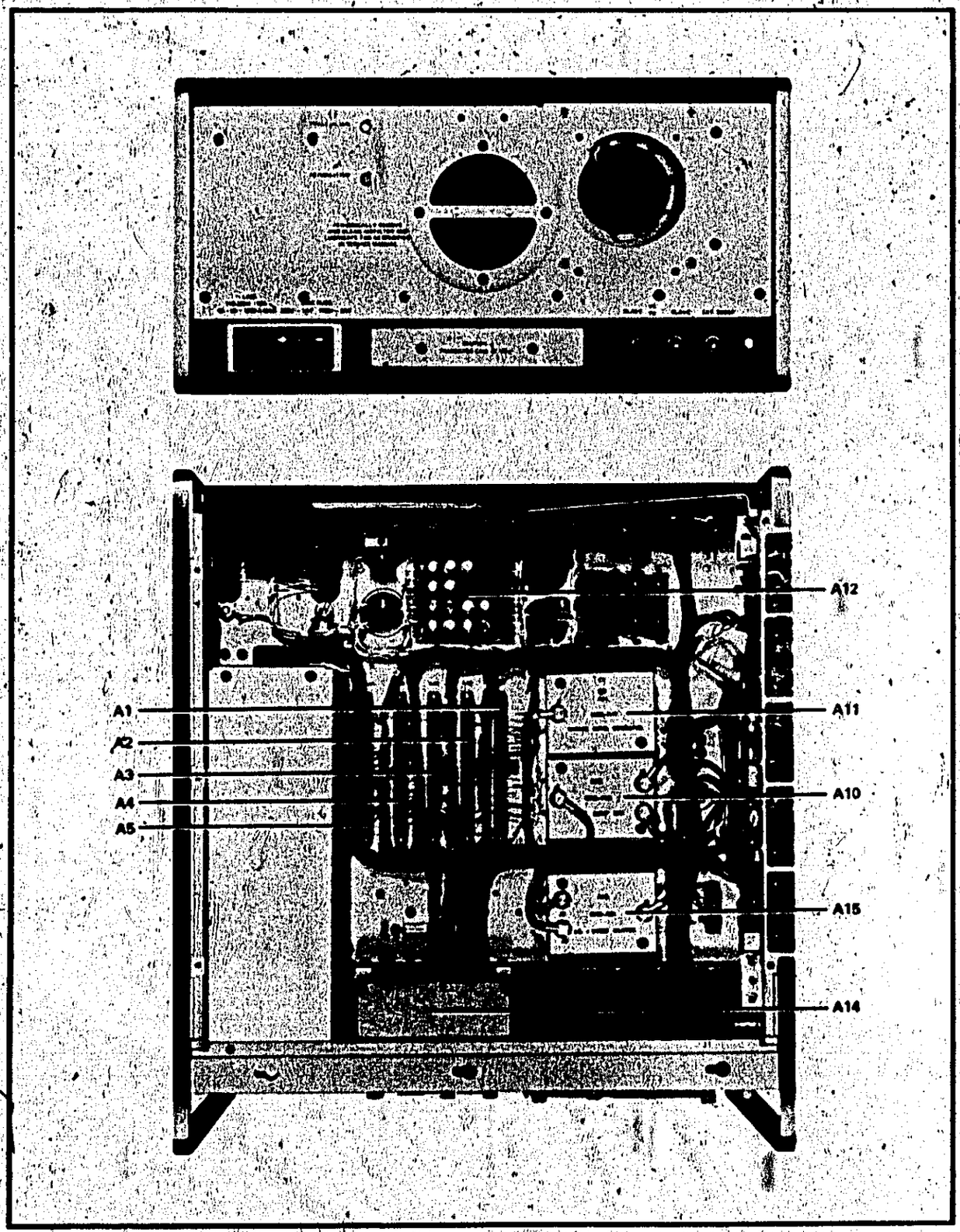


Figure G1-3 Assembly Locations – Rear and Bottom Views of 3702B

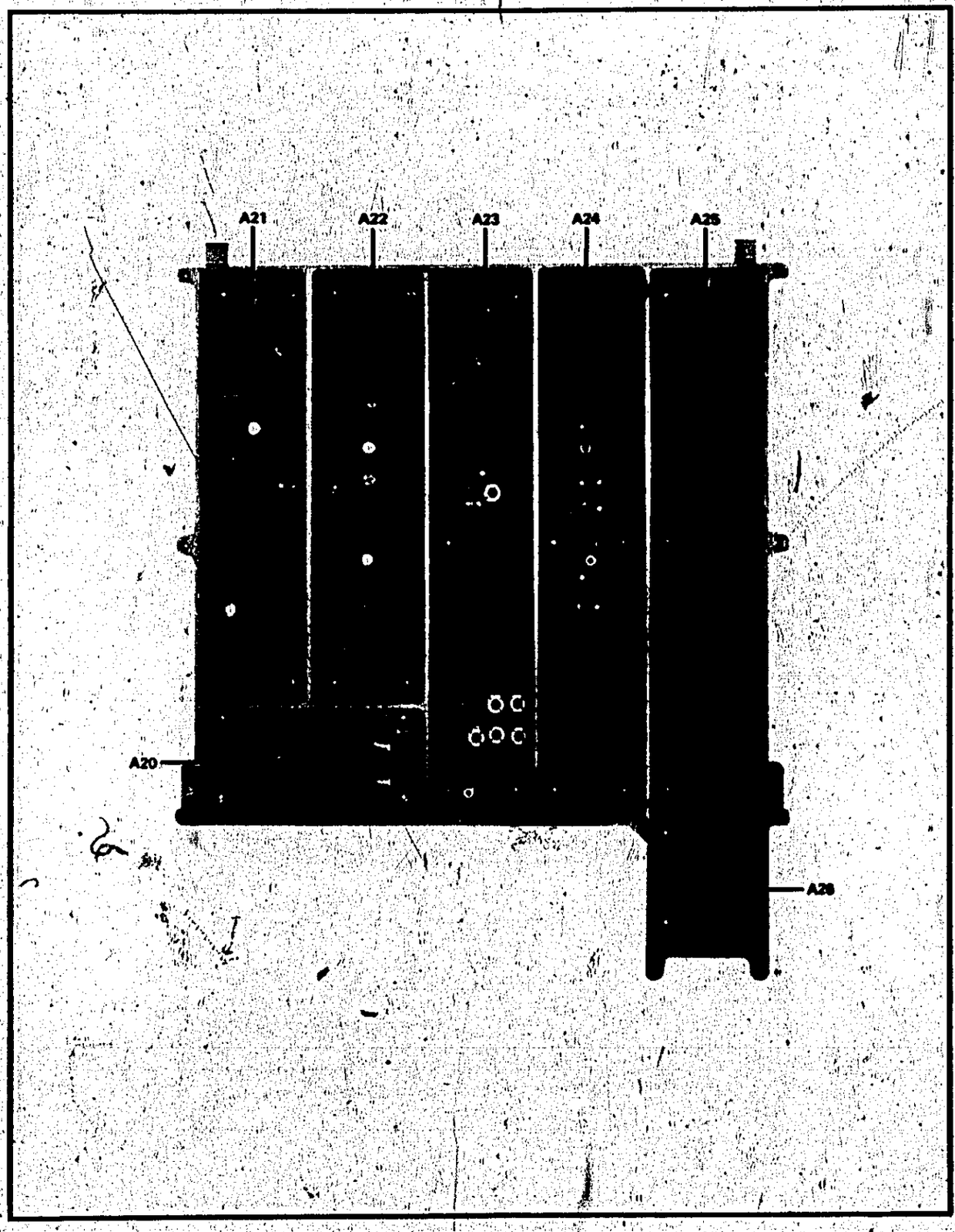


Figure G1-4 Assembly Locations – Casting Top View

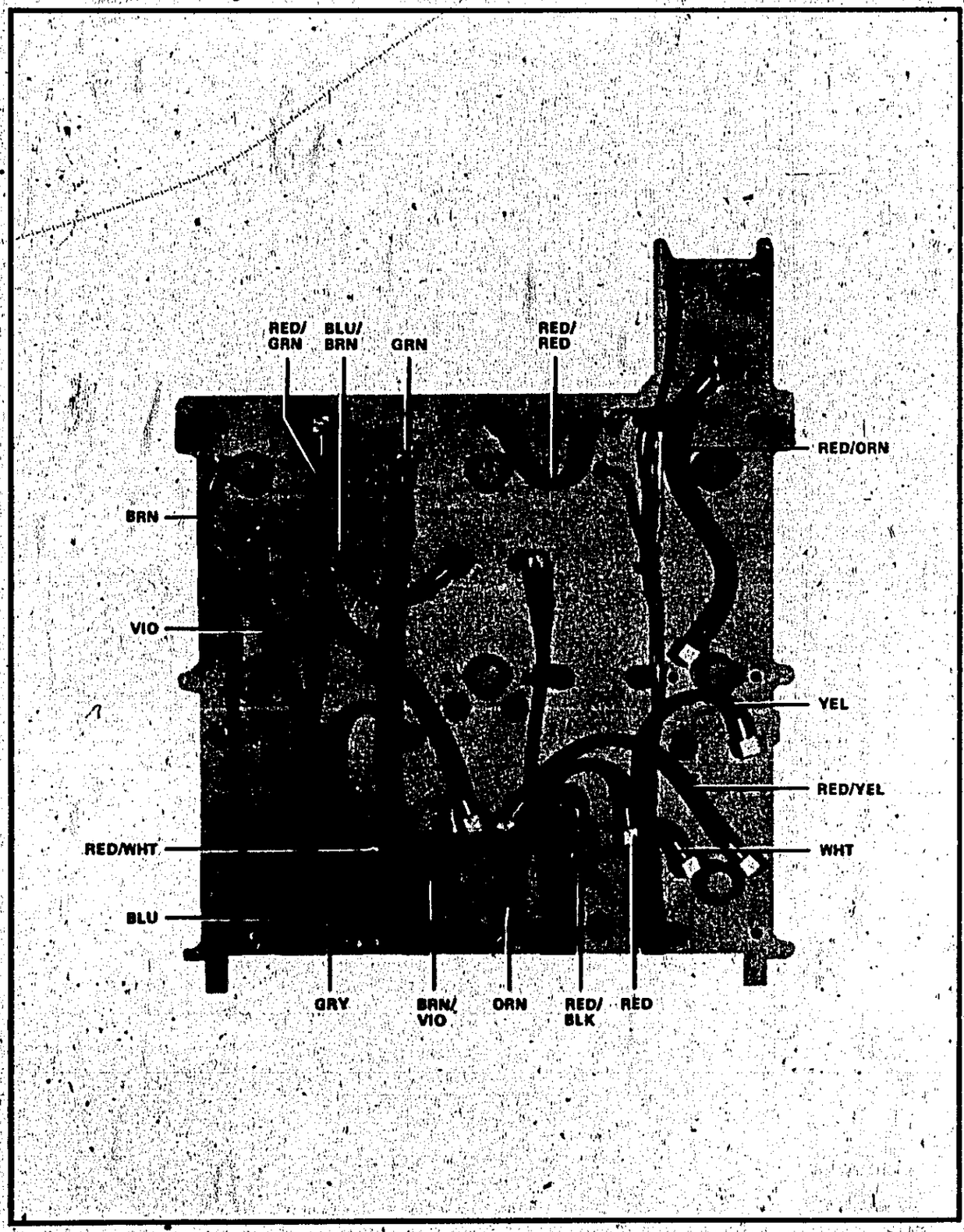
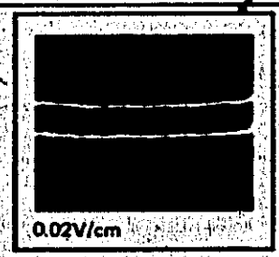
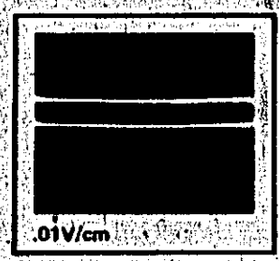
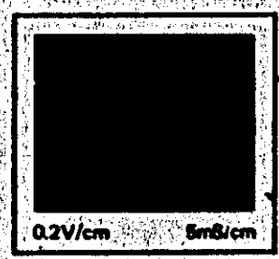


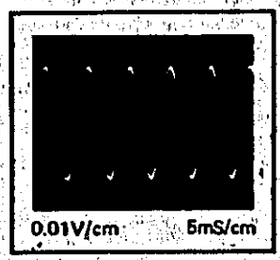
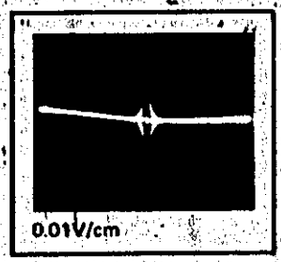
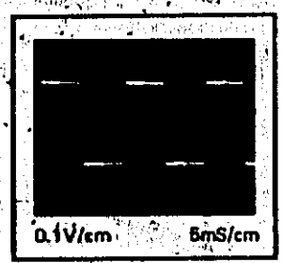
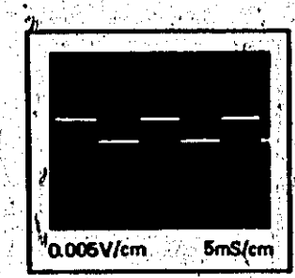
Figure G1-5 Casting Cable Locations – Casting Bottom View

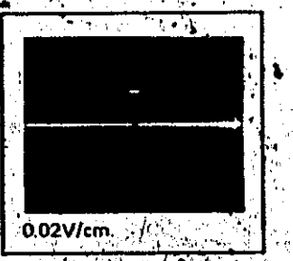
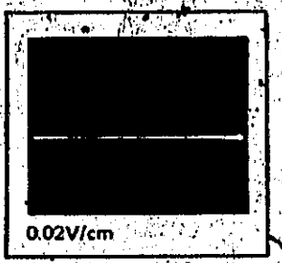
G1-12 Test Point Troubleshooting Procedure

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.

Test Point	Location	Procedure	Typical Waveform
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–	 .05V/cm 5mS/cm
1B	On T.P. bracket, A3(17)	a. Ensure that the Y1 Y2 CALIBRATION switch is set to OFF, and monitor with a DVM to obtain 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.	 0.02V/cm

Test Point	Location	Procedure	Typical Waveform
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 and the 15530A Low Pass Filter when monitoring this test point.	
1F	On T.P. bracket, A22(3)	a. Using a DVM, check for a voltage level of 30mV at 70MHz IF. b. Using a DVM, check for voltage level variations within 18mV to 80mV over the frequency range of 45 to 95MHz.	
1G	On T.P. bracket, A4(15)	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.	

Test Point	Location	Procedure	Typical Waveform
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.	

Test Point	Location	Procedure	Typical Waveform
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.	 

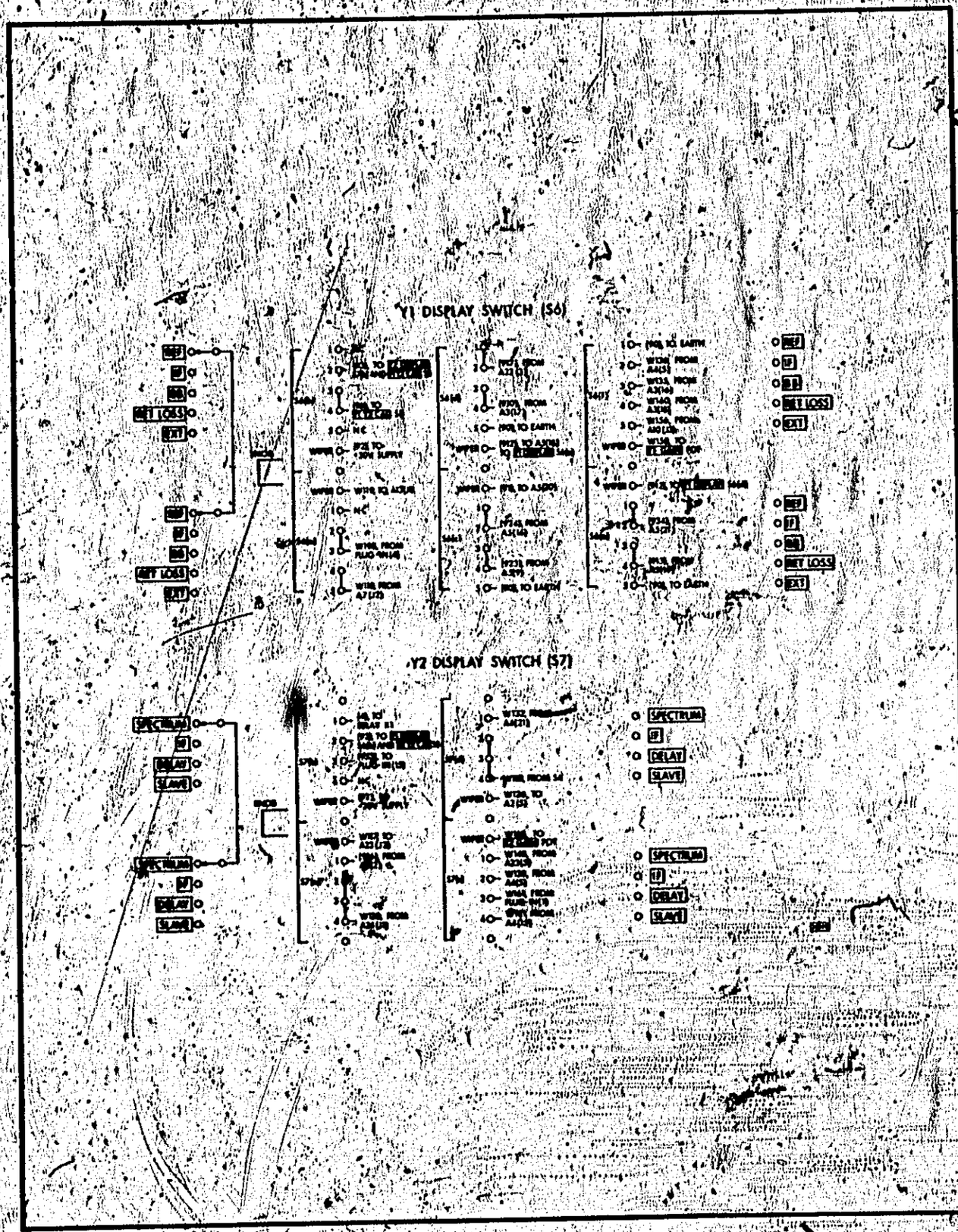


Figure G1-8. Y1 and Y2 DISPLAY Switches

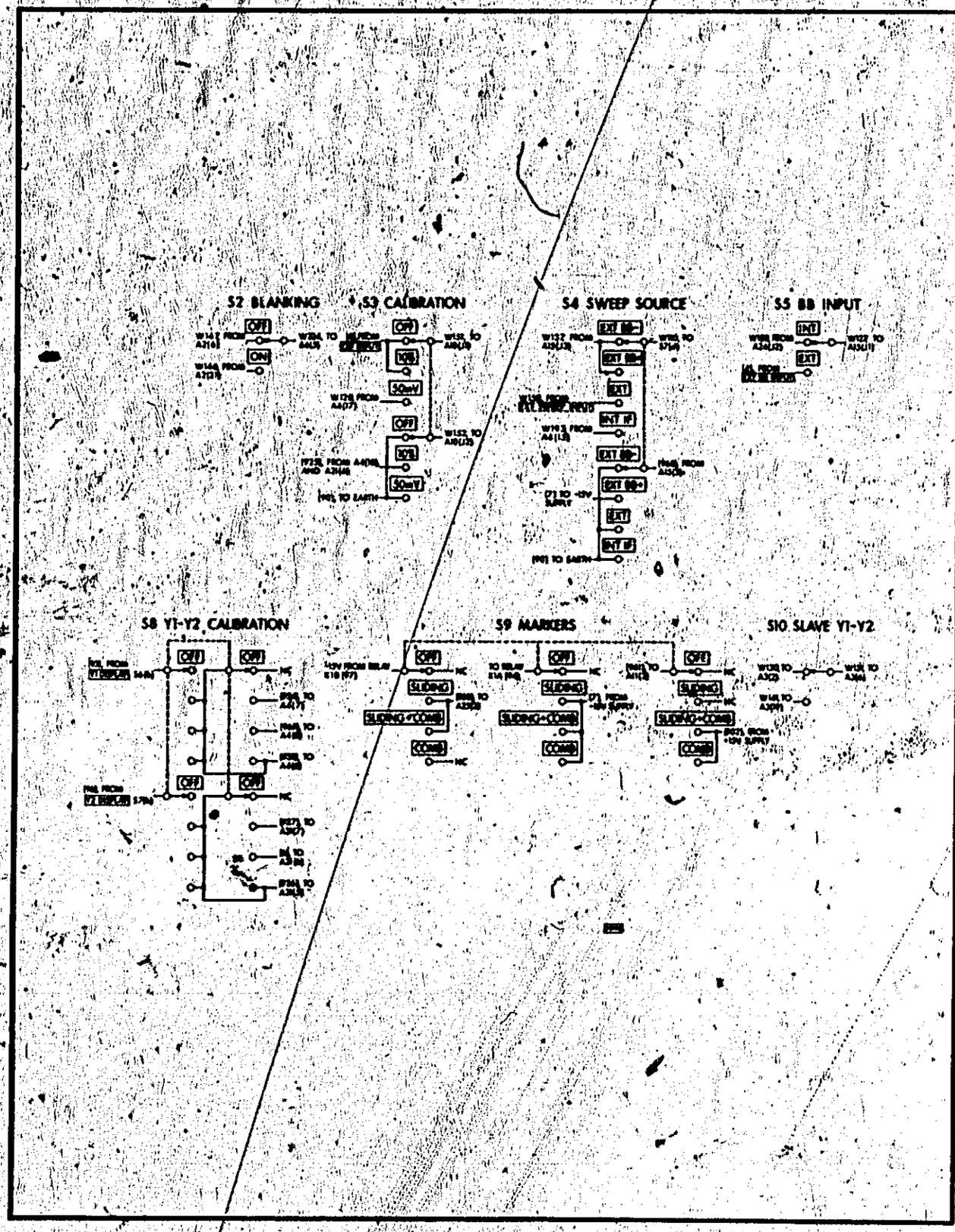


Figure G1-7 Remaining Switches

GENERAL SERVICE SHEET G2– IF SECTION

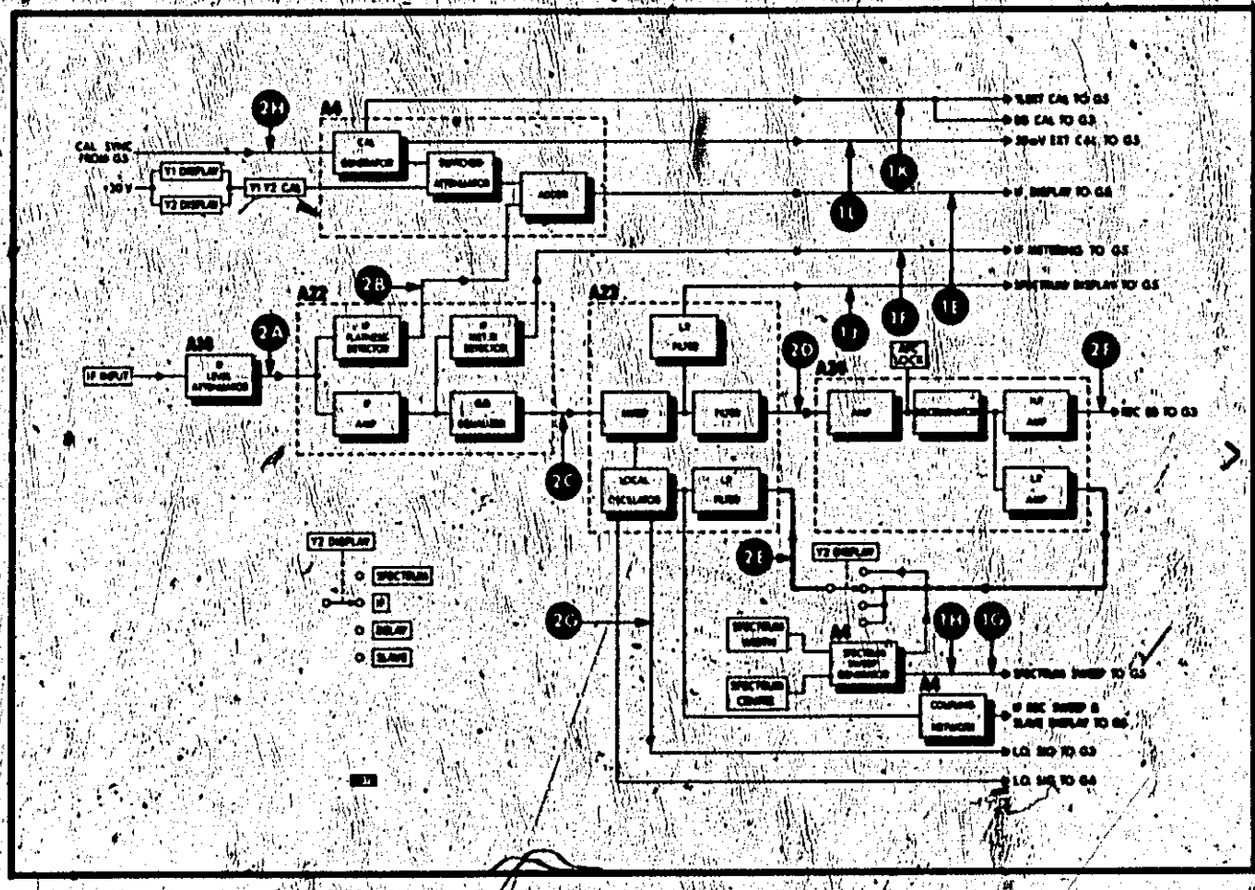


Figure G2-1 Simplified Block Diagram

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 detector provides the IF flatness display and is supplied to the DISPLAY SECTION G5 with a calibration signal available from the IF Calibrator A4. 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.

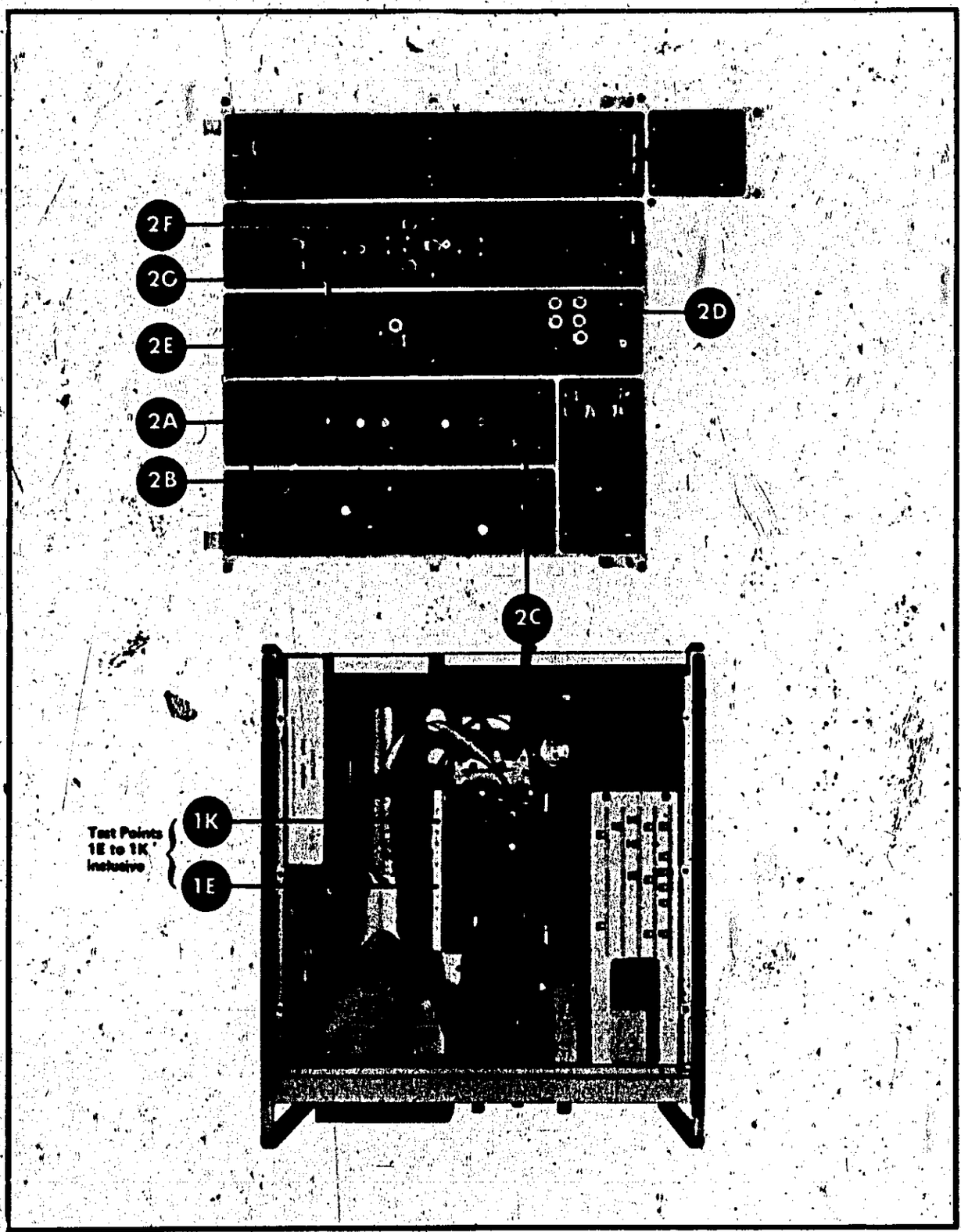


Figure G2-2 Test Point Locations – Casting Top View and Top View of 3702B

G2-14 TROUBLESHOOTING

G2-15 The typical outputs given in the troubleshooting 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 then 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

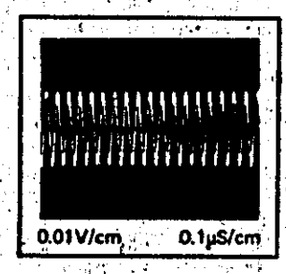
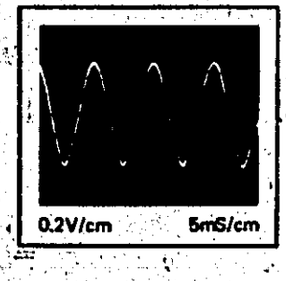
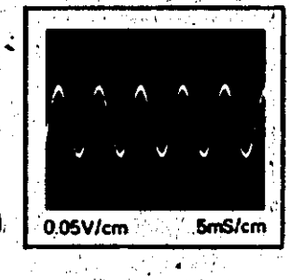
2. Set the 3715A/3716A controls as below:

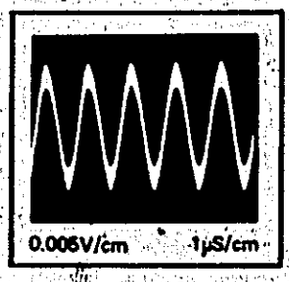
BB FREQUENCY	OFF

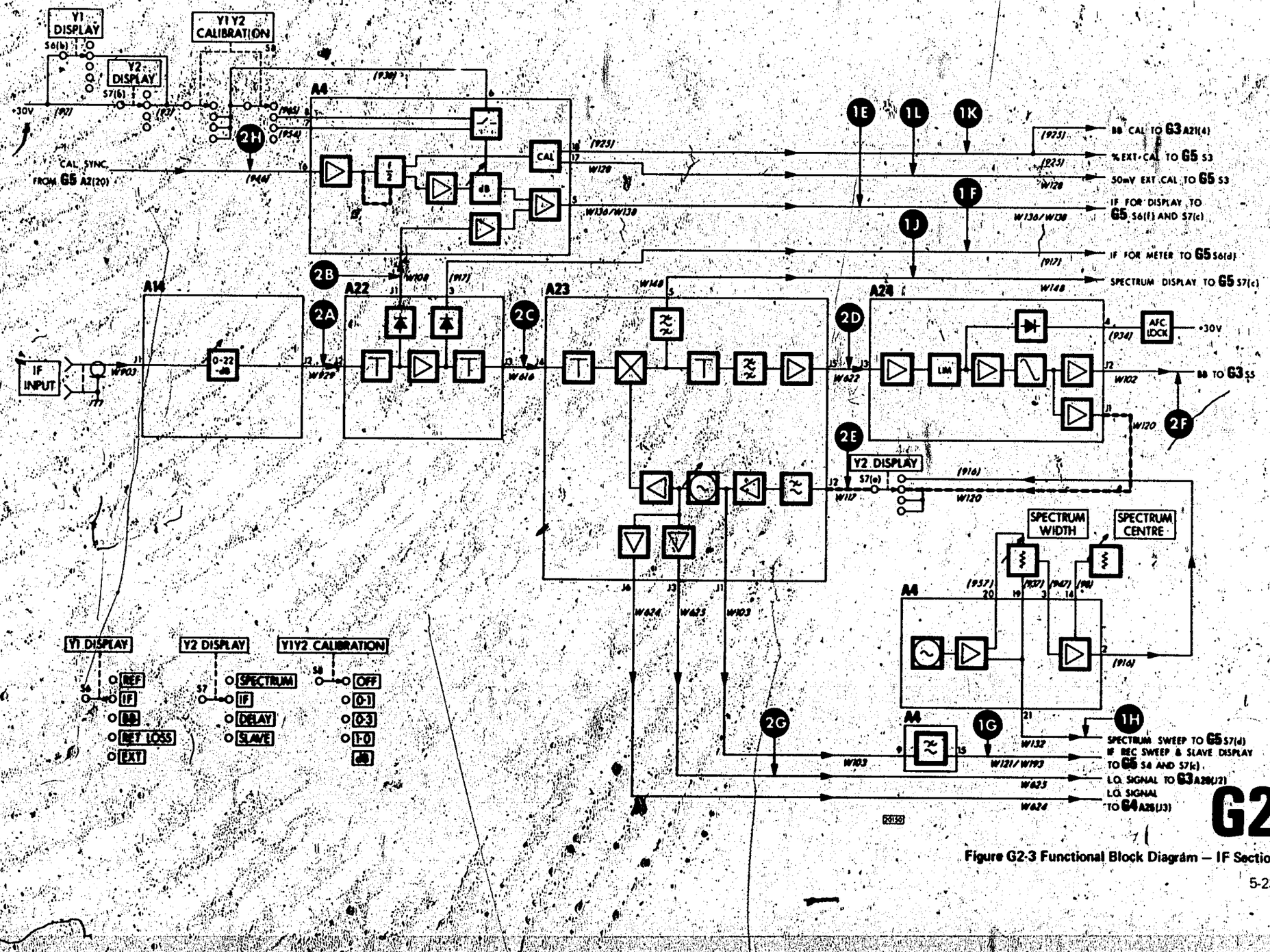
3. Set the 3702B controls as below:

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

Test Point	Location	Procedure	Typical Waveform
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.	
2B	A4(4)	a. DC level with variations.	

Test Point	Location	Procedure	Typical Waveform
2C	A22J3	a. Disconnect the BRN/BLU coded cable from A22J3. b. Connect the 411A RF Millivoltmeter, via the 75/50Ω matching pad and a 15539A cable, to A22J3. c. Measure the voltage level. d. Measure the voltage output variation as the 3710A IF FREQUENCY control is varied over the range 45 to 95MHz. The voltage output variation should be less than 0.02V. Reconnect the BRN/BLU cable to A22J3.	
2D	A23J5	a. Check that the signal output level is approximately 0.4V pk-pk. b. Monitor the frequency with the 5245L Electronic Counter. c. Check the variations in signal level are not greater than 0.05V as the 3710A IF FREQUENCY control is varied from 45 to 95MHz.	
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. c. Check that the amplitude variation is 1.8V as the SPECTRUM WIDTH control is varied from fully anticlockwise to fully clockwise. d. Check that the dc level variation is 2.5V as the SPECTRUM CENTRE control is varied from fully anticlockwise to fully clockwise.	 

Test Point	Location	Procedure	Typical Waveform
2F	A24J2	a. Set the 3715A/3716A BB FREQUENCY control to 83.3kHz. b. Check that the recovered BB signal has an amplitude of 0.3V. c. Check that the recovered BB amplitude is 0.3V for all BB FREQUENCY control settings up to 5.6MHz. d. Check that the variation in amplitude is not greater than 0.05V 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 411A RF Millivoltmeter, via the 75/50Ω matching pad to A23J3. c. Check that the voltage level does not drop below 0.34V 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 that the frequency at A23J3 is 87.4MHz ±0.1MHz using the 5245L Electronic Counter. Reconnect the RED/GRN cable to A23J3.	



G2

Figure G2-3 Functional Block Diagram — IF Section

GENERAL SERVICE SHEET G3 – BB SECTION

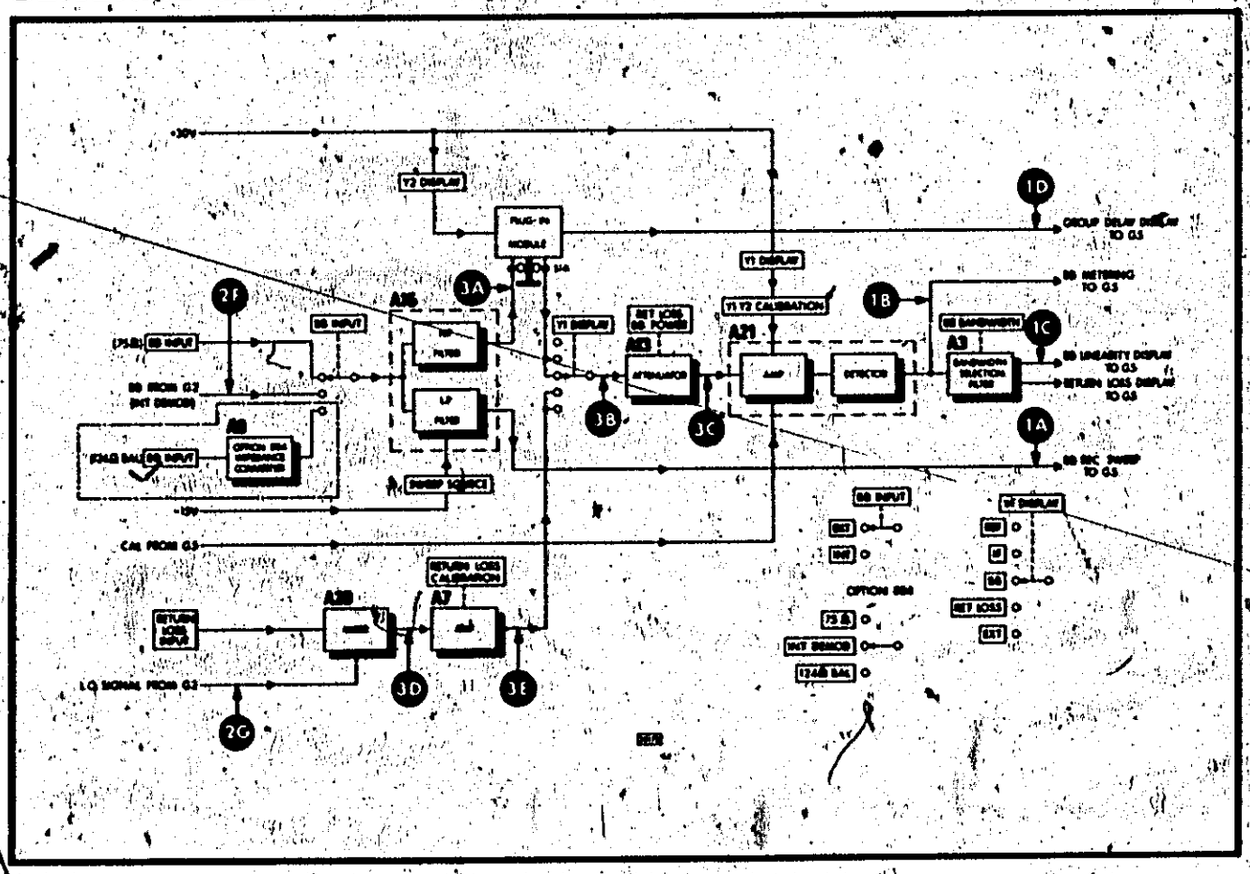


Figure G3-1 Simplified Block Diagram

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 A11, 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 the IF SECTION G2 to switch the gain of the amplifier, at half the sweep rate, to provide the calibration of 1, 3 or 10%. The BB signal is detected, and the output is simultaneously applied to the DISPLAY SECTION G5 to provide the meter signal; and to a low-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 1kHz.

G3-6 Option 004

G3-7 Option 004 provides an additional BB INPUT, at a balanced impedance of 124Ω. The Impedance Converter A8 separates the BB signal from the sweep signal and converts each to 75Ω 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 or a long cable, 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 Return 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.

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.

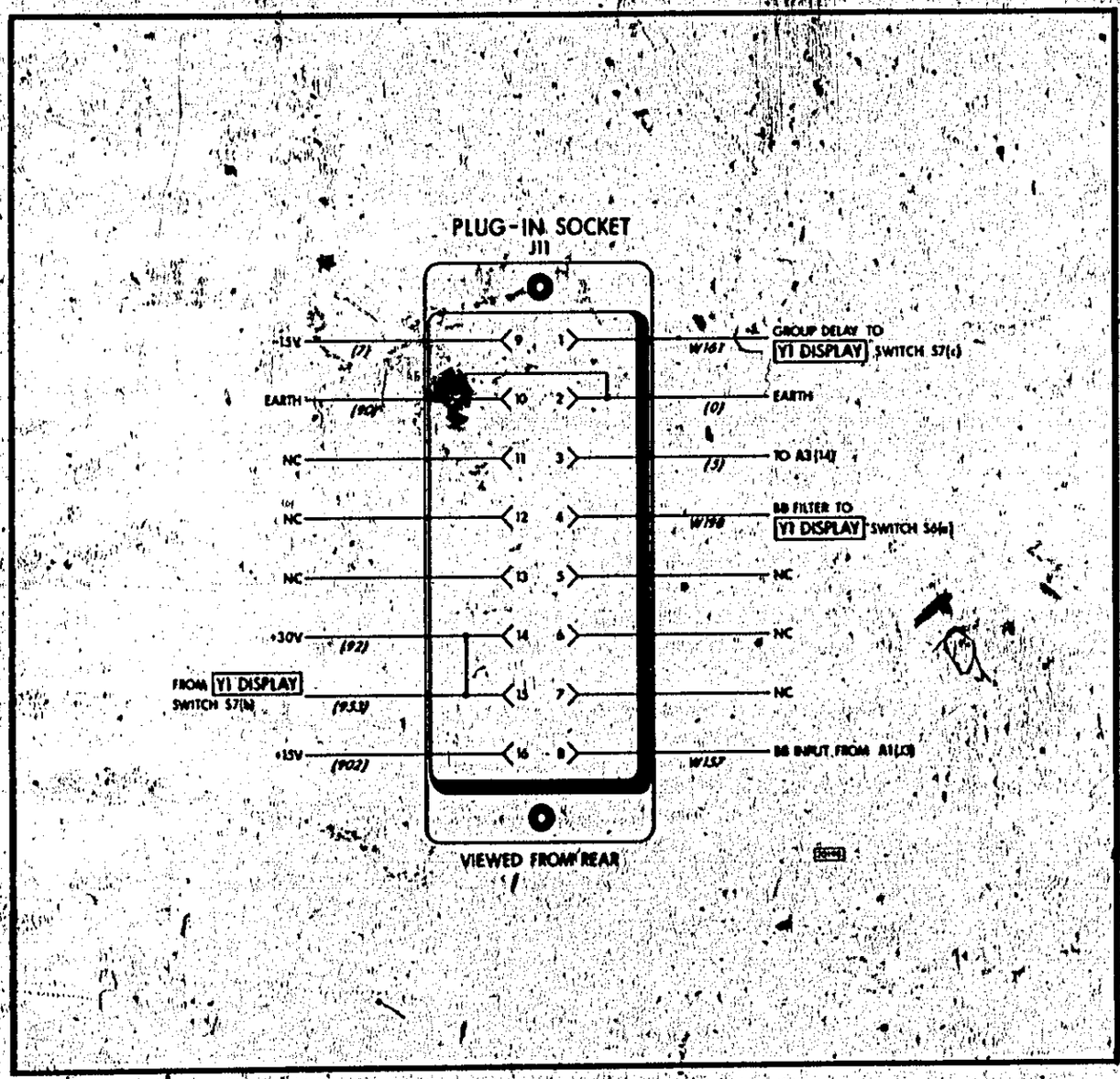


Figure G3-2 Plug-In Socket

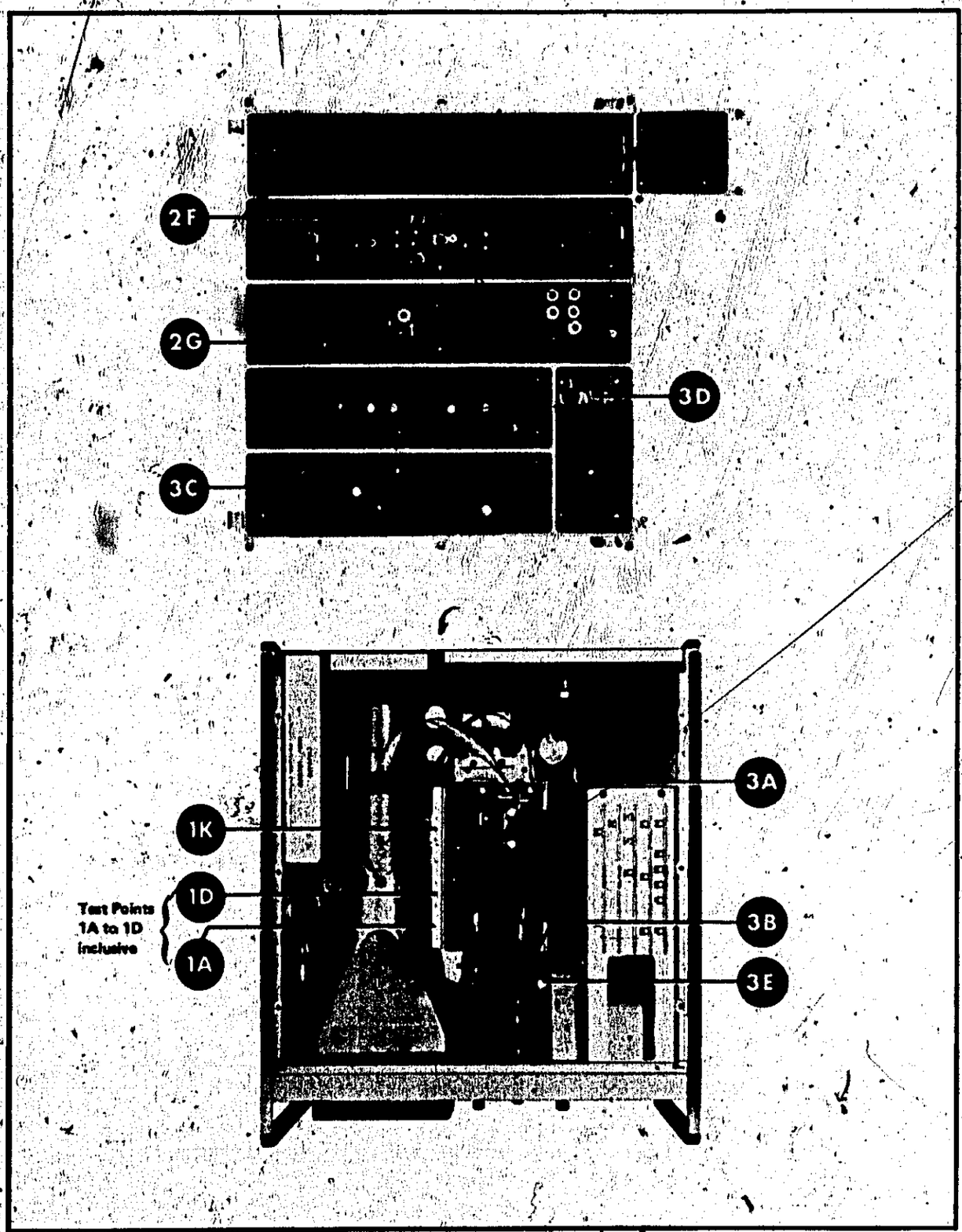


Figure G3-3 Test Point Locations – Casting Top View and Top View of 3702B

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.

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 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

Set the 3705A controls as below:

BB FREQUENCY	83.3kHz

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

TEST SET UP 2

Set the 3710A controls as below:

SWEEP	INT
SWEEP WIDTH	50MHz
IF FREQUENCY	70MHz
IF VERNIER	0
AUX OUTPUT	UNCAL IF
IF ATTENUATOR	insert 40dB

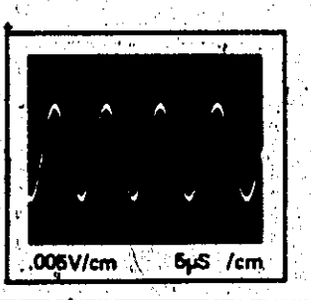
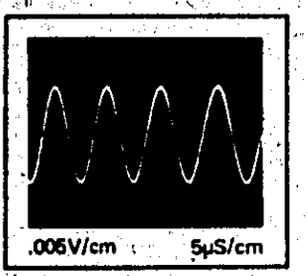
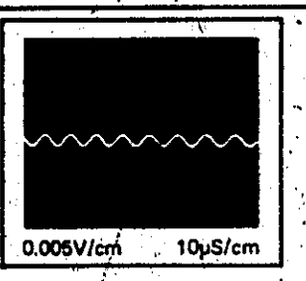
Set the 3715A/3716A controls as below:

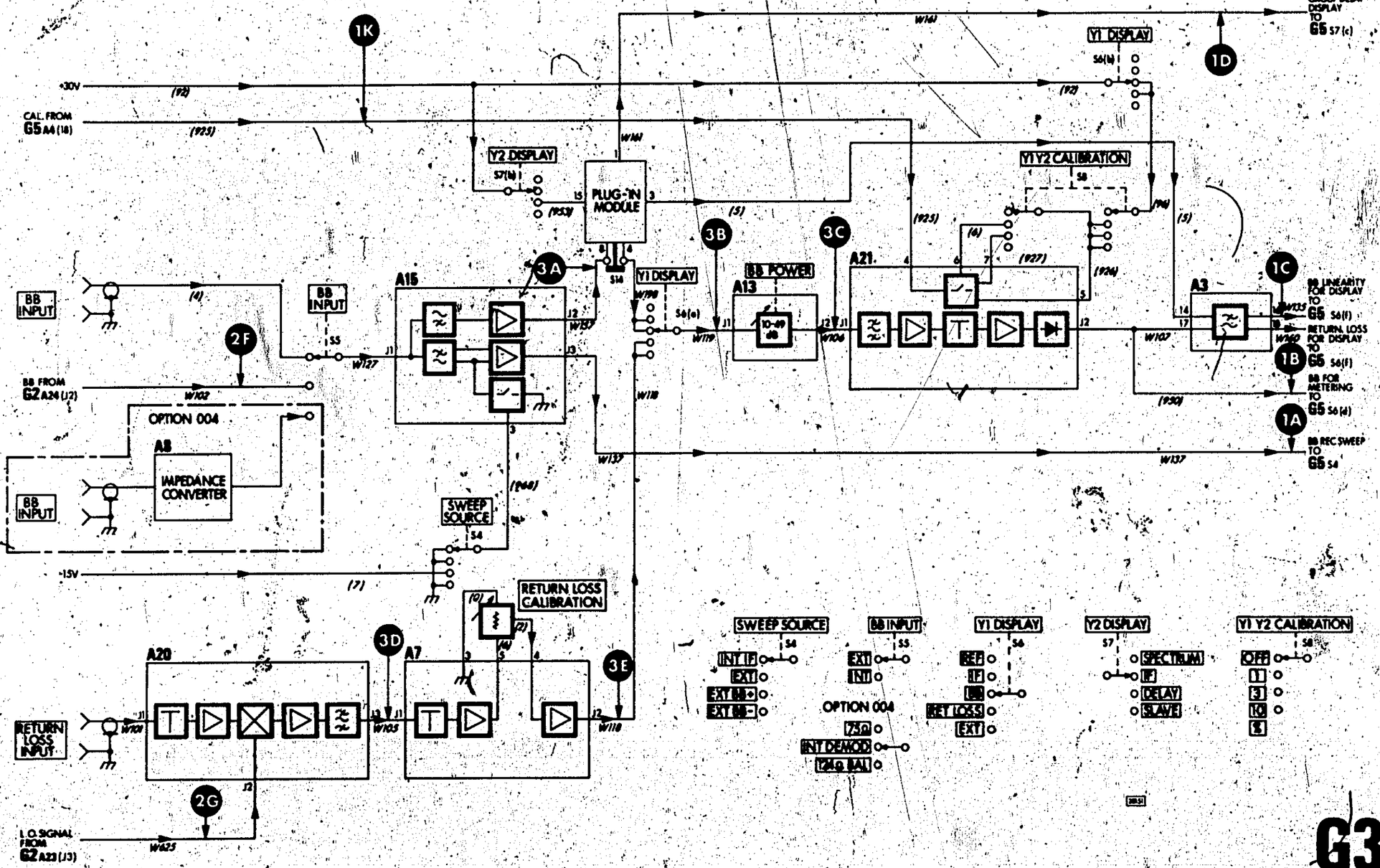
BB FREQUENCY	OFF

Set the 3702B controls as below:

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.

Test Point	Location	Procedure	Typical Waveform
3A	Plug-in (8)	a. Check that the signal level is 0.2V pk-pk for all 3715A/3716A BB FREQUENCY control settings.	
3B	Y1 DISPLAY S6(A)	a. Check that the signal level is 0.2V pk-pk 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	A2TJ1	a. Use a 1:1 probe to check that the BB signal level remains constant ±5mV as the 3702B and 3715A/3716A BB POWER attenuators are simultaneously adjusted to the same setting.	
3D	A20J3	a. Disconnect the GRN coded cable grom A20J3, and connect the 180A via the 15539A Test Cable to A20J3. b. Check that the variations in signal amplitude are not greater than 0.01V 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 variation in signal amplitude is 2V over the full range of the RETURN LOSS CALIBRATION control. Reconnect the BRN/GRY cable to A7J2.	



G3

Figure G3-4 Functional Block Diagram — BB Section

GENERAL SERVICE SHEET G4 – MARKER SECTION

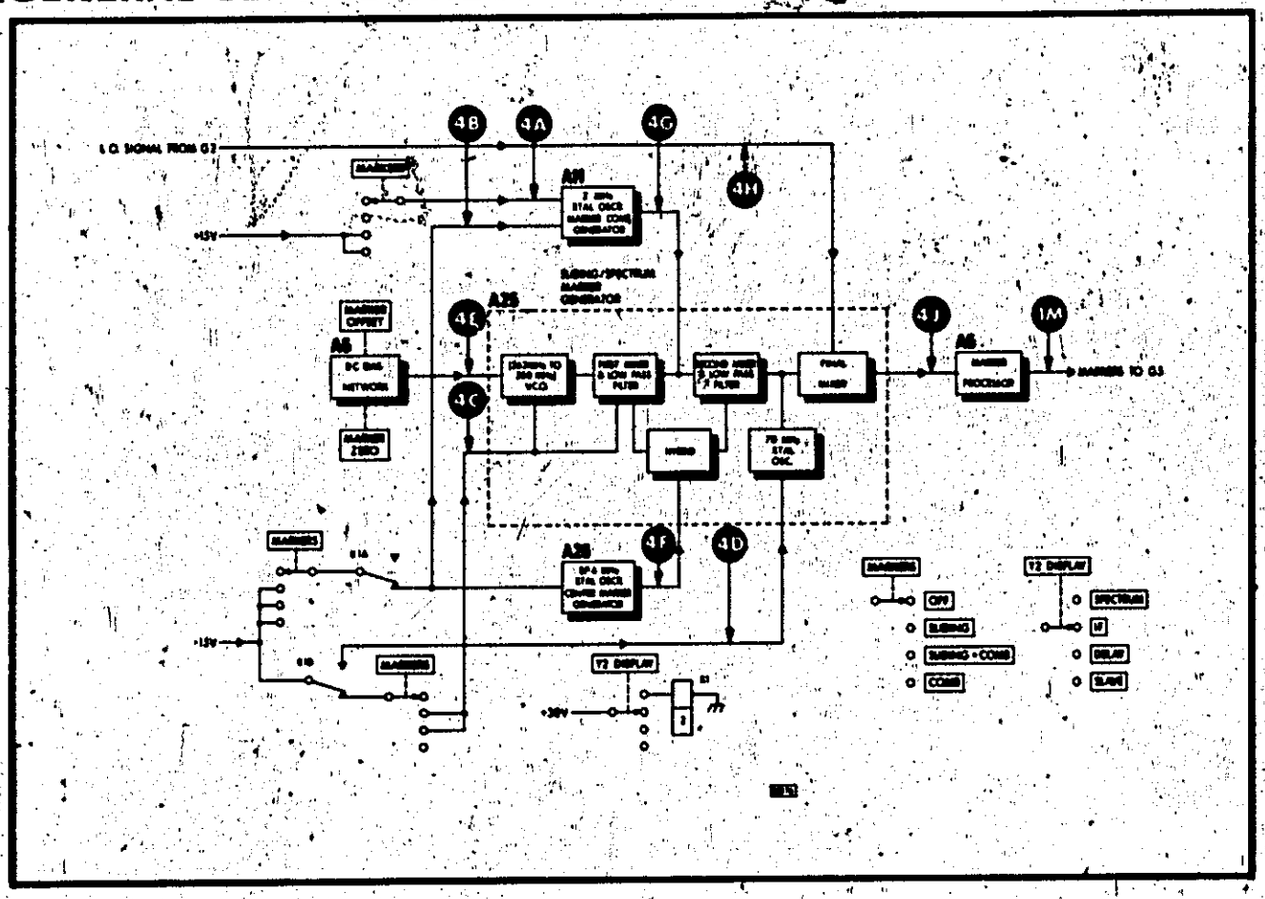


Figure G4-1 Simplified Block Diagram

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 crystal controlled 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 oscillators are operative for the various modes of the MARKERS switch.

Table G4-1 Switching of Marker Oscillators

Y2 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

G4-5 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 can be calibrated by the MARKER ZERO control.

G4-7 The first mixer on the A25 has two inputs, one from the VCO and the other via the hybrid from the 87.4MHz crystal oscillator on A26. The mixer product derived from the VCO output and the third harmonic of the 87.4MHz oscillator is selected via a low-pass filter to give a mixer output in the range 0 to 26MHz depending on the setting of the MARKER OFFSET control.

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

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 swept 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.

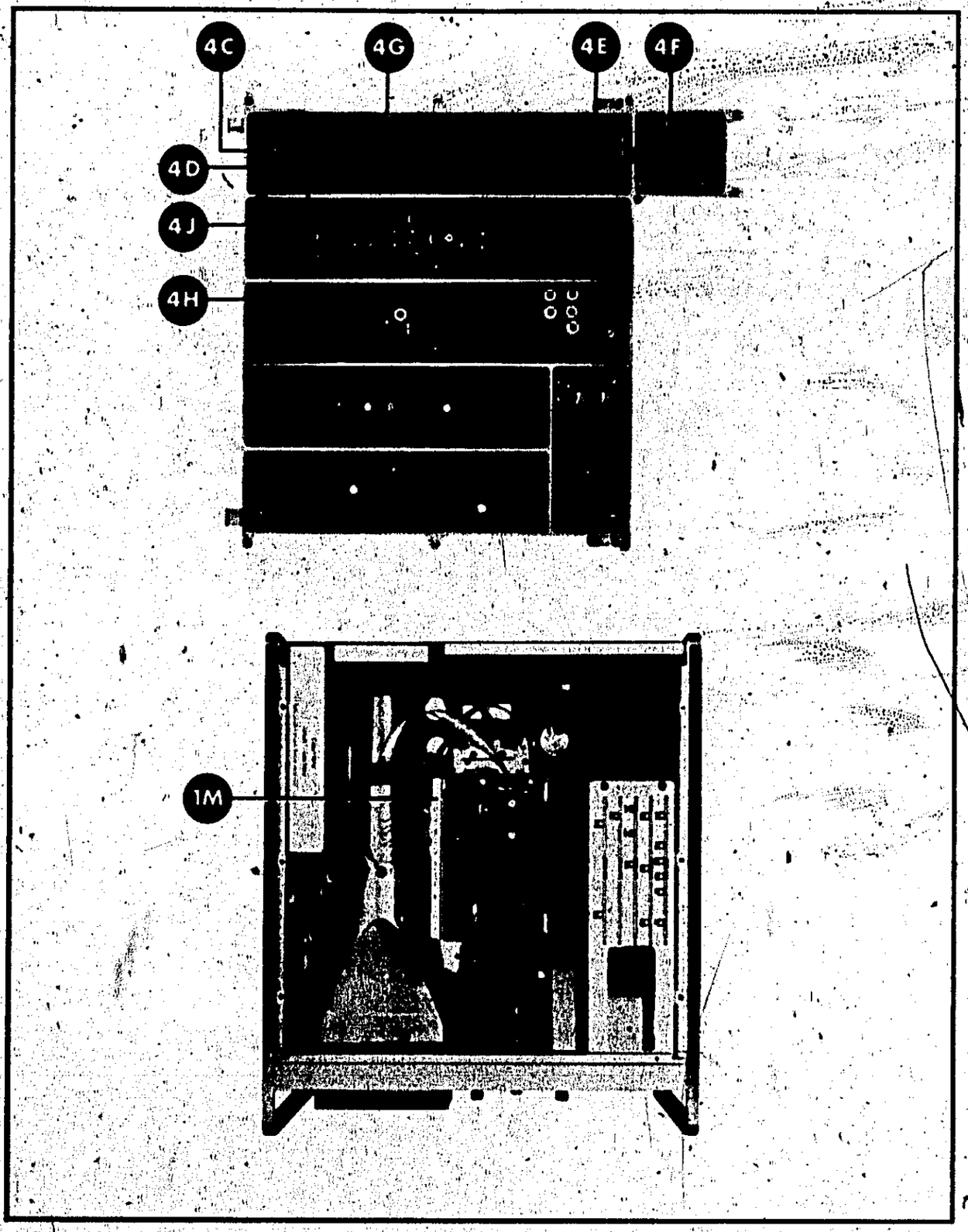


Figure G4-2 Test Point Locations — Casting Top View and Top View of 3702B

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.

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

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

1. Set the 3710A controls as below:

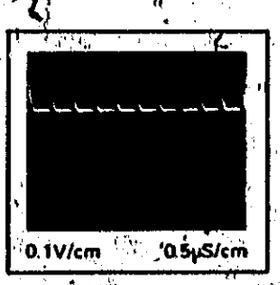
   SWEEP ..... INT
   SWEEP WIDTH 50MHz
   IF FREQUENCY 70MHz
   IF ATTENUATOR ..... insert 10dB

2. Set the 3702B controls as below:

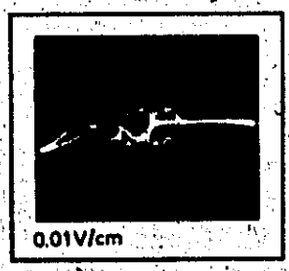
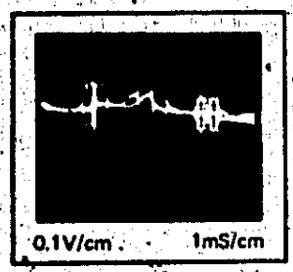
   Y1 DISPLAY ..... ANY position
   Y2 DISPLAY ..... IF
   IF ATTENUATOR ..... insert 10dB
   MARKERS ..... as indicated

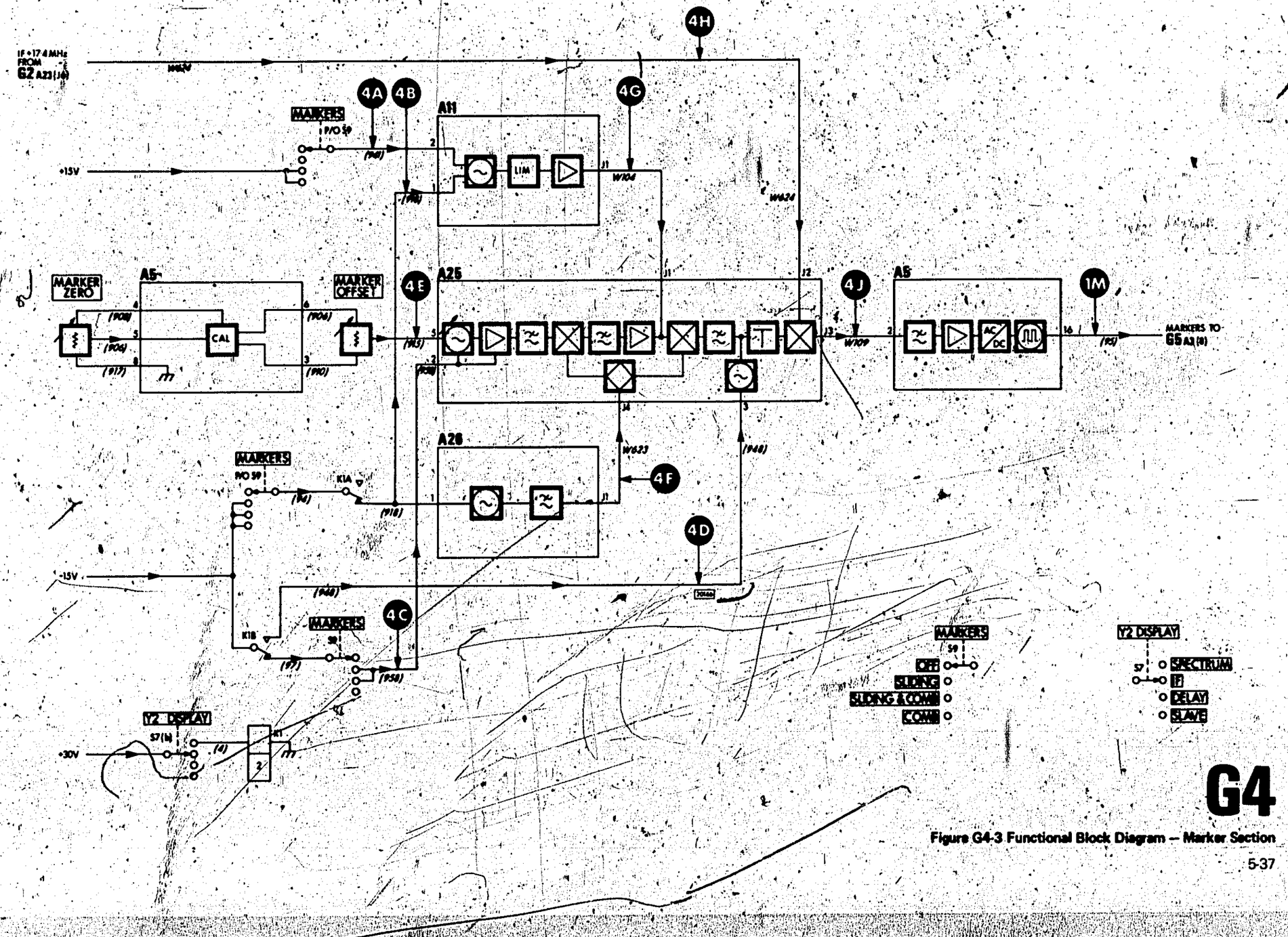
   Connect the 3710A IF OUTPUT to the 3702B IF INPUT, and ensure that the AFC LOCK lamp is alight.

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

Test Point	Location	Procedure	Typical Waveform
4E	A25(5)	This signal only contributes to the sliding markers operation: a. Check that the dc level is continuously variable from approximately -3.6V to -4.6V by operation of the MARKER OFFSET control. b. Check, when the MARKER OFFSET control is set to 0, that the MARKER ZERO control varies the dc level by 2V.	
4F	A26(J1)	a. Set the MARKERS switch to any position except OFF. b. Disconnect the RED/ORN cable for A26J1. c. Connect the 411A RF Millivoltmeter A26J1 via the 75/50Ω matching pad and measure the voltage output for all positions of the MARKERS switch except OFF. d. Disconnect the 411A RF Millivoltmeter and connect the 5245L 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. 1V ±0.2V
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. b. Check A11J1 for 2MHz spikes of amplitude 0.45V pk-pk. c. Measure the frequency at A11J1 using the 5245L Electronic Counter.	

Test Point	Location	Procedure	Typical Waveform
4H	A23J6	**Part I** a. Set the Y1 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. e. Check that the sweep width can be adjusted from ≤1MHz to ≥6MHz using the SPECTRUM WIDTH control. f. Disconnect the Spectrum Analyzer and connect the 411A RF Millivoltmeter to A23J6 via the 75/50Ω matching pad. g. Check that the voltage output is 0.34V. Reconnect the RED/YEL cable to A23J6. **Part II** a. Set the Y2 DISPLAY switch to any position except SPECTRUM. b. Disconnect the RED/YEL coded cable from A23J6. c. Connect the 411A RF Millivoltmeter 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. The voltage level should not drop below 0.34V. e. Disconnect the 3710A IF OUTPUT for the 3702B IF INPUT. f. Set the 3710A AUX OUTPUT to 70MHz XTAL. g. Using the 5245L Electronic Counter, check that the frequency at A23J6 is 87.4 ±0.1MHz. Reconnect the RED/YEL cable to A23J6.	

Test Point	Location	Procedure	Typical Waveform
4J	A25J3	**Part I** a. Set the Y2 DISPLAY to SPECTRUM. 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 Spectrum sweep, test point 1H. Reconnect the WHT cable to A25J3. **Part II** a. Set the Y2 DISPLAY switch to any position except SPECTRUM. 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. Reconnect the WHT cable to A25J3.	 



G4

Figure G4-3 Functional Block Diagram — Marker Section

GENERAL SERVICE SHEET G5 – DISPLAY SECTION

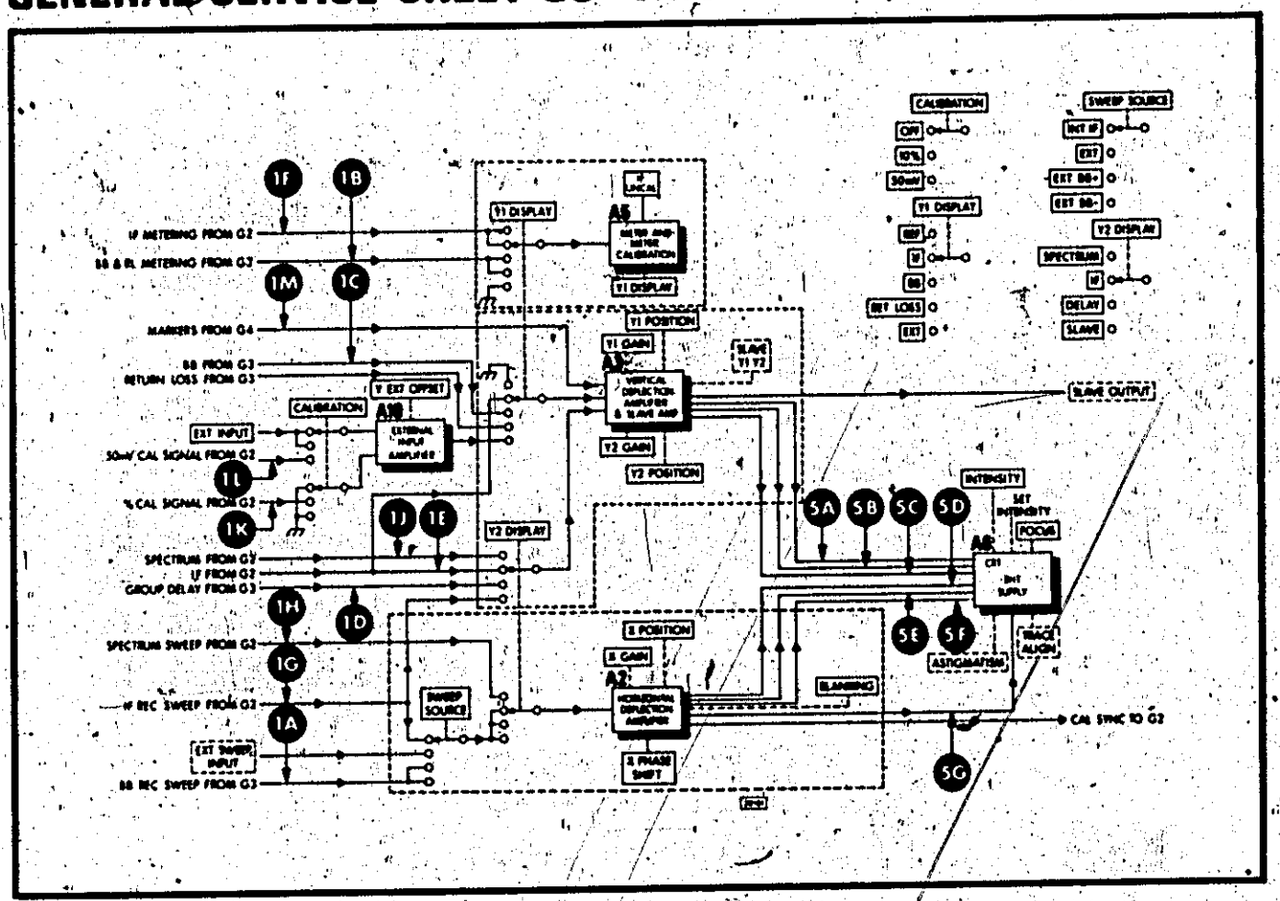


Figure G5-1 Simplified Block Diagram

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 all 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 calibration of the input signal, or a 50mV signal may be substituted for the external input.

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 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 90^0 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.

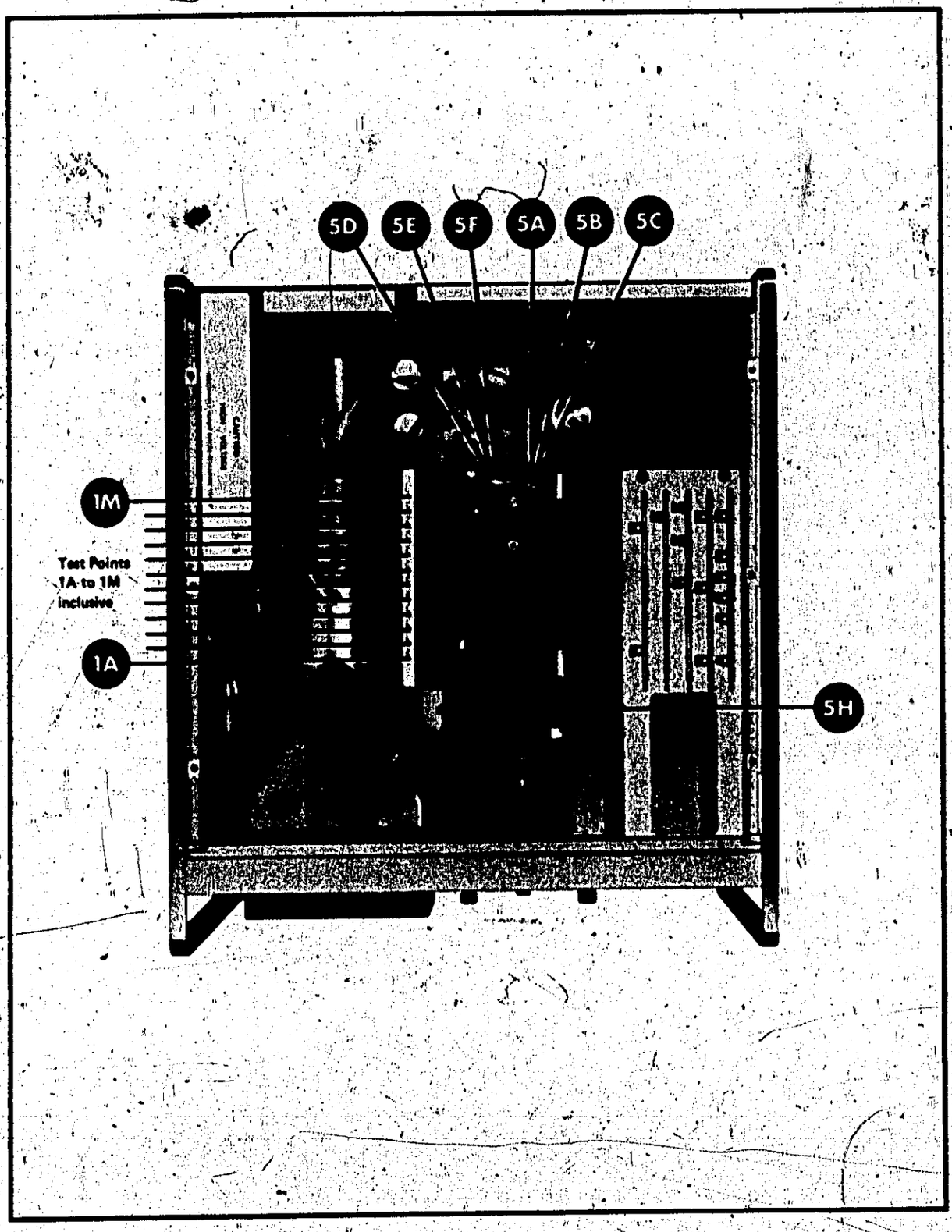


Figure G5-2 Test Point Locations – Top View of 3702B

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.

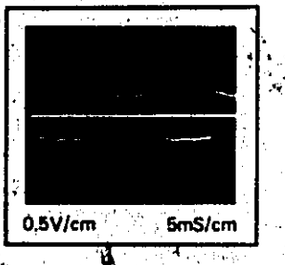
1. Set 3710A controls as below:

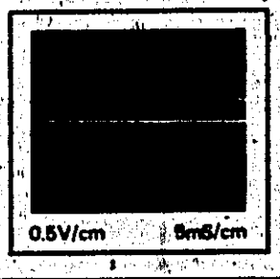
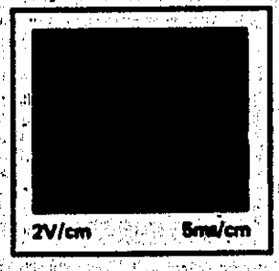
SWEEP WIDTH	50MHz
SWEEP	INT
IF FREQUENCY	70MHz
IF ATTENUATOR	10dB

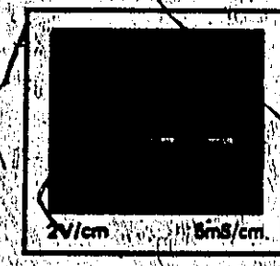
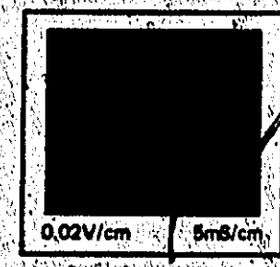
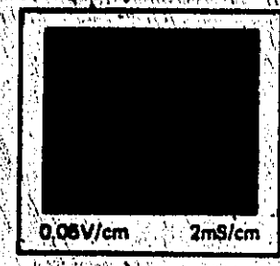
2. Set 3702B controls as below:

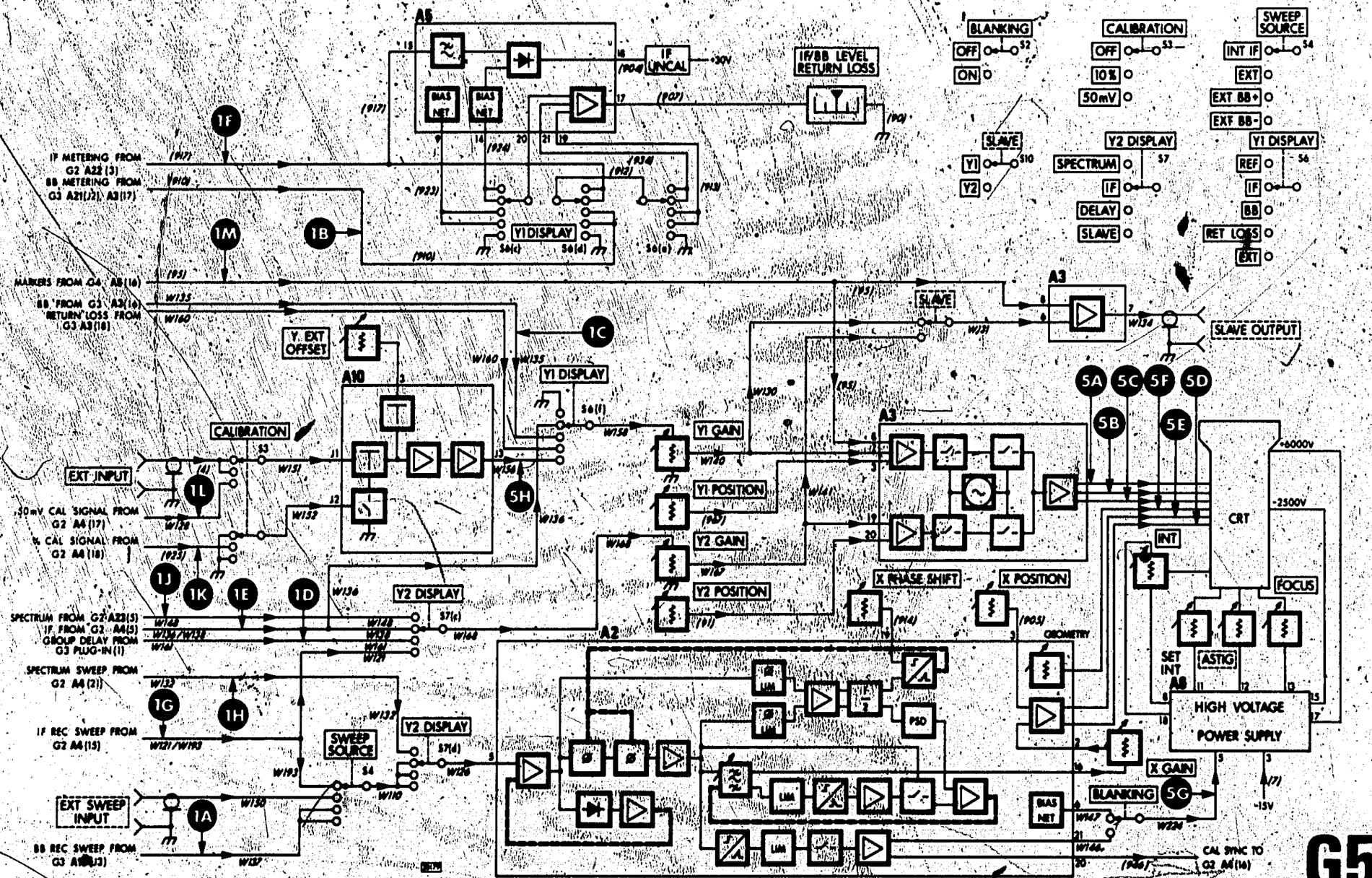
Y1 DISPLAY	IF
Y2 DISPLAY	IF
Y1 GAIN	anticlockwise
Y1 POSITION	anticlockwise
Y2 GAIN	anticlockwise
Y2 POSITION	clockwise
Y1/Y2 CALIBRATION	OFF
MARKERS	SLIDING
MARKER OFFSET	10MHz
SWEEP SOURCE	IF REC.
EXT INPUT CALIBRATION	OFF
IF ATTENUATOR	10dB

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

Test Point	Location	Procedure	Typical Waveform
5A	A3 pin (1)	Trigger Oscilloscope externally from the 3710A SWEEP OUTPUT. a. Monitor the dc level using 180A Oscilloscope and check for a dual trace. 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. (The Procedure is continued on the following page).	

Test Point	Location	Procedure	Typical Waveform
5A	A3 pin (1)	Adjust the Y1 and Y2 POSITION controls to set the dc level to its mid position. 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.	
5B	A3 pin (2)	As for A, but in anti-phase.	
5C	A3 pin (3)	dc level	
5D	A2 pin (2)	Trigger the Oscilloscope externally from the 3710A SWEEP OUTPUT. a. Set the SWEEP SOURCE switch to EXT and monitor dc level variation of 8V as 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 180°. c. 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 18Hz and check that the phase of the signal does not vary by more than 90°.	
5E	A2 pin (3)	As for D and check signal is in anti-phase to the signal at D.	
5F	A2 pin (1)	dc level.	

Test Point	Location	Procedure	Typical Waveform
5G	Blanking Switch A6(5)	BLANKING – OFF dc level BLANKING – ON Square wave switching from earth to 6V.	
5H	A10J3 Y1 DISPLAY S6(f)	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 its mid position. 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%.	 



G5

Figure G5-3 Functional Block Diagram — Display Section

ASSEMBLY SERVICE SHEET A1 – LOW VOLTAGE POWER SUPPLY

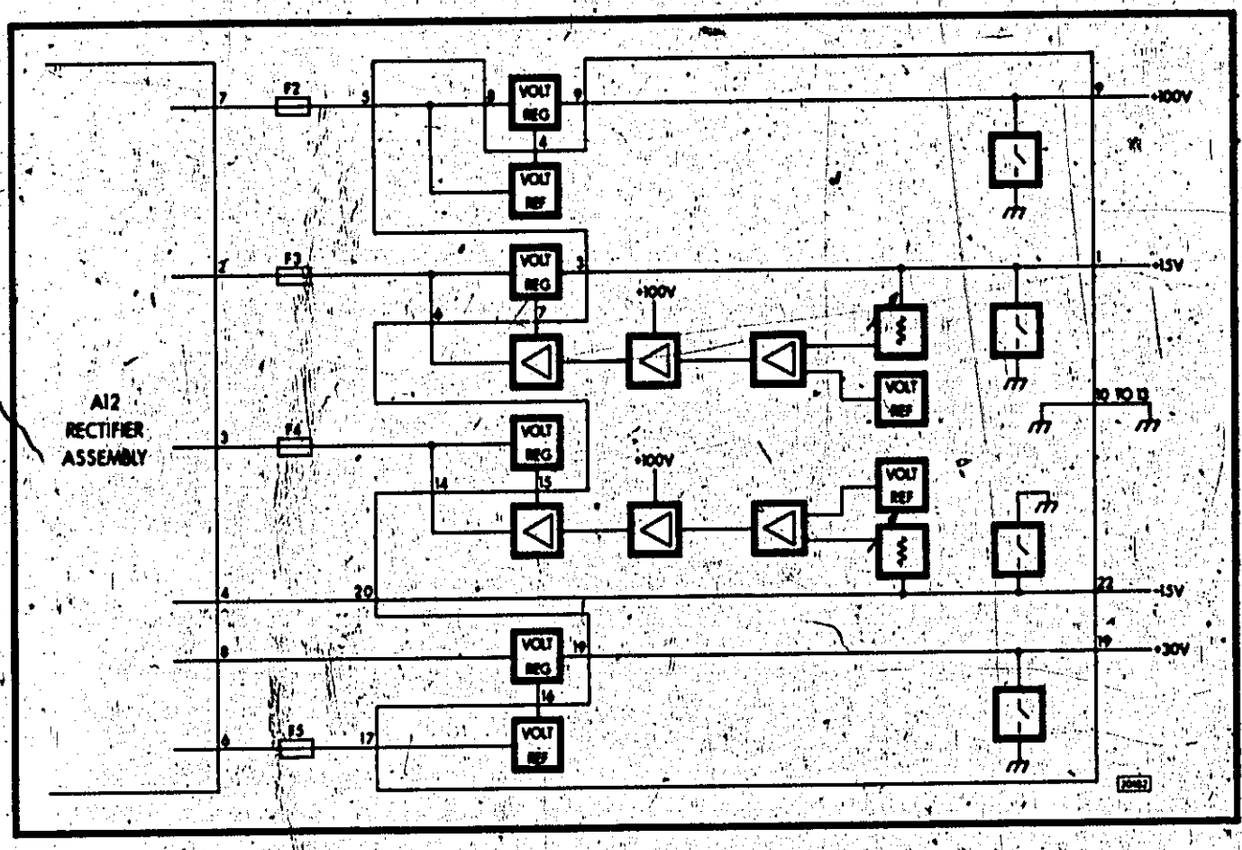


Figure A1-1 Simplified Block Diagram

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 Overload Protection

A1-12 Thyristors A1CR3, 6, 9 and 12 and breakdown diodes A1CR2, 5, 8 and 11 provide overvoltage protection on all 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.

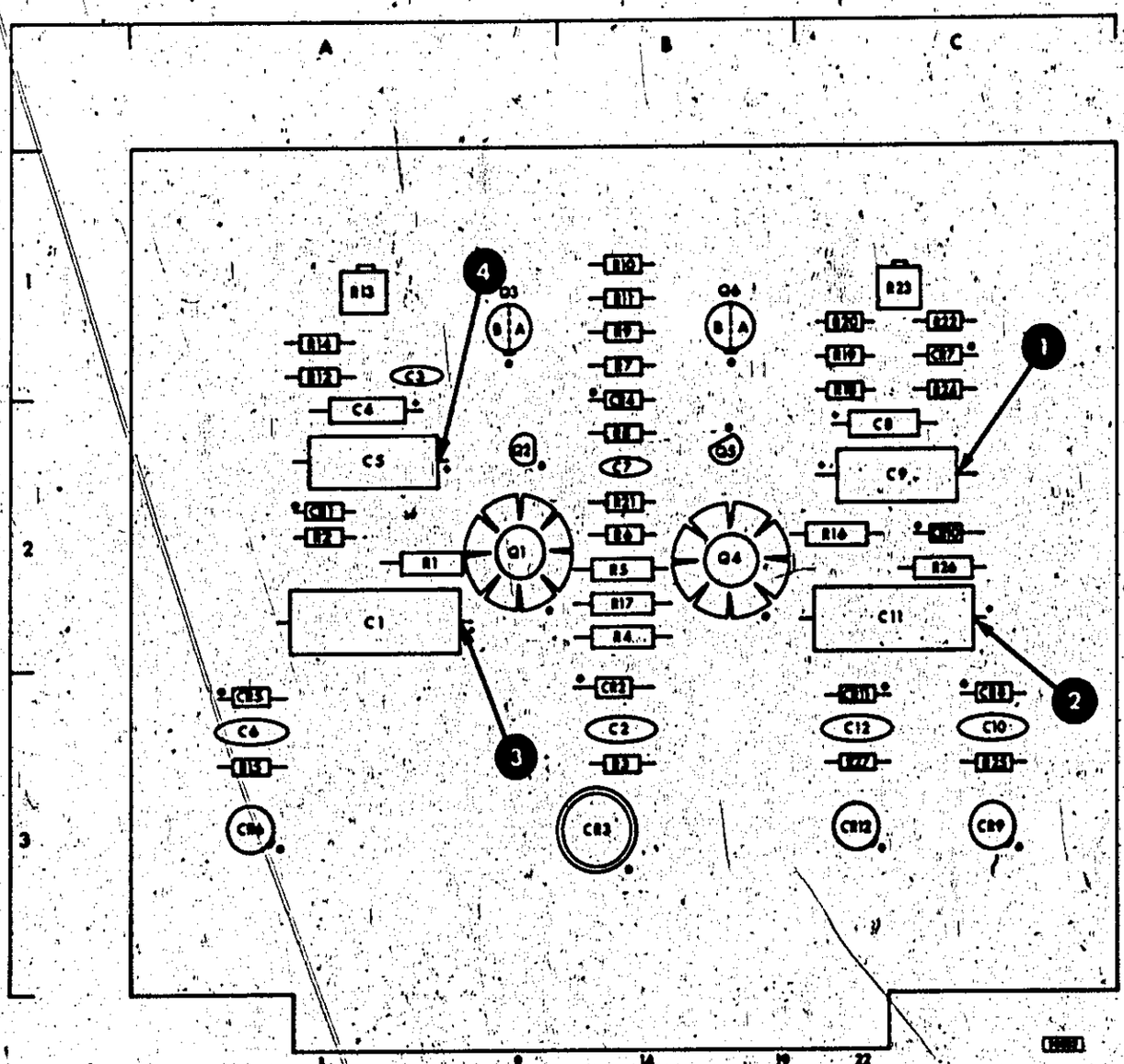
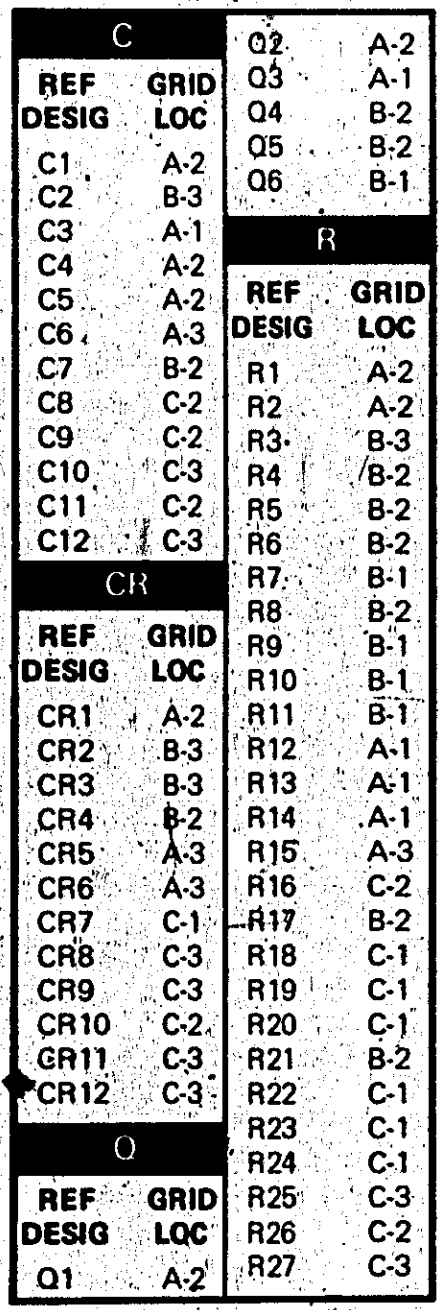


Figure A1-2 Component Location



C

REF DESIG	GRID LOC
C1	A-2
C2	B-3
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
C12	C-3

CR

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

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
R3	B-3
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

P/O A12

A1 LOW VOLTAGE POWER SUPPLY ASSEMBLY (0702-7203)

TO A8 (11)

TO
Y1 DISPLAY
Y2 DISPLAY
Y1, Y2 CALIBRATION

DS2 AFC LOCK

A-24

A1

Figure A1-4 Schematic Diagram — Assembly A1

ASSEMBLY SERVICE SHEET A2 – HORIZONTAL DEFLECTION

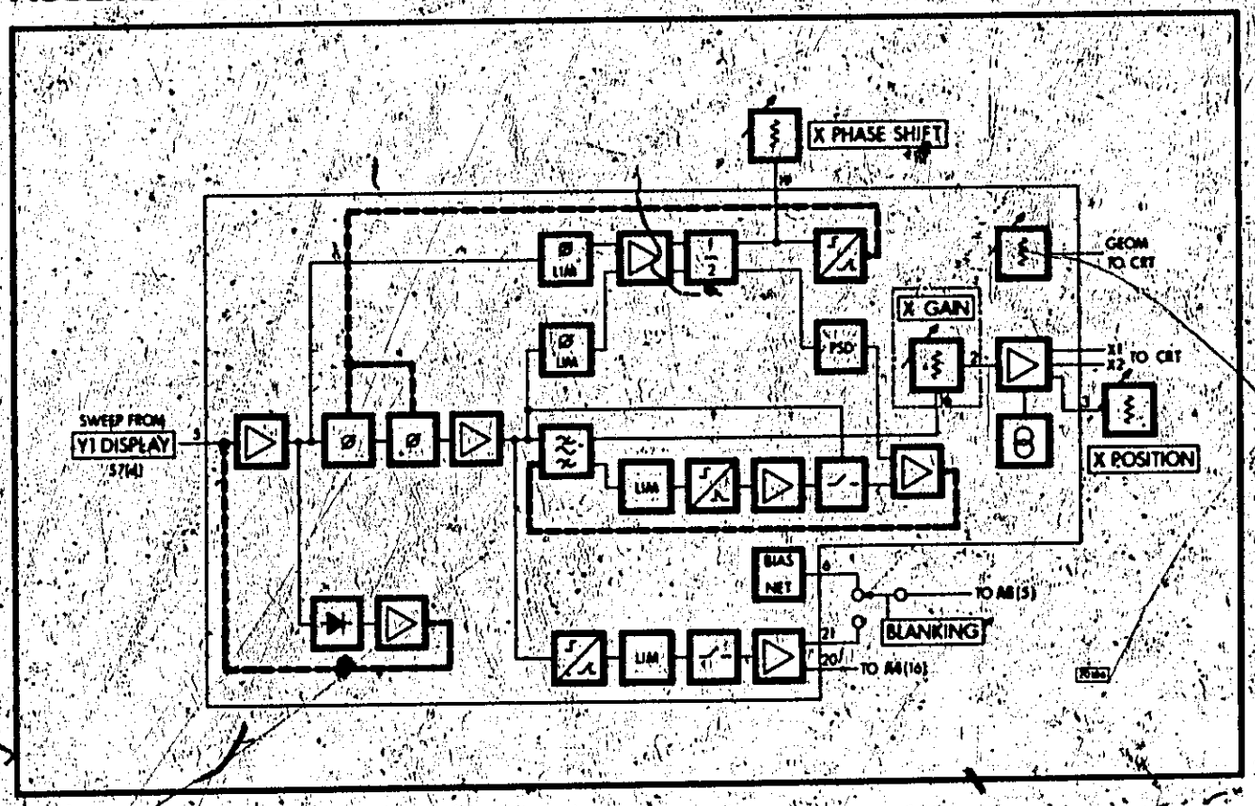


Figure A2-1. Simplified Block Diagram

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, 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 E1 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 input to MC3 will have an arbitrary phase shift introduced by phase shifters $\phi 1$ and $\phi 2$, depending upon the position of the X PHASE SHIFT control R4. With the BLANKING switch set to OFF any 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 $\phi 1$ and $\phi 2$, keeping the display in phase.

A2-10 MC2 acts as a unity gain buffer to prevent other circuits from loading phase shifter $\phi 2$, when E3 has a high resistance.

A2-11 Tracking Filter

A2-12 The sweep signal from the phase control loop is passed through active band pass 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.

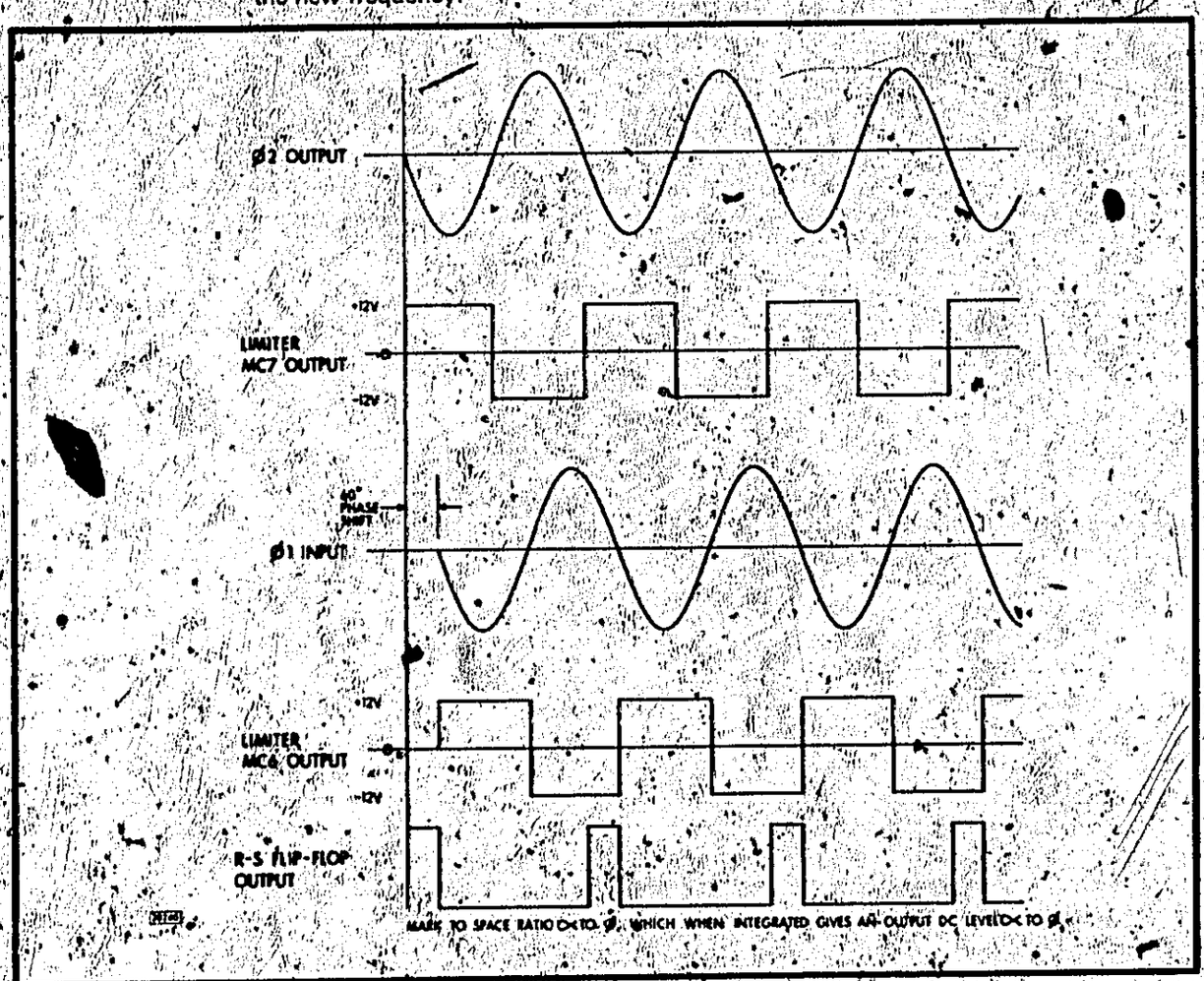


Figure A2-2 Timing Waveforms

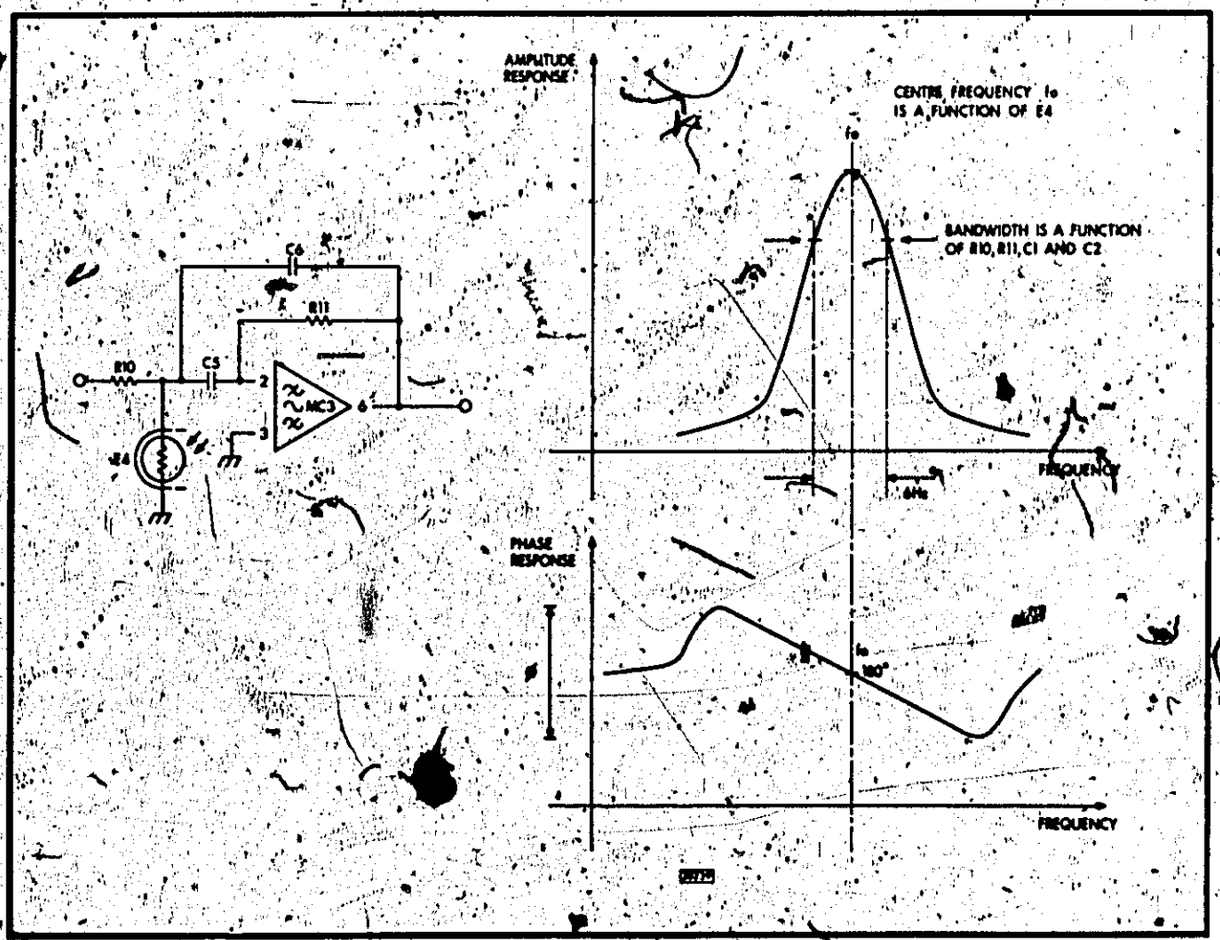


Figure A2-3 Active Filter

A2-16 Output Stage

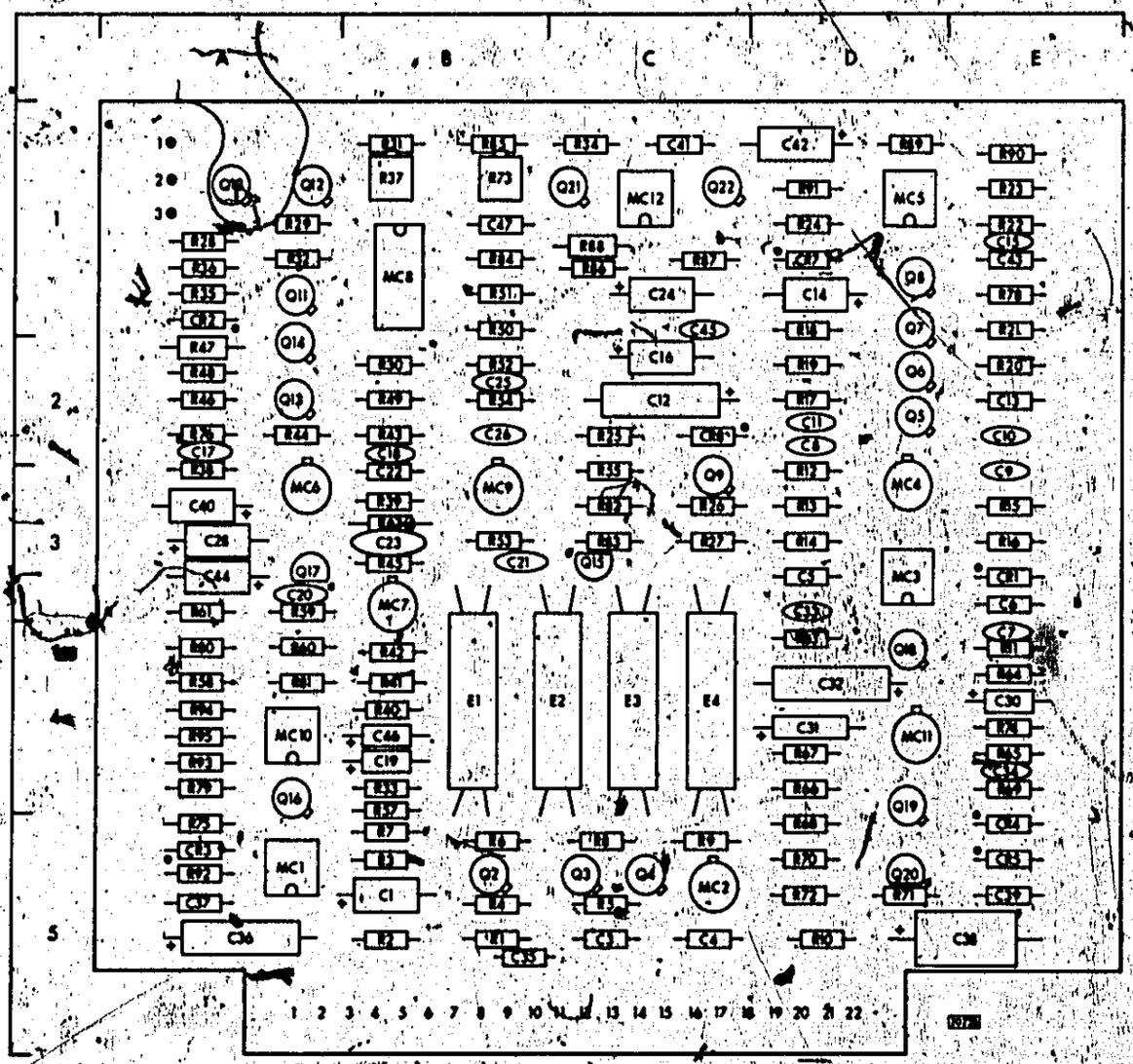
A2-17 The output from the active filter MC3 is applied via the X GAIN control R3 to differential amplifier Q10 to Q12, giving a differential output on Q10 and Q12 collectors, which is applied to the X deflection plates. The X POSITION control R7 varies the dc bias on the base of Q12. Q11 is a constant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

A2-18 Blanking Circuit

A2-19 The sweep output from MC2 is phase shifted 90° by the blank integrator Q18, and applied to the limiting amplifier MC11. Thus Q19 is alternatively switched on and off producing a 60V pk-pk blanking pulse to the intensity control grid via emitter follower Q20.

A2-20 Screen geometry is adjusted by bias resistor R37.

A2-21 Bias network R73 keeps the CRT intensity constant when changing the BLANKING switch from ON to OFF.



A2-4 Component Location

C

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
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

CR

REF DESIG	GRID LOC
CR1	E-3
CR2	A-1
CR3	A-5
CR4	E-5
CR5	E-5
CR7	D-1
CR8	C-2

E

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

MC

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

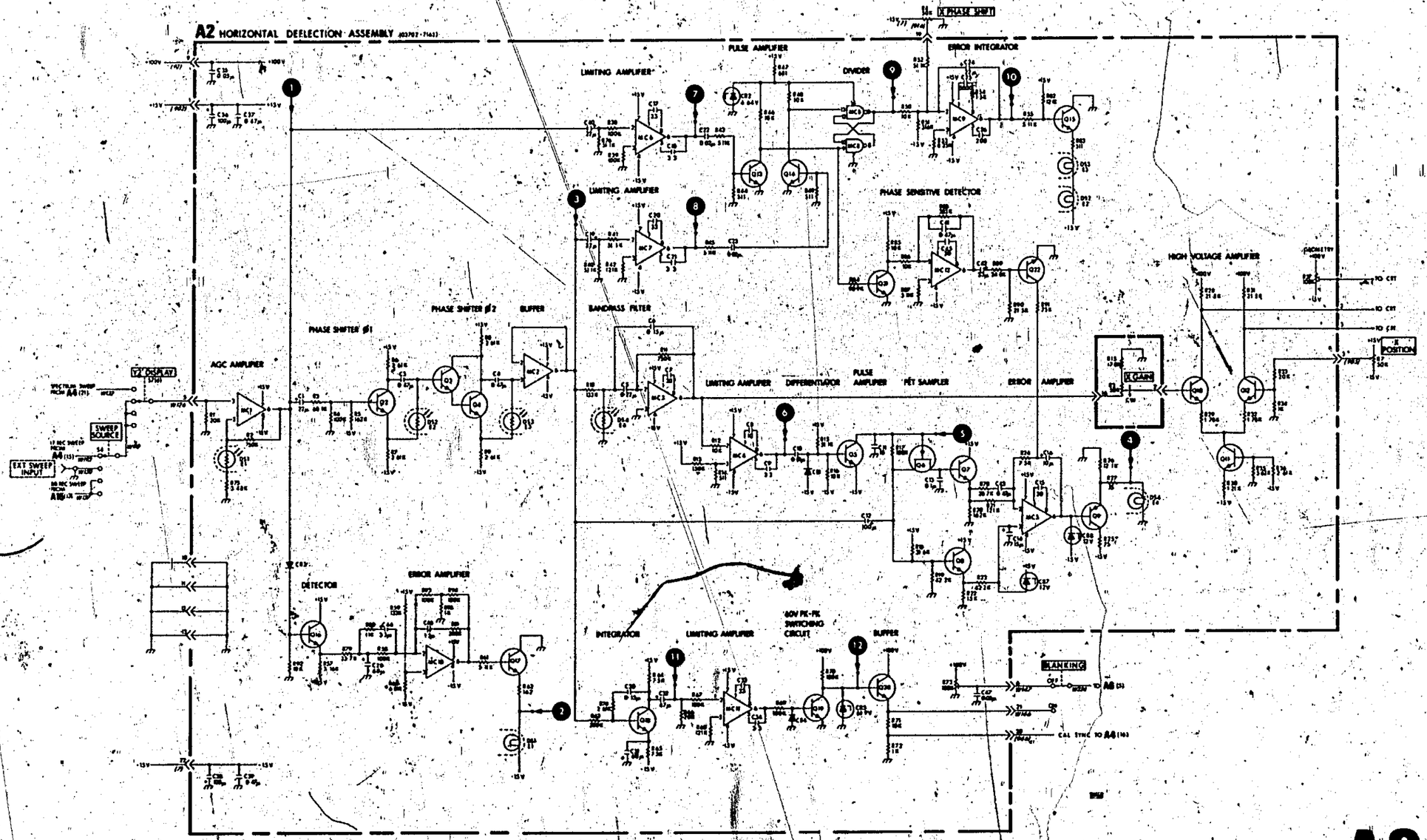
Q

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

R

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	C-3
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
R68	D-5
R69	E-4
R70	D-5
R71	D-5
R72	D-5
R73	B-1
R74	E-4
R75	A-5
R76	A-2
R78	E-1
R79	A-4
R80	A-4
R81	A-4
R82	C-3
R83	C-3
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

Figure A2-5 Grid Reference



A2

Figure A2-6 Schematic Diagram – Assembly A2

ASSEMBLY SERVICE SHEET A3 – VERTICAL DEFLECTION

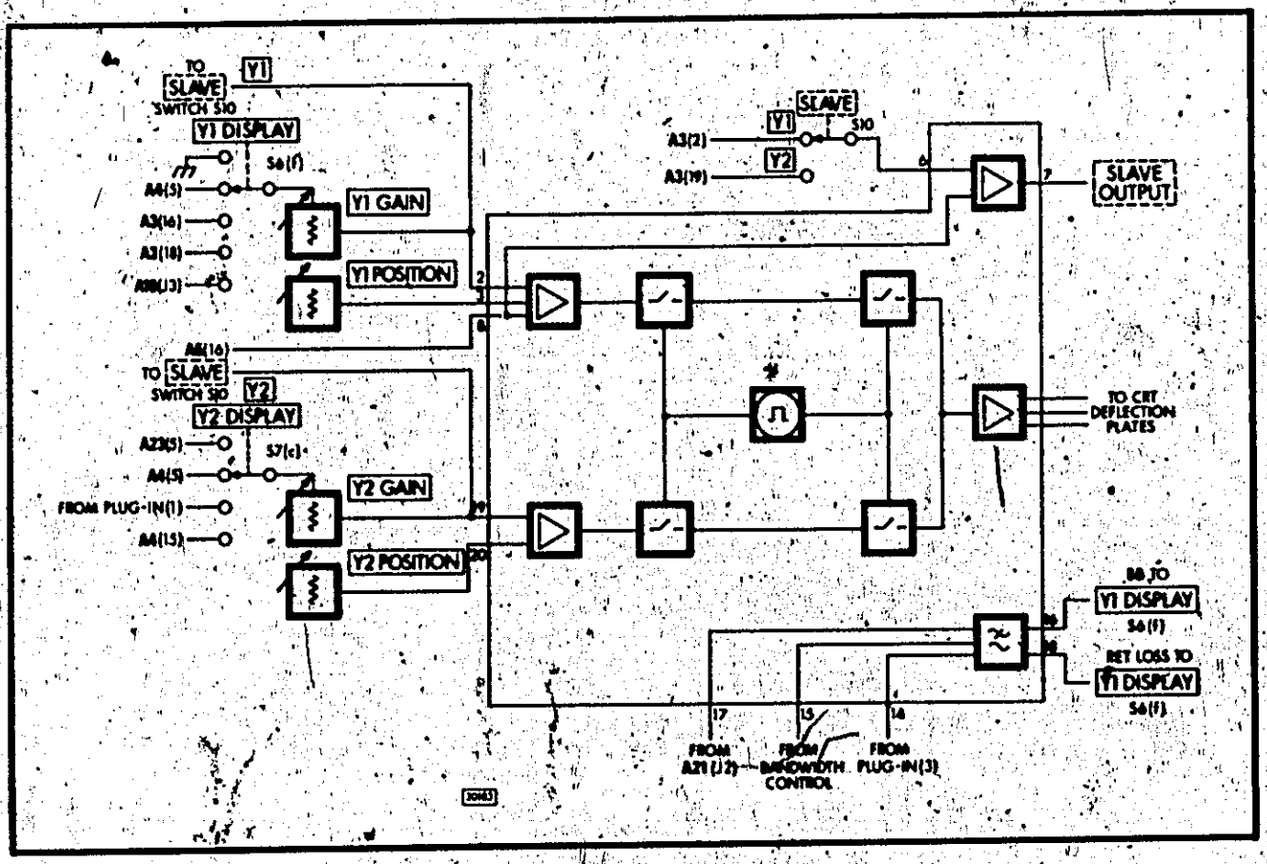


Figure A3-1 Simplified Block Diagram

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 for application to the Y1 trace is obtained from the Y1 DISPLAY switch S6(F). A portion of the amplitude of the input signal, determined by the position of the Y1 GAIN control, is simultaneously applied to the Y1 amplifier on assembly A3, and the SLAVE Y1 Y2 switch. The Y1 amplifier, MC1 and Q1, is a low voltage amplifier in which Q1 provides a low output impedance over the amplifier frequency range. The gain of the Y1 amplifier is determined by resistors R1 and R5 to R7. The markers from assembly A5(16) are also applied to the Y1 amplifier. The Y1 POSITION control varies the dc reference to the Y1 amplifier.

A3-6 Y2 Deflection

A3-6 The signal for application to the Y2 trace is obtained from the Y2 DISPLAY switch S7(C). A portion of the amplitude of the input signal, determined by the position of the Y2 GAIN control, is simultaneously applied to the Y2 amplifier on assembly A3, and the SLAVE Y1 Y2 switch. The Y2 amplifier MC2 and Q2 is a low voltage amplifier in which Q2 provides a low output impedance over the amplifier frequency range. The gain of the Y2 amplifier is determined by resistors R14, R16, and R18 to R20. The Y2 POSITION control varies the dc reference to the Y2 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 When Q4 is off, Q7 is on. The collector voltage of Q7 will change from -15V to almost 0V, allowing maximum current flow in Q6 and Q8. Therefore, the Y1 signal is grounded through Q6 while the Y2 signal is applied to the output, high voltage amplifier Q9 to Q12. With Q4 off, the collector of Q4 is at a potential of -15V and no current flows in transistors Q3 and Q5. Therefore Q3 is closed and Q5 opens. Similarly when Q7 turns off and Q4 turns on, maximum current flows in Q3 and Q5. The Y2 signal is grounded by the action of Q5 but the Y1 signal is allowed to pass to the output high voltage amplifier. Zener diodes CR3 to CR6 limit the amplitude of the chopped waveform to ±4.9V.

A3-10 The chopped signal containing the Y1 and Y2 information is applied to the differential high voltage amplifier Q9 to Q12. The collectors of Q10 and Q11 drive the CRT vertical deflection plates at the correct operating voltage, with Y1 and Y2 information, giving an effective double beam display. The amplifier balance is adjusted by R63, ie, zero volts between Q10 and Q11 collectors, with no input. Capacitors C23 and C24 adjust both sides of the amplifier for the best pulse response.

A3-11 Slave Output

A3-12 The Y1 and Y2 signals on R8A and R9A wipers are also applied via the SLAVE Y1 Y2 switch S10 to the slave amplifier MC3, where it is combined with the markers from A5(16). The output from the slave amplifier is routed directly to the back panel SLAVE OUTPUT connector.

A3-13 BB Post Detector Filter

A3-14 The detected BB signal from A21(J2) is applied to the filter via pin 17. The BB signal is then filtered by either a 1kHz or 5kHz low-pass filter depending upon the position of either the bandwidth control on the Receiver Plug-in or the switch in the plug-in housing.

A3-15 When the bandwidth control is in the 1kHz position, +30V is applied to the junction of R47 and R64 turning Q13 hard on, grounding one end of C14. Components Q14, R50, 51 and C13, 14 then form a 1kHz Sallen and Key active filter which will limit the frequency of the detected BB to 1kHz. In the two 5kHz positions of the bandwidth switch, the junction of R47 and R64 is grounded, turning Q13 off, and effectively open circuiting C14. The input for the detected BB will then be as shown in Figure A3-2.

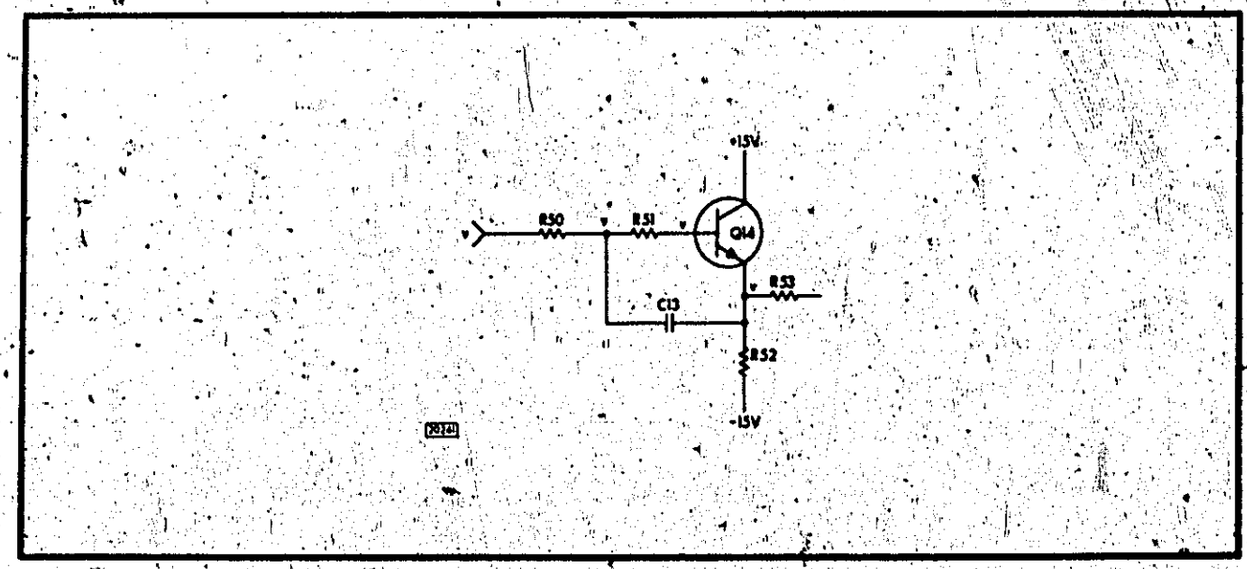


Figure A3-2 BB Post Detector Filter

A3-16 If we assume that the input impedance is high, then there will be no current drawn through R50 and R51, thus giving no voltage drop. The input voltage will then appear at Q14 emitter at the same amplitude. Thus C13 has virtually no effect on the input signal. The 1kHz filter no longer exists and the detected BB signal is then applied to another Sallen and Key filter Q15, R53, R54 and C15, 16 which has a cut-off frequency of 5kHz.

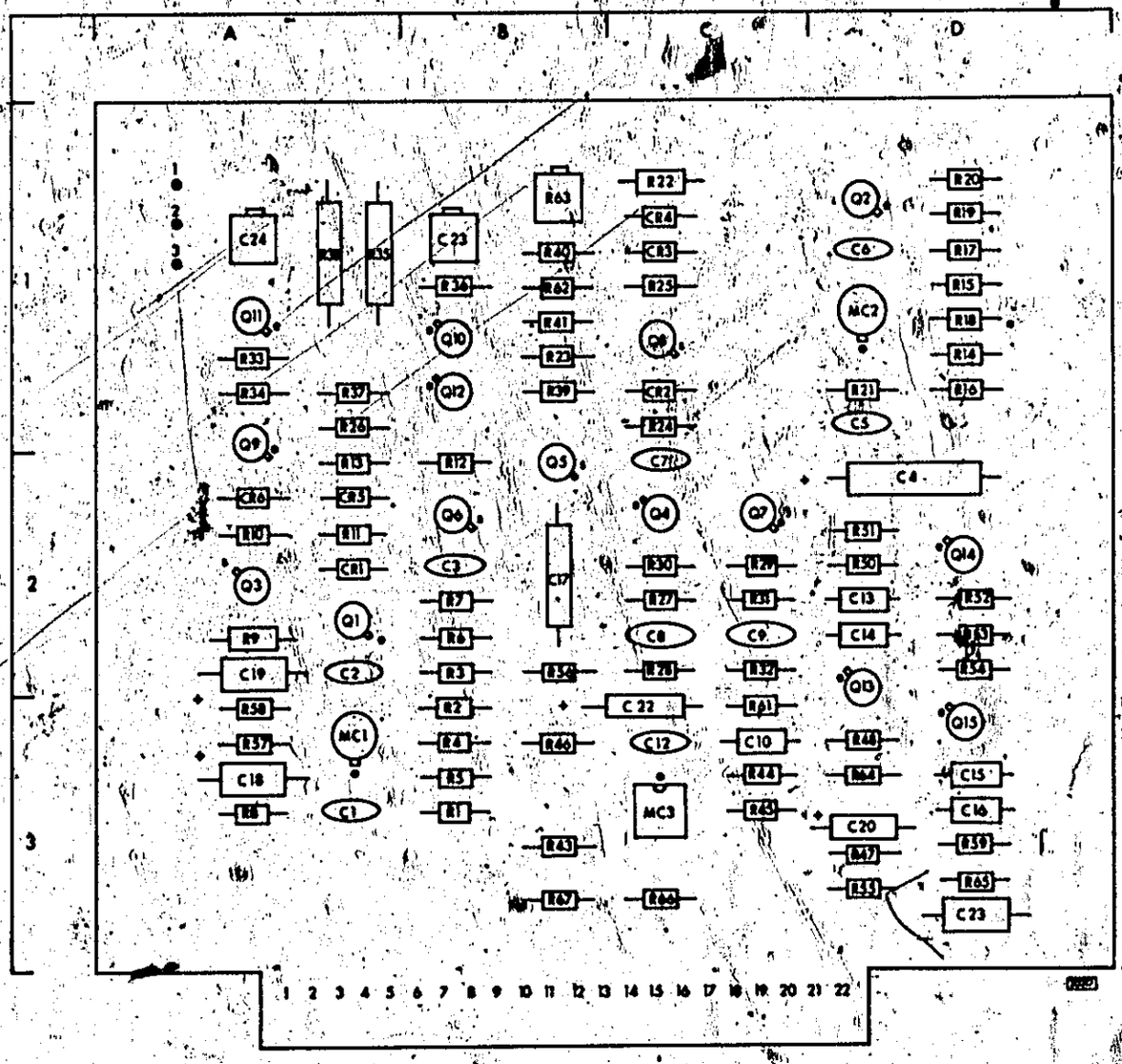


Figure A3-3 Component Location

C

REF DESIG	GRID LOC
C1	A-3
C2	A-2
C3	B-2
C4	D-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

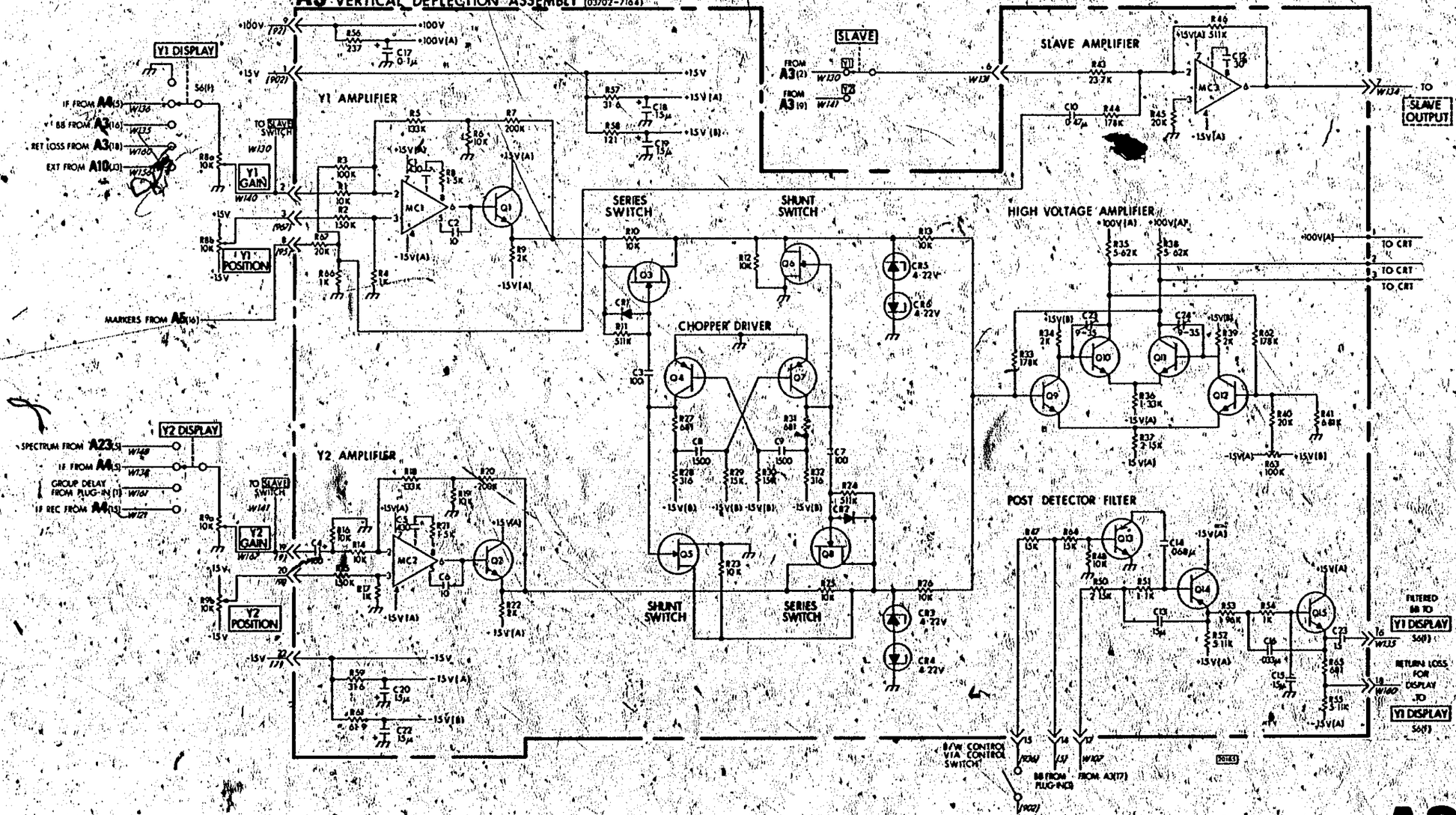
Q

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



A3

Figure A3-5 Schematic Diagram — Assembly A3

ASSEMBLY SERVICE SHEET A4– IF CALIBRATOR AND SPECTRUM SWEEP

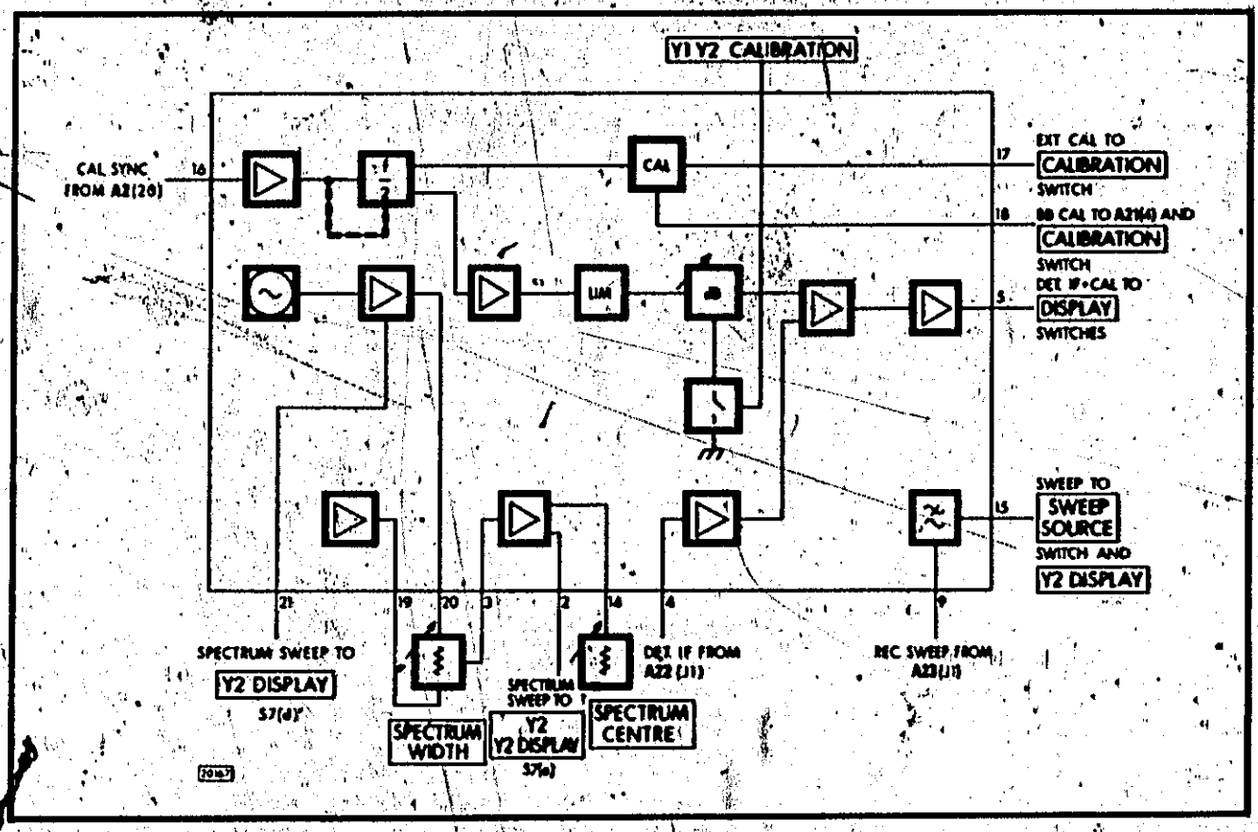


Figure A4-1 Simplified Block Diagram

A4-1 CIRCUIT DESCRIPTION

A4-2 IF Calibrator

A4-3 CAL SYNC pulses at the sweep frequency, from A2(20) are applied to the bistable Q2-3 via emitter-follower Q1, producing a 4V pk-pk square wave at half of the sweep frequency on Q2 and Q3 collectors.

A4-4 The square wave on Q2 collector is applied to emitter-follower Q4 and amplifier Q5, which form the calibrator circuit, producing calibration signals for EXT and BB displays.

A4-5 The square wave on Q3 collector is applied via emitter-follower Q6 and relay contact K1A to limiting amplifier Q7 and Q8. The output from Q8 collector is applied to buffer Q9 and can be varied by potentiometer R25 which sets the calibration of the split trace display when using the Y1 Y2 CALIBRATION switch. From Q9 emitter the signal is applied to switched attenuator R30 to R33 which is operated by relays K2 and 3, to give 0.1, 0.3 and 1dB calibration according to the setting of the Y1, Y2 CALIBRATION switch S8.

A4-6 The detected IF from A22(J1) is added via emitter follower Q14 to the calibration signal in the differential amplifier Q11 and Q12. The resulting calibrated, detected IF signal is then buffered by Q13 and applied to the A3 Vertical Amplifier via the Y1 DISPLAY and Y2 DISPLAY switches S6 and S7.

A4-7 Spectrum Sweep

A4-8 Spectrum Sweep Oscillator, Q15 and Q16 generates a 100Hz signal which is applied via the variable driver Q17 to Q19 to the spectrum sweep output (21) and the SPECTRUM WIDTH control R3. Transistors Q18 and Q19 are identically biased so that both emitters are at the same dc potential, allowing the amplitude of the 100Hz signal into emitter follower Q20 to be varied by the SPECTRUM WIDTH control R3 without varying the dc level. The SPECTRUM CENTRE control R6 varies the dc offset on the 100Hz signal from Q20 emitter, and the resulting signal (dc + sweep) is used to control the A23 Local Oscillator frequency in the SPECTRUM mode.

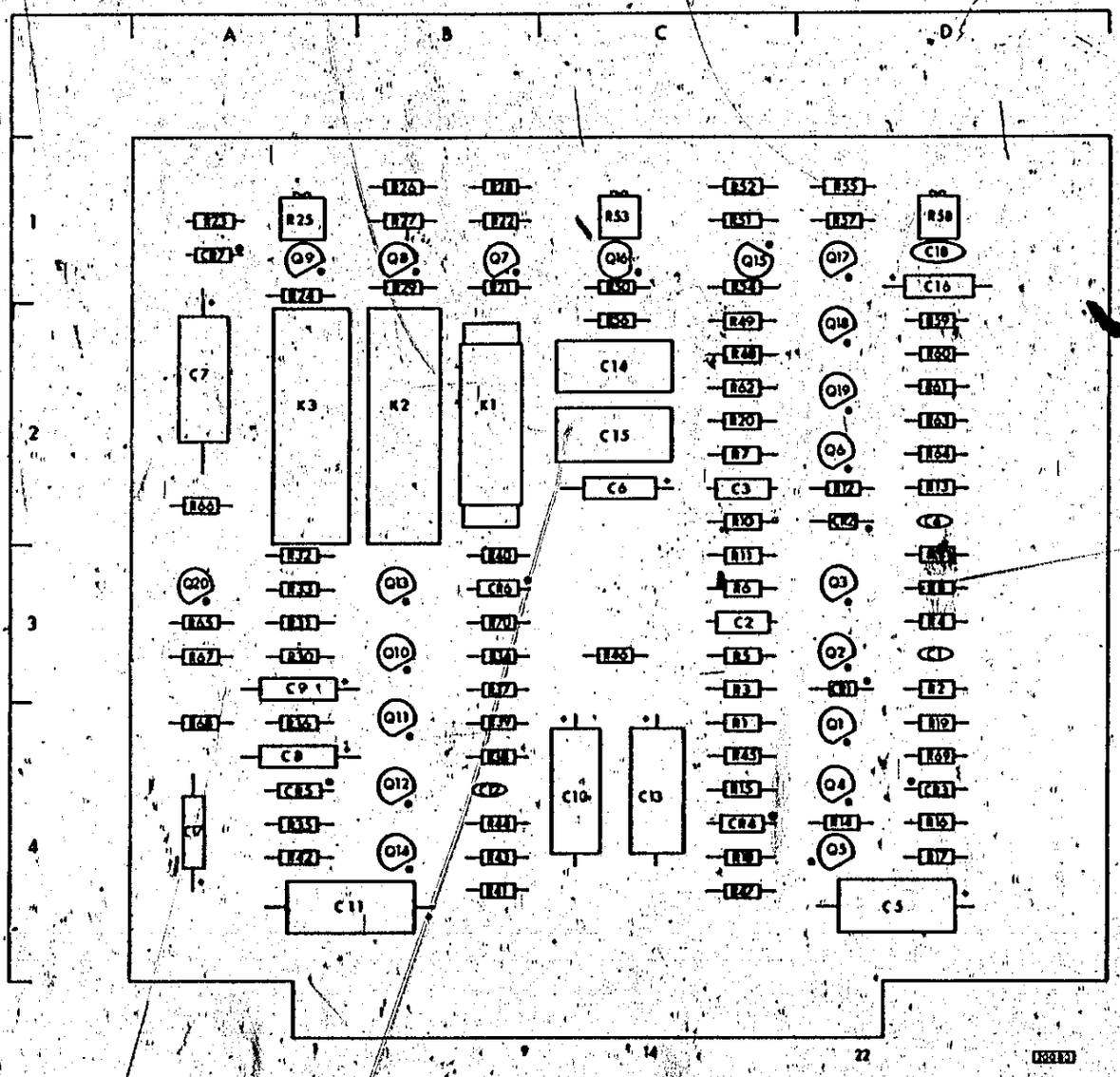


Figure A4-2 Component Location

C

REF DESIG	GRID LOC
C1	D-3
C2	C-3
C3	C-2
C4	D-2
C5	D-4
C6	C-2
C7	A-2
C8	A-4
C9	A-3
C10	C-4
C11	A-4
C12	B-4
C13	C-4
C14	C-2
C15	C-2
C16	D-1
C17	A-4
C18	D-1

CR

REF DESIG	GRID LOC
CR1	D-3
CR2	D-2
CR3	D-4
CR4	C-4
CR5	A-4
CR6	B-3
CR7	A-1

K

REF DESIG	GRID LOC
K1	B-2
K2	B-2
K3	A-2

Q

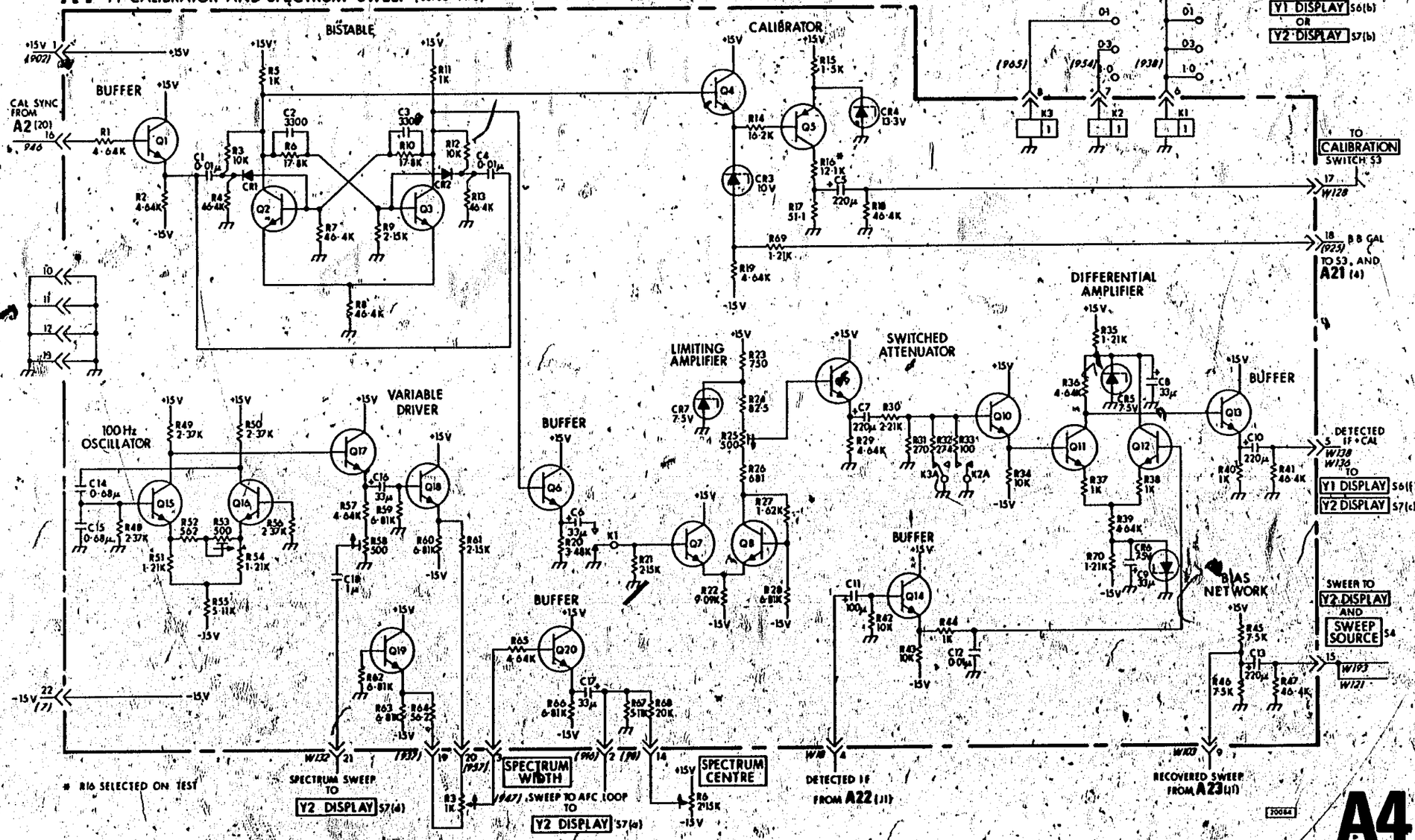
REF DESIG	GRID LOC
Q1	D-4
Q2	D-3
Q3	D-3
Q4	D-4
Q5	D-4
Q6	D-2
Q7	B-1
Q8	B-1
Q9	A-1
Q10	B-3
Q11	B-4
Q12	B-4
Q13	B-3
Q14	B-4
Q15	C-1
Q16	C-1
Q17	D-1
Q18	D-2
Q19	D-2
Q20	A-3

R

REF DESIG	GRID LOC
R1	C-4
R2	D-3
R3	C-3
R4	D-3
R5	C-3
R6	C-3
R7	C-2
R8	D-3
R9	D-3
R10	C-2
R11	C-3
R12	D-2
R13	D-2
R14	D-4
R15	C-4
R16	D-4
R17	D-4
R18	C-4
R19	D-4
R20	C-2
R21	B-1
R22	B-1
R23	A-1
R24	A-1
R25	A-1
R26	B-1
R27	B-1
R28	B-1
R29	B-1
R30	A-3
R31	A-3
R32	A-3
R33	A-3
R34	B-3
R35	A-4
R36	A-4
R37	B-3
R38	B-4
R39	B-4
R40	B-3
R41	B-4
R42	A-4
R43	B-4
R44	B-4
R45	C-4
R46	C-3
R47	C-4
R48	C-2
R49	C-2
R50	C-1
R51	C-1
R52	C-1
R53	C-1
R54	C-1
R55	D-1
R56	C-2
R57	D-1
R58	D-1
R59	D-2
R60	D-2
R61	D-2
R62	C-2
R63	D-2
R64	D-2
R65	A-3
R66	A-2
R67	A-3
R68	A-4
R69	D-4
R70	B-3

Figure A4-3 Grid Reference

A4 I F CALIBRATOR AND SPECTRUM SWEEP (03702-7173)



A4

Figure A4-4 Schematic Diagram — Assembly A4

ASSEMBLY SERVICE SHEET A5 – METER CONTROL AND MARKER PROCESSOR

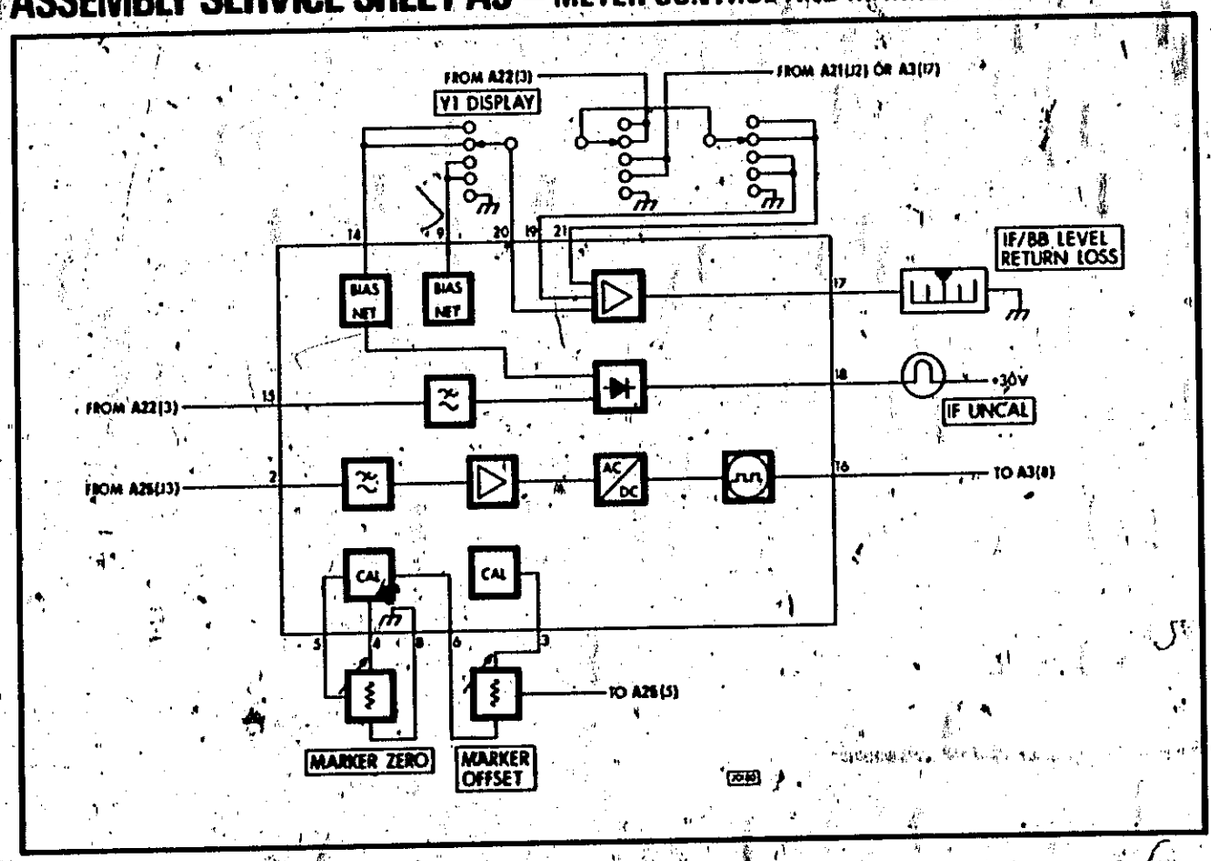


Figure A5-1 Simplified Block Diagram

A5-1 CIRCUIT DESCRIPTION

A5-2 Meter Control

A5-3 The meter amplifier MC1 compares the IF or BB input voltage level at one input, with the reference level determined by R57 or R60 on the other input. The time constant of the circuit, determined by R6 and C2, slows down the action of the meter and cancels any modulation which might cause meter 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 supplied to the IF level detector.

A5-5 The IF level detector MC2 compares the level of the IF signal from the low-pass filter with the reference level determined by R57. If both the inputs are equal, there will be no output from MC2, therefore Q1 will remain off and the IF UNCAL lamp will remain extinguished. If the output level of the low-pass filter varies by greater than ±1dB 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 A25 are applied to amplifier Q4-5 which has a low pass section to eliminate frequencies above 15kHz. Amplifier Q6 to Q9 amplifies the markers by 52dB.

A5-8 Amplifier Q10 and Q11 inverts the positive zero beats and applies them to full wave rectifier CR3 and CR4 which provides negative markers to switch Schmitt trigger Q12 and Q13. The markers are then applied to the Vertical Deflection Assembly A3 via emitter follower Q14.

A5-9 Amplifier Q15 to Q18 forms a stable constant current source holding the voltage across R10 and R11 constant to provide stable reference voltages for marker calibration.

A5-10 The voltage from the wiper of R11 is applied to the voltage controlled oscillator on the Sliding Marker Generator Assembly A25. This varies the frequency of the oscillator thereby varying the sliding markers from 0 to 26MHz.

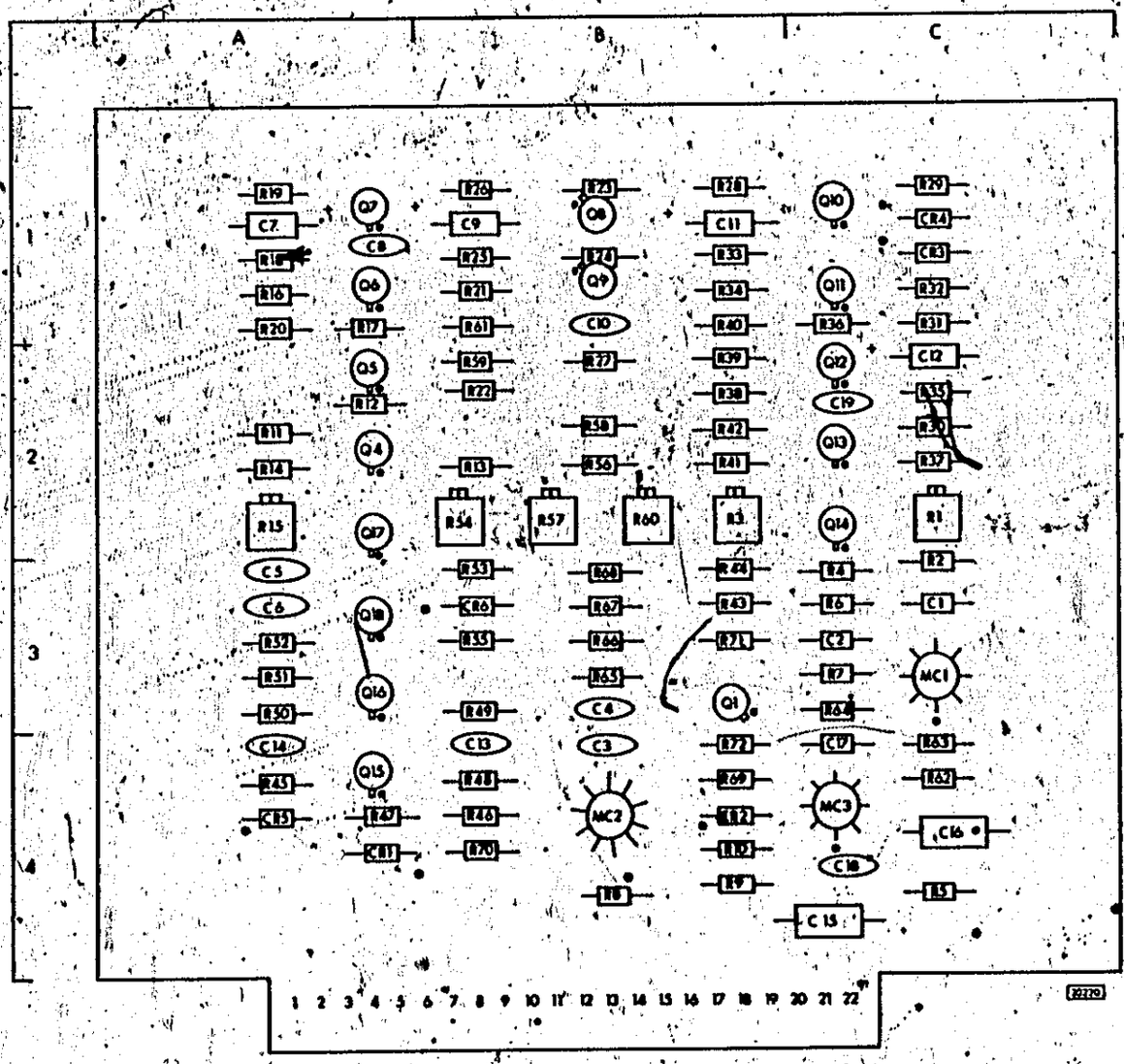
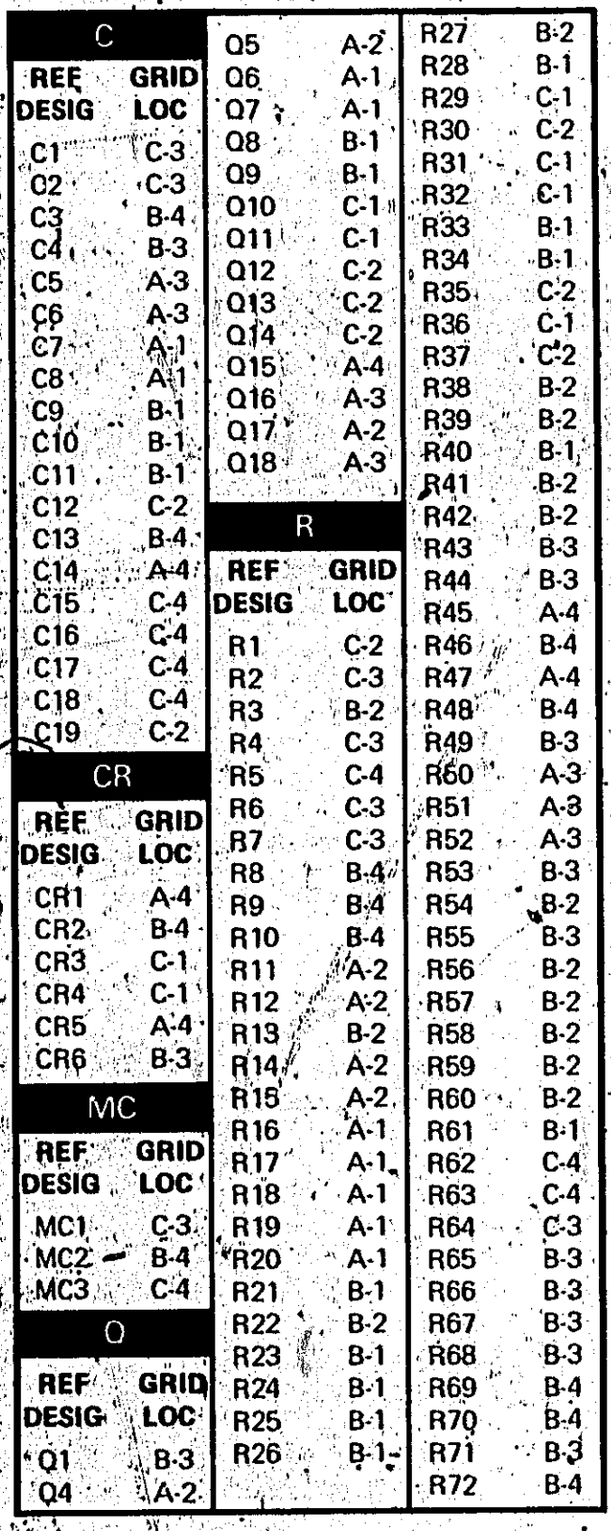


Figure A5-2 Component Location



C

REF DESIG	GRID LOC
C1	C-3
C2	C-3
C3	B-4
C4	B-3
C5	A-3
C6	A-3
C7	A-1
C8	A-1
C9	B-1
C10	B-1
C11	B-1
C12	C-2
C13	B-4
C14	A-4
C15	C-4
C16	C-4
C17	C-4
C18	C-4
C19	C-2

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

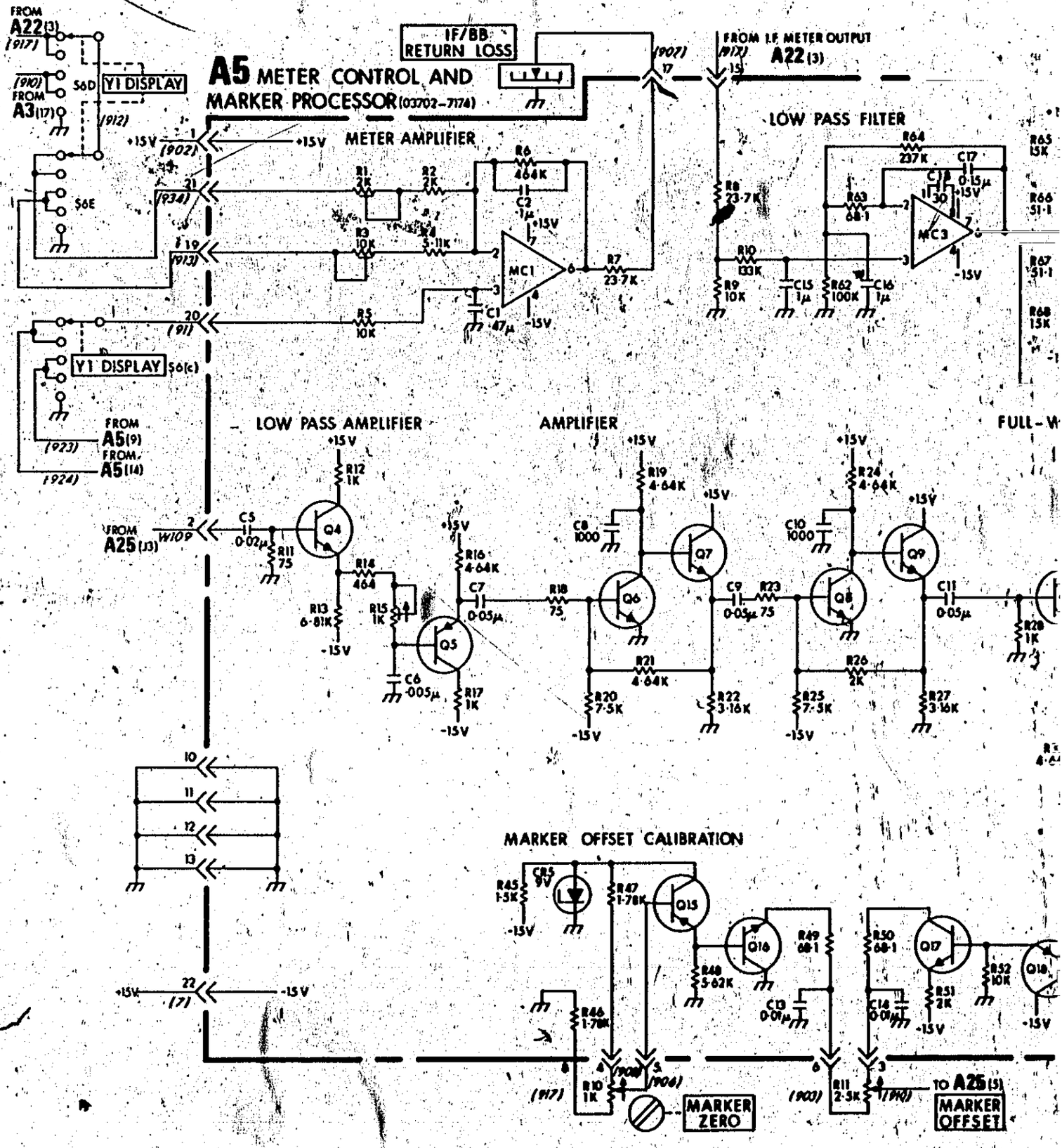
Q

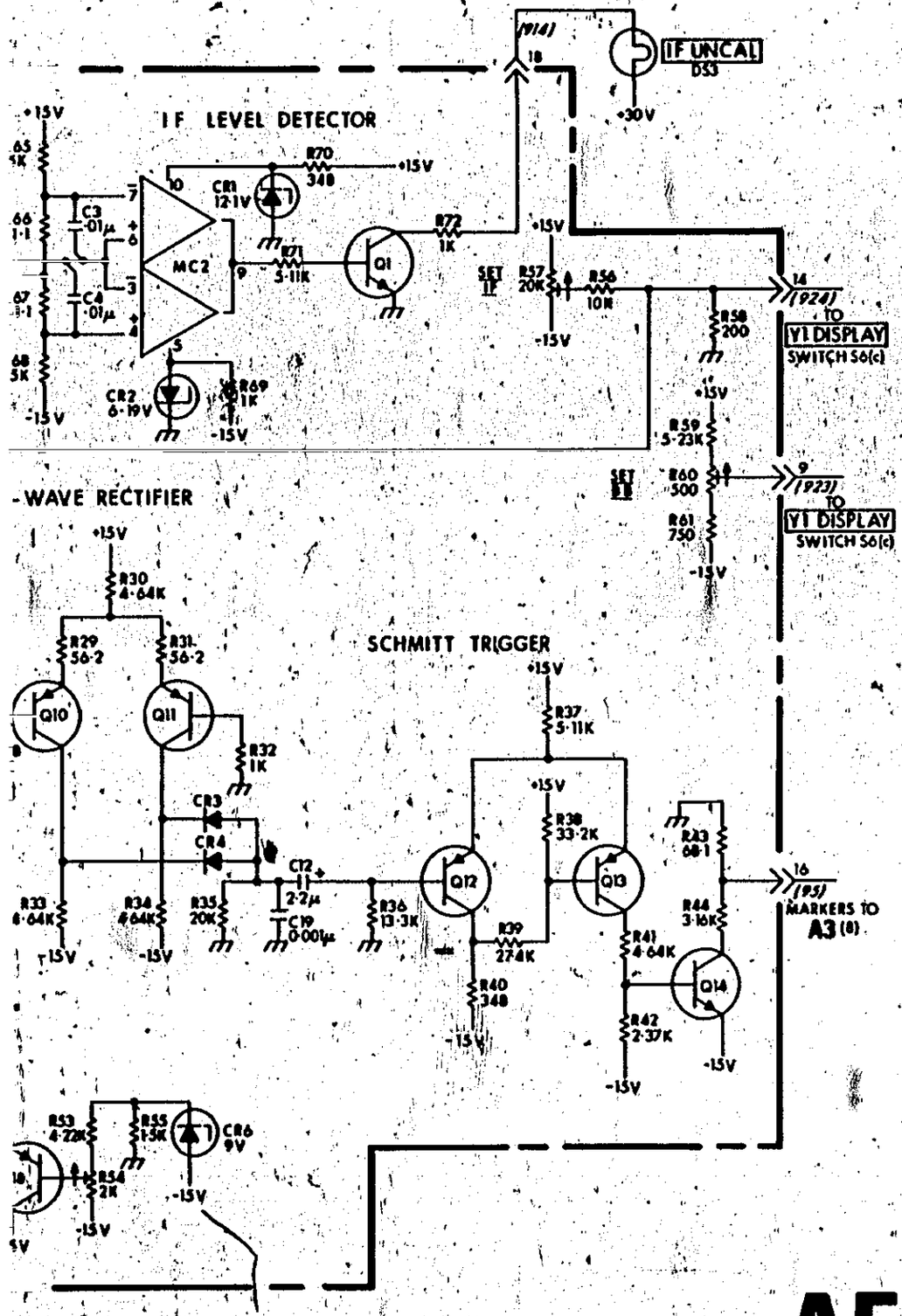
REF DESIG	GRID LOC
Q1	B-3
Q4	A-2
Q5	A-2
Q6	A-1
Q7	A-1
Q8	B-1
Q9	B-1
Q10	C-1
Q11	C-1
Q12	C-2
Q13	C-2
Q14	C-2
Q15	A-4
Q16	A-3
Q17	A-2
Q18	A-3

R

REF DESIG	GRID LOC
R1	C-2
R2	C-3
R3	B-2
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-2
R16	A-1
R17	A-1
R18	A-1
R19	A-1
R20	A-1
R21	B-1
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
R36	C-1
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-2
R55	B-3
R56	B-2
R57	B-2
R58	B-2
R59	B-2
R60	B-2
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-4

Figure A5-3 Grid Reference


A5 METER CONTROL AND MARKER PROCESSOR (03702-7174)
IF/BB RETURN LOSS
METER AMPLIFIER
LOW PASS FILTER
LOW PASS AMPLIFIER
AMPLIFIER
MARKER OFFSET CALIBRATION
MARKER ZERO
MARKER OFFSET
FROM A22 (3)
FROM I.F. METER OUTPUT A22 (3)
Y1 DISPLAY
FROM A3 (17)
FROM A25 (J3)
FROM A5 (9)
FROM A5 (14)
TO A25 (5)
+15V
-15V
MC1
MC3
Q4
Q5
Q6
Q7
Q8
Q9
Q15
Q16
Q17
Q18
CR5 9V



A5

Figure A5-4 Schematic Diagram — Assembly A5

ASSEMBLY SERVICE SHEET A6—HIGH VOLTAGE POWER SUPPLY

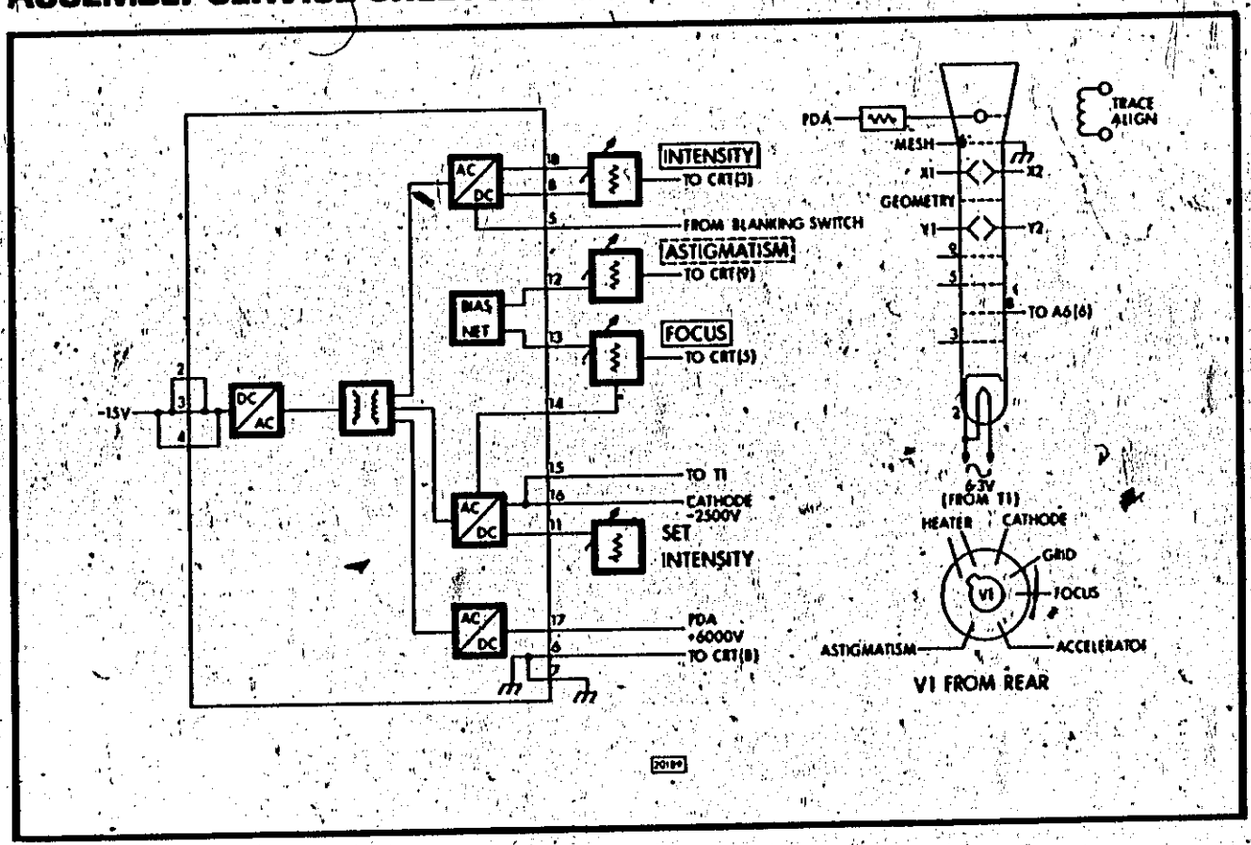


Figure A6-1 Simplified Block Diagram

A6-1 CIRCUIT DESCRIPTION

A6-2 Transistors Q1, 2 and transformer T1 operate as a push-pull converter changing the low voltage -15V dc supply to a high voltage ac supply. The transformer T1 is driven into saturation alternatively by Q1 and Q2, producing a 13kHz, 30V pk-pk square wave on T1 primary to be transformed to about 6000V pk-pk by the action of T1.

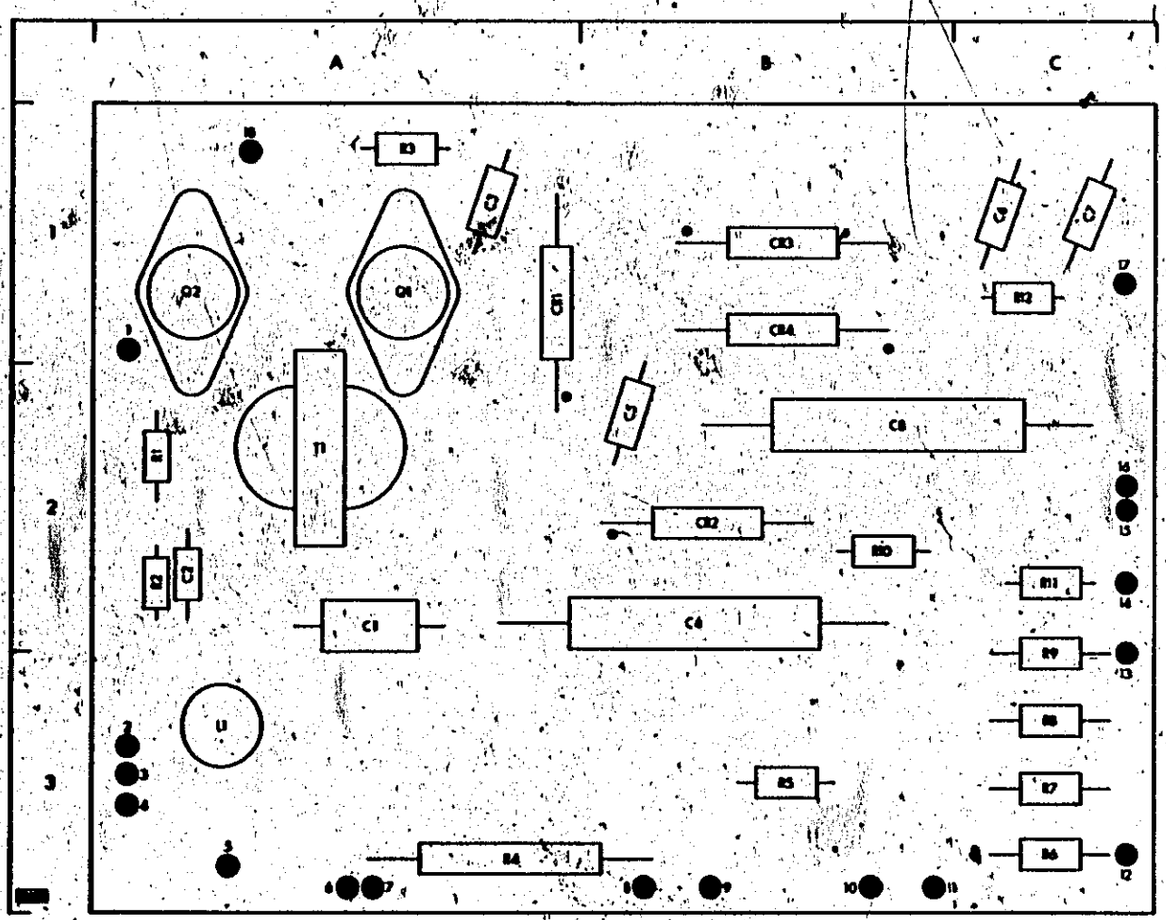
A6-3 Half wave rectifier CR1 provides -2650V dc which is applied to the CRT grid via the INTENSITY control R1. This control sets the grid-cathode potential and hence beam current. Providing the BLANKING switch S2 is in the ON position, a blanking signal from A2(21) is applied via A6(5) driving the grid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

A6-4 Half wave rectifier CR2 provides -2500V dc for the CRT cathode. Potential divider chain R6 to R9 and R11 provides control voltages for ASTIGMATISM control R13 and FOCUS control R2.

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

A6-6 Fine adjustment of the cathode supply is made by Set Intensity control R14.

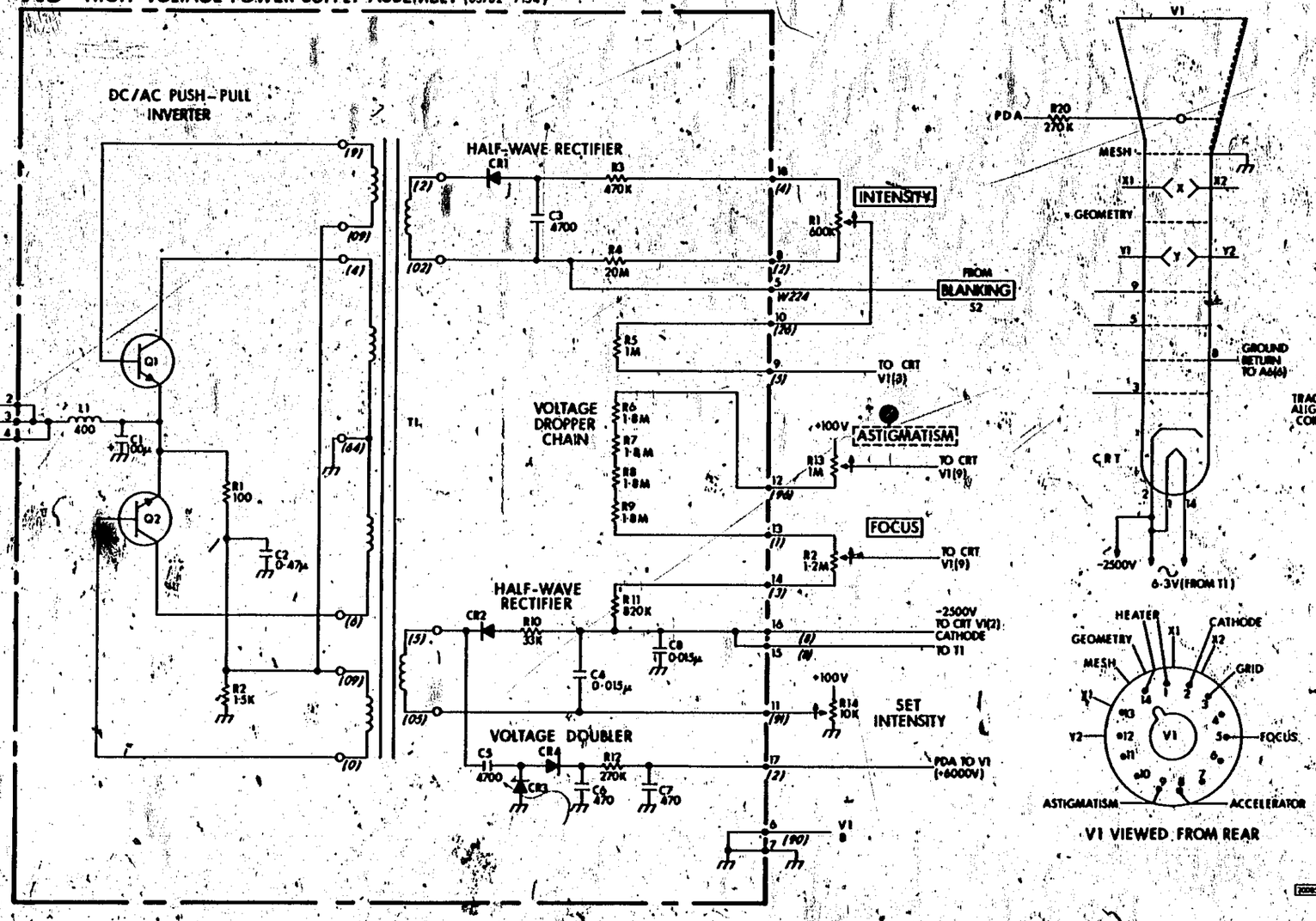
A6-7 Trace alignment is achieved by the TRACE ALIGN control R12 varying the potential across L1 between +15V and -15V.



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
C2	A-2	L		R2	A-2
C3	A-1	REF DESIG	GRID LOC	R3	A-1
C4	B-2	L1	A-3	R4	A-3
C5	B-2	Q		R5	B-3
C6	C-1	REF DESIG	GRID LOC	R6	C-3
C7	C-1	Q1	A-1	R7	C-3
C8	B-2	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

A6 HIGH VOLTAGE POWER SUPPLY ASSEMBLY (03702-7154)



A6

Figure A6-3 Schematic Diagram – Assembly A6

ASSEMBLY SERVICE SHEET A7– RETURN LOSS AMPLIFIER

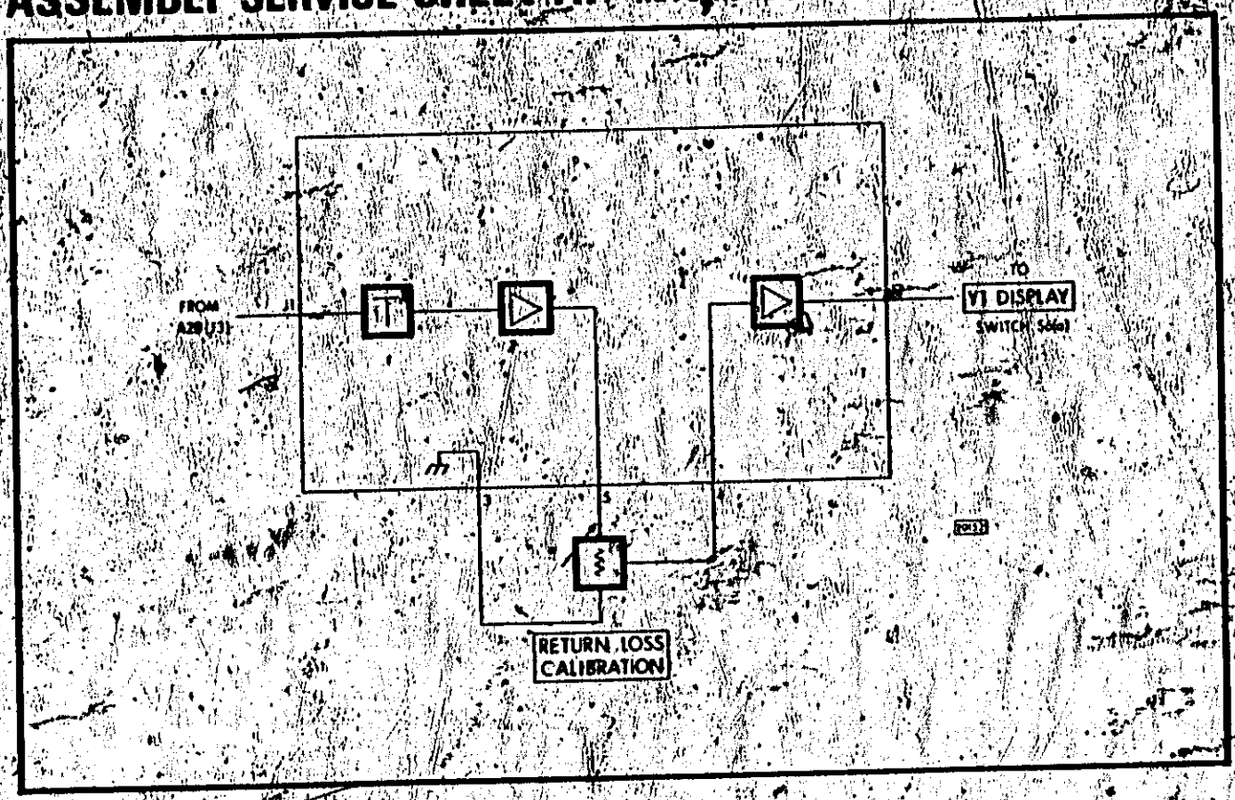
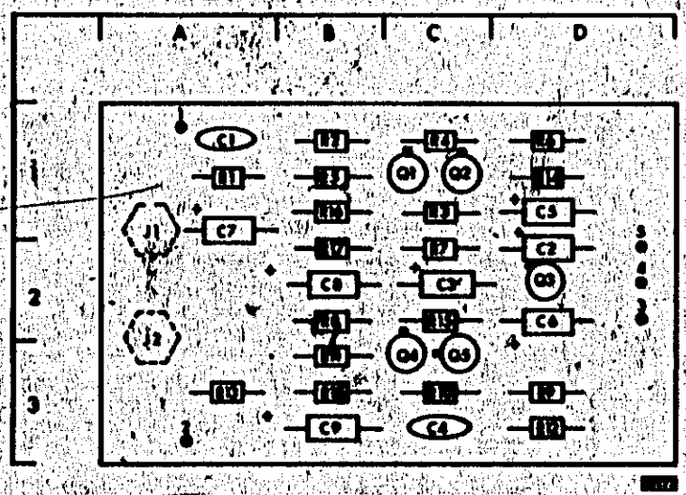


Figure A7-1 Simplified Block Diagram

A7-1 CIRCUIT DESCRIPTION

A7-2 The output from Return Loss Mixer A20 is applied to input J1. A matching pad formed by C1 and R1 provides a good return loss at input J1.

A7-3 The gain of the amplifier Q1 to Q5 can be varied by R1, the RETURN LOSS CALIBRATION control, to zero the RETURN LOSS meter M1. The output from the amplifier is applied via Y1 DISPLAY switch S6 to the BB/RETURN LOSS Attenuator A13.



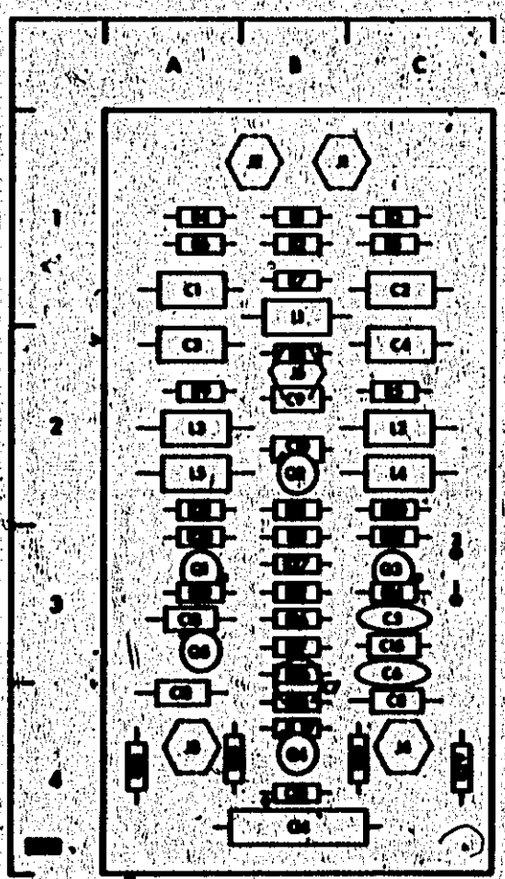
C		R	
REF DESIG	GRID LOC	REF DESIG	GRID LOC
C1	A-1	R1	A-1
C2	D-2	R2	B-1
C3	C-2	R3	C-1
C4	C-3	R4	C-1
C5	D-1	R5	B-1
C6	D-2	R6	D-1
C7	A-1	R7	C-2
C8	B-2	R8	B-2
C9	B-3	R9	D-3
		R10	C-3
Q		R11	B-3
REF DESIG	GRID LOC	R12	D-3
		R13	A-3
Q1	C-1	R14	D-1
Q2	C-1	R15	C-2
Q3	D-2	R16	B-1
Q4	C-3	R17	B-2
Q5	C-3	R18	B-3

Figure A7-2 Component Location and Grid Reference

A8-5 Resistors R1 to R6 also combine with resistors R7 to R9, R15 and High Pass Filter, C1 to C4 and L1, to provide a 124Ω balanced impedance match to the high frequency BB signals. The action of the high pass filter allows only the BB signal to be amplified by Differential Amplifier Q1 and Q3. The single ended output on the collector of Q1 is applied to the base of Q4 which presents a 75Ω unbalanced output impedance via J3 to the BB + Sweep Splitter Assembly, A15

A8-6 Transistor Q2 acts as a constant current generator for biasing Q1 and Q3. Capacitors C6 and C7 are adjusted for a flat frequency response over the BB range.

A8-7 The output from the BB INPUT SWITCH A9 is applied to A15 the BB + Sweep Splitter Assembly.



C

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

CR

REF DESIG	GRID LOC
CR1	B-4

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

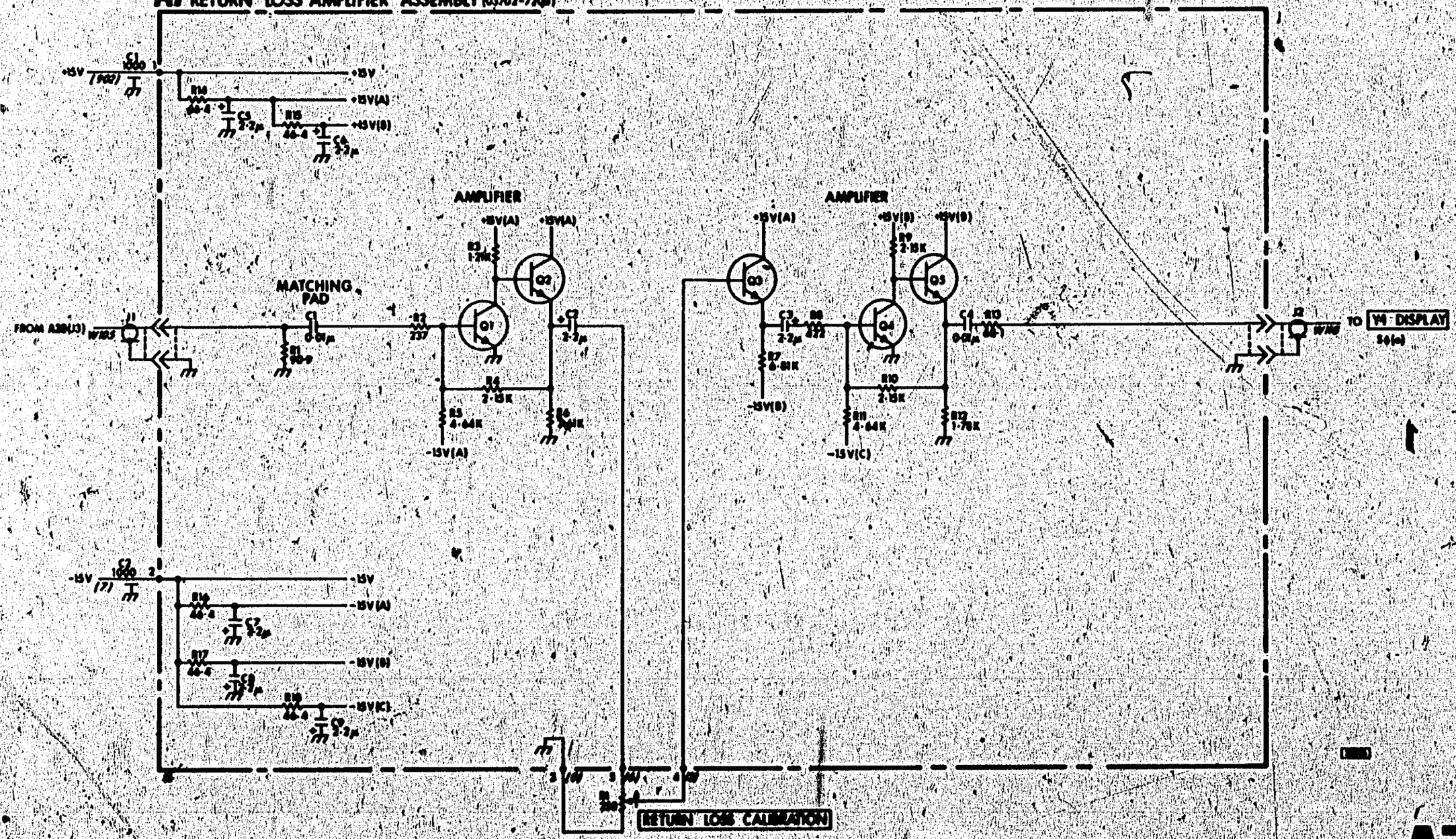
Q

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

Figure A8/A8-2 Component Location and Grid Reference



A7

Figure A7-3 Schematic Diagram — Assembly A7

ASSEMBLY SERVICE SHEET A8/A9 – IMPEDANCE CONVERTER AND BB INPUT SWITCH

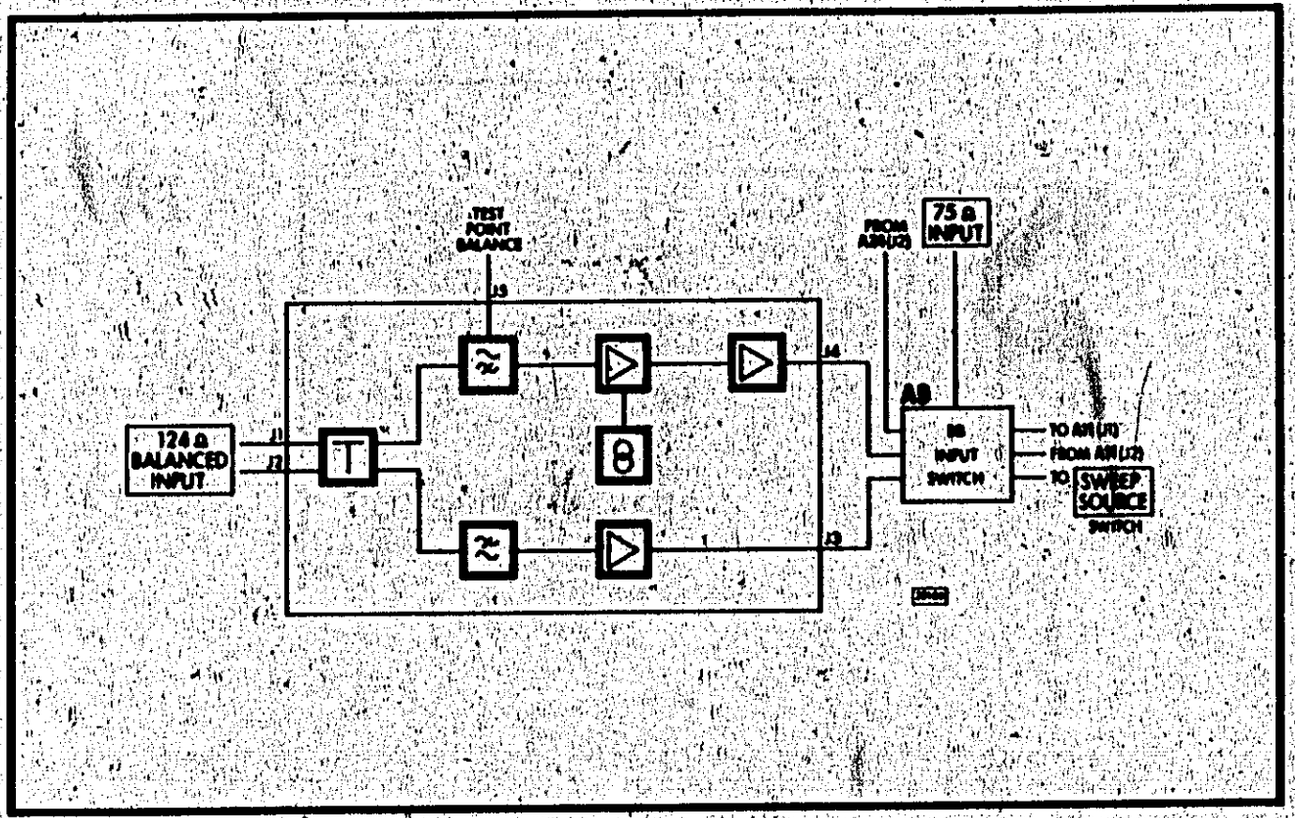


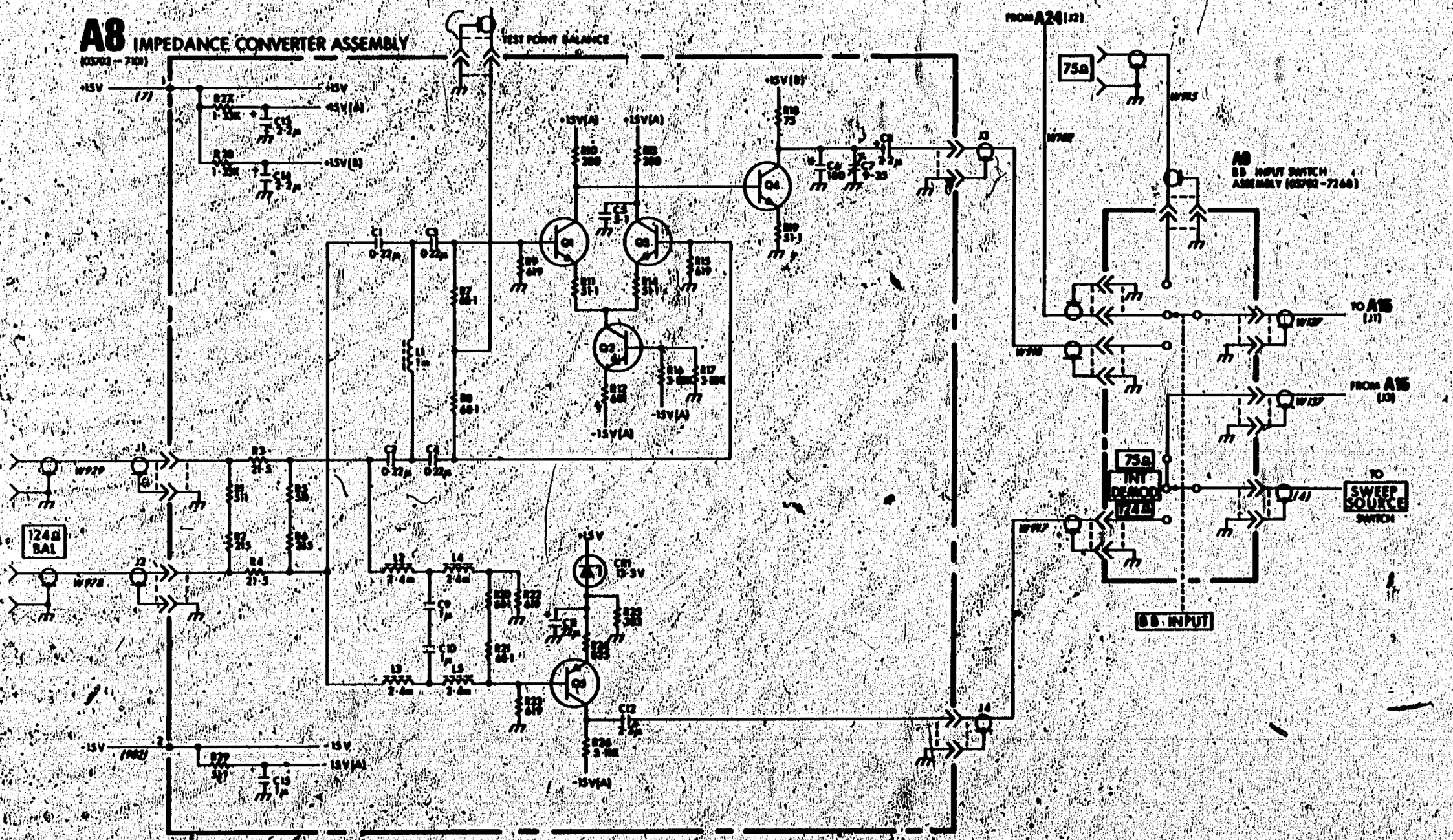
Figure A8/A9-1 Simplified Block Diagram

A8-1 CIRCUIT DESCRIPTION

A8-2 The A8 and A9 assemblies combine to form OPTION 004, which impedance matches the 124Ω balanced input at A8J1 and A8J2 and converts the impedance to an unbalanced 75Ω.

A8-3 The input signal at A8J1 and A8J2 can be either Baseband or Baseband + Sweep.

A8-4 Resistors R1 to R6 combined with resistors R20 to R23 and Low Pass Filter C9, C10 and L2 to L5 provide an impedance match to the low frequency sweep signals. The action of the low pass filter allows only the sweep signal to appear at the base of Q5 providing a recovered sweep signal is applied via J3 to the BB INPUT SWITCH Assembly A9.



A8/A9

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

ASSEMBLY SERVICE SHEET A10—EXTERNAL INPUT AMPLIFIER

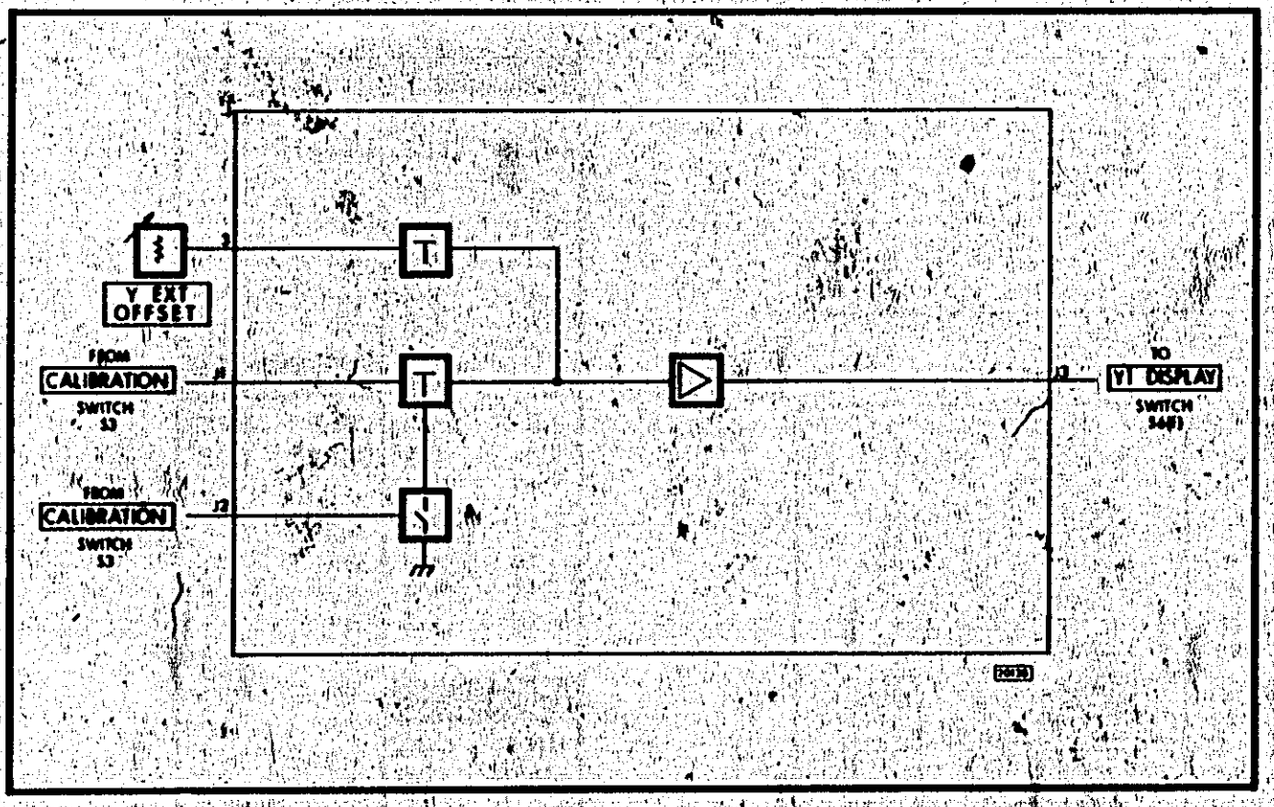


Figure A10-1 Simplified Block Diagram

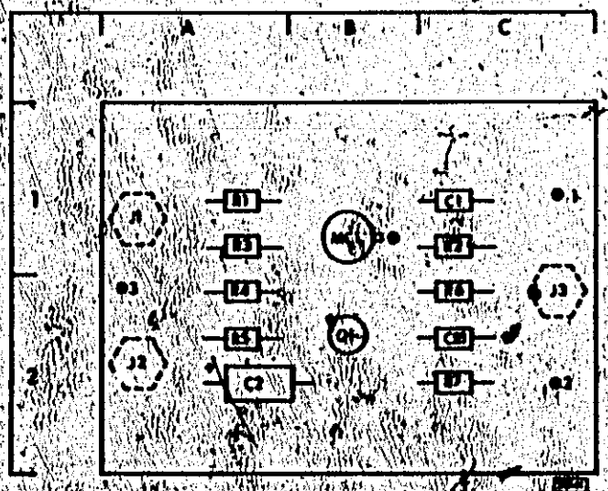
A10-1 CIRCUIT DESCRIPTION

A10-2 Calibration is achieved by applying a switching waveform from the IF Calibrator A4 via J2 to diode CR1 which clamps the voltage to the correct level in order to switch Q1. This varies the characteristic of the T-pad by switching the amplitude of the input signal by 10%.

A10-3 The EXT INPUT signal is applied via J1 to a T-pad R3 to R5 which provides an input impedance of 10kΩ.

A10-4 Amplifier MC1 amplifies the signal by a factor of 10 and the output is applied to J3. The output from J3 is applied to the Vertical Deflection Assembly A3 via the Y1 DISPLAY switch.

A10-5 The Y EXT OFFSET control is used to balance the Vertical Deflection A3 when large dc input signals are applied. Filter C1, R1 and R2 removes line noise.



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

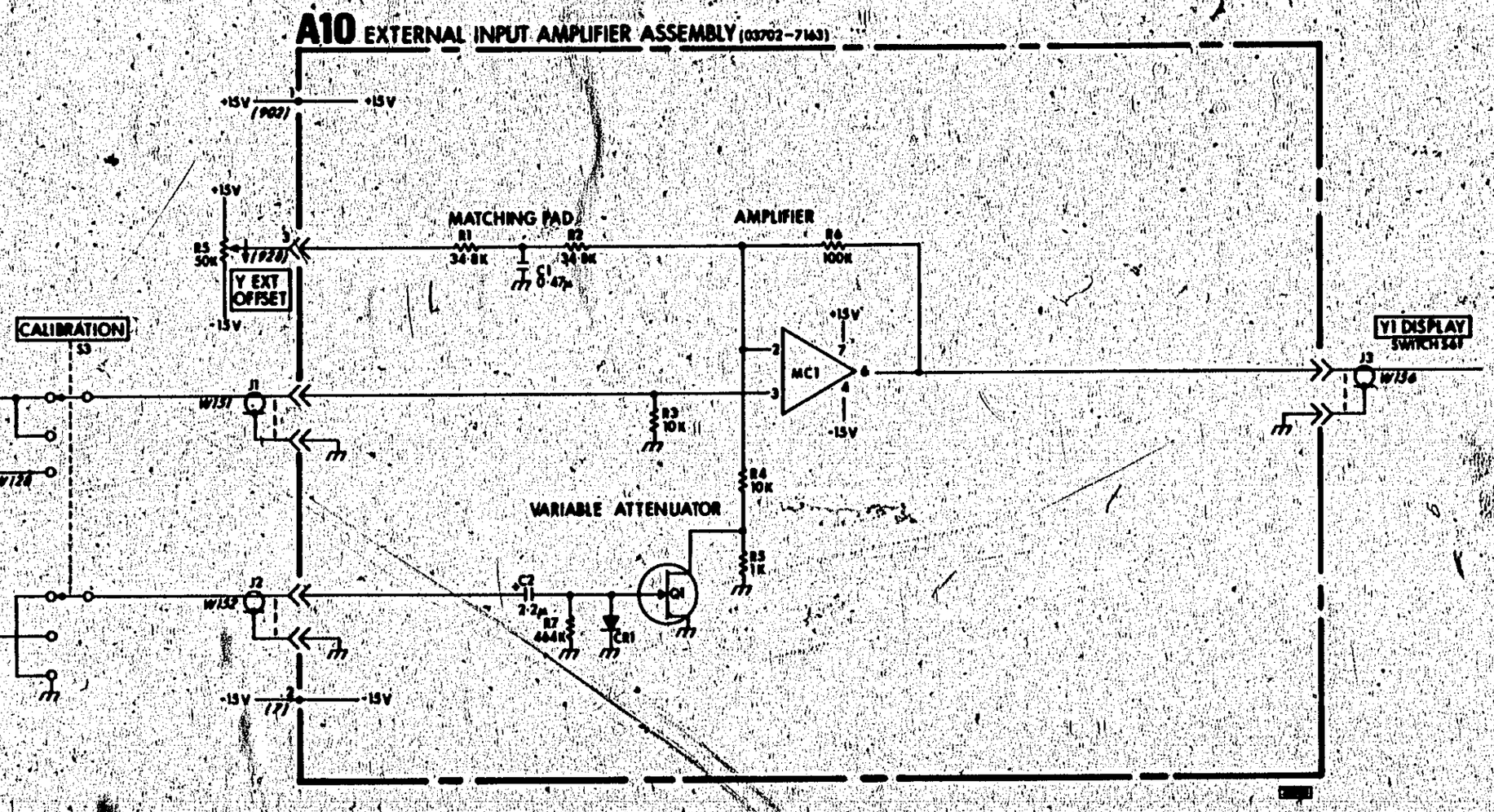
Q

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

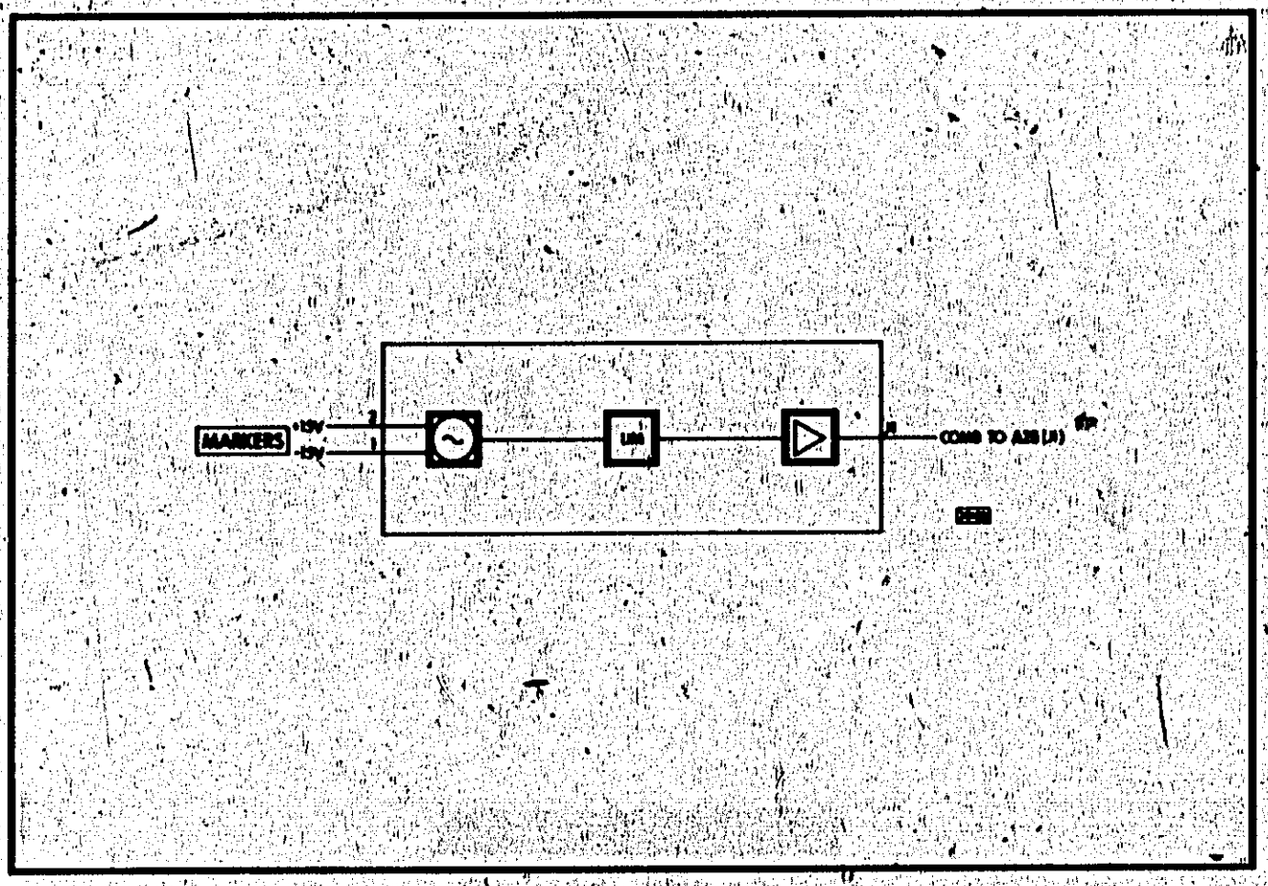
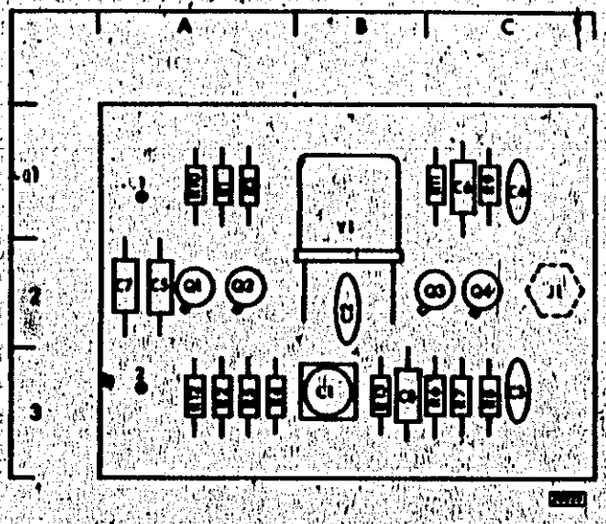


Figure A11-1 Simplified Block Diagram

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

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

Q

REF DESIG	GRID LOC
Q1	A-2
Q2	A-2
Q3	C-2
Q4	C-2

R

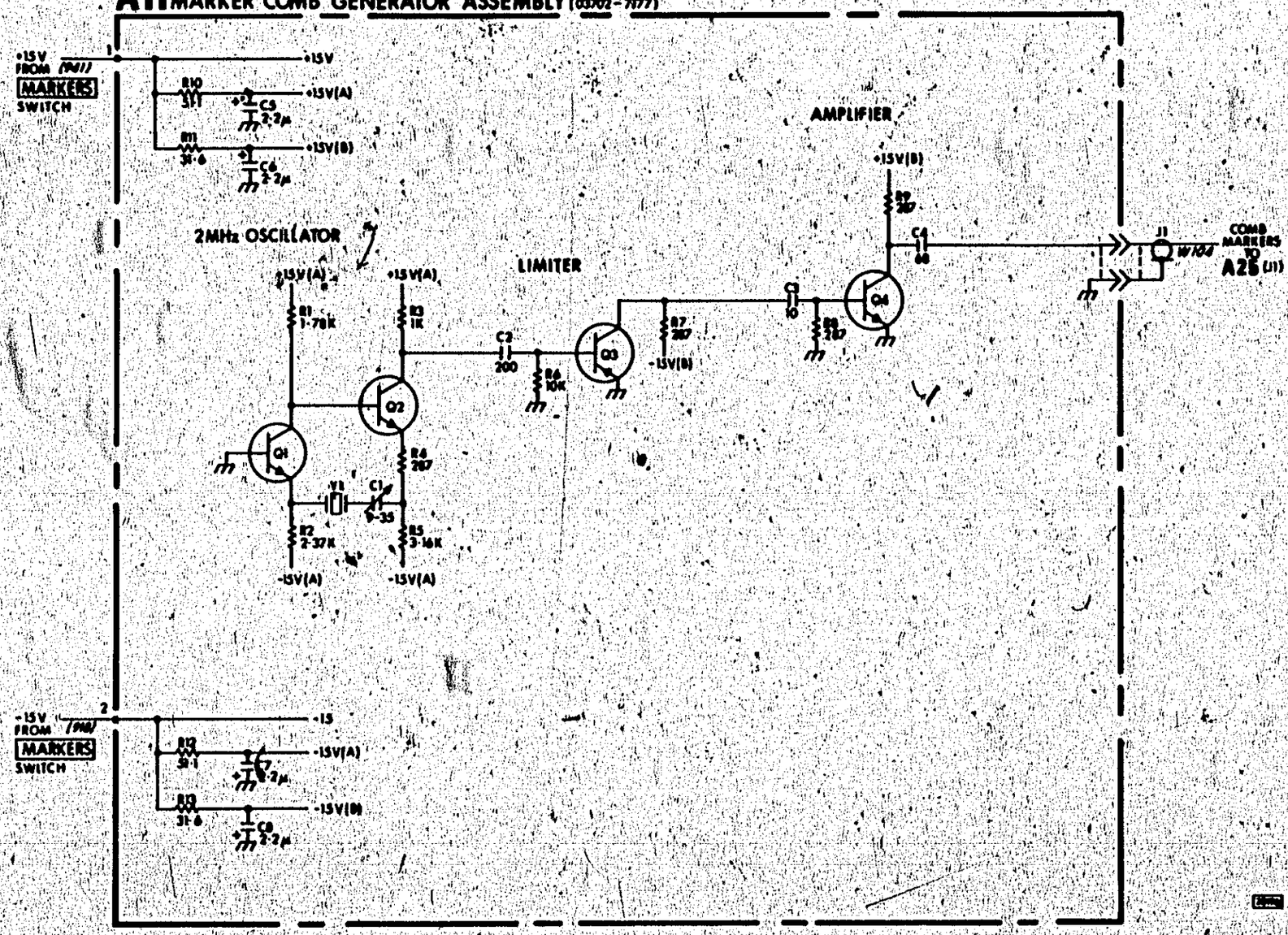
REF DESIG	GRID LOC
R1	A-1
R2	A-3
R3	A-1
R4	A-3
R5	A-3
R6	C-3
R7	C-3
R8	C-3
R9	C-1
R10	A-1
R11	C-1
R12	A-3
R13	B-3

Y

REF DESIG	GRID LOC
Y1	B-1

Figure A11-2 Component Location and Grid Reference

A11 MARKER COMB GENERATOR ASSEMBLY (03702-7177)



A11

Figure A11-3 Schematic Diagram – Assembly A11

ASSEMBLY SERVICE SHEET A12 – POWER SUPPLY RECTIFIERS

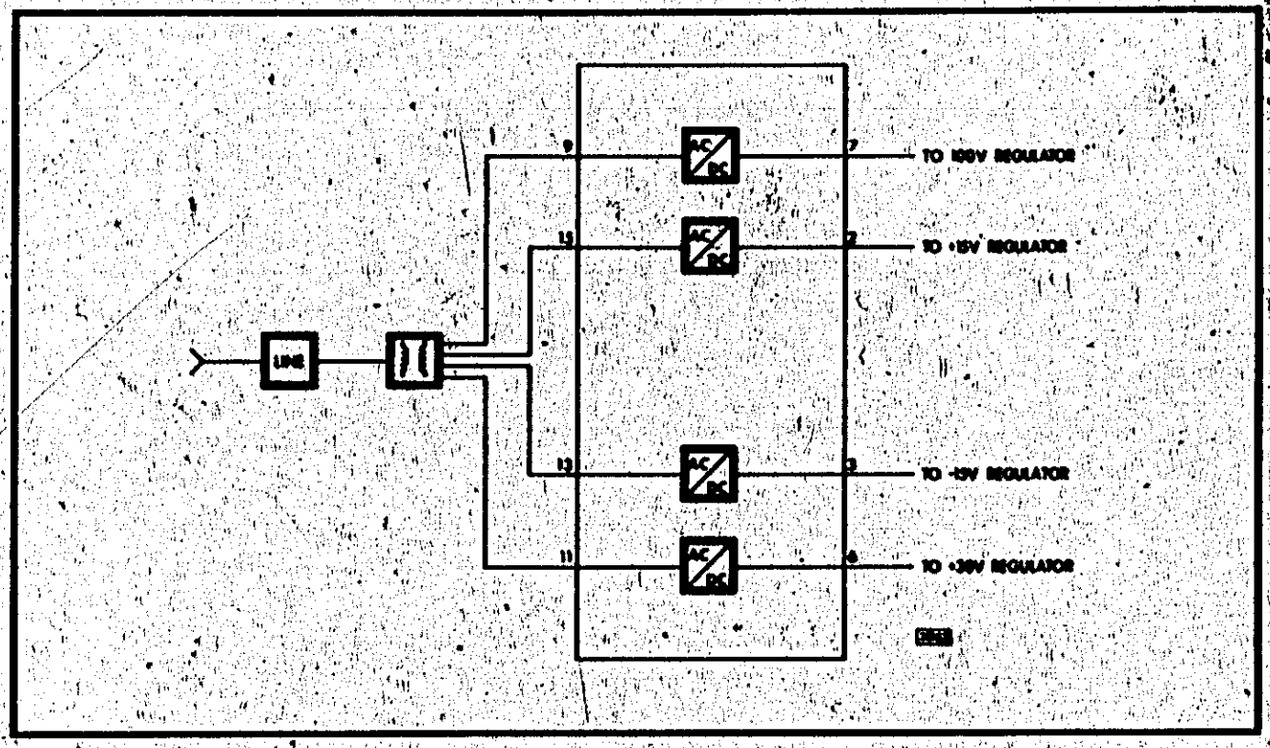


Figure A12-1 Simplified Block Diagram

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 115V or 230V to be used according to the setting of the selection switch in E1. The Line fuse should be a 2A slow-blow when using 115V Line and 1A slow-blow when using 230V Line.

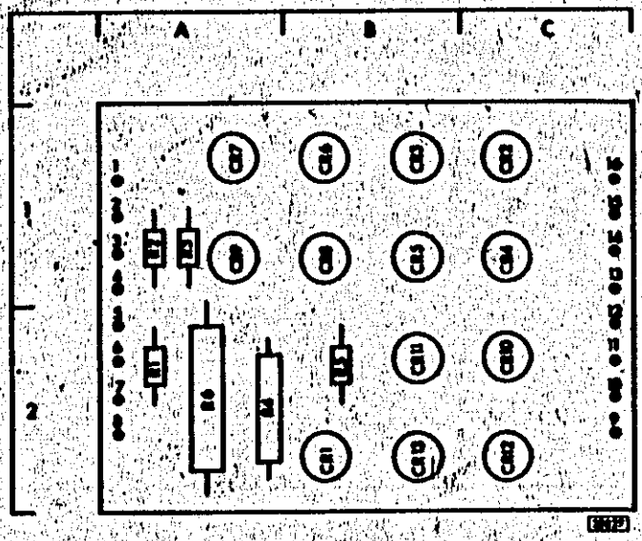
A12-3 Half-wave rectifier CR1 provides 154V dc to drive the +100V regulator Q1.

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.

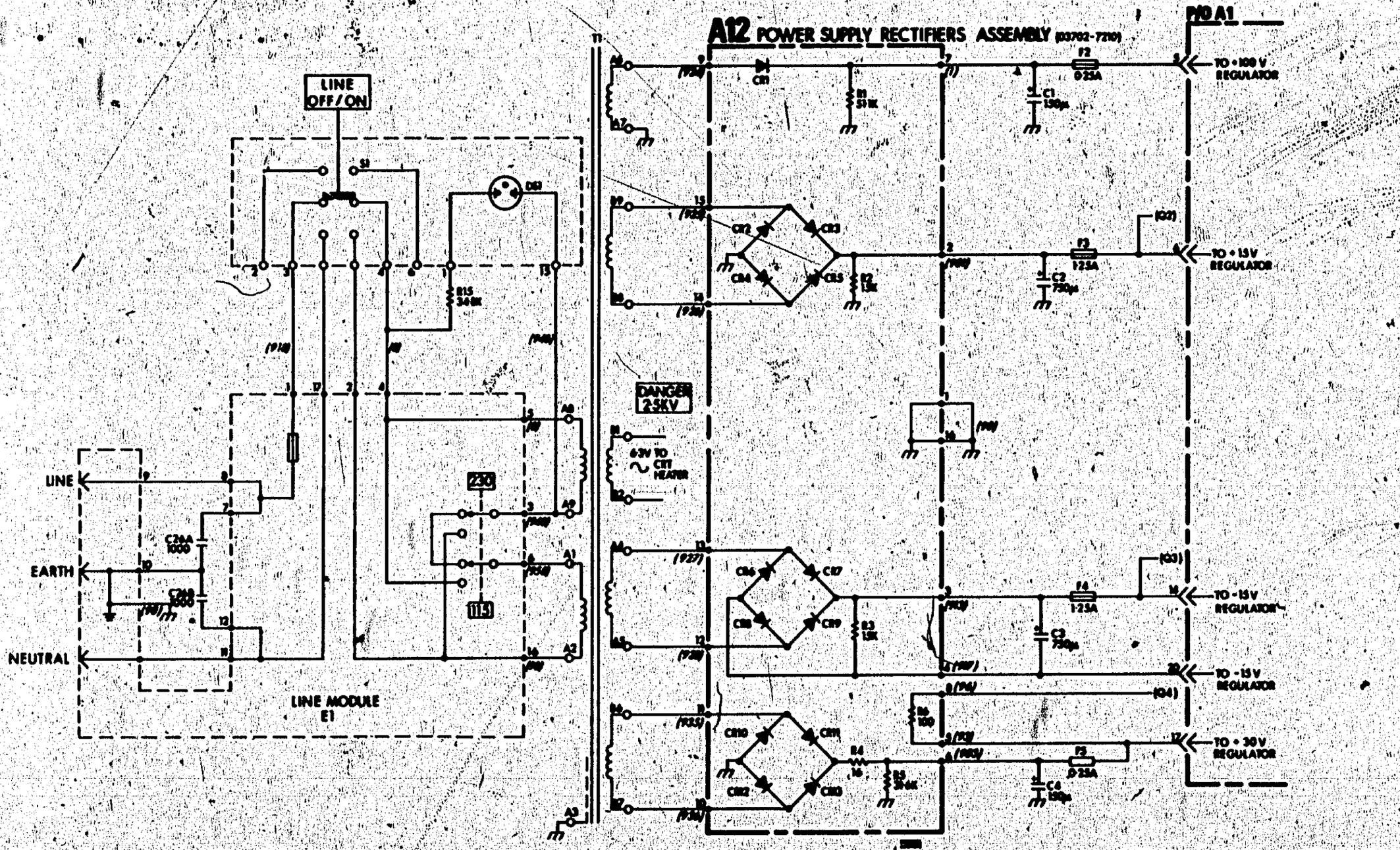
A12-6 Bridge rectifier CR10 to CR13 provides 72V dc to drive the +30V regulator Q4, for which R6 is the collector load.

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

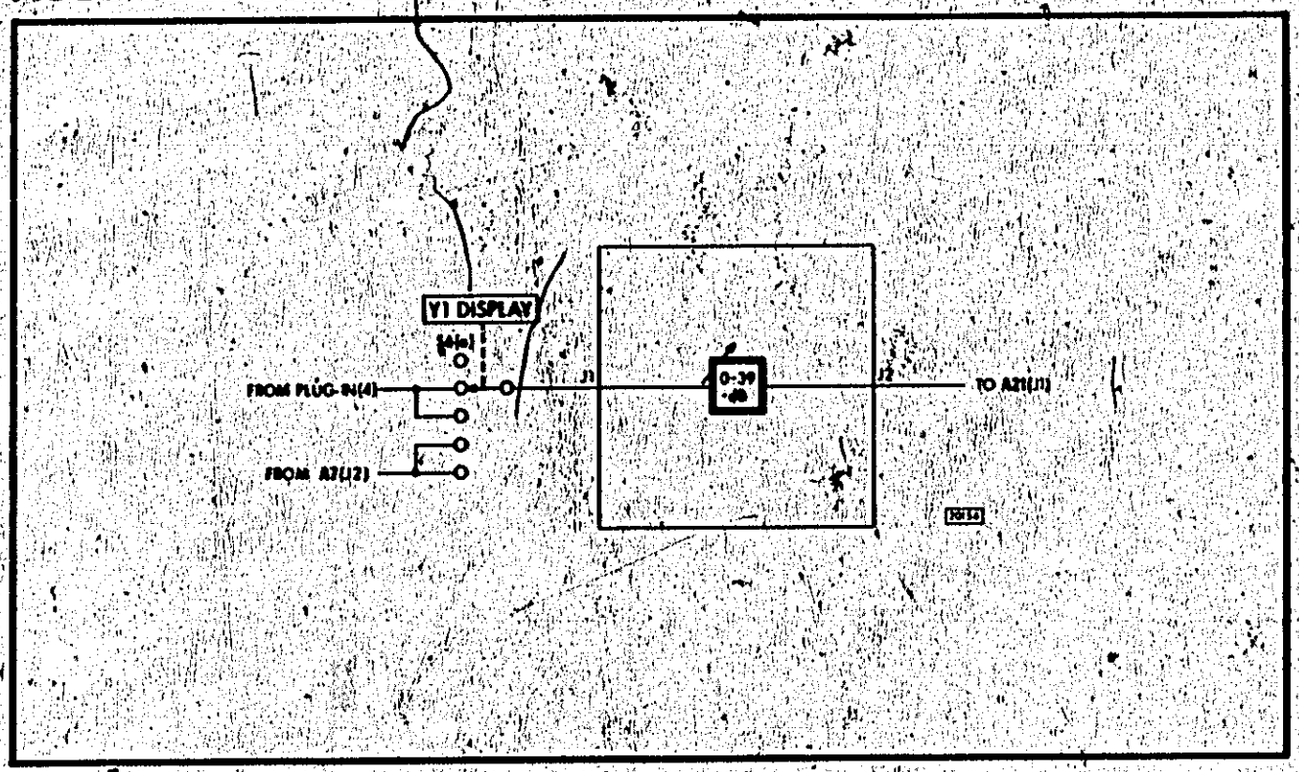


Figure A13-1 Simplified Block Diagram

A13-1 CIRCUIT DESCRIPTION

A13-2 The BB attenuator provides 39dB of attenuation, in 1dB steps and is calibrated from -10 to -49dB to maintain the input level to the BB Amplifier A21 of -49dBm.

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

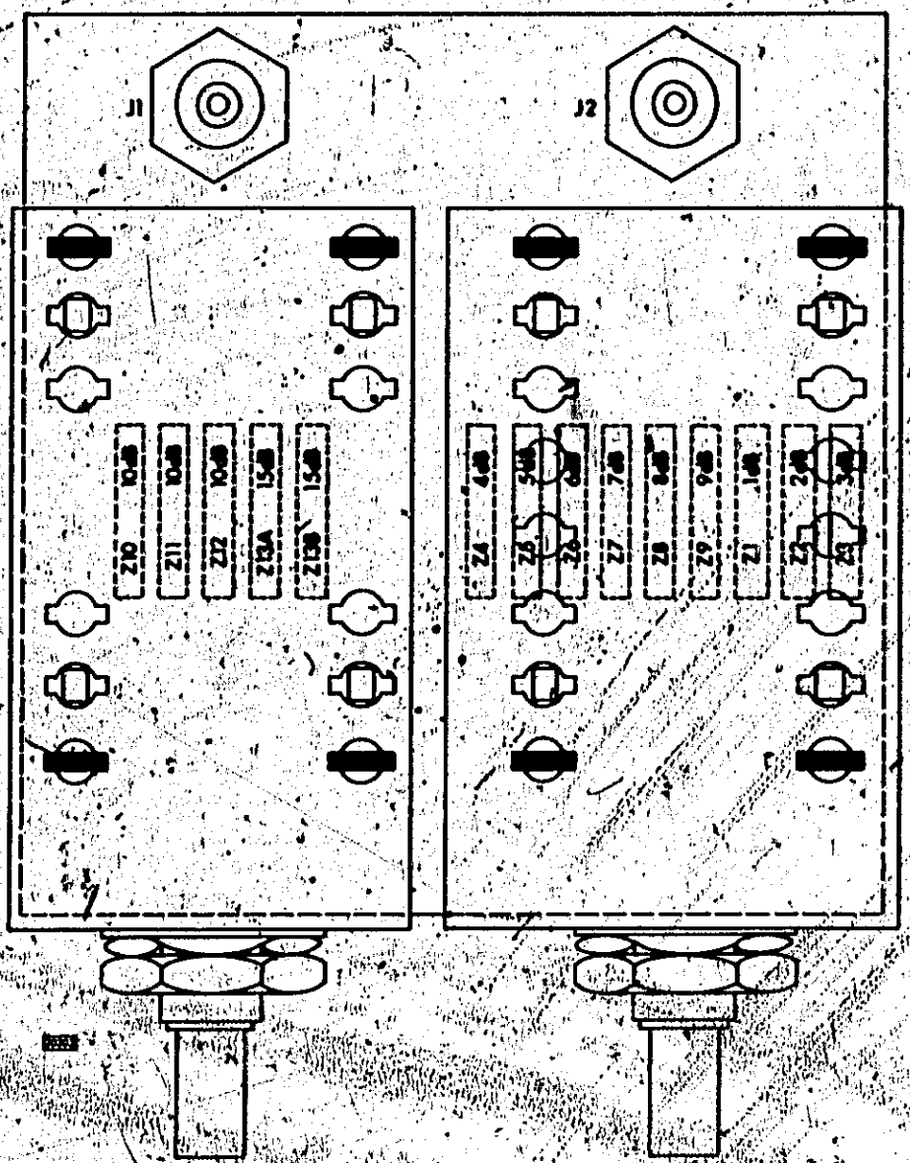
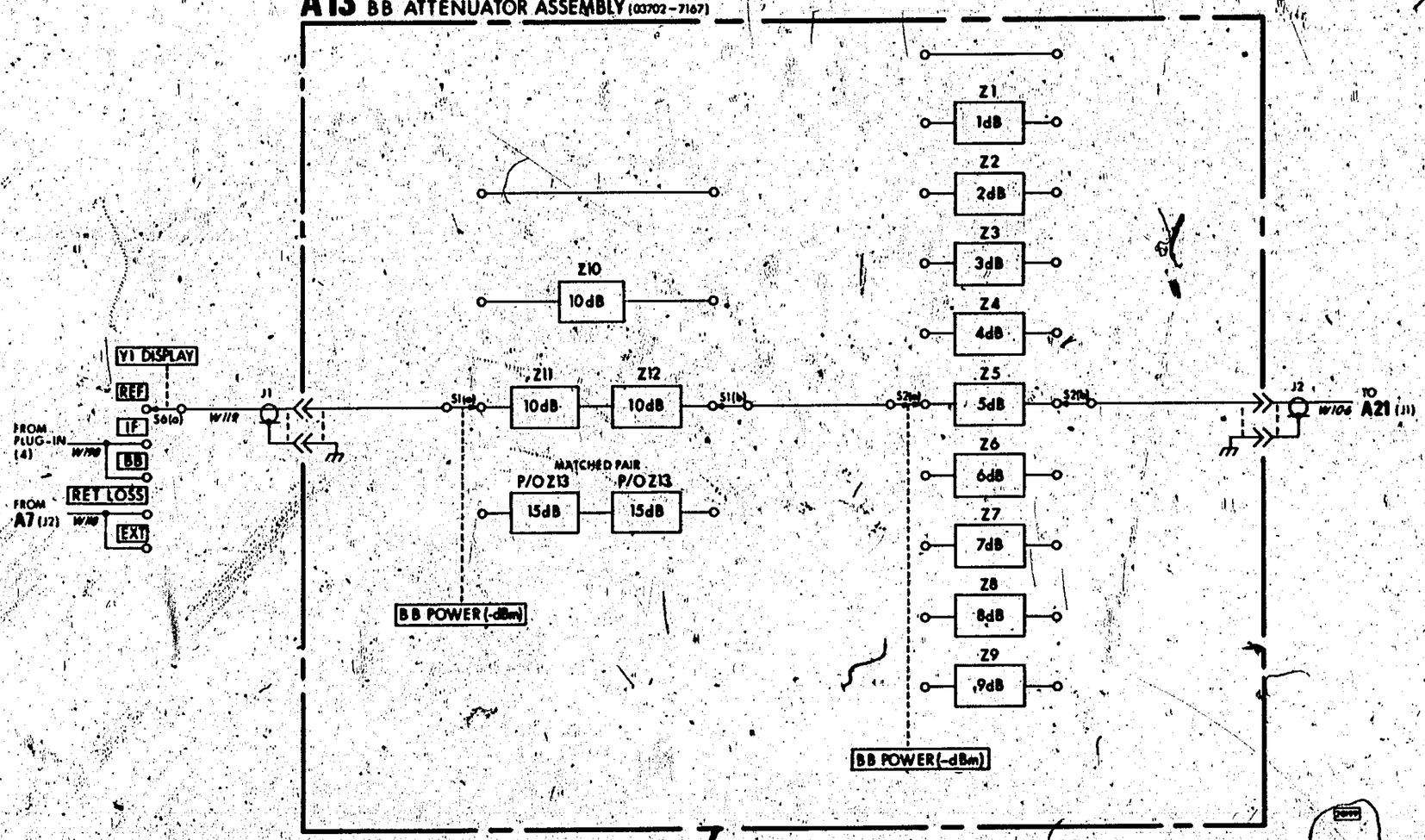


Figure A13-2 Component Location



A13

Figure A13-3 Schematic Diagram — Assembly A13

ASSEMBLY SERVICE SHEET A14 – IF ATTENUATOR

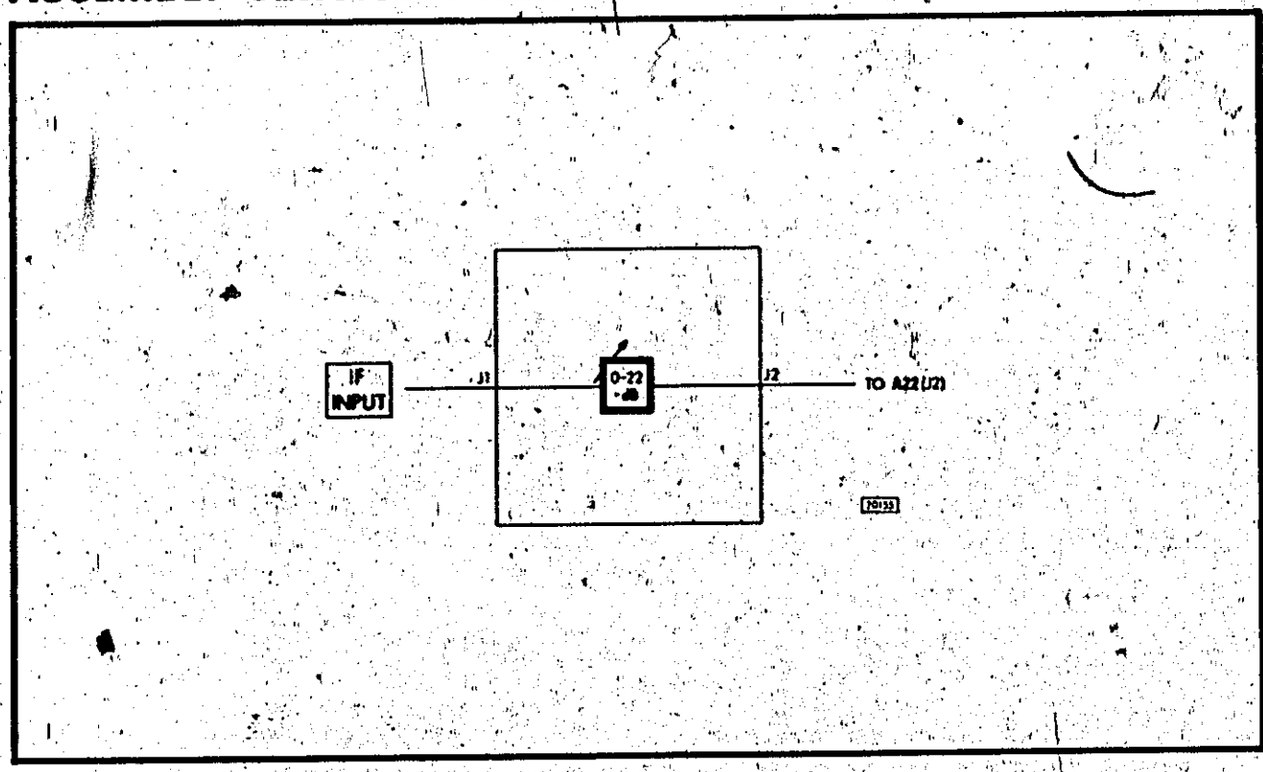


Figure A14-1 Simplified Block Diagram

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.

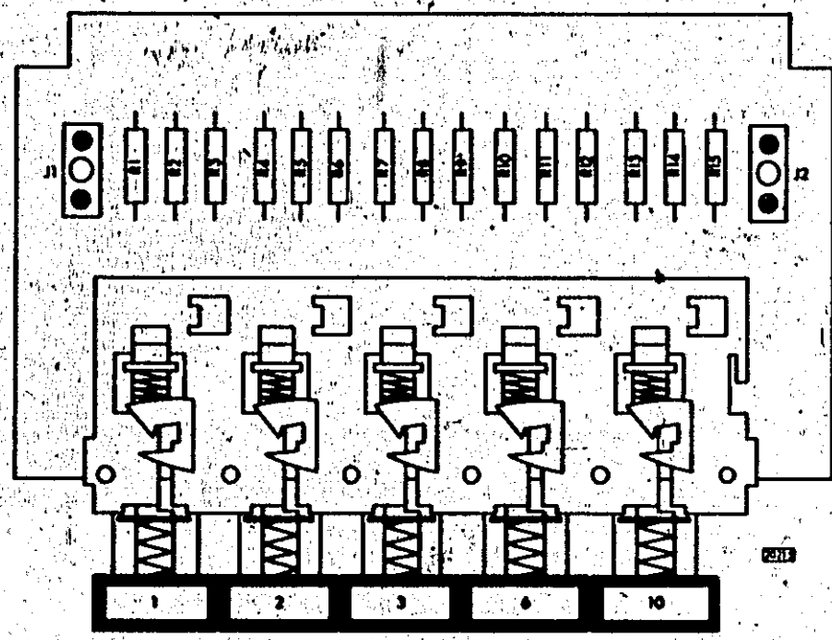
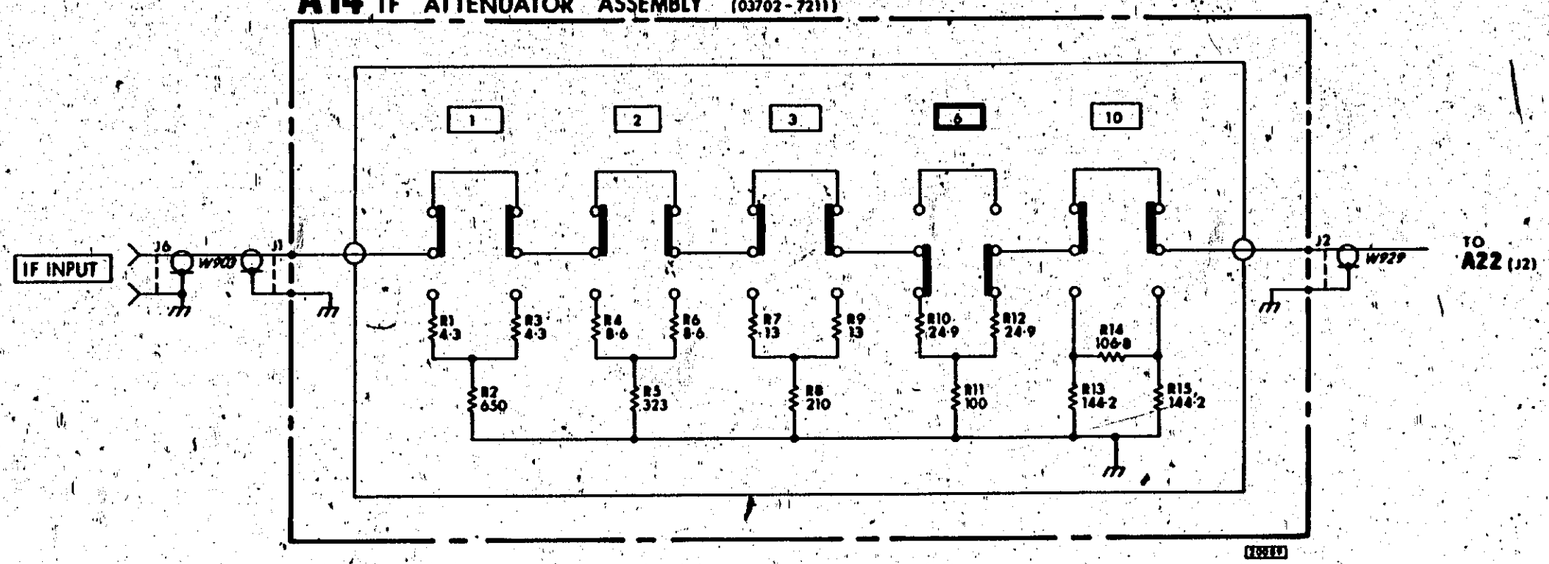


Figure A14-2 Component Location



A14

Figure A14-3 Schematic Diagram — Assembly A14

ASSEMBLY SERVICE SHEET A15 — BB + SWEEP SPLITTER

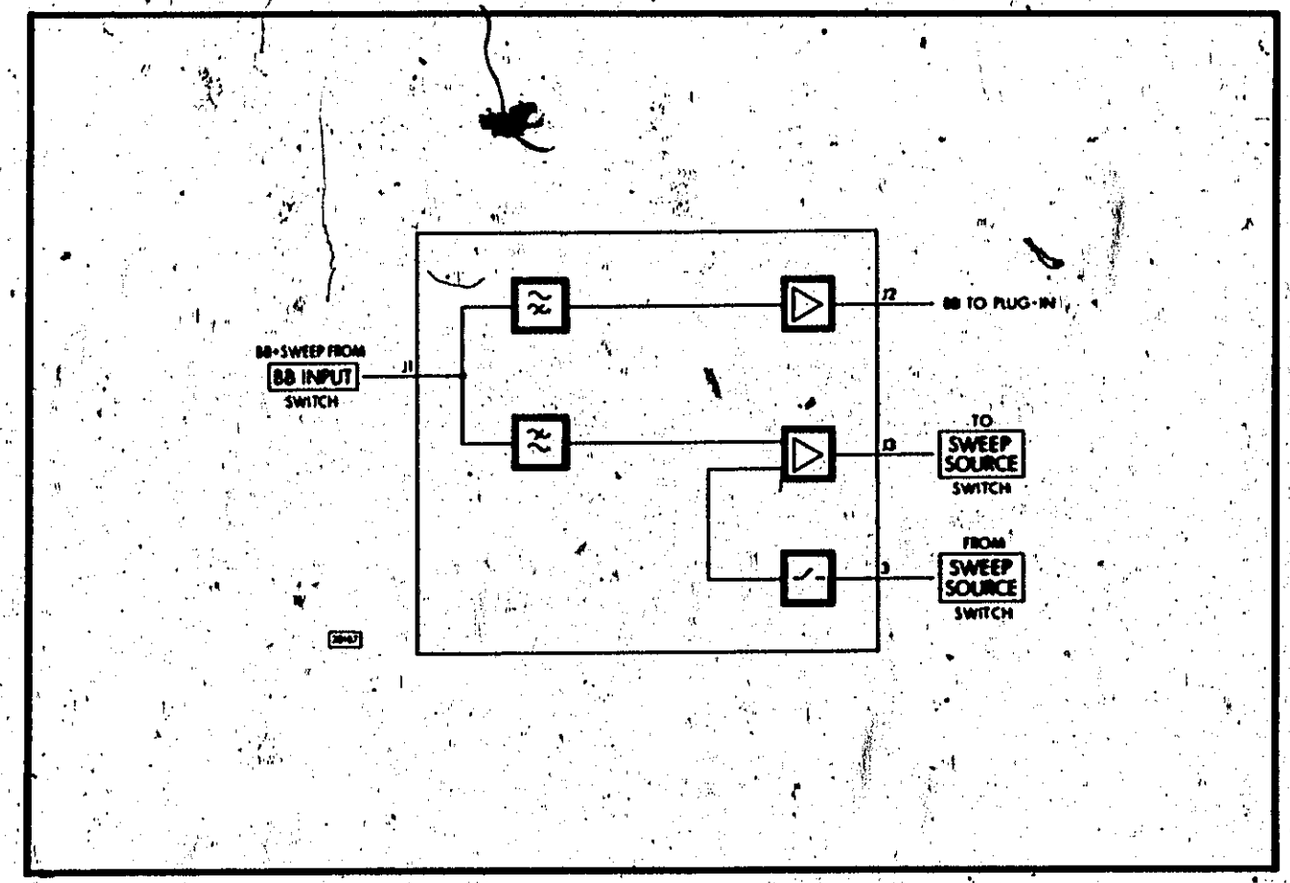
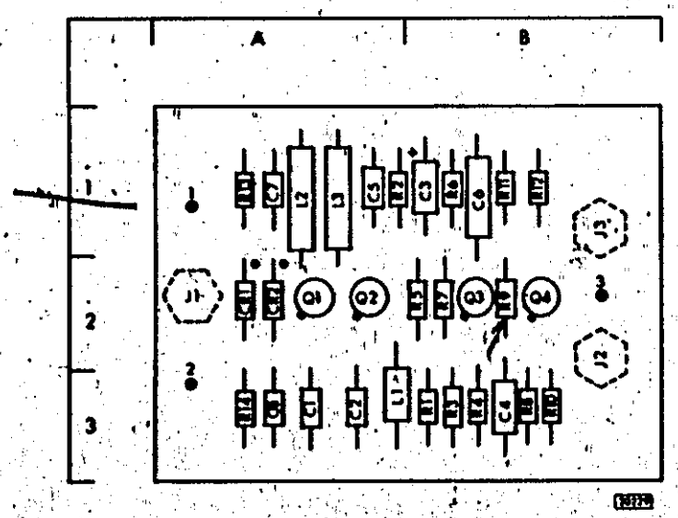


Figure A15-1 Simplified Block Diagram

A15-1 CIRCUIT DESCRIPTION

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 S5. High-pass filter C1, C2 and L1 removes the sweep and the remaining BB is then amplified by Q1 and applied to the plug-in unit via J2. Low-pass filter L2, L3 and C5 removes the BB and the remaining sweep signal is then amplified by Q2 and Q3 and applied to the Y2 DISPLAY switch S7 via J3.

A15-3 When the SWEEP SOURCE switch S4 is in the EXT BB + position, -15V is applied to Q4 gate turning it, hard on and grounding Q3 base. Q3 is then effectively in a common base configuration, and the sweep signal at J3 is in phase with the signal at Q2 base. When S4 is in the EXT BB – position, Q4 gate is grounded turning it off. Transistors Q2 and Q3 then function as a normal differential amplifier with 180° shift through Q3.



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

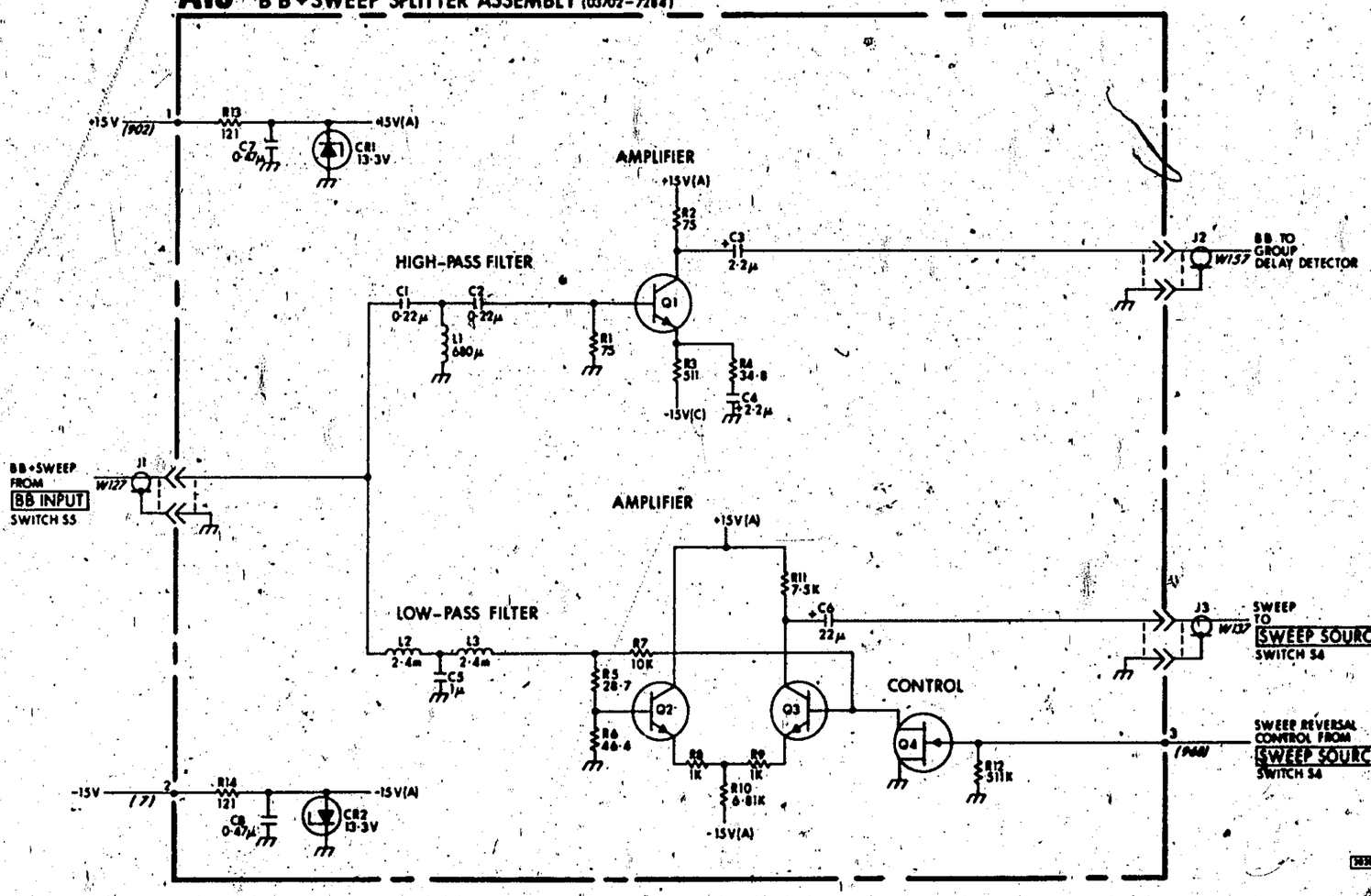
CR	
REF DESIG	GRID LOC
CR1	A-2
CR2	A-2

L	
REF DESIG	GRID LOC
L1	A-3
L2	A-1
L3	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

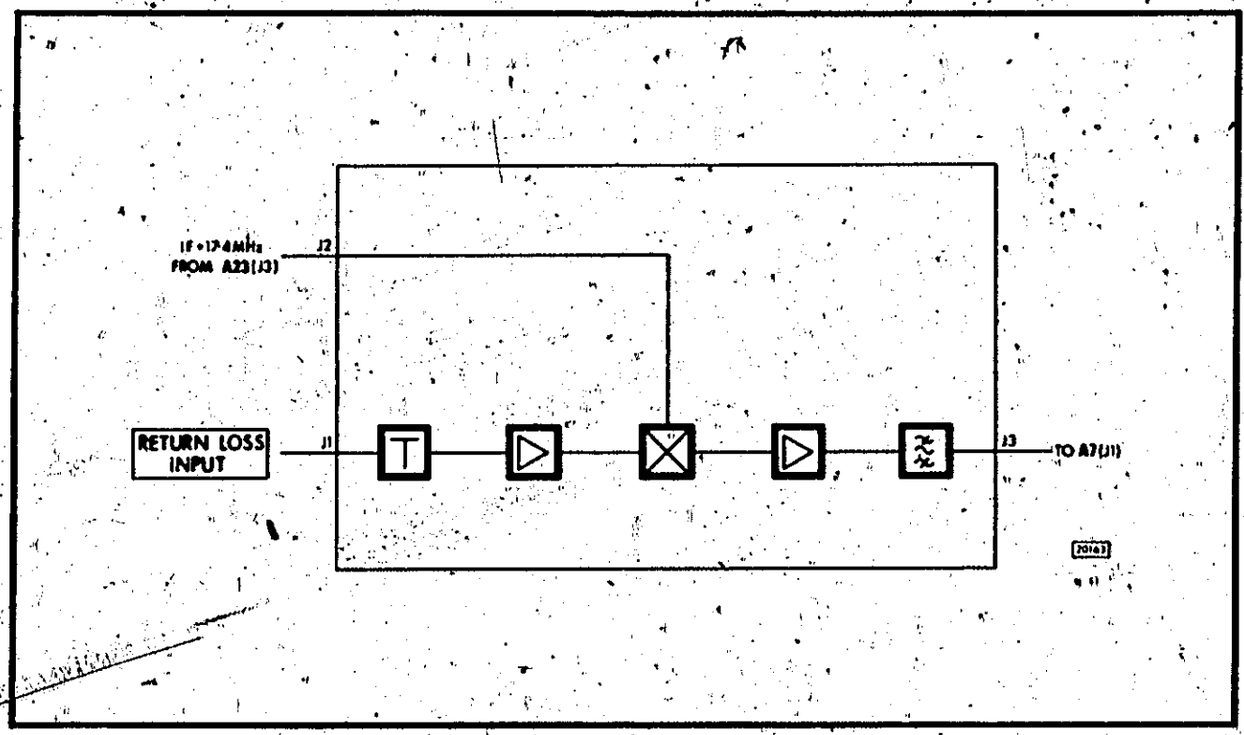


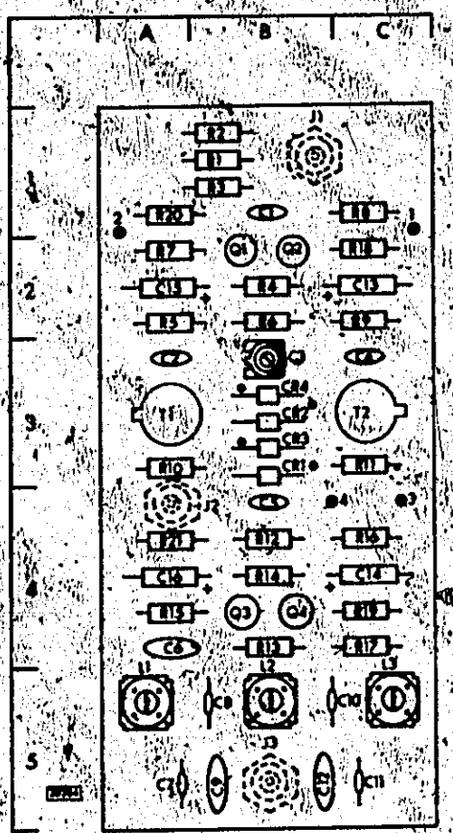
Figure A20-1 Simplified Block Diagram

A20-1 CIRCUIT DESCRIPTION

A20-2 The 8dB Matching Pad R1 to R3 ensures a good match at the RETURN LOSS INPUT. Amplifier Q1 and Q2 raises the input signal to a level sufficient to drive the return loss mixer. Variable capacitor C3 is adjusted to provide a flat response over 50MHz.

A20-3 Mixer T1, T2 and CR1 to CR4 mixes the IF return loss signal with the IF +17.4MHz signal from J2. The lower sideband signal of 17.4MHz is amplified by Q3 and Q4 and applied to the narrowband filter, C6 to C12 and L1 to L3, to remove unwanted mixing products. The filter has a bandwidth of 1MHz and is 3dB down at 16.9MHz and 17.9MHz.

A20-4 The output from the filter is applied to the Return Loss Amplifier assembly A7 via J3.



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

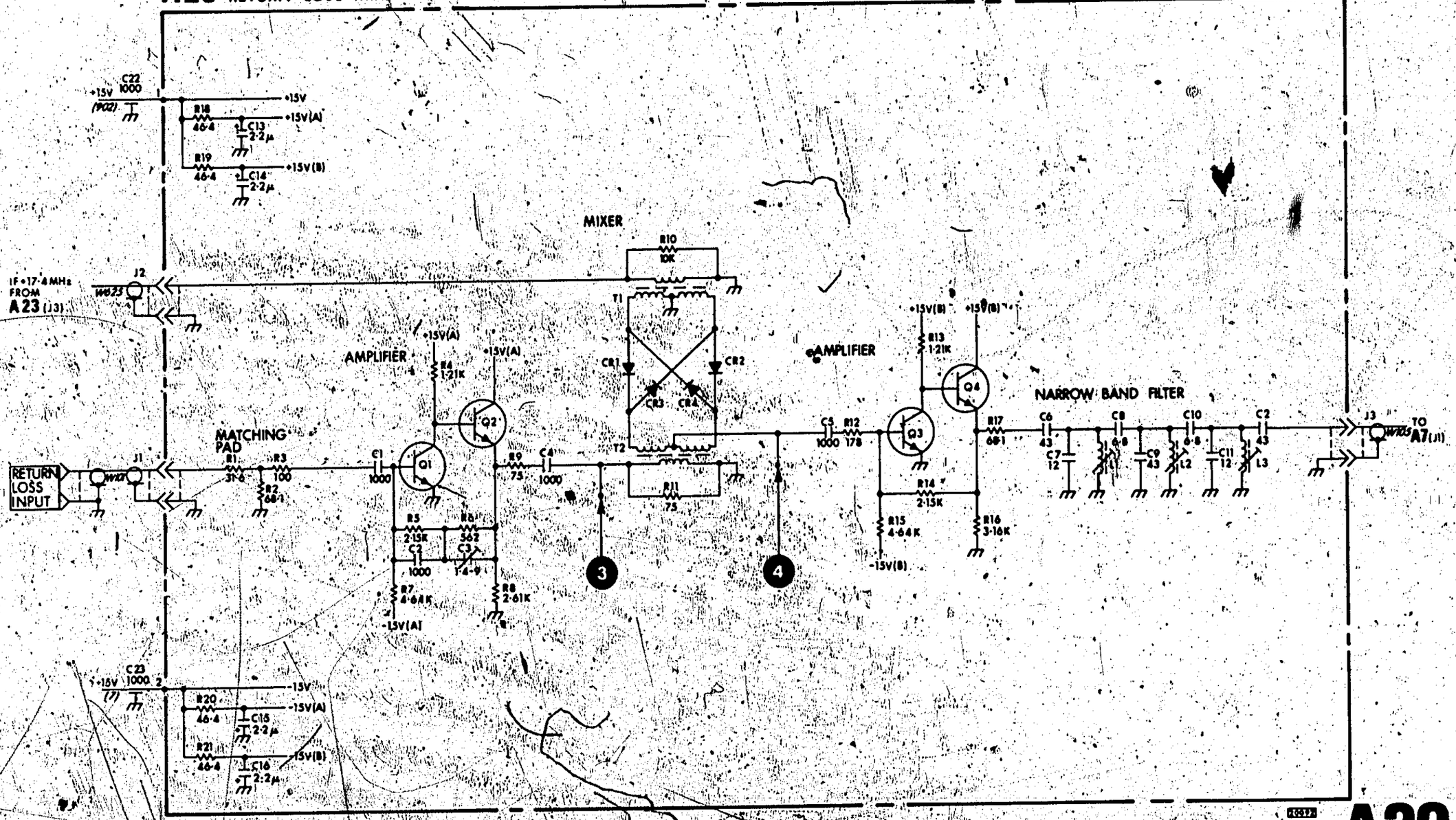
Q	
REF DESIG	GRID LOC
Q1	B-2
Q2	B-2
Q3	B-4
Q4	B-4

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

A20 RETURN LOSS MIXER ASSEMBLY (03702-7175)



A20

Figure A20-3 Schematic Diagram — Assembly A20

ASSEMBLY SERVICE SHEET A21—BB AMPLIFIER

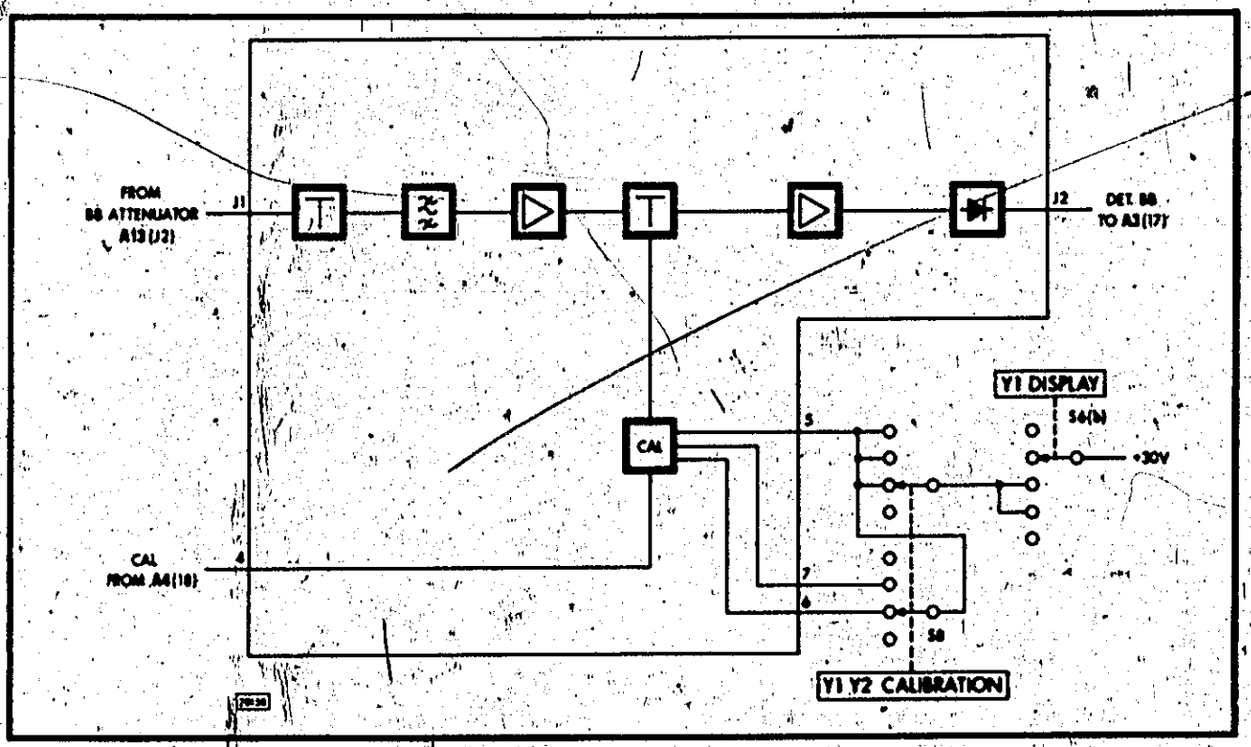


Figure A21-1 Simplified Block Diagram

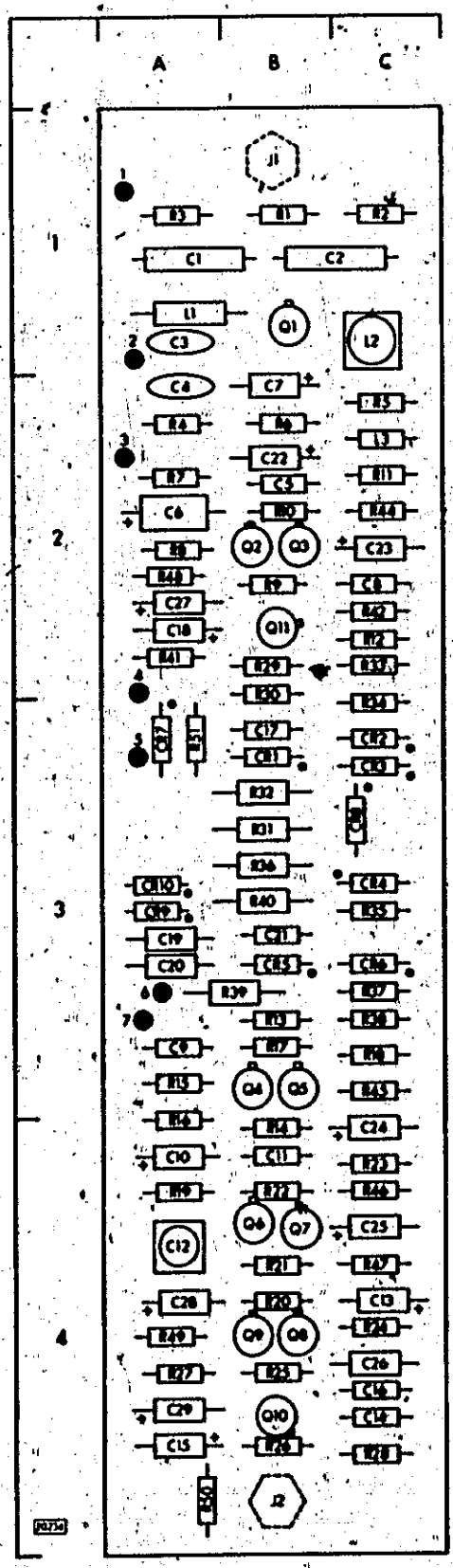
A21-1 CIRCUIT DESCRIPTION

A21-2 The BB signal at J1 from the BB attenuator A13, is applied to the base of Q1 via a 2dB matching pad, R1 to R3, and a bandpass filter. The filter consists of a high and lowpass section in series; the high pass section, C1, C2 and L1, has a lower cut-off frequency of 10kHz; while the low pass section, C3, C4 and L2 is adjustable to give a lower cut-off frequency, 1dB down, at 15MHz.

A21-3 The BB signal is amplified by approximately 60 times, by Q1 to Q3 before being chopped by the calibration signal from the switching network. Y1 Y2 CALIBRATION switch S8 selects an incremental change in attenuation proportional to 1, 3 and 10% of the BB signal during the presence of a calibration pulse at Q11 base. This is achieved by diodes CR1 to CR6 by-passing resistors R33, R34, R35, R37 and R38; which constitutes part of the shunt element of T-attenuator R2, R13, R29 and R30. Diode switches CR1 to CR6 are controlled by zener diodes CR7 to CR9, which are activated by the Y1 Y2 CALIBRATION switch.

A21-4 The chopped BB signal is then applied to amplifier Q4 to Q7. Capacitor C12 is adjusted to provide a flat response up to approximately 12MHz.

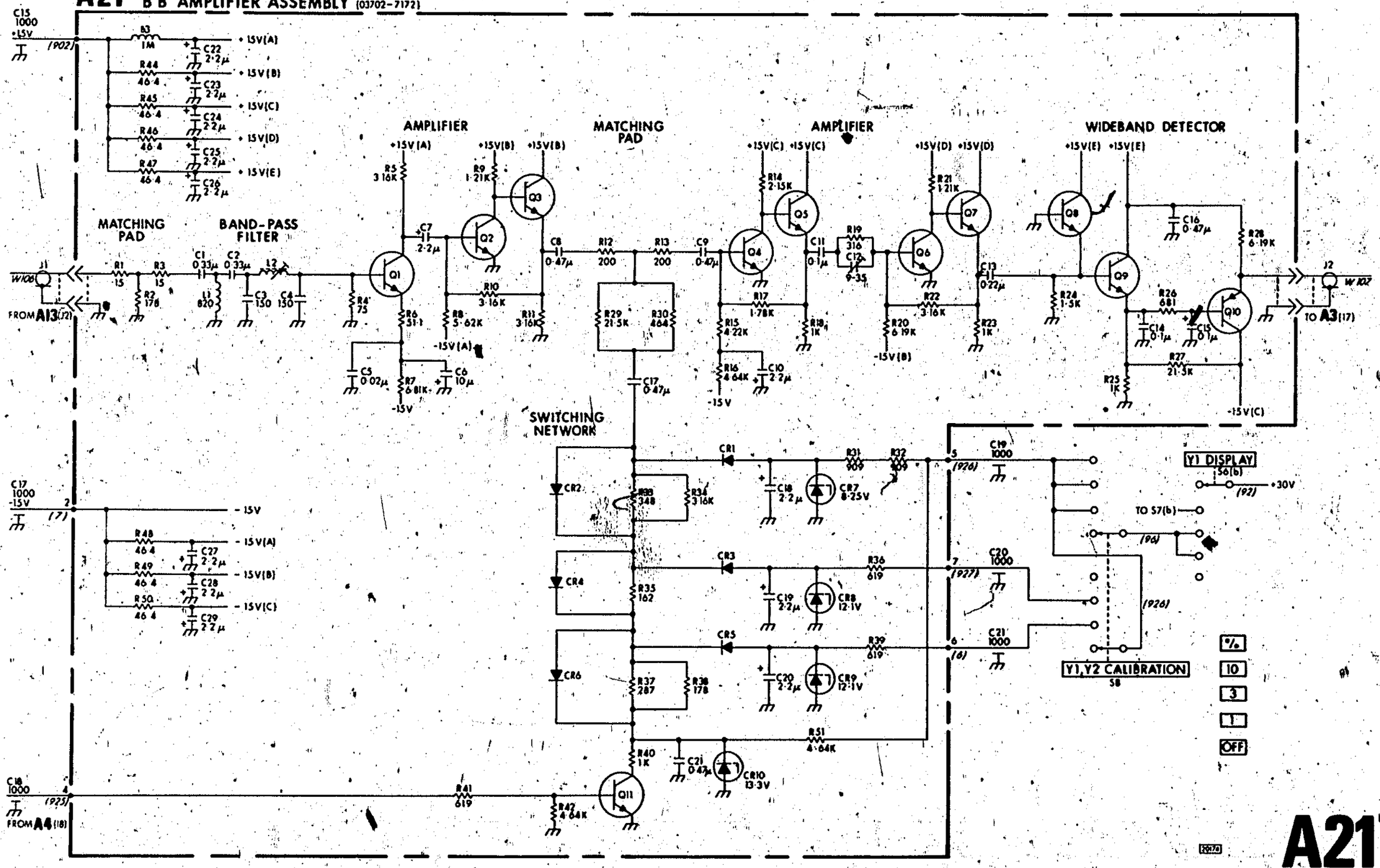
A21-5 The signal from amplifier Q4 to Q7 is detected by wideband detector Q8 to Q10, producing an output at T2 proportional to the amplitude of the BB signal at Q9 base. Transistor Q8 clamps the negative half cycles to approximately 0.6V, while Q10 is an emitter follower which drives the meter amplifier on A5, and also the post detector filter on A3.



C		J		R	
REF DESIG	GRID LOC	REF DESIG	GRID LOC	REF DESIG	GRID LOC
C1	A-1	J1	B-1	R1	B-1
C2	C-1	J2	B-4	R2	C-1
C3	A-1	**L**		R3	A-1
C4	A-2	REF DESIG	GRID LOC	R4	A-2
C5	B-2	L1	A-1	R5	C-2
C6	A-2	L2	C-1	R6	B-2
C7	B-2	L3	C-2	R7	A-2
C8	C-2	**Q**		R8	A-2
C9	A-3	REF DESIG	GRID LOC	R9	B-2
C10	A-4	Q1	B-1	R10	B-2
C11	B-4	Q2	B-2	R11	C-2
C12	A-4	Q3	B-2	R12	C-2
C13	C-4	Q4	B-3	R13	B-3
C14	C-4	Q5	B-3	R14	B-4
C15	A-4	Q6	B-4	R15	A-3
C16	C-4	Q7	B-4	R16	A-4
C17	B-3	Q8	B-4	R17	B-3
C18	A-2	Q9	B-4	R18	C-3
C19	A-3	Q10	B-4	R19	A-4
C20	A-3	Q11	B-2	R20	B-4
C21	B-3	**R**		R21	B-4
C22	B-2	REF DESIG	GRID LOC	R22	B-4
C23	C-2	R1	B-1	R23	C-4
C24	C-4	R2	C-1	R24	C-4
C25	C-4	R3	A-1	R25	B-4
C26	C-4	R4	A-2	R26	B-4
C27	A-2	R5	C-2	R27	A-4
C28	A-4	R6	B-2	R28	C-4
C29	A-4	R7	A-2	R29	B-2
CR		R8	A-2	R30	B-2
REF DESIG	GRID LOC	R9	B-2	R31	B-3
CR1	B-3	R10	B-2	R32	B-3
CR2	C-3	R11	C-2	R33	C-2
CR3	C-3	R12	C-2	R34	C-3
CR4	C-3	R13	B-3	R35	C-3
CR5	B-3	R14	B-4	R36	B-3
CR6	C-3			R37	C-3
CR7	A-3			R38	C-3
CR8	C-3			R39	A-3
CR9	A-3			R40	B-3
CR10	A-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 A21-2 Component Location and Grid Reference

A21 B B AMPLIFIER ASSEMBLY (03702-7172)



A21

Figure A21-3 Schematic Diagram — Assembly A21

ASSEMBLY SERVICE SHEET A22 – IF AMPLIFIER AND DETECTOR

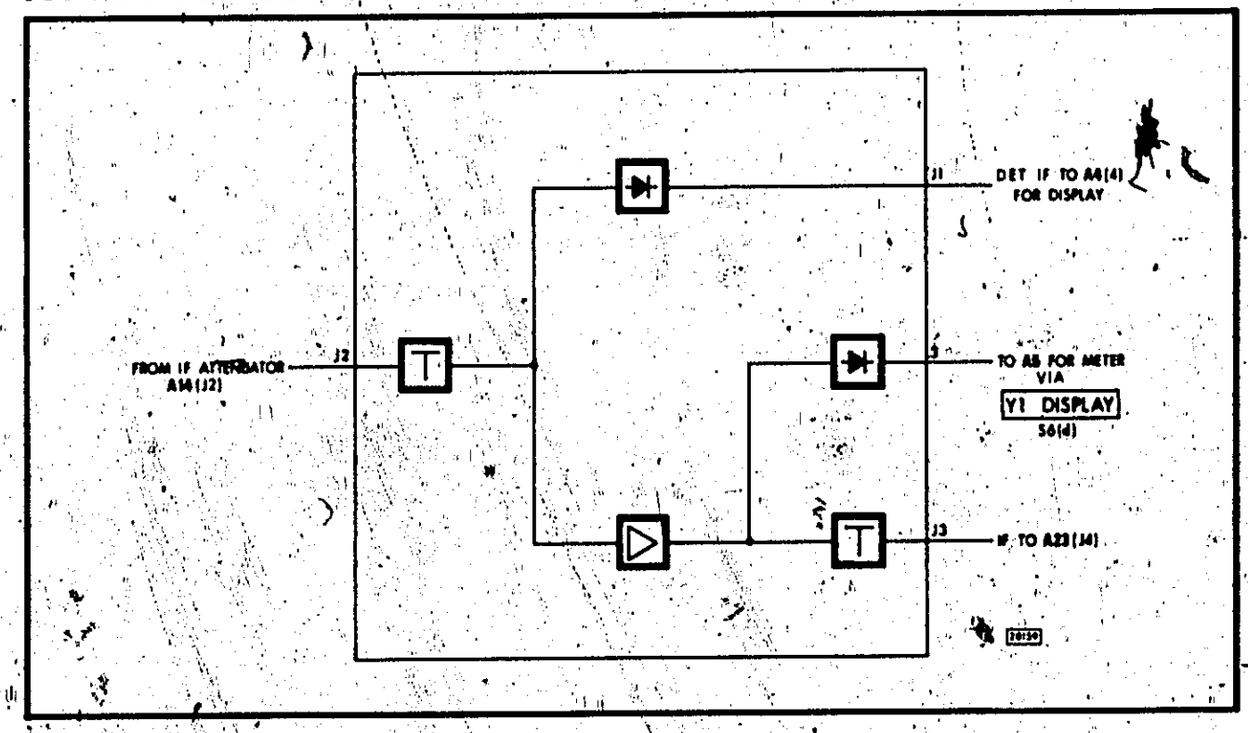


Figure A22-1 Simplified Block Diagram

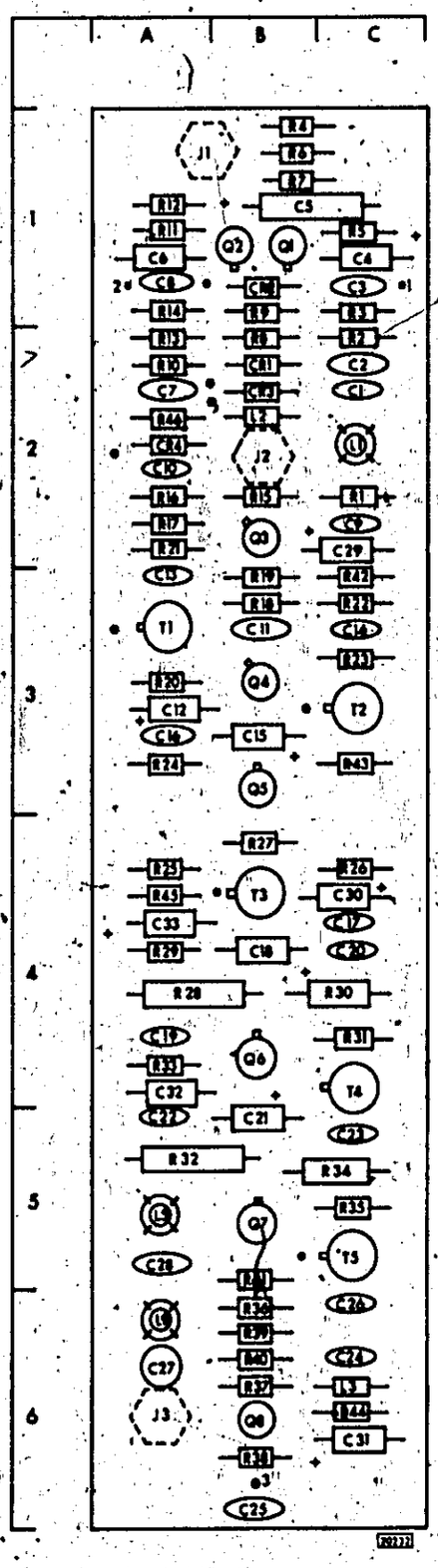
A22-1 CIRCUIT DESCRIPTION

A22-5 Resistors R39 to R41 form an 8dB Matching Pad, matching Q7 output to the group delay equalizer C27, R28 and L4, L5 which provides an overall flat group delay characteristic. The output from the group delay equalizer at a level of approximately +3dBm is applied to the IF Mixer and Local Oscillator assembly A23.

A22-3 Grounded base stages, Q3 to Q7 form a flat response wideband, IF amplifier covering the range 45 to 95MHz. The overall gain of Q3 to Q7 is 21dB giving a +11dBm signal at the input of detector Q8. Detector Q8 gives a voltage proportional to the IF level which, with -10dBm at J2, will give a centre scale reading on the IF LEVEL meter in REF and IF positions of the Y1 DISPLAY switch.

A22-4 The balanced detector CR1, CR2 and Q1, Q2 is biased to detect the IF signal and gives an output proportional to the pk-pk IF input which can then be displayed on either Y1 or Y2 trace.

A22-5 Resistors R39 to R41 form an 8dB Matching Pad, matching Q7 output to the group delay equaliser C27, R28 and L4, L5 which provides an overall flat group delay characteristic. The output from the group delay equaliser at a level of approximately +3dBm is applied to the IF Mixer and Local Oscillator assembly A23.



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

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

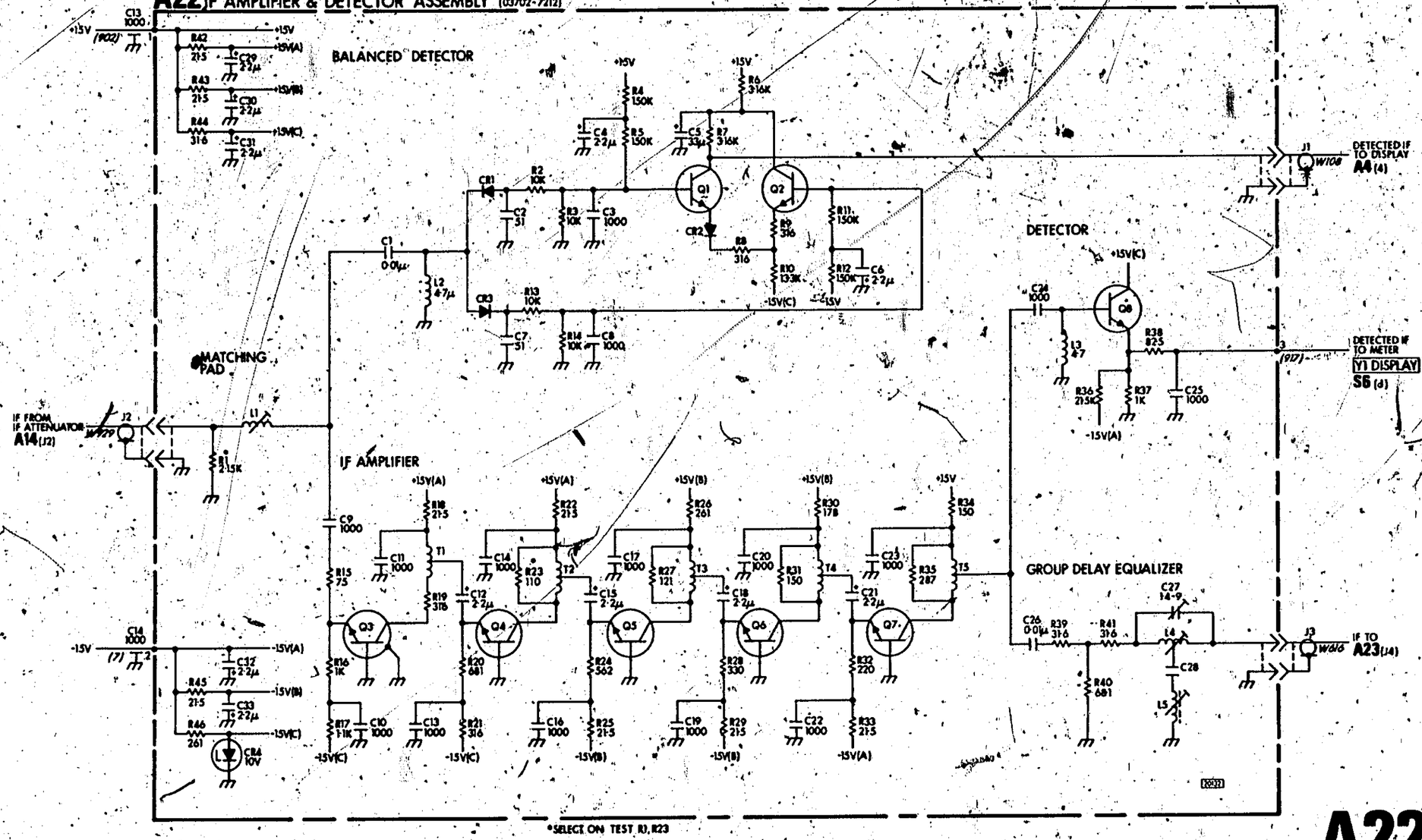
Q	
REF DESIG	GRID LOC
Q1	B-1
Q2	B-1
Q3	B-2
Q4	B-3
Q5	B-3
Q6	B-4
Q7	B-5
Q8	B-6

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

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

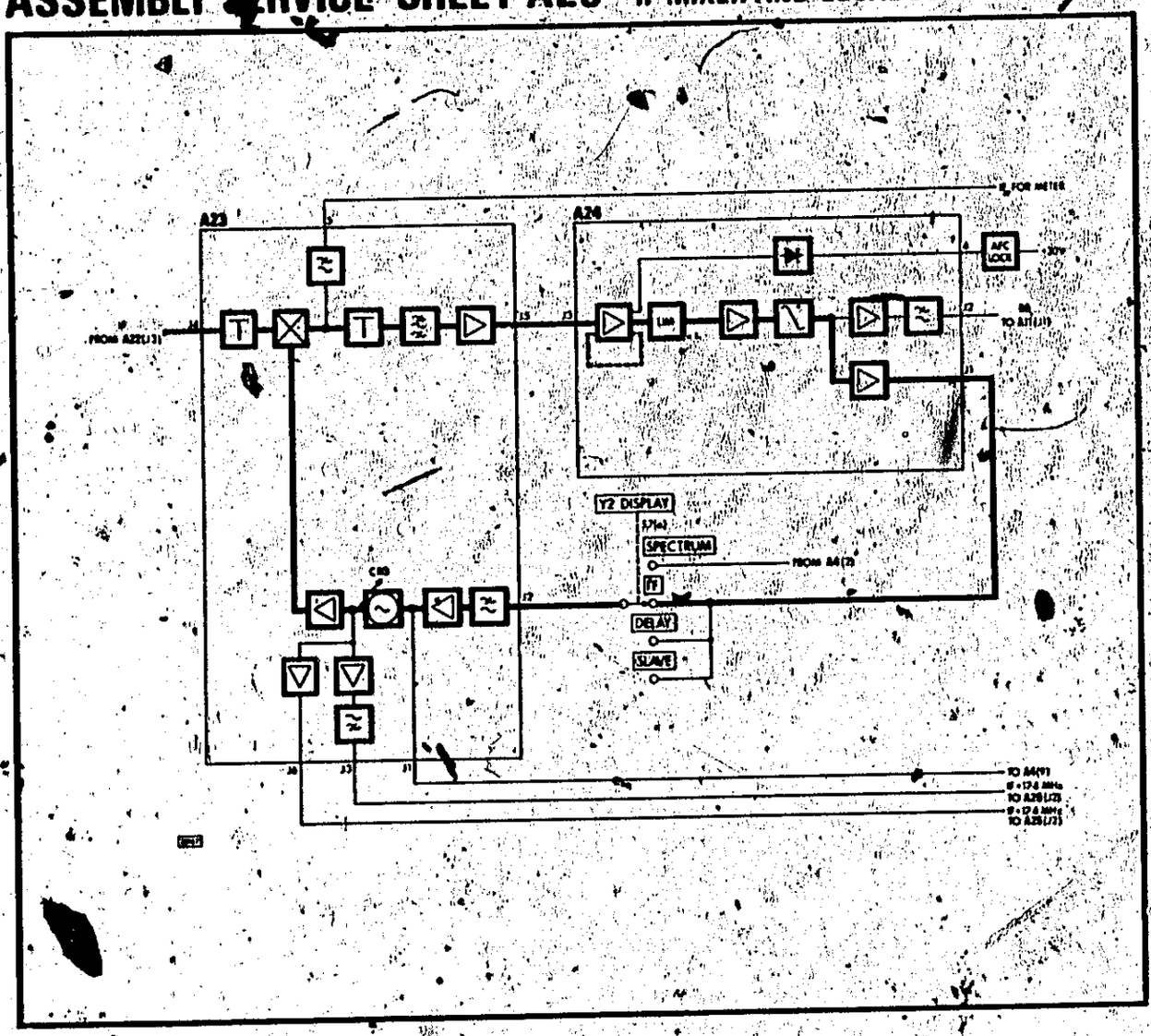
A22 IF AMPLIFIER & DETECTOR ASSEMBLY (03702-7212)



A22

Figure A22-3 Schematic Diagram — Assembly A22

ASSEMBLY SERVICE SHEET A23 – IF MIXER AND LOCAL OSCILLATOR



A23-1 Simplified Block Diagram

A23-1 CIRCUIT DESCRIPTION

A23-2 The primary function of this assembly is to mix the IF signal from the IF Amplifier A22 with an internally generated frequency from the local oscillator, to produce a 17.4MHz signal for the IF Discriminator A24.

A23-3 IF Mixer

A23-4 The main IF signal, from IF Amplifier A22, is applied to the mixer T1, to T4 and CR4 to CR7 via matching pad R24 to R26, where it is mixed with the local oscillator output (IF + 17.4MHz) to produce the 17.4MHz signal for the IF discriminator A24 in IF, DELAY and SLAVE positions of the Y2 DISPLAY switch. An 8dB matching pad R35 to R37 matches the mixer output to bandpass filter C23 to C27 and L4 to L8 which selects the 17.4MHz lower sideband. Transistors Q6 and Q7 amplify the 17.4MHz signal to provide a 5V pk-pk output which is adjusted by R46.

A23-5 Local Oscillator

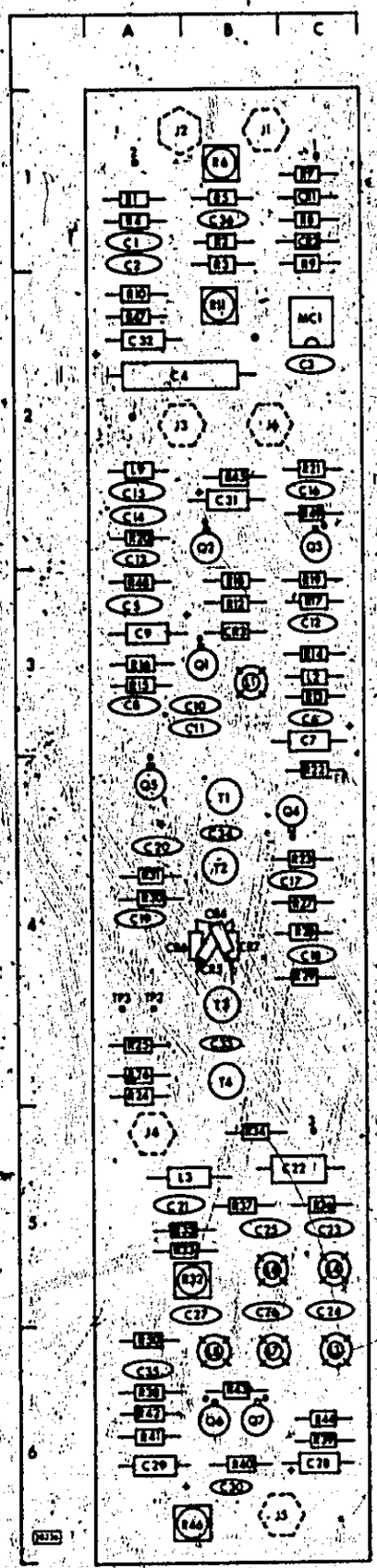
A23-6 Voltage controlled Oscillator Q1 produces a local oscillator signal between 62.4 and 112.4MHz depending upon the bias voltage on varactor diode CR3. The bias on CR3 is adjusted in the range -2 to -5V by A24R23 while L1 tunes the frequency of the oscillator to 87.4MHz in the all positions of the Y2 DISPLAY switch S7 except SPECTRUM. The AFC signal from S7 controls the bias on CR3 and hence the local oscillator frequency. The AFC signal is applied from J2 via a band-stop filter, which rejects any BB signal present on the AFC signal, and amplifier MC1, which has a low-pass characteristic. The local oscillator signal is then fed to the mixer via buffer amplifier Q4 and Q5 which prevents spurious signals from the mixer appearing on the other local oscillator outputs.

A23-7 In addition, the local oscillator signal is applied to:

a. Buffer amplifier Q2 — which provides a local oscillator output to the Return Loss Mixer via assembly A20 high-pass filter C14 to C15 and L9 which prevents the lower sideband mixing product from the A20 from affecting local oscillator outputs.

b. Buffer amplifier Q3 — which provides a local oscillator output to Sliding Spectrum Marker Generator A25.

A23-8 In the SPECTRUM position of the Y2 DISPLAY switch the local oscillator will be swept approximately ±3MHz about 70MHz. This swept signal is applied to a mixer on the Sliding Spectrum Marker Generator assembly A25 via J6 where it is mixed with the 70MHz from the crystal oscillator, producing a zero beat marker at 70MHz for display on the Y1 trace. The signal is also applied to mixer T1 to T4 and CR4 to CR7 where it is mixed with the incoming IF at J4, again producing a zero beat marker when the local oscillator frequency is the same as the IF frequency. This marker is smoothed by filter L3 and C22 and displayed on the Y2 trace for comparison with the Y1 trace.



C

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

CR

REF DESIG	GRID LOC
CR1	C-1
CR2	C-1
CR3	B-3
CR4	B-4
CR5	B-4
CR6	B-4
CR7	B-4

J

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

L

REF DESIG	GRID LOC
L1	B-3
L2	C-3
L3	A-5
L4	C-5
L5	C-6
L6	B-5
L7	B-6
L8	B-6
L9	A-2

MC

REF DESIG	GRID LOC
MC1	C-2

Q

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

R

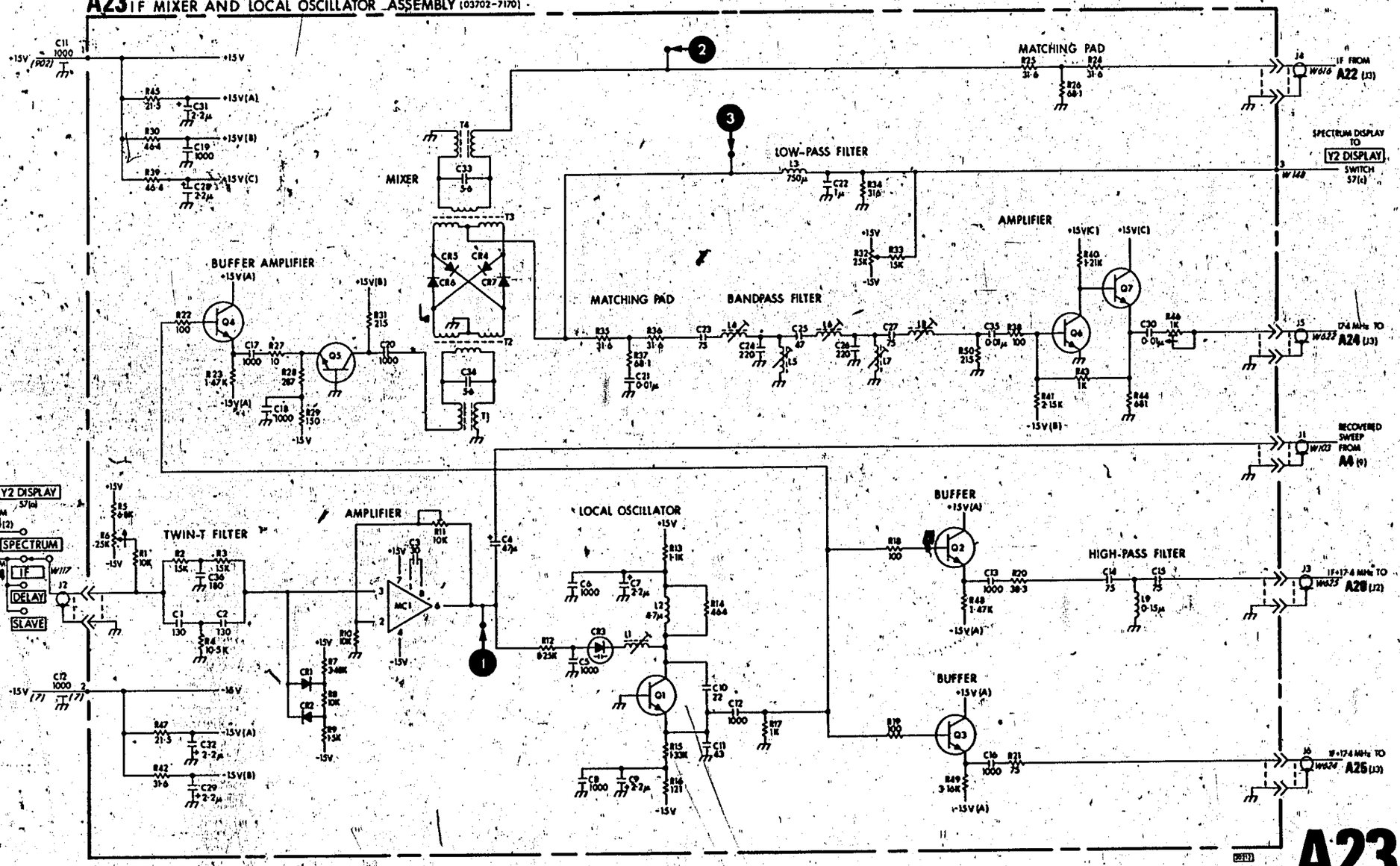
REF DESIG	GRID LOC
R1	A-1
R2	B-1
R3	B-1
R4	A-1
R5	B-1
R6	B-1
R7	C-1
R8	C-1
R9	C-1
R10	A-2
R11	B-2
R12	B-3
R13	C-3
R14	C-3
R15	A-3
R16	A-3
R17	C-3
R18	B-3
R19	C-3
R20	A-2
R21	C-2
R22	C-4
R23	C-4
R24	A-4
R25	A-4
R26	A-4
R27	C-4
R28	C-4
R29	C-4
R30	A-4
R31	A-4
R32	B-5
R33	B-5
R34	B-5
R35	B-5
R36	C-5
R37	B-5
R38	A-6
R39	C-6
R40	B-6
R41	A-6
R42	A-6
R43	B-6
R44	C-6
R45	B-2
R46	B-6
R47	A-2
R48	A-3
R49	C-2
R50	A-6

T

REF DESIG	GRID LOC
T1	B-4
T2	B-4
T3	B-4
T4	B-4

A23-2 Component Location and Grid Reference

A23 IF MIXER AND LOCAL OSCILLATOR ASSEMBLY (03702-7170)



A23

A23-3 Schematic Diagram — Assembly A23

ASSEMBLY SERVICE SHEET A24 – IF DISCRIMINATOR

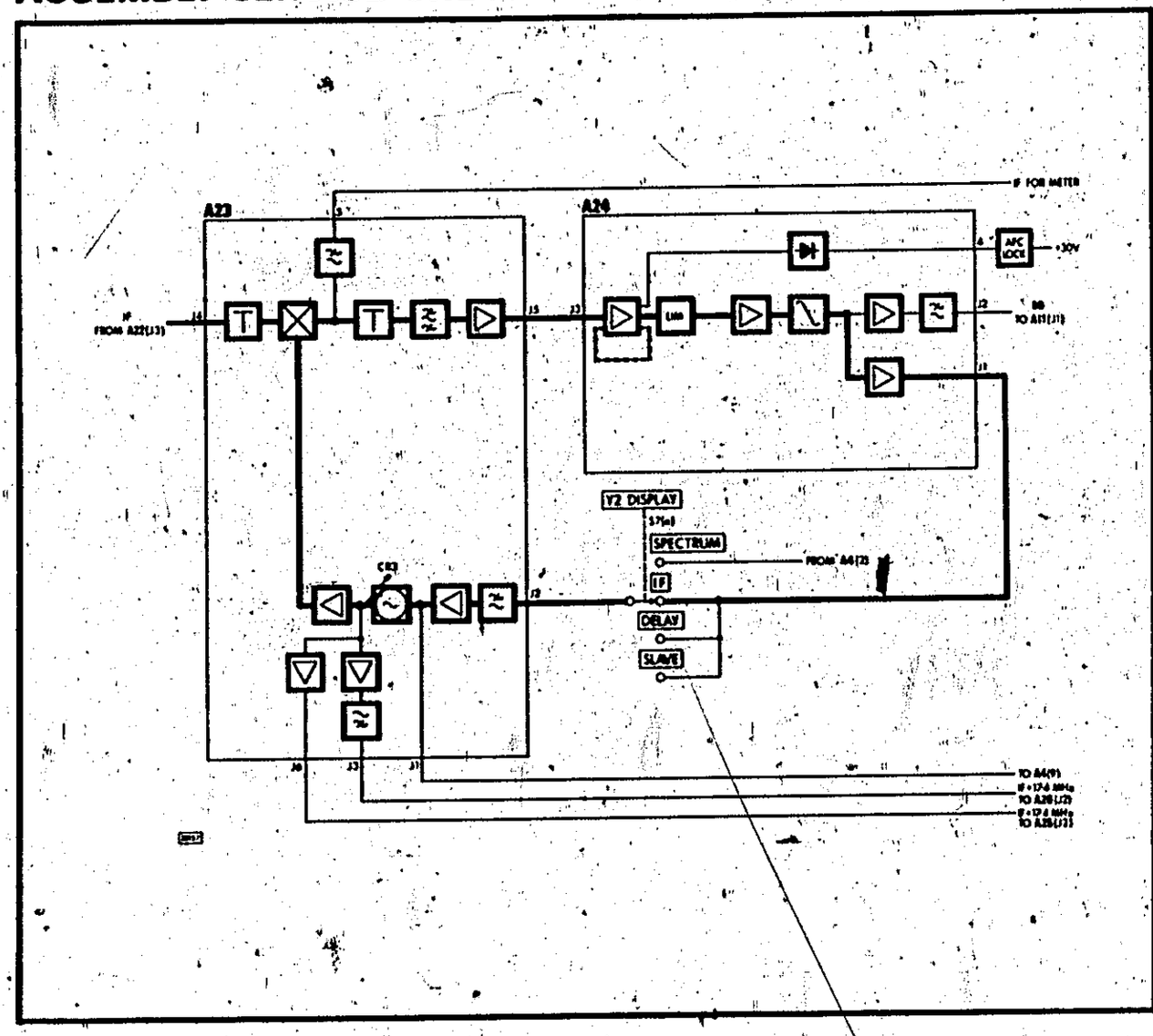


Figure A24-1 Simplified Block Diagram

A24-1 CIRCUIT DESCRIPTION

A24-2 The IF discriminator recovers the BB + Sweep signal which has been modulated onto the original IF signal. The input signal at J3 is applied to an AGC amplifier Q2 and Q3, with feedback loop MC1 and Q1, which has a gain of 40dB at 70Hz. The PIN diode attenuator CR1 is controlled by Q1. The PIN diode attenuator ensures that the input level, and hence the output level of amplifier Q2, Q3 remains constant, at 1.2V pk-pk. If the output level from the amplifier varies, it is

detected by CR2 which varies the dc level to MC1 which in turn controls Q1 and hence CR1. The AGC amplifier also suppresses AM contained on the input signal. The output from MC1 also supplies the detector Q6 and Q7.

A24-3 The detector Q6 and Q7 is used to drive the AFC LOCK lamp. If there is no IF signal applied to detector CR5, then transistor Q6 will be held *on* resulting in Q7 being held *off* and the AFC LOCK lamp extinguished. When the applied IF signal from Q5 emitter, at a level of 1.5V pk-pk, is applied to CR5; it is sufficient to drive Q6 *off* and turn Q7 *on* which lights the AFC LOCK lamp.

A24-4 The 17.4MHz signal is then applied to limiter MC2 which consists of MECL gates to ensure that the AM is almost completely suppressed. The signal from the limiter MC2 is amplified by Q4, Q5 to a level of 1.5V pk-pk and applied to a tuned amplifier.

A24-5 Harmonics of the 17.4MHz signal generated in the limiting process are reduced by tuned amplifier Q8, Q9, L1 and C21, which is balanced by variable resistor R38. To improve the modulator linearity, the tuned circuit is tuned to 15.3MHz and not to 17.4MHz. The output from the tuned amplifier, which also constitutes part of the triple tuned discriminator, is applied to the remainder of the discriminator. The two other tuned amplifiers Q10, C24 and L2 and Q11 C25 and L3 are tuned to 9.5MHz and 25MHz respectively. Each amplifier has the same gain at 17.4MHz. The outputs from the tuned amplifiers are detected by CR6 and CR7, passed through emitter followers Q12 and Q13, and summed at R53. Variable resistor R53 sets the demodulator output to 0V, when there is no 17.4MHz IF applied to the circuit. Variable resistor R43 adjusts the voltage level at R53 wiper to 0V when a 17.4MHz IF signal is applied to J3.

A24-6 The demodulated IF signal is applied through emitter follower Q14 to the series feedback amplifier Q15 and Q16 which drives the low-pass filter, L4, L5 and C32 to C34. The low-pass filter removes any remaining high frequency signal before the BB output from J2 is applied to the BB INPUT switch. In addition, the recovered BB + Sweep signal is applied to amplifier MC3 to MC5 which has 90dB of gain. This amplifier sets up the AFC control to ensure that the bias voltage on the varactor A23CR3 is at the correct level, such that an IF frequency of 70MHz will be equivalent to a local oscillator frequency of 87.4MHz.

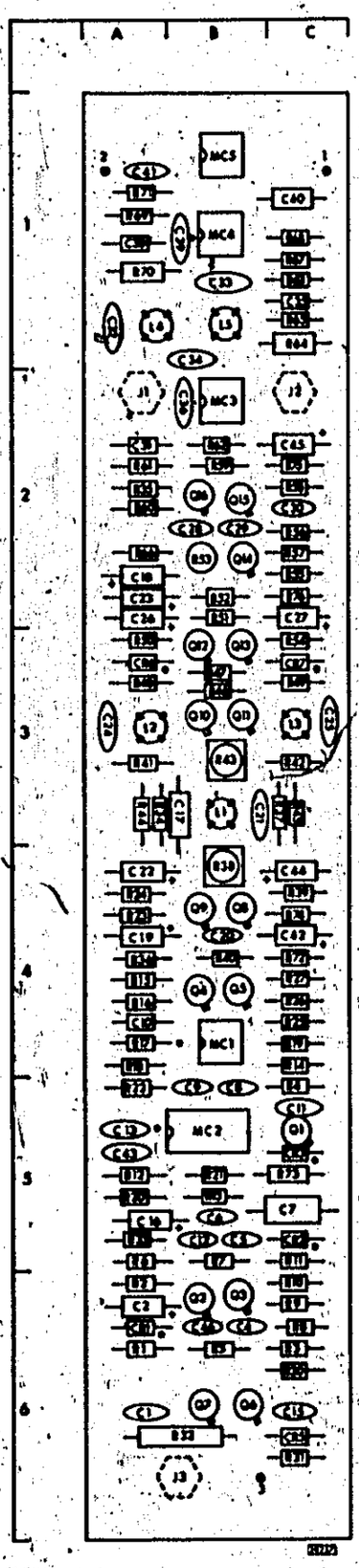


Figure A24-2 Component Location

C

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

CR

REF DESIG	GRID LOC
CR1	A-6
CR2	C-5
CR3	C-5
CR5	C-6
CR6	A-3
CR7	C-3

J

REF DESIG	GRID LOC
J1	A-2
J2	C-2
J3	A-6

L

REF DESIG	GRID LOC
L1	B-3
L2	A-3
L3	C-3
L4	A-1
L5	R-1

MC

REF. DESIG	GRID LOC
MC1	B-4
MC2	B-5
MC3	B-2
MC4	B-1
MC5	B-1

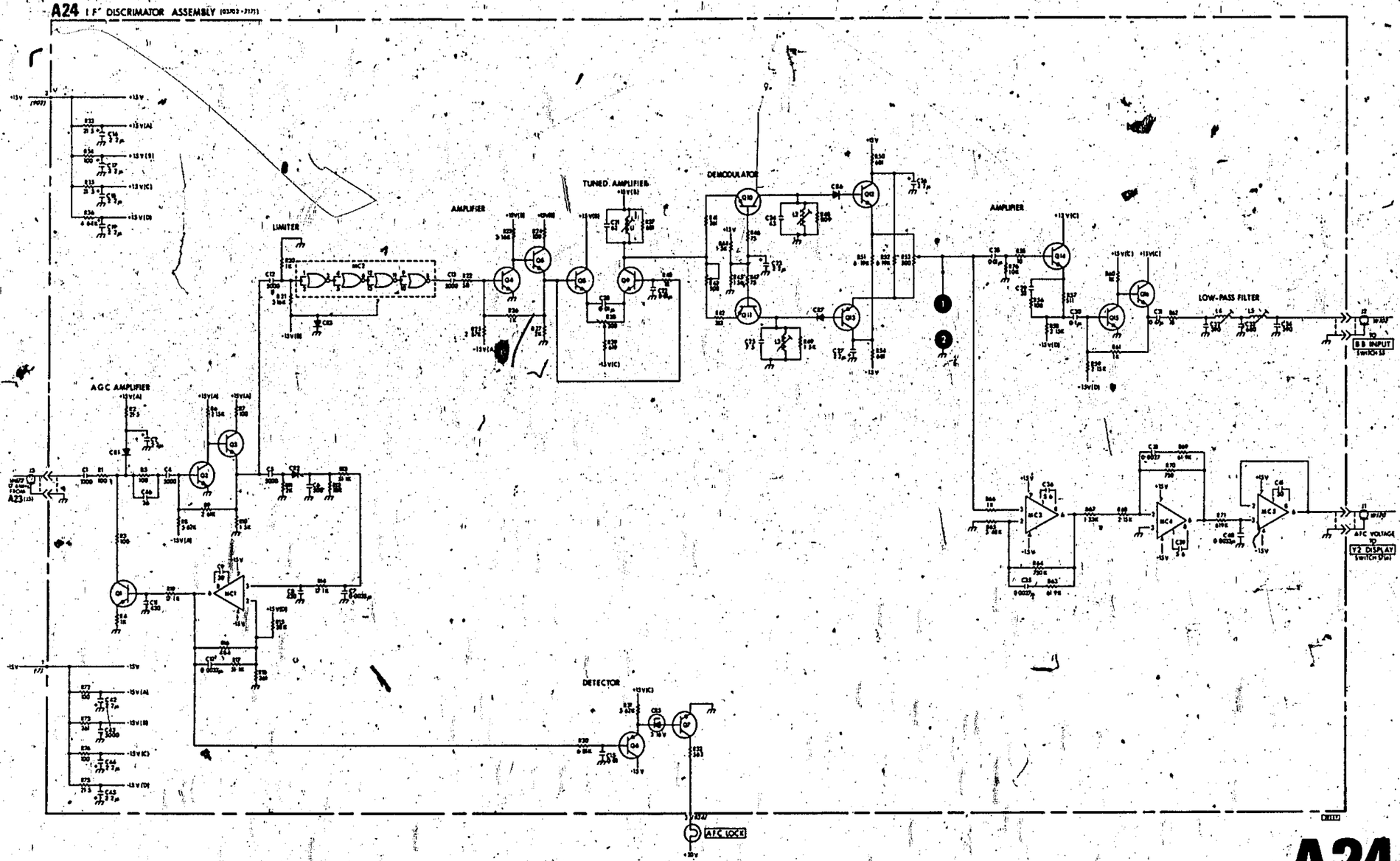
Q

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

R

REF DESIG	GRID LOC
R1	A-6
R2	A-6
R3	C-6
R4	C-5
R5	B-6
R6	A-5
R7	B-5
R8	C-6
R9	C-6
R10	C-6
R11	C-5
R12	A-5
R13	B-5
R14	C-4
R15	A-4
R16	A-4
R17	A-4
R18	A-4
R19	C-4
R20	A-5
R21	B-5
R22	A-5
R23	A-4
R24	A-4
R25	C-4
R26	C-4
R27	C-4
R30	C-6
R31	C-6
R32	A-6
R33	A-5
R34	A-3
R35	A-2
R36	A-4
R37	C-3
R38	B-4
R39	C-4
R40	B-4
R41	A-3
R43	C-3
R43	B-3
R44	A-3
R45	C-3
R46	B-3
R47	B-3
R48	A-3
R49	C-3
R50	A-3
R51	B-2
R52	B-2
R53	B-2
R54	C-3
R55	C-2
R56	C-2
R57	C-2
R58	C-2
R59	B-2
R60	A-2
R61	A-2
R62	B-2
R63	C-1
R64	C-1
R65	C-1
R66	A-2
R67	C-1
R68	C-1
R69	A-1
R70	A-1
R71	A-1
R72	C-4
R73	C-5
R74	C-4
R75	C-2
R76	C-2

Figure A24-3 Grid Reference



A24

Figure A24-4 Schematic Diagram — Assembly A24

ASSEMBLY SERVICE SHEET A25 – SLIDING/SPECTRUM MARKER GENERATOR

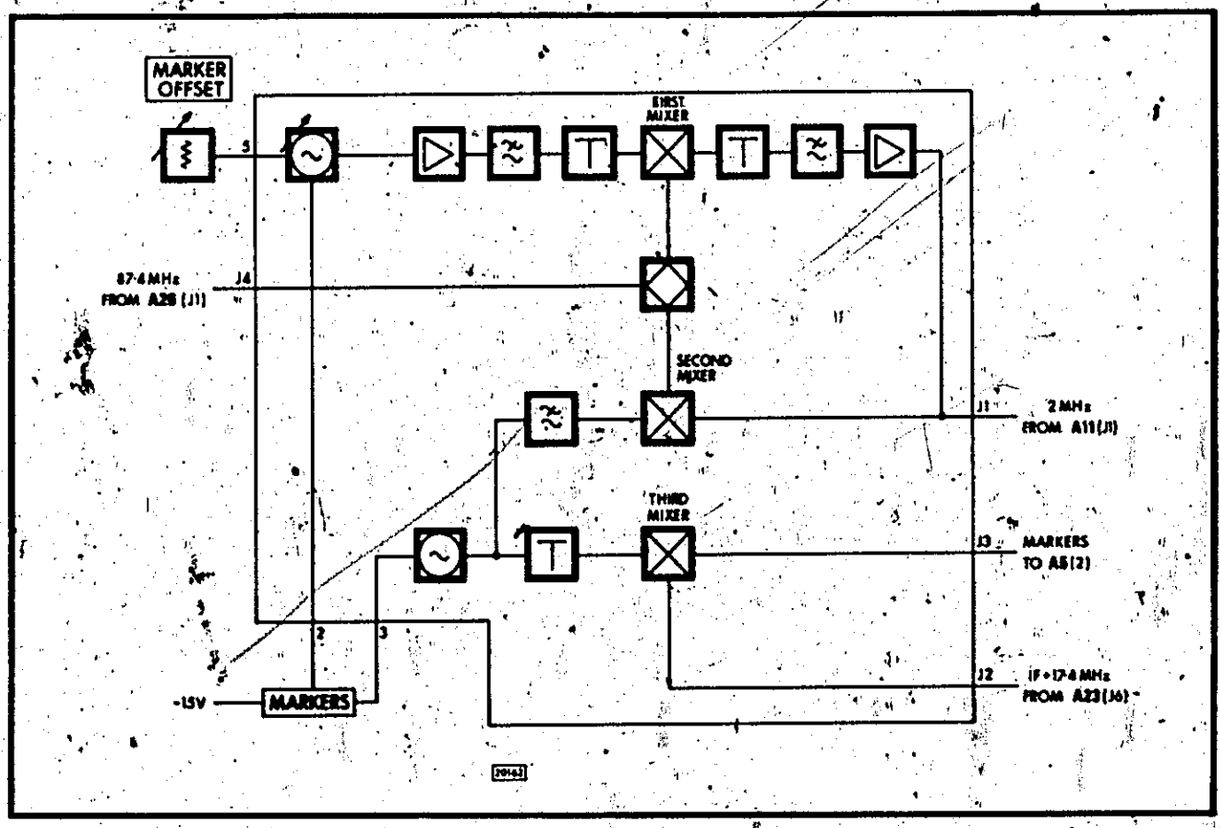


Figure A25-1 Simplified Block Diagram

A25-1 CIRCUIT DESCRIPTION

A25-2 Sliding Markers

A25-2 Voltage controlled oscillator Q1 generates a signal in the 262 to 287MHz range dependent upon the bias voltage applied from the MARKER OFFSET control to the varacter CR1. Variable inductor L1 is tuned to allow the oscillator frequency to vary from 262 to 287MHz when the MARKER OFFSET control is tuned over its range. Transistor Q2 forms a wideband amplifier which applies the oscillator signal through a low-pass filter and a matching pad to the first mixer. The low-pass filter and matching prevent higher order mixing products affecting the oscillator.

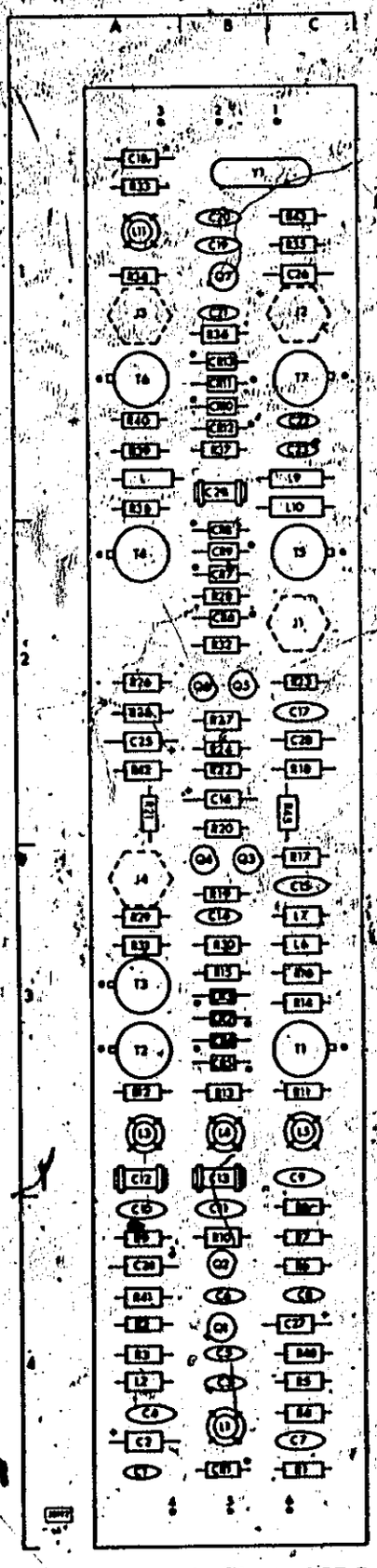
A25-4 Wideband amplifier Q2, with a flat gain-versus-frequency response, amplifies the signal from Q1 which is then applied to a low-pass filter L3 to L5 and C12, C13 and a matching pad R11 to R13 to prevent higher order mixing products affecting the oscillator. Centre marker generator A26 provides an 87.4MHz signal via J4 to the hybrid which divides the signal equally between the first and second mixers, at the same time preventing mixing products from one mixer affecting the other. The first mixer T1, T2 and CR2 to CR5 mixes the third harmonic of the 87.4MHz with the output from the voltage controlled oscillator to provide an output from which 0 – 25MHz is filtered by low-pass filter L6, L7 and C14. Amplifier Q3-6, which has a gain of 43dB, amplifies the signal which is then applied to the second mixer along with 2MHz spikes from the Comb Marker Generator A26 via J1.

A25-5 The second mixer T4, T5 and CR6 to CR9 mixes the 87.4MHz from the centre marker generator with the 0 – 25MHz from the first mixer to produce an output of 87.4MHz with two sidebands of 0 – 25MHz, spaced equally. Low pass filter L8 to L10, C22 and C23 passes these frequencies to the third mixer via the matching pad R38 to R40 but rejects higher order mixing products.

A25-6 The third mixer T6, T7 and CR10 to CR13 mixes the A23 local oscillator frequency via J2 with the output from the second mixer to produce zero beat markers which are applied to the Marker Processor A5 via J3.

A25-7 Spectrum Marker

A25-8 Relay K1 is controlled by the Y2 DISPLAY switch and S9(A) when in the SPECTRUM mode, removes through the MARKERS switch and contact K1A the -15V rail to assemblies A11 and A26, while K1B disables the MARKERS switch S9(B) and energizes the -15V (D) rail. In the SPECTRUM mode therefore, only the 70MHz oscillator Q7 is energized and the third mixer produces one marker centred on 70MHz.



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

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

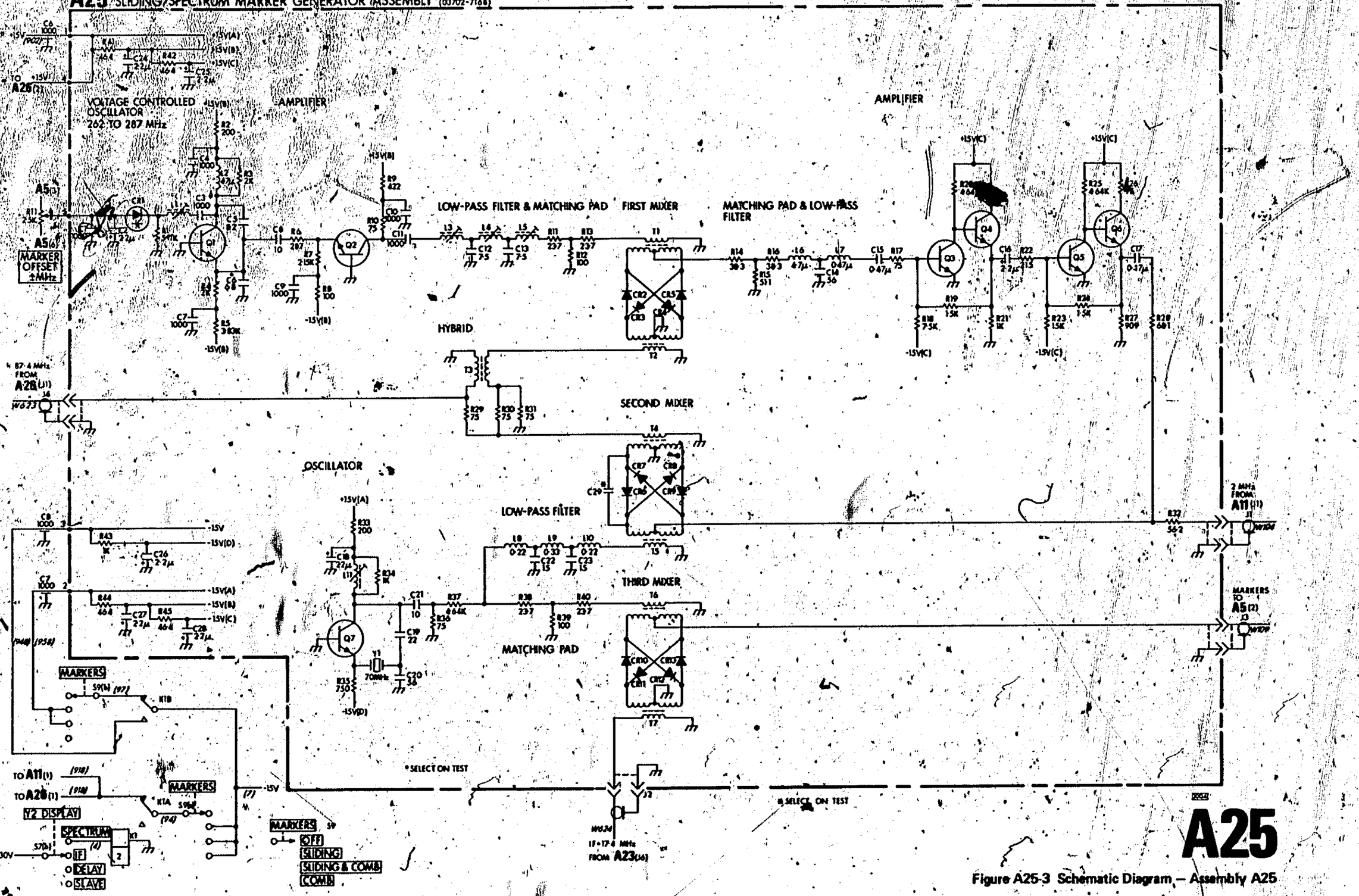
Q	
REF DESIG	GRID LOC
Q1	B-4
Q2	B-4
Q3	B-3
Q4	B-3
Q5	B-2
Q6	B-2
Q7	B-1

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

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 A25-2 Component Location and Grid Reference

A25 SLIDING/SPECTRUM MARKER GENERATOR ASSEMBLY (00702-7168)



A25

Figure A25-3 Schematic Diagram — Assembly A25

ASSEMBLY SERVICE SHEET A26– CENTRE MARKER GENERATOR

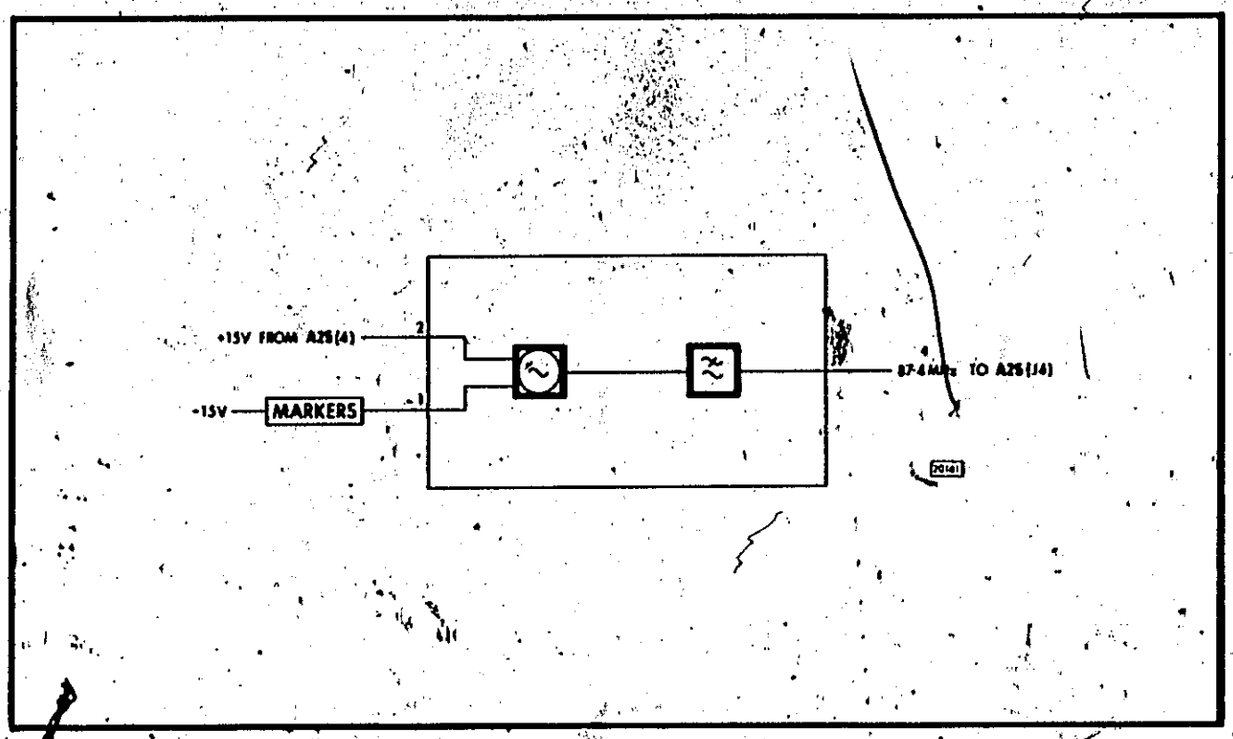


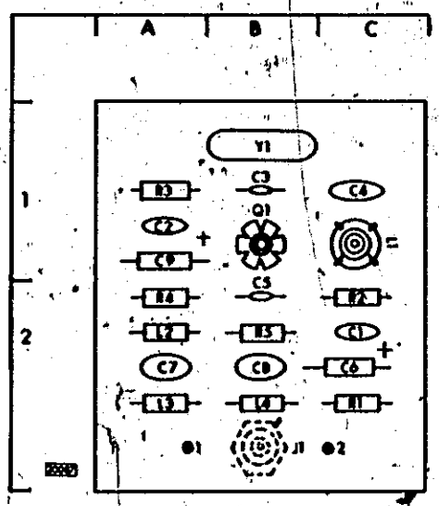
Figure A26-1 Simplified Block Diagram

A26-1 CIRCUIT DESCRIPTION

A26-2 The crystal oscillator Q1 generates 87.4MHz to provide a centre marker in all modes other than SPECTRUM, and to drive the first and second mixers on the Sliding/Spectrum Marker Generator A25. Inductor L1 adjusts the oscillator output to approximately 1.1V pk-pk.

A26-3 Low pass filter L2 to L4 and, C7 and C8 removes unwanted harmonics to prevent spurious mixing products in the mixers.

A26-4 In SPECTRUM mode the oscillator is disabled and a single marker is produced by the 70MHz crystal oscillator on the Sliding/Spectrum Marker Generator A25.



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

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

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

Y	
REF DESIG	GRID LOC
Y1	B-1
J1	B-2
Q1	B-1

Figure A26-2 Component Location and Grid Reference

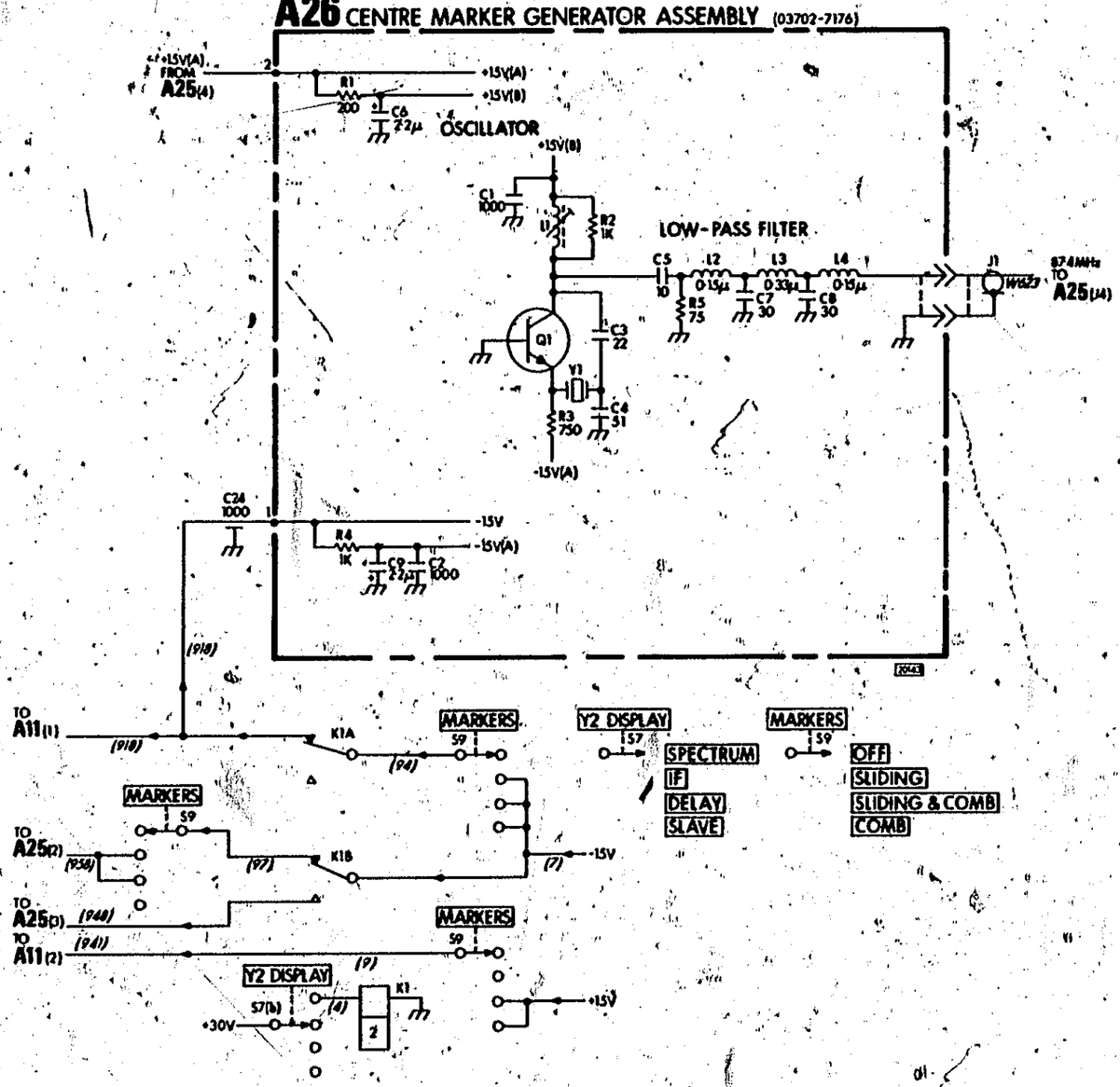


Figure A26-3. Schematic Diagram – Assembly A26

CATHODE-RAY TUBE WARRANTY

The cathode-ray tube (CRT) supplied in your Hewlett-Packard instrument and replacement CRT's purchased from hp are warranted by the Hewlett-Packard Company against electrical failure for a period of one year from the date of sale. Broken tubes and tubes with phosphor or mesh burns are not included under this warranty. If the CRT is broken when received, a claim should be made with the responsible carrier.

Your nearest Hewlett-Packard Sales/Service Office (listed at rear of instrument manual) maintains a stock of replacement tubes and will assist in processing the warranty claim.

We would like to evaluate every defective CRT. This engineering evaluation helps us to provide a better product for you. Please fill out the CRT Failure Report on the reverse side of this sheet and return it with the defective CRT to:

Hewlett-Packard Limited,
South Queensferry,
West Lothian, Scotland.

Attention:- CRT QA

To avoid damage to the tube while in shipment, please follow the shipping instructions below; warranty credit is not allowed on broken tubes.

SHIPPING INSTRUCTIONS

It is preferable that the defective CRT be returned in the replacement CRT carton. If the carton or packaging material is not available, pack the CRT according to the instructions below:

1. Carefully wrap the tube in ¼inch thick cotton batting or other soft padding material.
2. Wrap the above in heavy kraft paper.
3. Pack wrapped tube in a rigid container which is at least 4 inches larger than the tube in each dimension.
4. Surround the tube with at least 4 inches of packed excelsior or similar shock absorbing material; be sure the packing is tight all around the tube.

Thank you,

CRT Department

CATHODE-RAY TUBE FAILURE REPORT

DATE _____

FROM:

NAME _____

COMPANY _____

ADDRESS _____

1. hp INSTRUMENT MODEL NO. _____
2. hp INSTRUMENT SERIAL NO. _____
3. CRT SERIAL NO. _____
4. Please describe the failure and, if possible, show the trouble on the appropriate CRT face below.

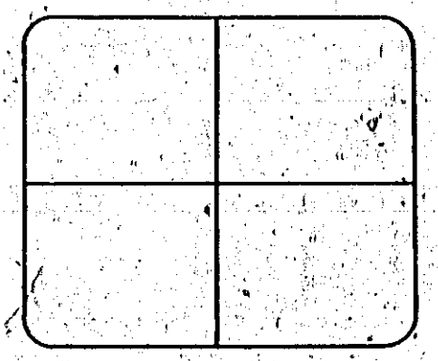
_____

_____

_____

_____

_____



5. Is the CRT within warranty? Yes _____ No _____
6. hp Sales/Service Office _____ Repair Order No. _____

CUT ALONG DOTTED LINE

HP MANUAL CHANGES

Make all corrections in your manual according to errata.
Check the following table for your instrument serial prefix
and make indicated changes in the manual:

MANUAL TITLE: 3702B
MANUAL PRINTED: November 1971
MANUAL PART NO: 03702-95010
CHANGE DATE: 5th August, 1974.

SERIAL PREFIX	MAKE CHANGE	SERIAL PREFIX	MAKE CHANGE	SERIAL PREFIX	MAKE CHANGE
ERRATA	None				
1150U	1				
1201U	1,2,				
1205U	1,2,3,				
1242U-00251	1,2,3,4,				
1249U	1 thru' 5				
1245U	1 - 4, 6				
1251U	1 thru' 7				
1251U-00331	1 thru' 8				
1251U-00356	1 thru' 9				
1317U	1 thru' 10				
1318U/1322U	1 thry' 11				
1330U-00496	1 thru' 12				
1331U-00526	1 thru' 13				
1331U-00596	1 thru' 14				
1331U-00631	1 thru' 15				
1331U-00666	1 thru' 16				
1331U-00815	1 thru' 17				
1424U-00936	1 thru' 18				

ERRATA

Page 4-3 Table 4-1
Add: 7124-2339 1 LABEL (to Accessory Kit material list).

Page 4-4 Table 4-1, Page 5-47, Figure A1-4, Page 5-83, Figure A12-3
Change: F3 2110-0094 FUSE 1.25A to F3 2110-0043 FUSE 1.5A
F4 2110-0094 FUSE 1.25A to F4 2110-0043 FUSE 1.5A
K1 0490-0893 RLY CHANGEOVER 2P to K1 0490-1061 RLY CHANGEOVER 3P
Delete: L1 5060-0408 COIL TRACK ALIGN
Change: Part No of MP4 03702-350 STRIP FACING SIDEFRAME to 03702-364
Delete: MP7 1490-0030 STAND TILT

Page 4-5 Table 4-1
Delete: MP10 03702-10013 BRACKET STAND OFF
Change: Part No Of MP 15 03702-346 BOX SCREENING to 03702-365

Page 4-6 Table 4-1
Delete: MP16 00180-01218 BRACKET (2 OFF)
Change Part No of R1 5040-0418 COVER INSULATING POTENTIOMETER to 5040-0421
Delete: 5040-0418 R2 COVER INSULATING POTENTIOMETER

Page 4-7 Table 4-1
Change: Part No of R6 0370-1005 KNOB SPECTRUM CENTRE to 0370-2191
Part No of R14 2100-0156 R: VAR 10K OHM to 2100-3193
Table 4-1, Page 5-53, Figure A2-6
Change: R15 0698-3136 R: FXD 17.8K OHM to R15 0757-0123 R: FXD 34.8K OHM
Table 4-1
Add: W4 03702-7304 1 ASSY TROUBLESHOOTING HARNESS
03702-366 1 CAPTIVE SPACER
03702-10026 1 ASSY TERMINAL BRACKET

Page 4-9 Table 4-1
Add: W170 03702-7305 1 ASSY COAX CBL VIO/BLK
Change: Part No of W925 03702-769 ASSY COAX CBL RED/GRN 03702-7306

ASSEMBLY A1

Page 4-10 Table 4-1, Page 5-47, Figure A1-4

Change: A1R1 0698-0088 R: FXD 215 OHM 1% ½W to A1R1 0698-3401 R: FXD 215 OHM 1% ½W

Delete: A1C12 0160-0174 C FXD 0.47UF 10% 25WVDC

A1C11 1902-3311 DIO BKDN 38.3V

A1CR12 1884-0073 DIO SCR

A1R27 0757-0280 R FXD 1K OHM 1% ⅛W

ASSEMBLY A2

Page 4-10 Table 4-1, Page 5-53, Figure A2-6

Add: Cable Assembly 03702-750

Change: A2C6 0160-3849 C: FXD 0.15UF to A2C6 0160-3910 C: FXD 0.1UF

A2C33 0160-0642 C: FXD 33PF to A2C33 0160-2204 C: FXD 100PF 5% 300WVDC

A2C34 0160-3136 C: FXD 3.3PF to A2C34 0160-2197 C: FXD 10PF 5% 300WVDC

A2E1, A2E2, A2E3, A2E4: 5082-4532 VOLTAGE CONTROL RESISTOR TO A2E1, A2E2, A2E3, A2E4: 1990-0336 VOLTAGE CONTROL RESISTOR

Delete: A2R27 0757-0398 R: FXD 75 OHM

Change: A2R30 0757-0274 R FXD 1.21K OHM to A2R30 0757-0280 R FXD 1K OHM 1% ⅛W

A2R34 0757-0280 R: FXD 1K OHM to A2R34 0757-0438 R: FXD 5.11K OHM 1% ⅛W

A2R65 0757-0440 R: FXD 7.5K OHM to A2R65 0757-0430 R: FXD 5.11K OHM 1% ⅛W

A2R82 0757-0444 R: FXD 12.1K OHM to A2R82 0698-3455 R: FXD 261K OHM

A2R83 0757-0416 R: FXD 511 OHM to A2R83 0698-3132 R: FXD 261 OHM

A2R66 0757-0449 R: FXD 20K OHM to A2R66 0757-0442 R: FXD 10K OHM 1% ⅛W

A2R67 0757-0465 R: FXD 100K OHM to A2R67 0757-0442 R: FXD 10K OHM 1% ⅛W

Add: A2R96 0698-3455 R: FXD 261K OHM 1% ⅛W between Q3 base and Q2 emitter

Change: Position of R82 from Q15 base to between Q4 emitter and MC2 pin 3

A2R60 0757-0439 R: FXD 6.81K OHM to A2R60 0757-0200 R FXD 5.62K OHM 1% ⅛W

Delete: A2R68 0757-0467 R FXD 121K OHM 1% ⅛W

A2R74 0698-0085 R FXD 2.61K OHM 1% ⅛W

Change: A2R89 0757-0123 R FXD 34.8K OHM to A2R89 0757-0440 R FXD 7.5K OHM 1% ⅛W

A2R90 0757-0199 R FXD 21.5K OHM to A2R90 0757-0123 R FXD 34.8K OHM 1% ⅛W

Add: A2CR9 1901-0040 DIO SI (Anode connected to Q22 base, cathod to GRD)

Change: A2C36 0180-0137 C FXD 100UF 20% 10WVDC to A2C36 0180-0098 C FXD 100UF 20% 20WVDC

A2C38 0180-0137 C FXD 100UF 20% 10WVDC to A2C38 0180-0098 C FXD 100UF 20% 20WVDC

A2C5 0160-3740 C FXD 0.22UF 5% to A2C5 0160-3910 C FXD 0.1UF

A2C31 0180-0106 C FXD 60UF 10% 6 WVDC to A2C31 0180-1940 C FXD 33UF 15WVDC

A2C42 0180-0229 C FXD 22UF 15WVDC to A2C42 0180-1940 C FXD 33UF 15WVDC

ASSEMBLY A3

Page 4-14 Table 4-1, Page 5-59 Figure A3-5

Add: Cable Assembly 03702-750

Delete: A3C4 0180-0098 C: FXD 100UF 20% 20WVDC

Change: A3C8 0160-2222 C: FXD 1500PF to A3C8 0160-2221 C: FXD 1300PF 5% 300WVDC

A3C9 0160-2222 C: FXD 1500PF to A3C9 0160-2221 C: FXD 1300PF 5% 300WVDC

A3C23 (from Q15 emitter to pin 16) to A3C25 and

Add: A3C25 0180-0106 C: FXD 60UF 10% 6WVDC (changed from 15UF)

Change: A3CR3 1902-3070 DIO BKDN 4.22V to A3CR3 1902-3045 DIO BKDN 3.48V

A3CR4 1902-3070 DIO BKDN 4.22V to A3CR4 1902-3048 DIO BKDN 3.48V

A3CR5 1902-3070 DIO BKDN 4.22V to A3CR5 1902-3048 DIO BKDN 3.48V

A3CR6 1902-3070 DIO BKDN 4.22V to A3CR6 1902-3048 DIO BKDN 3.48V

A3Q4 1853-0015 XSTR SI NPN to A3Q4 1853-0036 XSTR SI NPN

A2Q7 1853-0015 XSTR SI NPN to A3Q7 1853-0036 XSTR SI NPN

A3Q14 1854-0015 XSTR SI NPN to A3Q14 1853-0036 XSTR SI NPN

ASSEMBLY A3 (cont'd)

Change: A3R4 0757-0280 R: FXD 1K OHM to A3R4 0698-3132 R: FXD 2.61 OHM 1% ¼W
A3R17 0757-0280 R: FXD 1K OHM to A3R17 0698-3132 R: FXD 2.61 OHM 1% ¼W
A3R47 0757-0446 R: FXD 15K OHM to A3R47 0757-0465 R: FXD 100K OHM
A3R64 0757-0446 R: FXD 15K OHM to A3R64 0757-0465 R: FXD 100K OHM
A3C1 0160-0939 C FXD 430PF to A3C1 0410-0210 C FXD 270PF
A3C5 0160-0939 C FXD 430PF to A3C1 0410-0210 C FXD 270PF

Add: A3C26 0180-0195 C FXD 0.33UF 10% 35WVDC

ASSEMBLY A4

Page 4-10 Table 4-1, Page 5-63, Figure A4-4

Change: A4C1 0150-0093 C: FXD 0.01UF to A4C1 0160-2146 C: FXD 0.02UF
A4C4 0150-0093 C: FXD 0.01UF to A4C4 0160-2146 C: FXD 0.02UF
A4C14 0160-3367 C: FXD 0.68UF to A4C14 0160-0627 C: FXD 1UF
A4C15 0160-3367 C: FXD 0.68UF to A4C15 0160-0627 C: FXD 1UF
A4R8 0698-3162 R: FXD 46.4K OHM to A4R8 0698-0084 R: FXD 2.15K OHM
A4R9 0698-0084 R: FXD 2.15K OHM to A4R9 0698-3162 R: FXD 46.4K OHM

Delete: A4R69 0757-0274 R: FXD 1.21K OHM 1% ¼W

Change: A4R61 0698- R: FXD 2.15K OHM to A4R61 0757-0422 R: FXD 909 OHM
A4R64 0757-0395 R: FXD 56.2 OHM to A4R64 0757-0316 R: FXD 42.2 OHM
A4R67 0757-0438 R: FXD 5.11K OHM to A4R67 0698-0085 R: FXD 2.61K OHM

ASSEMBLY A5

Page 4-18 Table 4-1, Page 5-67, Figure A5-4

Change: A5C7 0150-0096 C: FXD 0.05UF to A5C7 0160-2672 C: FXD 0.047UF 5% 80WVDC
A5C9 0150-0096 C: FXD 0.05UF to A5C9 0160-2672 C: FXD 0.047UF 5% 80WVDC
A5C11 0150-0096 C: FXD 0.05UF to A5C11 0160-2672 C: FXD 0.047 UF 5% 80WVDC

Delete: A5C12 0180-0155 C: FXD 2.2UF 20% 20WVDC

Change: A5C19 0150-0050 C: FXD 1000PF to A5C19 0160-2145 C: FXD 0.005UF
A5MC1 1820-0217 IC OP AMP to A5MC1 1820-0203 IC OP AMP
A5R1 2100-2521 R: VAR 2K OHM to A5R1 2100-2522 R: VAR 10K OHM
A5R2 0698-5490 R: FXD 2K OHM to A5R2 0757-0438 R: FXD 5.11K OHM
A5R4 0757-0438 R: FXD 5.11K OHM to A5R4 0757-0280 R: FXD 1K OHM
A5R11 0757-0398 R: FXD 75 OHM to A5R11 0757-0420 R: FXD 750 OHM
A5R18 0757-0398 R: FXD 75 OHM to A5R18 0757-0420 R: FXD 750 OHM

Delete: A5R36 0757-0289 13.3K OHM 1% ¼W

Change: A5R38 0757-0457 R: FXD 33.2K OHM to A5R38 0757-0469 R: FXD 150K OHM
A5R39 0757-0452 R: FXD 27.4K OHM to A5R39 0757-0123 R: FXD 34.8K OHM
A5R41 0698-3155 R: FXD 4.64K OHM to A5R41 0757-0416 R: FXD 511 OHM
A5R53 0698-3154 R: FXD 4.22K OHM to A5R53 0698-0084 R: FXD 2.15K OHM

Change: A5R63 68.k OHM to 68.1K OHM

Add: A5R73 0698-3155 R: FXD 4.64K OHM 1% ¼W in place of A5C12

Alter: A5R61 should go to NOT to -15V

ASSEMBLY A6

Page 4-20 Table 4-1, Page 5-71, Figure A6-3

Change: A6C4 0160-2054 C: FXD 0.015UF to A6C4 0160-3907 C: FXD 0.02UF
A6C8 0160-2054 C: FXD 0.015UF to A6C8 0160-3907 C: FXD 0.02UF

Change the positions of C4 and C8 as shown on page 7, Figure 1

ASSEMBLY A10
Page 4-22 Table 4-1, Page 5-79, Figure A10-3
Change: A10R4 0757-0442 R: FXD 10K OHM to A10R4 0757-0447 R: FXD 16.2K OHM
A10R5 0757-0280 R: FXD 1K OHM to A10R5 0698-3152 R: FXD 8.48K OHM
A10R7 0698-3260 R: FXD 464K OHM to A10R7 0757-0465 R: FXD 100K OHM 1% ⅛W
A10C1 0160-0174 C: FXD 0.47UF 25V to A10C1 0160-0128 C: FXD 2.2UF 25V
A10R1 0757-0123 R: FXD 34.8K OHM to A10R1 0757-0283 R: FXD 2K OHM 1% ⅛W
A10R2 0757-0123 R: FXD 34.8K OHM to A10R2 0757-0461 R: FXD 68.1K OHM 1% ⅛W

ASSEMBLY A11
Page 4-22 Table 4-1, Page 5-81, Figure A11-3
Change A11C5 0180-0097 C: FXD 47UF to A11C5 0180-0155 C: FXD 2.2UF
A11C6 0180-0097 C: FXD 47UF to A11C6 0180-0155 C: FXD 2.2UF
A11C7 0180-0097 C: FXD 47UF to A11C7 0180-0155 C: FXD 2.2UF
A11C8 0180-0097 C: FXD 47UF to A11C8 0180-0155 C: FXD 2.2UF
Add: A11L1 9100-1641 IND FXD 240UH in place of R10
A11L2 9100-1641 IND FXD 240UH in place of R11
Delete: A11R10 0757-0394 R: FXD 51.1 OHM 1% ⅛W
A11R11 0757-0180 R: FXD 31.6 OHM 1% ⅛W

ASSEMBLY A12
Page 5-83 Figure A12-3
Change: The following transformer designations from:

A8	to	A7
B6	to	A4
B7	to	A3
A4	to	B6
A5	to	B7
A7	to	A5

Add: A8 as shown on page 7, Figure 2.

ASSEMBLY A13
Page 4-23 Table 4-1
Change: S2 03702-358 KNOB DIAL UNITS to S2 03716-0021 KNOB DIAL UNITS
Delete: A13A1Z11 0960-0128 ATTEN PAD 10dB
Change: A13A1Z12 0960-0128 ATTEN PAD 10db to A13A1Z12 0960-0129 ATTEN PAD 20dB

ASSEMBLY A15
Page 2-24 Table 4-1, Page 5-89, Figure A15-3
Change: A15C3 0180-0097 C: FXD 47UF to A15C3 0180-0155 C: FXD 2.2UF
A15C4 0180-0097 C: FXD 47UF to A15C4 0180-0155 C: FXD 2.2UF
Add: A15C9 0180-0155 C: FXD 2.2UF (between +15V(A) and GRD)
A15C10 0180-0155 C: FXD 2.2UF (between -15V(A) and GRD)
Delete: A15CR1 1902-3193 DIO BKDN 13.3V
A15CR2 1902-3193 DIO BKDN 13.3V
Change: A15L2 9100-1662 IND FXD 2.4MH to A14L2 03716-70042 IND FXD 2MH
Delete: A15L3 9100-1662 IND FXD 2.4MH
Change: A15R5 0698-2322 R: FXD 28.7 OHM to A15R5 0698-3429 R:FXD 19.6 OHM 1% ⅛W
A15R6 0698-4037 R: FXD 46.4 OHM to A15R6 0698-3432 R: FXD 26.1 OHM 1% ⅛W
A15R8 0757-0280 R: FXD 1K OHM to A15R8 0757-0274 R: FXD 1.21K OHM 1% ⅛W
A15R9 0757-0280 R: FXD 1K OHM to A15R9 0757-0274 R: FXD 1.21K OHM 1% ⅛W

ASSEMBLY A21
Page 4-26 Table 4-1, Page 5-95, Figure A21-3

Change A21C9 0160-0174 C: FXD 0.47UF to A21C9 0150-0096 C: FXD 0.05UF
A21C13 0180-1735 C: FXD 0.22UF to A21C13 0150-0096 C: FXD 0.05UF
A21C14 0150-0121 C: FXD 0.1UF to A21C14 0150-0093 C: FXD 0.01UF
A21C15 0180-1743 C: FXD 0.1UF to A21C15 0150-0093 C: FXD 0.01UF
A21C17 0160-0174 C: FXD 0.47UF to A21C17 0150-0096 C: FXD 0.05UF
A21C21 0160-0174 C: FXD 0.47UF to A21C21 0150-0096 C: FXD 0.05UF

Add: A21C30 0160-3136 C: FXD 3.3PF between Q4 base and Q5 emitter

Change: A21CR8 1902-3082 DIO BKDN 4.64V to A21CR8 1902-3182 DIO BKDN 12.1V
A21CR9 1902-3082 DIO BKDN 4.64V to A21CR9 1902-3182 DIO BKDN 12.1V
A21R17 0757-0278 R: FXD 1.78K OHM to A21R17 0698-0084 R: FXD 2.15K OHM
A21R41 0757-0418 R: FXD 619 OHM to A21R41 0698-5490 R: FXD 2K OHM
A21C1 0170-0071 C: FXD 0.33UF 20% 50WVDC to A21C1 0160-3735 C: FXD 0.33UF 5% 50WVDC
A21C2 0170-0071 C: FXD 0.33UF 20% 50WVDC to A21C1 0160-3735 C: FXD 0.33UF 5% 50WVDC
A21C14 0150-0093 C: FXD 0.01UF to A21C14 0180-1735 C: FXD 0.22UF

ASSEMBLY A22
Page 4-28 Table 4-1, Page 5-97, Figure A22-3

Change: A22R18 0698-3430 R: FXD 21.5 OHM to A22R18 0757-0418 R: FXD 619 OHM
A22R38 0757-0399 R: FXD 82.5 OHM to A22R38 0757-0282 R: FXD 221 OHM
A22C5 0180-0229 C: FXD 33UF 10V to A22C5 0180-1940 C: FXD 33UF 15V
A22CR4 1902-0025 DIO BKDN 10V to A22CR4 1902-1264 DIO BKDN 10V
A22R34 0758-0715 R: FXD 150 OHM 1% ½W to A22R34 0757-0801 R: FXD 150 OHM 1% ¼W

ASSEMBLY A23
Page 4-30 Table 4-1, Page 5-101, Figure A23-3

Change: A23C14 0160-2202 C: FXD 75PF to A23C14 0160-2264 C: FXD 20PF 5% 500WVDC
Delete: A23C15 0160-2202 C: FXD 75PF 5% 300WVDC
Change: A23C22 0180-0291 C: FXD 1UF to A23C22 0160-0627 C: FXD 1UF 10% 100WVDC
Add: A23C37 0160-0174 C: FXD 0.47UF
Change A23L5 03702-7300 IND VAR to A23L5 03702-7311 IND VAR
A23L7 03702-7300 IND VAR to A23L7 03702-7311 IND VAR
A23L9 9100-2249 IND FXD 0.15UF to A23L9 9100-2247 IND FXD 0.1UH
Add: A23L10 9100-2247 IND FXD 0.1UH
Change: A23Q6 1854-0092 XSTR SI NPN to A23Q6 1854-0071 XSTR SI NPN
A23Q7 1854-0092 XSTR SI NPN to A23Q7 1854-0071 XSTR SI NPN
Add: A23Q8 1854-0071 XSTR SI NPN
A23C41 0160-0665 C: FXD 5.6PF 5% 30WVDC
Change: A23CR1 1901-0347 DIO SI to A23CR1 1901-0518 DIO SI
A23CR2 1901-0347 DIO SI to A23CR2 1901-0518 DIO SI
A23R7 0698-3152 R: FXD 3.48K OHM to A23R7 0757-0739 R: FXD 2K OHM 1% ¼W
A23R8 0757-0442 R: FXD 10K OHM to A23R8 0757-0449 R: FXD 20K OHM
Add: Q8 and C37 as shown on page 7, Figure 3

Change: Change A23R9 0757-0427 R: FXD 1.5K OHM to A23R9 2100-2497 R: VAR 2K OHM 10% ½W
Add: A23R51 0757-0401 R: FXD 100 OHM 1% ¼W
A23C38 0150-0050 C: FXD 1000PF +80 -20%
Delete: A23R34 0698-3444 R: FXD 316 OHM 1% ¼W
Add: A23C40 0160-0174 C: FXD 047UF (between junction of R33 and C22, and PIN 3)
A23C39 0160-2264 C: FXD 20PF
A23L11 9100-2247 IND FXD 0.1UH
A23L12 9100-2247 IND FXD 0.1UH

Assembly A23 (Cont'd)

Change: A23Q1 1854-0019 XSTR SI NPN to A23Q1 1854-0427 XSTR SI NPN
A23R12 0757-0441 R: FXD 8.25K OHM to A23R12 0757-0280 R FXD 1K OHM 1% ⅛W
A23C5 0150-0050 C: FXD 1000PF to A23C5 0160-2218 C: FXD 1000PF 5% 300WVDC

ASSEMBLY A24

Page 4-32 Table 4-1, Page 5-105, Figure A24-4

Change: A24C15 0150-0093 C: FXD 0.01UF to A24C15 0160-0174 C: FXD 0.47UF
A24C24 0160-2200 C: FXD 43PF to A24C24 0160-2150 C: FXD 33PF
A24C43 0180-0155 C: FXD 2.2UF to A24C43 0160-2145 C: FXD 5000PF
Delete: A24C46 0160-0660 C: FXD 36PF 5% 30WVDC
Add: A24C48 0160-3138 C: FXD 18PF 5% 30WVDC
A24CR4 1901-0040 DIO SI
Change: A24CR5 1902-3036 DIO BKDN 3.16V to A24CR5 1901-0040 DIO SI
Add: A24CR8 1902-3203 DIO BKDN 14.7V 5% 400mW
Change: A24R8 0757-0200 R: FXD 5.62K OHM to A24R8 0698-0085 R: FXD 2.61K OHM 1% ⅛W
A24R9 0698-0085 R: FXD 2.61K OHM to A24R9 0757-0317 R: FXD 1.33K OHM 1% ⅛W
A24R16 0698-0082 R: FXD 464 OHM to A24R16 0698-3260 R: FXD 464K OHM 1% ⅛W
A24R32 0698-5615 R: FXD 562 OHM to A24R32 0757-0159 R: FXD 1K OHM
A24R33 0757-0200 R: FXD 5.62K OHM to A24@33 0698-3430 R: FXD 21.5 OHM
A24R34 0757-0280 R: FXD 1K OHM to A24R34 0757-0401 R: FXD 100 OHM 1% ⅛W
A24R61 0757-0280 R: FXD 1K OHM to A24R61 0757-0421 R: FXD 825 OHM
Add: A24R76 0698-3160 R: FXD 31.6K OHM 1% ⅛W
A24R77 0698-3136 R: FXD 17.8K OHM 1% ⅛W
Change: A24R4 0757-0280 R: FXD 1K OHM to A24R4 0757-0317 1.33K OHM 1% ⅛W
Detector circuitry as shown on page 8, Figure 4.

Change: A24R15 0757-0449 R: FXD 20K OHM to A24R15 0757-0123 R: FXD 34.8K OHM 1% ⅛W
A24R18 0698-3132 R: FXD 261 OHM to A24R18 0757-0417 R: FXD 562 OHM 1% ⅛W
A24R55 0757-0346 R: FXD 10 OHM to A24R55 0757-0401 R: FXD 100 OHM 1% ⅛W
A24R66 0757-0280 R: FXD 1K OHM to A24R66 0757-0447 R: FXD 16.2K OHM 1% ⅛W
A24 R67 0757-0317 R: FXD 1.33K OHM to A24R67 0757-0279 R: FXD 3.16K OHM 1% ⅛W
A24R68 0698-0084 R: FXD 2.15K OHM to A24R68 0757-0438 R: FXD 5.11K OHM 1% ⅛W
Add: A24C47 0160-2218 C: FXD 1000PF 300WVDC (between the junction of R66 and C28 and GRD)
Change: A24R71 0757-0484 R: FXD 619K OHM to A24R71 0757-0485 R: FXD 681K OHM

ASSEMBLY A25

Page 4-35 Table 4-1, Page 5-109, Figure A25-3

Add: A25C29 0150-0050 C: FXD 1000PF 600WVDC
Change: A25L1 03702-7298 IND VAR to A25 L1 03702-726 IND VAR
Position of C29 from second mixer to between J3 and deck.

ASSEMBLY A26

Page 4-37 Table 4-1, Page 5-111, Figure A26-3

Change: A26R3 0757-0420 R: FXD 750 OHM to A26R3 0757-0731 R: FXD 825 OHM 1% ⅛W
A26R4 0757-0280 R: FXD 1K OHM to A26R4 0757-0407 R: FXD 200 OHM
Add: A26Y1 0410-0428 XTAL 87.4MHz

Page 4-41 Table 4-4, Page 5-26, Figure 3-2, Page 5-29, Figure 3-4, Page 5-89, Figure A15-3

Change: W157 03703-7249 ASSY COAX CBL GRN/VIO to W169 03702-7303 ASSY COAX CBL BLU/WHT from A15J2 to Plug-in (8) for OPTION 004 ONLY
Add: W129 03702-7302 ASSY COAX CBL RED/WHT for OPTION 004 ONLY

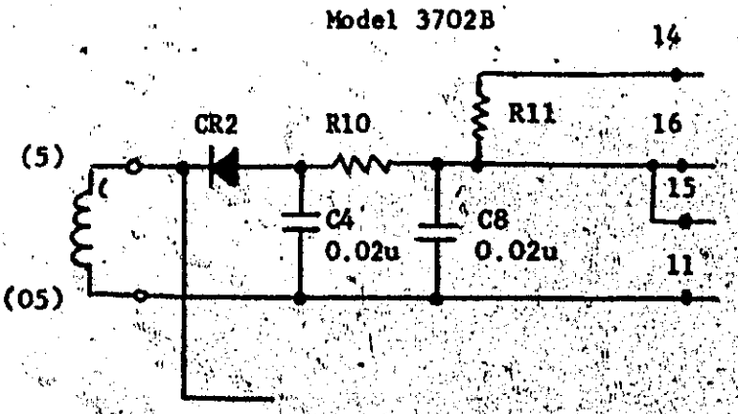


FIGURE 1 P/O Assembly A6 - Update as shown

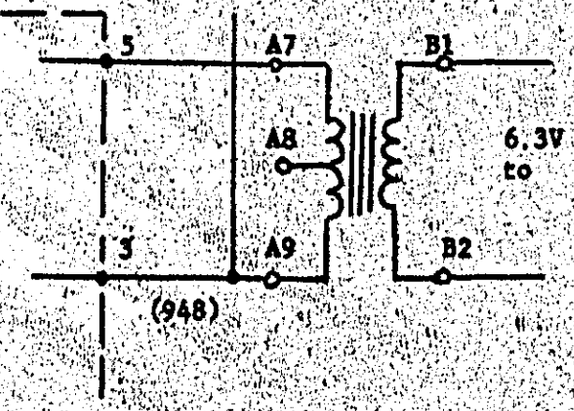


FIGURE 2 P/O Assembly A12 - Update as shown

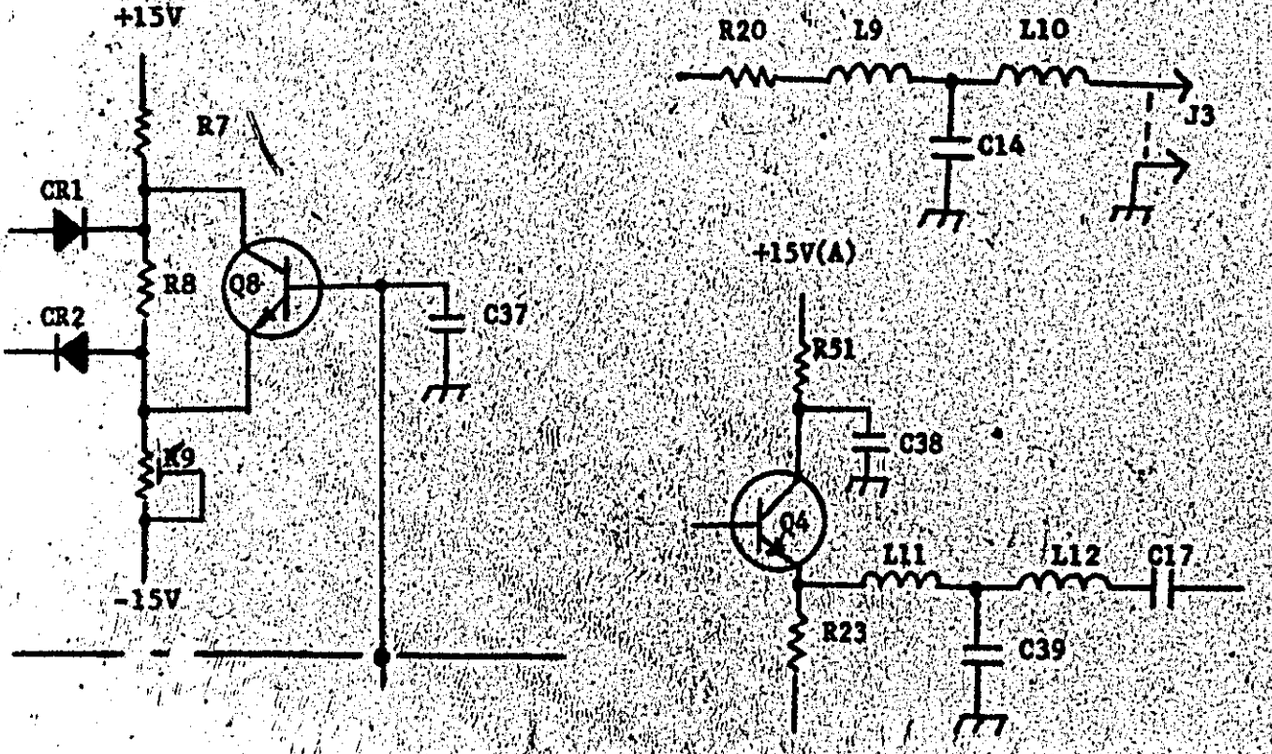


FIGURE 3 P/O Assembly A23 - Update as shown

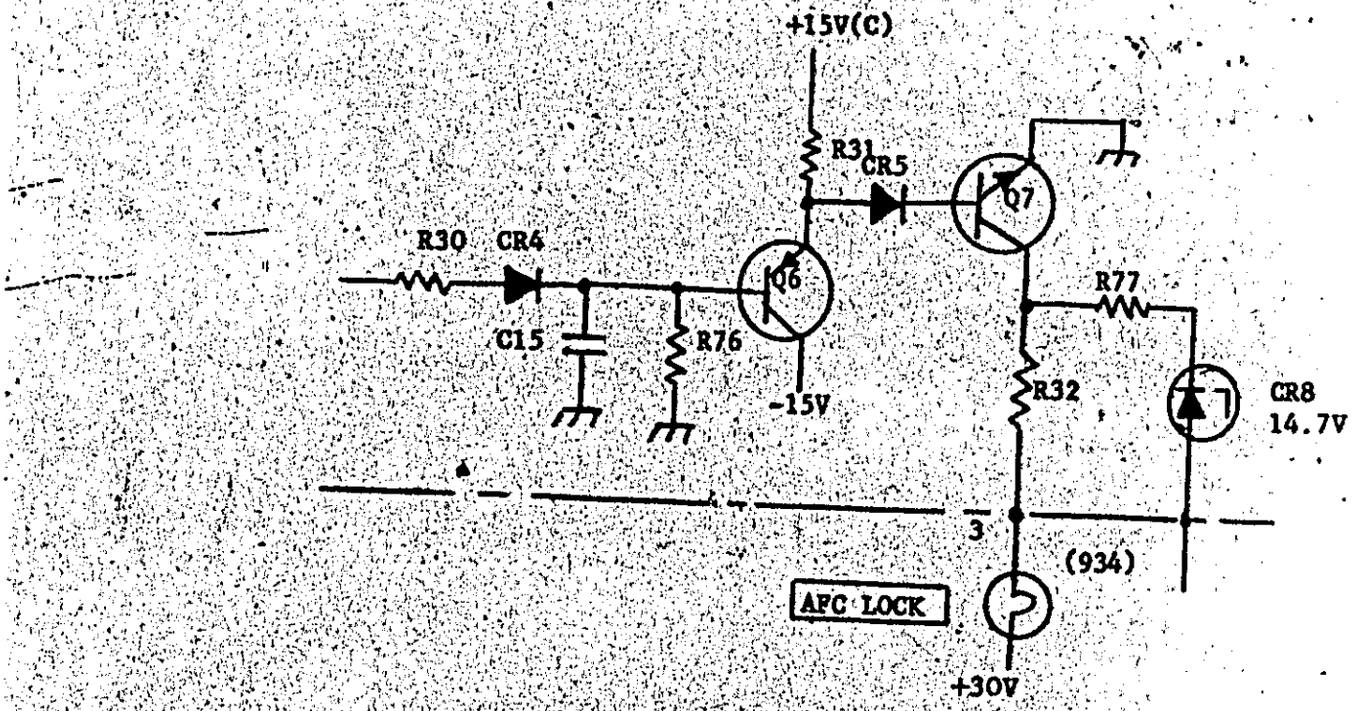


FIGURE 4 - P/O Assembly A24 - Update as shown

Page 4-12
Add: A2MC12 IC OP AMP

Page 4-10
Change: A2C3,4 to PEN 0160-3910 C: FXD 0.1uF 5% 300V

Page 4-11
Change: A2C19,24 to Part No 0180-1940 C: FXD Elec 33uF 15VDCW
A2C40 to Part No 0180-0106 C: FXD Elec 60uF 6VDCW
A2CR8 to Part No 1902-3203 Diode Zener 14.7V

Page 4-13
Change: A2R82 to Part No 0757-0488 R: FXD 909K ohm 1% ¼W
A2R40,41 to Part No 0698-3449 R: FXD 28.7K ohm 1% ¼W
A2R42,39 to Part No 0757-0280 R: FXD 1K ohm 1% ¼W
A2R38,76 to Part No 0757-0442 R: FXD 10K ohm 1% ¼W
A2R52 to Part No 0757-0460 R: FXD 61.9K ohm 1% ¼W

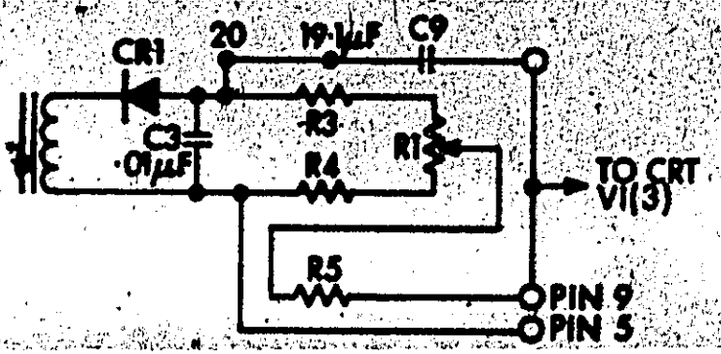
Page 4-14
Delete: A2R88
Change: A2R89 to Part No 0698-3152 R: FXD 3.48K ohm 1% ¼W
A2R91 to Part No 0757-0280 R: FXD 1K ohm 1% ¼W
A2R96 to Part No 0757-0488 R: FXD 909K ohm 1% ¼W

Figures A2-4,A2-5,A2-6
Delete: R83 and replace with wire link

CHANGE 1
Table 4-1
Delete: R15
A23R11
Change: A24C39 to 0160-3138 C: FXD 15pF 5%
A24R65 to 0757-0440 R: FXD 7.5K OHM 1% ¼W
A24R67 to 2100-2030 R: VAR 20K OHM 10% ¼W
Figure A23-2,A23-3
Replace R11 with wire link.
Figure A24-4
Change: C39 to 15pF
R65 to 7.5K OHM
R67 to 20K OHM Variable resistor

CHANGE 2
Table 4-1
Change: A2R92 to 0757-0465 R: FXD 100K OHM
A7R1 to 2100-3218

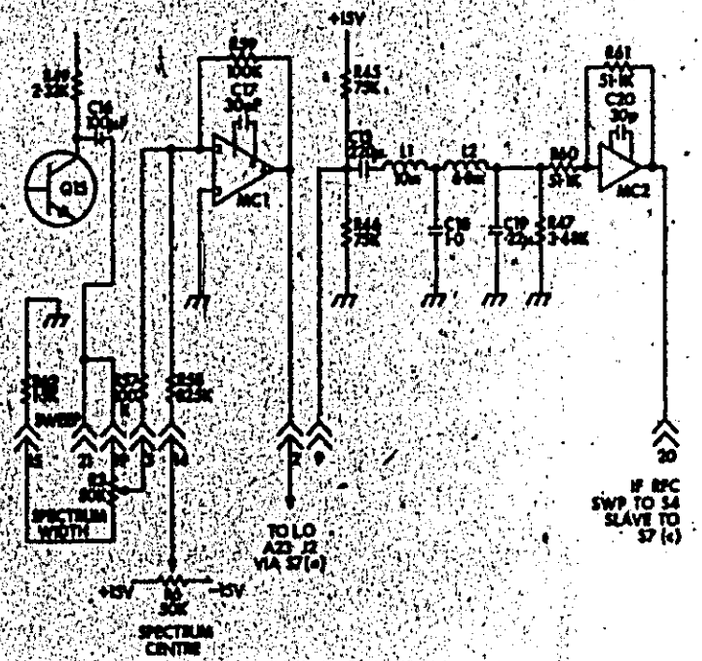
CHANGE 3 Page 4-20, Table 4-1
Change: A6C3 to 0160-0907 C:FXD 0.01uF
Add: A6C9 0160-3958 C:FXD 0.1uF
Page 5-71, Figure A6-3
Make changes as below



Change 3 (cont'd)

Page 4-15, Table 4-1
Change: A2R46 to 0698-3457 R:FXD 316K
Page 5-59, Figure A3-5
Change: R46 to 316K
Page 4-26, Table 4-1
Change: A21C25 to Part No 0150-0121 C:FXD 0.1uF
Page 5-95 Figure A21-3
Change: C25 to 0.1
Page 4-14,17,18, Table 4-1
Change: A4CR3 to Part No 1902-1264
A4CR4 to Part No 1902-0626
A4CR5,6,7 to Part No 1902-1263
A4C16 to C:ELEC Part No 0180-0098 100uF
A4C17 to Part No 0160-2199 C:FXD 30pF
A4R45,46 to Part No 0757-0462 R:FXD 75K
A4R47 to 0698-3152 R:FXD 3.48K
A4R57,59 to Part No 0757-0465 R:FXD 100K
A4R58 to Part No 0757-0487 R:FXD 825K
A4R60,61 to 0757-0658 R:FXD 51.1K
A4R62 to Part No 0757-0427 R:FXD 1.5K
Delete: A4R63,64,65,66,67,68
A4Q17,18,19,20
Add: A4C18 Part No 0160-0127 C:FXD 1uF
A4CI9 Part No 0160-3740 C:FXD 0.22uF
A4C20 Part No 0160-2199 C:FXD 30pF
A4L1 Part No 9140-0131 I:FXD 10mH
A4L2 Part No 9100-1637 I:FXD 6.8mH
A4MC1,2 Part No 1820-0477 LINEAR IC
Page 5-63, Figure A4-4
Modify as follows

MODIFICATION TO A4 BOARD



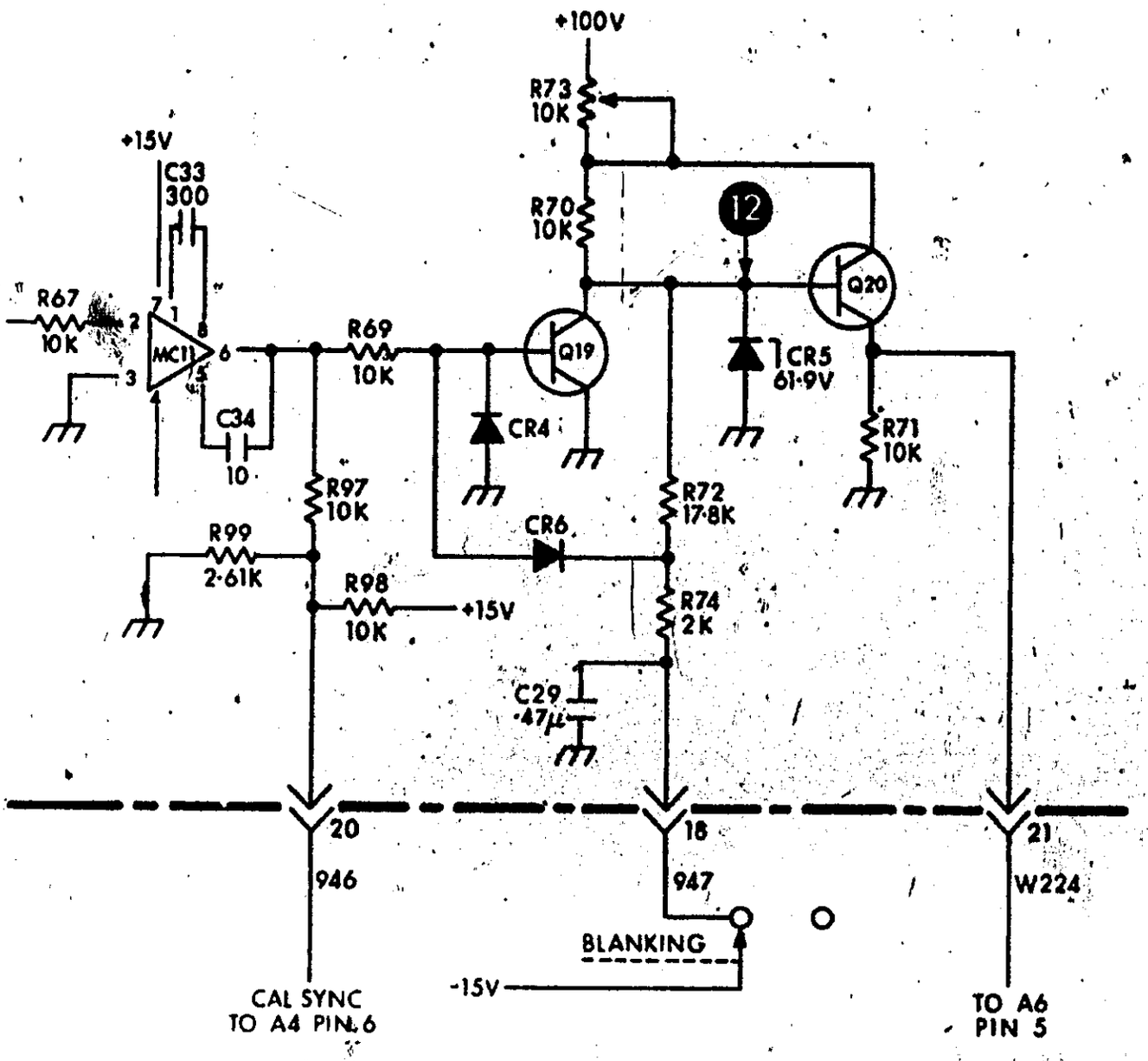
Page 4-6, Table 4-1
Change: R3 to Part No 2100-3298 R:VAR 50K LIN - 50K LIN

CHANGE 4

Table 4-1

Change : A25L1 to part no 03701-731 Ind Var
A25C5,6 to part no 0150-0091 C. Fxd 1.5pF ±.25pF 500VDWC
Delete : Hybrid to part no 15537A Hybrid 4 port BNC
Change : A2 to part no 03702-7321 Assy Horiz Deflection.
A2R69,70 to part no 0757-0442 R. Fxd 10k 1% 1/8W
A2R72 to part no 0698-3136 R. Fxd 17.8K Ohm 1% 1/8W
A2R73 to part no 2100-2522 R. Var 10k Ohm 10% ½W
Delete : A2C47 to part no 0150-0096 C. Fxd 0.05uF 100VWDC
Add : A2R74 to part no 0698-5490 R. Fxd 2K Ohm 1% 1/8W
A2R99 to part no 0698-0085 R. Fxd 2.61K Ohm 1% 1/8W
A2C29 to part no 0160-0174 C. Fxd 0.47uf -20+80% 25WVDC
A2R97,98 to part no 0757-0442 R. Fxd 10K Ohm 1% 1/8W

MODIFICATION TO A2 BOARD



CHANGE 5 Table 4-4

Add : A23 part no 03702-70002 IF Mixer and Local Oscillator (in place of 03702-7170)

Table 4-1

Change : A3CR3/4/5/6 to part no 1902-3066 Di Bkdn 4.02V 5%

Add : CR1 part no 1901-0040 Di Si

Change : A21R40 to part no 0698-0082 R. Fxd 464 Ohm 1% 1/8W

A6Q1,2 to part no 1854-0590 Xstr Si

Change : A3Q3/8 to part no 1855-0081 Xstr Fet N Channel

A4R16 to part no 0757-0289 R. Fxd 13.3K Ohm 1% 1/8W

A4R15 to part no 0698-3444 R. Fxd 316 Ohm 1% 1/8W

A4R17 to part no 0757-0394 R Fxd 61.1 Ohm 1% 1/8W

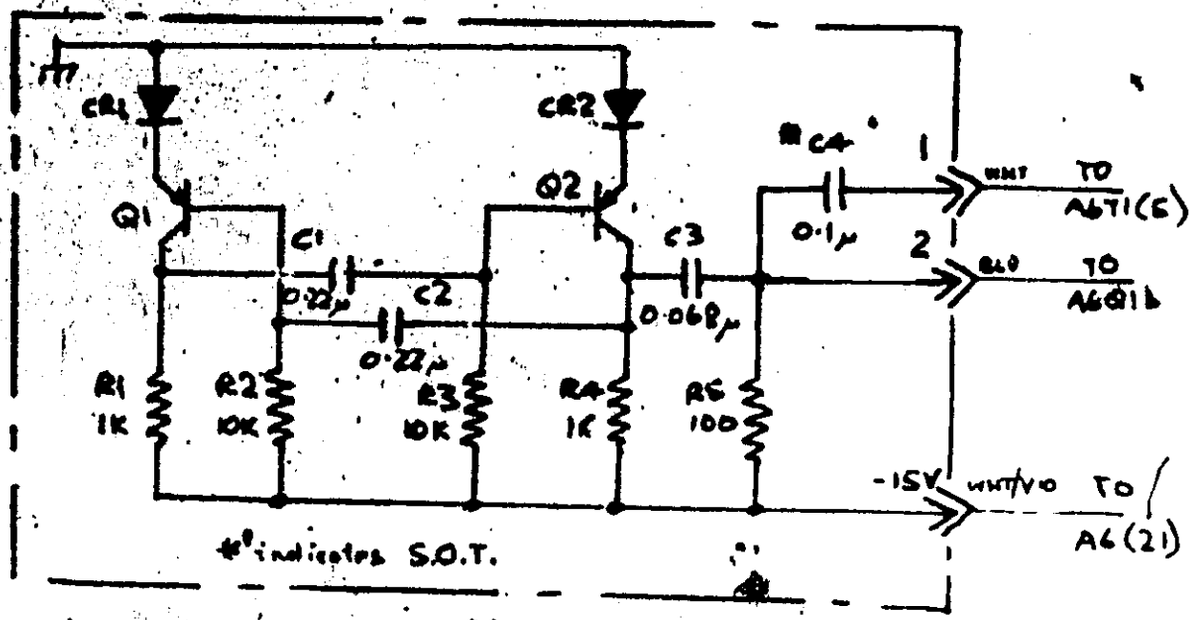
CHANGE 6 Table 4-1

Add :	A27	part no 03702-70004	EHT Stimulus Oscillator
	C30	part no 0170-0019	C. Fxd .1uF 200V 5%
	C31	part no 0180-0089	C. Fxd 10uF 150V
Delete :	A6C9	part no 0160-3958	C. Fxd .1uF 250V 10%
	A6C2	part no 0160-0174	C. Fxd .47uF -20+80% 25V
Add :	A6C11	part no 0160-0907	C. Fxd .01uF 5KV

S.M.L. for 03702-70004

A27C1,2	C. Fxd 0.22uF 5% 100V	0160-3740
A27C3	C. Fxd 0.068uF 5% 100V	0160-3741
A27C4	C. Fxd 0.1uF 5% 160V	0160-3910
A27CR1,2	Dio Si	1901-0050
A27Q1,2	Xstr. Si PNP	1853-0036
A27R1,4	R. Fxd 1K 1% 1/8W	0757-0280
A27R2,3	R. Fxd 10K 1% 1/8W	0757-0442
A27R5	R. Fxd 100 Ohm 1% 1/8W	0757-0401
	P.C. Board Blank	03702-30004

CIRCUIT DIAGRAM FOR 03702-70004



CHANGE 7 Table 4-1

Change : A5R46 to part no 0757-0278 R. Fxd 1.78K Ohm 1% 1/8W
Add : A25C30 part no 0160-0662 C. Fxd 51pF 5% 30V
Fit C30 Across R22
Change : A5R14 to part no 0757-0280 R. Fxd 1K Ohm 1% 1/8W

CHANGE 8 Table 4-1

Change : A5R66/67 to part no 0698-3434 R. Fxd 34.8 Ohm 1% 1/8W
Change : A4C14/15 to part no 0160-0627 C. Fxd 1.0uF 10%
Change : A22R46 to part no 0698-3441 R. Fxd 215 Ohm 1% 1/8W
Change : A22C20 to part no 0150-0093 C. Fxd .01uF 100VWDC

Table 4-4

Change : A8R19 to part no 0698-4382 R. Fxd 53.2 Ohm 1% 1/8W

Table 4-1

Delete : A4R62 part no 0757-0427 R. Fxd 1.5K Ohm 1W 1%
Add : R21 part no 0757-0427 R. Fxd 1.5K Ohm 1% 1/8W
(R21 fitted between XA3 pin 21 and pin 13)
(R3 wire routed to XA3 pin 21)
Change : A2R70 to part no 0757-0839 R. Fxd 10K Ohm 1% 1/2W

CHANGE 9 Table 4-4

Change : A8C1/2/3/4 to part no 0160-3740 C. Fxd 0.22uF.
Ref. Change 6
Change : A27CR1/2 to part no 1901-0025 D1 S1

CHANGE 10 Table 4-1

Add : A6C10 part no 0160-3958 C. Fxd 0.1uF 250V
(fitted between pin 5 and ground)
Change : A6 to part no 03702-70006 Assy High Voltage Power Supply
Change : "under B1" to part no 03710-10050 Fan Filter Assy.

CHANGE 11 Reference Change 6 on Change Sheet (03702-70002)

Change : A23L3,7 to part no 03702-7328 Coil RF
A23L4,5,6, to part no 03702-7329 Coil RF
A23L8 to part no 03702-7338 Coil RF
A23L9 to part no 03702-7331 Coil Rf
A23C20,24 to part no 0160-2211 C. Fxd 510pF 5%
A23C21,22,23 to part no 0160-2206 C. Fxd 160pF 5%
A23C27,28 to part no 0160-2204 C. Fxd 100pf 5%
MP15 part no 03702-190 to part no 03702-10046 Lid Screening Casting
A24 to part no 03702-70003 Assy Disgriminator

CHANGE 12 Table 4-1

Add :A4 part no 03702-70001 IF Calibrator Assembly
(in place of 03702-7173)

	03702-30001	PC Board
A4 C1	0160 -0127	C FXD 1uF
A4 C2	0160 -0127	C FXD 1uF
A4 C3	0180 -0098	C FXD 100uF
A4 C4	0160 -2199	C FXD 30pF
A4 C5	0180 -0159	C FXD 220uF
A4 C6	0160 -0127	C FXD 1uF
A4 C7	0160 -3740	C FXD 0.22uF
A4 C8	0160 -2199	C FXD 30pF
A4 C9	0180 -0158	C FXD 2.2uF
A4 C10	0160 -2199	C FXD 30pF
A4 C11	0160 -3958	C FXD 0.1uF
A4 C12	0180 -0159	C FXD 220uF
A4 C13	0160 -3958	C FXD 0.1uF
A4 C14	0180 -0155	C FXD 2.2uF
A4 C15	0180 -1746	C FXD 15uF
A4 C16	0180 -1746	C FXD 15uF
A4 C17	0180 -0155	C FXD 2.2uF
A4 CR1	1902 -0025	DIO BKDN 10v
A4 CR2	1901 -0025	DIO 5.1
A4 CR3	1902 -3094	DIO BKDN 5.11v
A4 CR4	1902 -3172	DIO BKDN 11v
A4 L1	9140 -0137	IND FXD 10mH
A4 L2	9100 -1673	IND FXD 6.8mH
A4 MC1	1820 -0477	I.C. LM 301
A4 MC2	1820 -0477	I.C. LM 301
A4 MC3	1820 -0054	I.C. SN7400
A4 MC4	1820 -0304	I.C. SN7472
A4 MC5	1820 -0477	I.C. LM 301
A4 MP1	4040 -0752	Extractor yellow
A4 MP2	4040 -0752	Extractor yellow
A4 Q1	1854 -0071	XSTR SI NPN 2N3391
A4 Q2	1854 -0071	XSTR SI NPN 2N3391
A4 Q3	1854 -0071	XSTR SI NPN 2N3391
A4 Q4	1854 -0071	XSTR SI NPN 2N3391
A4 Q5	1854 -0071	XSTR SI NPN 2N3391
A4 Q6	1854 -0071	XSTR SI NPN 2N3391
A4 R1	0698 -3150	R FXD 2.37K OHM
A4 R2	0698 -3150	R FXD 2.37K OHM
A4 R3	0757 -0417	R FXD 562 OHM
A4 R4	0757 -0274	R FXD 1.21K OHM
A4 R5	0698 -3150	R FXD 2.37K OHM
A4 R6	0698 -3150	R FXD 2.37K OHM
A4 R7	0757 -0274	R FXD 1.21K OHM
A4 R8	0698 -3151	R FXD 2.87K OHM
A4 R9	0757 -0465	R FXD 100 K OHM

.....

Table 4-1

A4 R10	0757 -0484	R FXD	619K OHM
A4 R11	0757 -0465	R FXD	100K OHM
A4 R12	0757 -0462	R FXD	75K OHM
A4 R13	0757 -0462	R FXD	75K OHM
A4 R14	0698 -3152	R FXD	3.48KOHM
A4 R15	0757 -0458	R FXD	51.1KOHM
A4 R16	0757 -0458	R FXD	51.1KOHM
A4 R17	0757 -0288	R FXD	9.09KOHM
A4 R18	0698 -5490	R FXD	2KOHM
A4 R19	0698 -3155	R FXD	4.64KOHM
A4 R20	0757 -0280	R FXD	1KOHM
A4 R21	0698 -3443	R FXD	287 OHM
A4 R22	0698 -5490	R FXD	2KOHM
A4 R23	0698 -0084	R FXD	2.15KOHM
A4 R24	0698 -3155	R FXD	4.64KOHM
A4 R25	2100 -2644	R VAR	500K OHM
A4 R26	0757 -0438	R FXD	5.11KOHM
A4 R27	0757 -0458	R FXD	51.1KOHM
A4 R28	0757 -0424	R FXD	1.1K OHM
A4 R29	0759 -0420	R FXD	750 OHM
A4 R30	0698 -3156	R FXD	14.7KOHM
A4 R31	0757 -0469	R FXD	150 OHM
A4 R32	0757 -0420	R FXD	750 OHM
A4 R33	0757 -0278	R FXD	1.78KOHM 1% 1/8w
A4 R34	0698 -3443	R FXD	287 OHM
A4 R35	0757-0420	R.Fxd.	750Ω 1% ⅛W
A4 R36	0698 -3156	R FXD	14.7KOHM
A4 R37	0757 -0469	R FXD	150 OHM
A4 R38	0757 -0401	R FXD	100 OHM
A4 R39	0698 -4307	R FXD	14.3KOHM
A4 R40	0757 -0398	R FXD	75 OHM
A4 R41	0698 -3155	R FXD	4.64KOHM
A4 R42	0757 -0401	R FXD	100 OHM
A4 R43	0757 -0180	R FXD	31.6 OHM
A4 R44	0698 -3402	R FXD	316 OHM
A4 R45	0757 -0401	R FXD	100 OHM
A4 R46	0757 -0180	R FXD	31.6 OHM
A4 R47	0757 -0460	R FXD	61.9KOHM
A4 R53	2100 -2574	R VAR	500 OHM

CHANGE 13

Table 4-1

Change : E1 to part no 37 connector mains socket 4 voltage 5060-9410

Delete : MP9 Panel rear lower 03702-172
MP8 Panel rear upper 03702-174

Add : MP8 Panel rear 03702-10040

Table 4-2

Change : MP9 to part no 03702-10042

Table 4-3

Change : MP9 to part no 03702-10043
A10R7 to part no 0757-0449 R.Fxd. 20KΩ

CHANGE 14 Table 4-1

Delete : A1 C2 part no 0160-0174 C Fxd 0.47uf
A1 R3 part no 0757-0280 R.Fxd 1kohm 1% 1/8w
A1 CR2 part no 1902-0664 Di Si Bkdn 12v
A1 CR3 part no 1884-0012 D1 Sch.

Change : A2R72 to part no 0698-3161 R.Fxd. 38.3KΩ 1% ⅛W
A24R49 to part no 0757-0338 R.Fxd 1KΩ 1% ⅛W
A4R37 to part no 0757-0461 R.Fxd 68.1KΩ 1% ⅛W
A4R47 to part no 0757-0199 R.Fxd. 21.5KΩ 1% ⅛W

CHANGE 15 Table 4-1

Change : A4R40 to part no 0757-0398 R.Fxd 75Ω 1% ⅛W
A2R73 to part no 2100-2489 R.Var 5KΩ 10% 0.5W

CHANGE 16 Table 4-1

Change : A24R68 to part no 0698-3430 R.Fxd 21.5Ω 1% ⅛W
A4R32 to part no 0698-3446 R.Fxd 383Ω 1% ⅛W
A4R33 to part no 0757-0430 R.Fxd 2.21KΩ 1% ⅛W
Table 4-4

Add : A8C16 C.Fxd 75pF 5% part no 0160-3143

CHANGE 17 Table 4.1

Change : A2R47 R.Fxd 681Ω to R.Fxd 332Ω 1% 0.5W part no 0757-0809
Change : A10 R5 R.Fxd 8.48K to R.Fxd 2.67K 1% Part No. 0698-3492

CHANGE 18 Table 4-1

Change : A24R8 R.Fxd 619Ω 1% 0.125W to R.Fxd 619Ω 1% 0.5W Part No. 0757-0158

A23 03702-70002 IF MIXER AND LOCAL OSCILLATOR

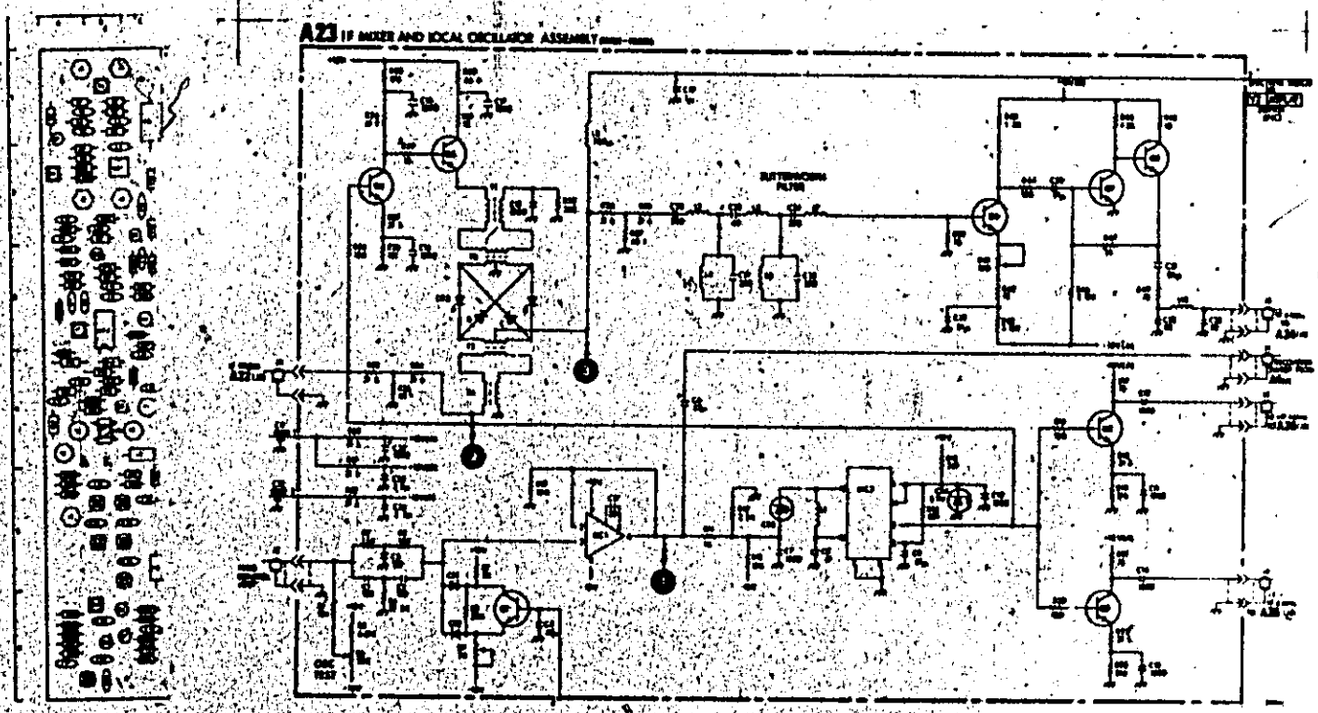
A23R1	0757-0442	R FXD FLM 10K 1% ⅛W
A23R2	0757-0446	R FXD FLM 15K 1% ⅛W
A23R3	0757-0446	R FXD FLM 15K 1% ⅛W
A23R4	0698-4477	R FXD FLM 10.5K 1% ⅛W
A23R5	0757-0439	R FXD FLM 6.81K 1% ⅛W
A23R6	2100-2591	R VAR LIN 25K 10% ½W
A23R7	0757-0739	R FXD FLM 2K 1% ⅛W
A23R8	0757-0449	R FXD FLM 20K 1% ⅛W
A23R9	2100-2497	R VAR CER 2K 10% ½W
A23R10	0757-0442	R FXD FLM 10K 1% ⅛W
A23R11	0757-0280	R FXD FLM 1K 1% ⅛W
A23R12	0698-6250	R FXD FLM 2.5K 1% ⅛W
A23R13	0757-0442	R FXD FLM 10K 1% ⅛W
A23R14	0757-0419	R FXD FLM 681 OHM 1% ⅛W
A23R15	0698-4579	R FXD FLM 261 OHM 1% ⅛W
A23R17	0757-0401	R FXD FLM 100 OHM 1% ⅛W
A23R17	0757-0398	R FXD FLM 75 OHM 1% ⅛W
A23R18	0698-3430	R FXD FLM 21.5 OHM 1% ⅛W
A23R19	0698-3444	R FXD FLM 316 OHM 1% ⅛W
A23R20	0757-0401	R FXD FLM 100 OHM 1% ⅛W
A23R21	0757-0398	R FXD FLM 75 OHM 1% ⅛W
A23R22	0698-3430	R FXD FLM 21.5 OHM 1% ⅛W
A23R23	0698-3444	R FXD FLM 316 OHM 1% ⅛W
A23R24	0757-0401	R FXD FLM 100 OHM 1% ⅛W
A23R25	0698-3204	R FXD FLM 178 OHM 1% ⅛W
A23R26	0698-7660	R FXD FLM 61.9 OHM 1% ⅛W
A23R27	0698-3430	R FXD FLM 21.5 OHM 1% ⅛W
A23R28	0757-0403	R FXD FLM 121 OHM 1% ⅛W
A23R29	0757-0346	R FXD FLM 10 OHM 1% ⅛W
A23R30	0698-4037	R FXD FLM 46.4 OHM 1% ⅛W
A23R31	0757-0346	R FXD FLM 10 OHM 1% ⅛W
A23R32	0698-3446	R FXD FLM 383 OHM 1% ⅛W
A23R33	0757-0180	R FXD FLM 31.6 OHM 1% ⅛W
A23R34	0757-0180	R FXD FLM 31.6 OHM 1% ⅛W
A23R35	0757-0397	R FXD FLM 68.1 OHM 1% ⅛W
A23R36	0757-0180	R FXD FLM 31.6 OHM 1% ⅛W
A23R37	0757-0397	R FXD FLM 68.1 OHM 1% ⅛W
A23R38	0757-0180	R FXD FLM 31.6 OHM 1% ⅛W
A23R39	0757-0398	R FXD FLM 75 OHM 1% ⅛W
A23R40	0757-0427	R FXD FLM 1.5K 1% ⅛W
A23R41	2100-1984	R VAR CER 100 OHM 10% ½W
A23R42	0757-0346	R FXD FLM 10 OHM 1% ⅛W
A23R43	0757-0279	R FXD FLM 3.16K 1% ⅛W
A23R44	0757-0401	R FXD FLM 100 OHM 1% ⅛W
A23R45	0757-0427	R FXD FLM 1.5K 1% ⅛W
A23R46	0698-0084	R FXD FLM 2.15K 1% ⅛W
A23R47	0757-0280	R FXD FLM 1K 1% ⅛W
A23R48	0757-0346	R FXD FLM 10 OHM 1% ⅛W
A23R49	0757-0398	R FXD FLM 75 OHM 1% ⅛W
A23R50	0698-3430	R FXD FLM 21.5 OHM 1% ⅛W
A23R51	0698-3430	R FXD FLM 21.5 OHM 1% ⅛W
A23R52	0698-3430	R FXD FLM 21.5 OHM 1% ⅛W

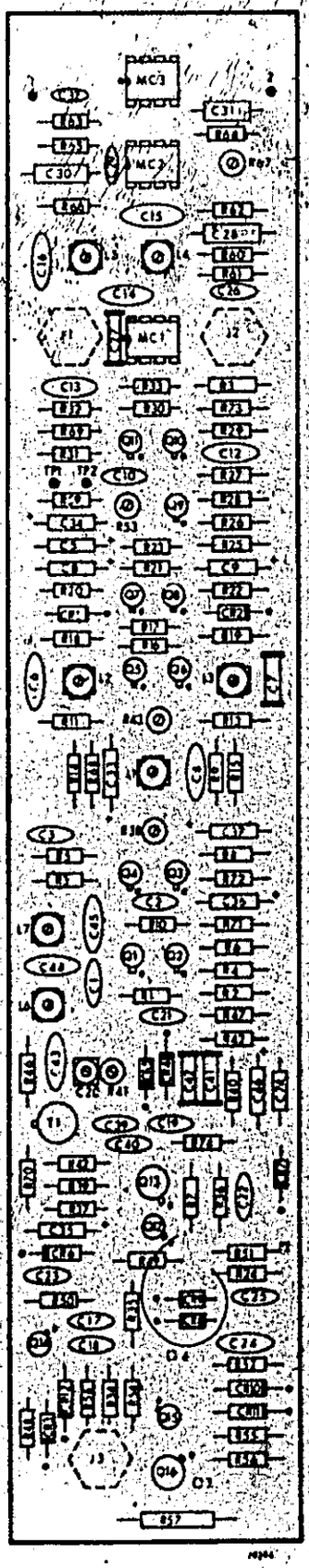
A23 03702-70002 IF MIXER AND LOCAL OSCILLATOR

A23C1	0140-0195	C FXD MICA 130 PF 5% 300VDC
A23C2	0140-0195	C FXD MICA 130 PF 5% 300VDC
A23C3	0140-0197	C FXD MICA 180 PF 5% 300VDC
A23C4	0160-0174	C FXD CER .47 UF 25VDCW
A23C5	0160-2199	C FXD MICA 30 PF 300VDCW
A23C6	0180-0097	C FXD TA 47 UF 35VDCW
A23C7	0150-0050	C FXD CER 1000 PF 1KVDCW
A23C8	0150-0093	C FXD CER .01 UF 100VDCW
A23C9	0150-0093	C FXD CER .01 UF 100VDCW
A23C10	0150-0050	C FXD CER 1000 PF 1KVDCW
A23C11	0150-0050	C FXD CER 1000 PF 1KVDCW
A23C12	0150-0050	C FXD CER 1000 PF 1KVDCW
A23C13	0150-0050	C FXD CER 1000 PF 1KVDCW
A23C14	0150-0050	C FXD CER 1000 PF 1KVDCW
A23C15	0150-0050	C FXD CER 1000 PF 1KVDCW
A23C16	0150-0050	C FXD CER 1000 PF 1KVDCW
A23C17	0150-0050	C FXD CER 1000 PF 1KVDCW
A23C18	0150-0050	C FXD CER 1000 PF 1KVDCW
A23C19	0160-0627	C FXD POLY CARB 1 UF
A23C20	0160-0134	C FXD MICA 220 PF 300VDCW
A23C21	0140-0198	C FXD MICA 200 PF 300VDCW
A23C22	0140-0192	C FXD MICA 68 PF 300VDCW
A23C23	0140-0198	C FXD MICA 200 PF 300VDCW
A23C24	0160-0134	C FXD MICA 220 PF 300VDCW
A23C29	0150-0093	C FXD CER .01 UF 100VDCW
A23C30	0150-0093	C FXD CER .01 UF 100VDCW
A23C31	0150-0093	C FXD CER .01 UF 100VDCW
A23C32	0140-0193	C FXD CER 82 PF 30VDCW
A23C33	0140-0193	C FXD CER 82 PF 30VDCW
A23C34	0150-0050	C FXD CER 1000 PF 1KVDCW
A23C35	0180-0155	C FXD DTA 2.2 UF 20VDCW
A23C36	0180-0155	C FXD DTA 2.2 UF 20VDCW
A23CR1	1901-0518	DIO HOT CARRIER
A23CR2	1901-0518	DIO HOT CARRIER
A23CR3	0122-0602	CVVAR
A23CR4	1902-0041	DIO BKDOWN 5.11V
A23CR5	1901-0545	QUAD SIL HOT CARR
A23L1	03702-739	COIL RF
A23L2	9140-0144	COIL MLD CHOKE 4.7 UH 10%
A23L3	03702-7182	COIL RF
A23L4	03702-7300	COIL RF
A23L5	03702-7316	COIL RF
A23L6	03702-7300	COIL RF
A23L7	03702-7182	COIL RF
A23L8	03702-7182	COIL RF
A23J1	1250-0932	CONN RF 75 OHMS
A23J2	1250-0932	CONN RF 75 OHMS
A23J3	1250-0932	CONN RF 75 OHMS
A23J4	1250-0932	CONN RF 75 OHMS
A23J5	1250-0932	CONN RF 75 OHMS
A23J6	1250-0932	CONN RF 75 OHMS

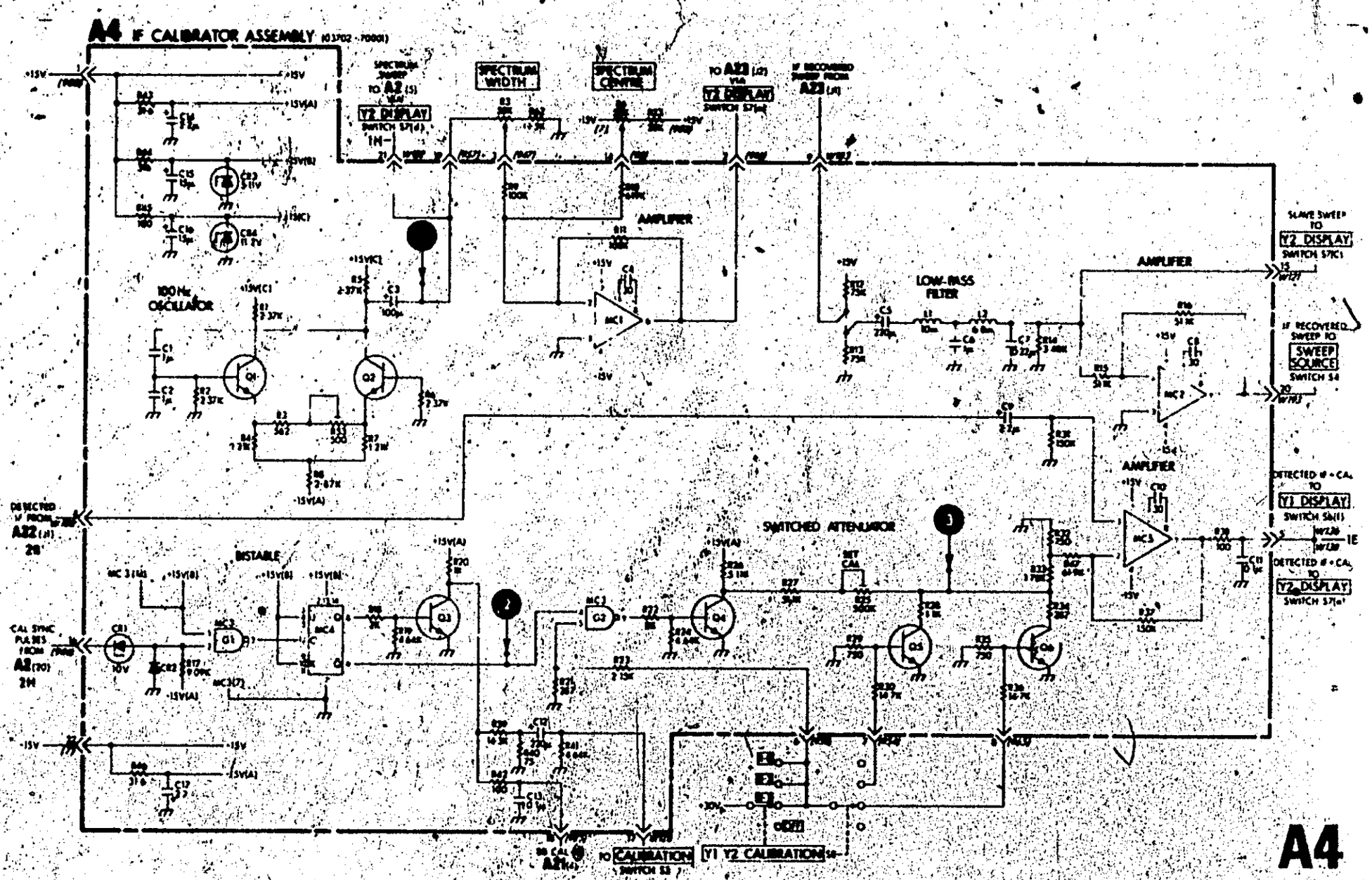
A23 03702-70002 IF MIXER AND LOCAL OSCILLATOR

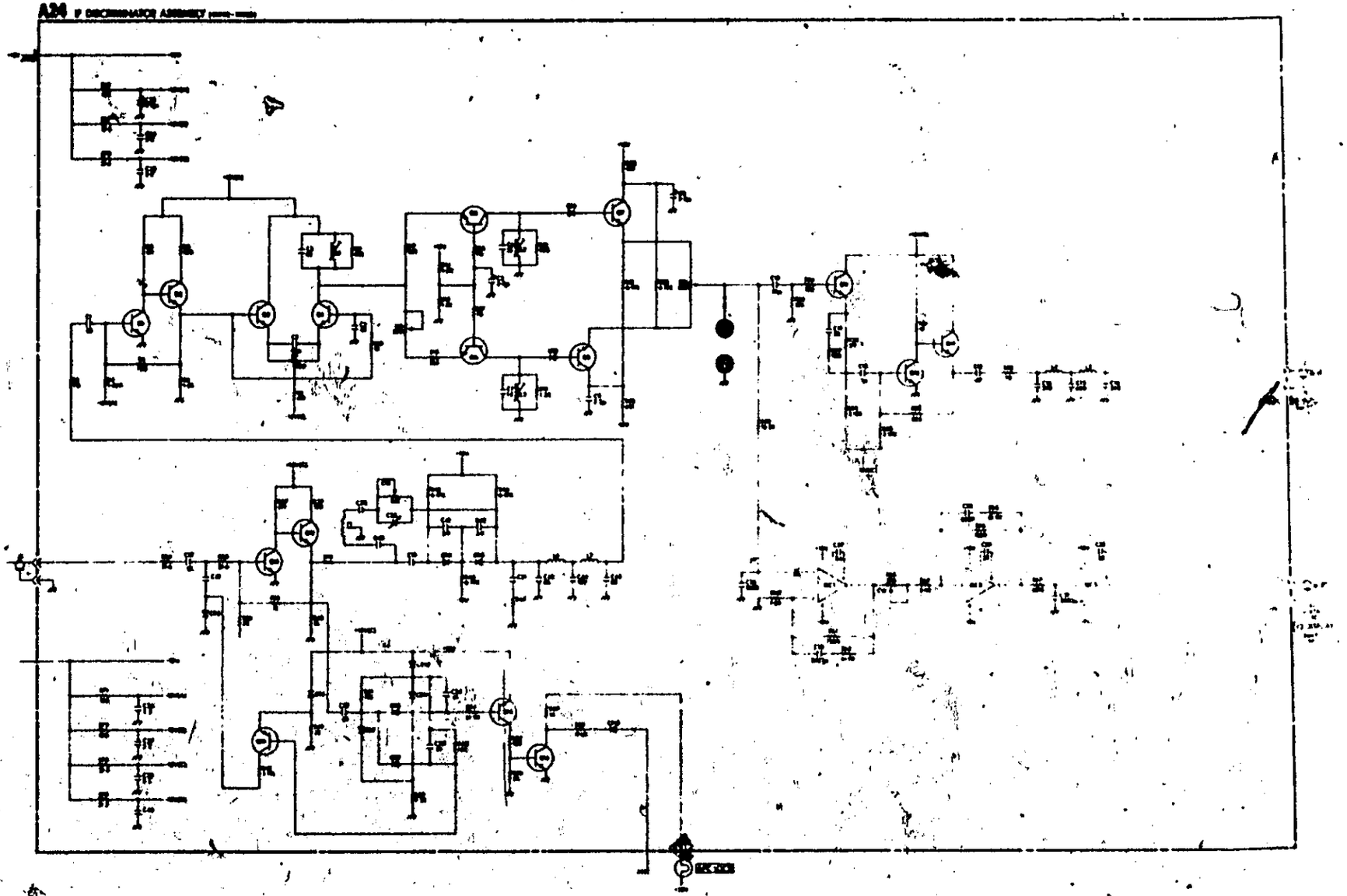
A23Q1	1854-0071	XSTR NPN SI
A23Q2	1854-0073	XSTR NPN SI
A23Q3	1854-0073	XSTR NPN SI
A23Q4	1854-0233	XSTR NPN SI
A23Q5	1854-0233	XSTR NPN SI
A23Q6	1854-0073	XSTR NPN SI
A23Q7	1854-0073	XSTR NPN SI
A23Q8	1854-0073	XSTR NPN SI
A23MC1	1820-0477	OP AMP
A23MC2		MOTOROLA MC 1648
A23T1	03710-70023	
A23T2	03710-70024	
A23T3	03710-70024	
A23T4	03710-70023	

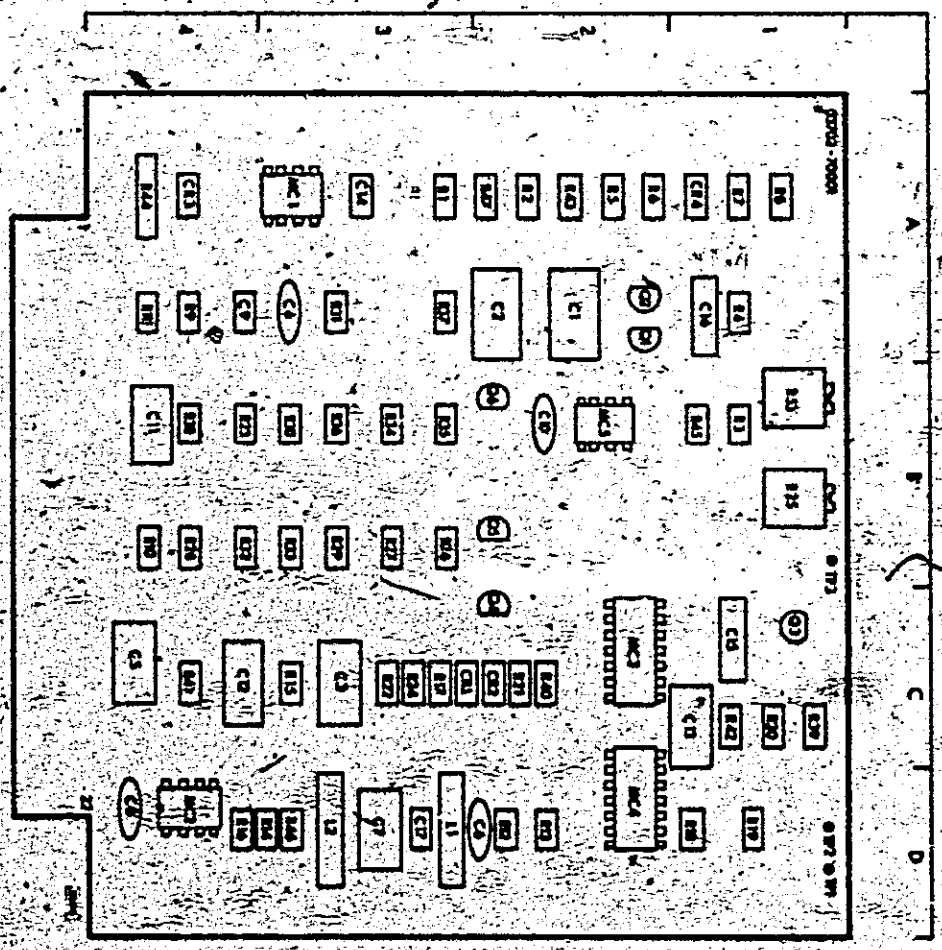

A23 IF MIXER AND LOCAL OSCILLATOR ASSEMBLY



A24 IF DISCRIMINATOR
03702-70003


A4 IF CALIBRATOR ASSEMBLY
100 Hz OSCILLATOR
BISTABLE
SPECTRUM WIDTH
SPECTRUM CENTRE
Y2 DISPLAY
AMPLIFIER
LOW-PASS FILTER
SWITCHED ATTENUATOR
SLAVE SWEEP TO Y2 DISPLAY
IF RECOVERED SWEEP TO SWEEP SOURCE
TO CALIBRATION
Y1 Y2 CALIBRATION
A4


A24 IF DISCRIMINATOR ASSEMBLY



SERVICE NOTE

Supercedes : None

HP MODEL 3702B IF/BB RECEIVER

Serial Nos below 1136U00124

REMOVAL OF CROSSTALK BETWEEN Y1 AND Y2 TRACES

Trouble may be experienced with crosstalk between the Y1 and Y2 displays when either is positioned well off the screen.

To eliminate the problem replace the following parts :

A3Q3 with Hp Part No 1855-0081

A3Q8 with Hp Part No 1855-0081

A3CR3 with Hp Part No 1902-3066

A3CR4 with Hp Part No 1902-3066

A3CR5 with Hp Part No 1902-3066

A3CR6 with Hp Part No 1902-3066

/ Update your Service Manual to indicate this change.

KMcD/mm/W.A.

1/73 - 14

HEWLETT hp PACKARD

Europe 7 rue du Bois-du Lan, 1217 Meyrin 2, Switzerland Cable "HEWPACKSA" Tel (022) 41 54 00
United States 333 Logue Avenue, Mountain View, California 94040 Tel (415) 968 9200

3702B-2

PRODUCTION MEMO

To: hp Service Facilities

From: hp Limited, South Queensferry Subject: hp 3702B IF/BB Receiver

UNDERRATED CAPACITOR IN A2 ASSEMBLY A2C12

Serial No:s below 1317U-00381
except 1251U-00373
1251U-00378
1251U-00379

On the above serial numbers A2C12 is underrated and should be replaced with 100μF 20V, hp Part Number 0180-0098.

This change should be implemented whenever instruments become available.

Update the service manual parts list to show this change.

KMcD/WA 7/73-14

HEWLETT hp PACKARD

SERVICE NOTE

Supercedes : None

HP MODEL 3702B IF/BB RECEIVER

All Serial Nos

PREFERED REPLACEMENT FOR A4,CR3,CR4,CR5,CR6,CR7.

In Order to eliminate possible noise problems the prefered replacements for the following diodes are :-

A4CR3 HP Part No 1902-1264
A4CR4 HP Part No 1902-0626
A4CR5 HP Part No 1902-1263
A4CR6 HP Part No 1902-1263
A4CR7 HP Part No 1902-1263

Update your Service Manual to show this change.

KMcD/mm

1/73 - 14

HEWLETT hp PACKARD

Europe 7 rue du Bois-du-Lan, 1217 Meyrin 2, Switzerland Cable "HEWPACKSA" Tel (022) 41 54 00
United States 333 Logue Avenue, Mountain View, California 94040 Tel (415) 968 9200

SERVICE NOTE

Supercedes : None

HP MODEL 3702B IF/BB RECEIVER

Serial Nos below 1242U00251

IMPROVEMENT IN MARKER DISPLAY

The following modification improves the performance of the marker generator and allows A5R15 to be adjusted to provide narrower markers.

To implement this modification the following parts are required :

Hp Part No	Description	Quantity
0122-0601	Voltage Variable Capacitor	1
0150-0091	Capacitor 1.5pF	2
0160-0644	Capacitor 100pF	1
0160-0662	Capacitor 51pF	1
0698-3441	Resistor 215 Ohm	1
0757-0280	Resistor 1K	2
03701-731	Inductor Variable	1
9170-0817	Ferrite bead	2
0360-0124	Pins	4

Instruments above serial number 1205U-00211 are already partially modified on A25.

HEWLETT hp PACKARD

Europe 7 rue du Bois-du-Lan, 1217 Meyrin 2, Switzerland Cable "HEWPACKSA" Tel (022) 41 54 00
United States 333 Logue Avenue, Mountain View, California 94040 Tel (415) 968 9700

MODIFICATION PROCEDURE

1. Remove instrument top and bottom covers
2. Replace A5R14 with 1K hp Part No 0757-0280
3. Remove A25 P.C. board from casting
4. Remove and discard A25 C1, C5, C6, L1, R22, CR1
5. Fit and solder pins to P.C. Board as indicated in Fig.1.
6. Modify P.C. Board track as indicated in Fig.2.
7. Replace A25 C1, C5, C6, L1, R22, CR1, and fit new parts A25 R46 and C30 as follows :

   R22 .... 215 Ohm HP Part no 0698-3441

   C30 .... 51pF HP Part no 0160-0662

   C30 is connected in parallel with R22 with both parts soldered to the pins fitted in (5). Fit a ferrite bead to each leg of C30. See Fig.1.

   CR1 .... HP Part no 0122-0601

   C1 .... 100pF HP Part no 0160-0644

   R46 .... 1K HP Part no 0757-0280

   The anode end of CR1 and one leg of C1 is soldered to pins fitted in (5). R46 is soldered to pins. See Fig.1.

   C5 .... 1.5pF HP Part no 0150-0091

   C6 .... 1.5pF HP Part no 0150-0091

   L1 .... HP Part no 03701-731 (Ensure correct location)
8. Replace A25 board in casting.

CALIBRATION

1. Set the 3710A controls :

Sweep Width	50 MHz
Sweep	Int
I.F. Frequency	70 MHz
I.F. Attenuator	10dB
Line	ON

Set the 3716A/3715A controls :

B.B. Frequency	OFF

Set ... / Cont ...

Calibration

1. (Cont)

Set the 3702B controls :

Y1 Display	REF
Y2 Display	I.F.
Y1 Gain	Counter Clockwise
Y2 Gain	Counter Clockwise
Y1 Position	Mid-travel
Y2 Position	Mid-travel
Markers	Sliding
Marker Offset	10
Sweep Source	Int I.F.
Line	ON

2. Connect the 3710A I.F. OUTPUT to the 3702B I.F. INPUT and adjust the 3702B IF ATTENUATOR for an on scale meter reading.

3. Set the BLANKING to OFF and adjust the X-PHASE SHIFT to superimpose the markers on the forward and return traces. It is possible that only the centre marker will be displayed at this stage. Set the BLANKING to ON.

4. Set the MARKER OFFSET to 0 and adjust A25 L1 to superimpose all three markers in the centre. Use the MARKER ZERO as a fine control and adjust it so that the sliding markers move from the centre before the MARKER OFFSET control reaches 0.5 MHz.

5. Set the MARKERS switch to SLIDING & COMB and set the MARKER OFFSET to 20.

6. Using the 2 MHz marker comb as standard adjust A5 R54 to superimpose the sliding markers on the 20 MHz comb marker.

7. Recheck marker zero as in (4) and reset MARKER ZERO if necessary and repeat (6)

8. ... Cont / ...

8. Check the calibration of the MARKER OFFSET control against the 2 MHz comb markers for an accuracy of ±0.5 MHz up to 20 MHz and ±0.75 MHz 20 to 25 MHz. If necessary adjust A25 L1 slightly, reset MARKER ZERO and repeat 5 through 8 as necessary.

9 Set the MARKERS switch to comb and adjust A5 R15 for the narrowest markers consistent with a solid marker display over the whole sweep and check for solid marker display with the MARKERS switch in COMB + SLIDING and SLIDING . Readjust A5 R15 if necessary.

10. Update Service Manual to show this change.

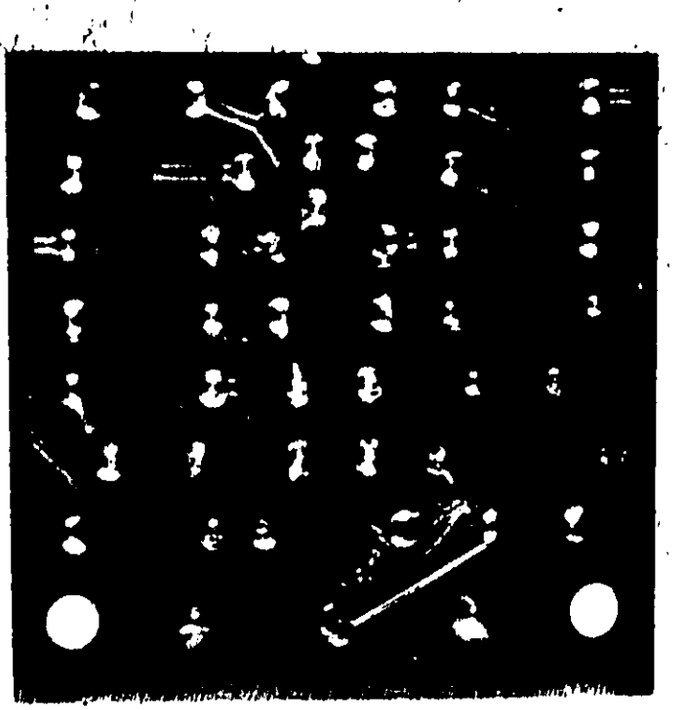


FIGURE 2.

1. Remove track from p.c. board at points A.
2. Fit wire link at point B.

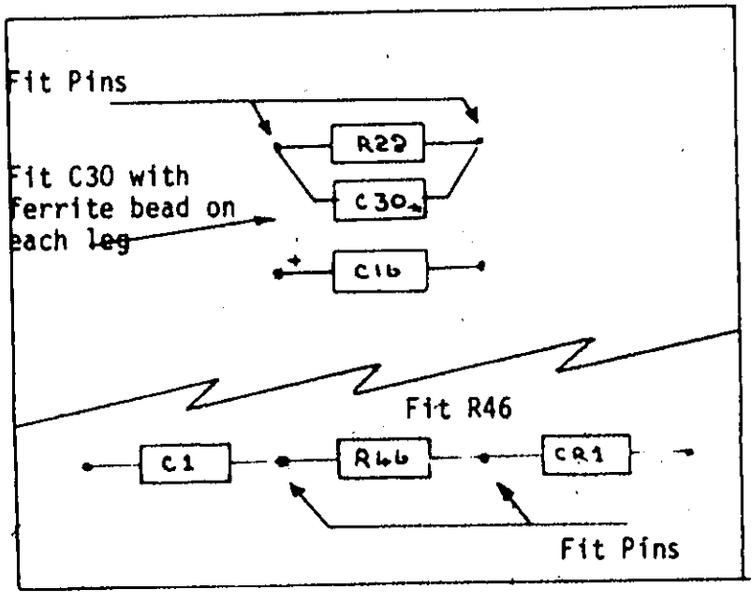


FIGURE 1.

SERVICE NOTE

Supercedes : None

HP MODEL 3702B I.F./BB RECEIVER

ALL SERIAL NOS

PREFERRED REPLACEMENT FOR A2C35

In the event of a replacement being required for A2C35, replace with HP Part No 0150-0052.

This capacitor has a higher voltage rating allowing a greater margin of safety.

Update your service manual to show this change.

KM/mm/WO

2/73 - 14

HEWLETT hp PACKARD

Europe 7 rue du Bois-du-Lan, 1217 Meyrin 2, Switzerland. Cable "HEWPACKSA" Tel (022) 41 54 00
United States 333 Logue Avenue, Mountain View, California 94040 Tel (415) 968-9200

SERVICE NOTE

Supercedes : None

HP MODEL 3702B I.F./BB RECEIVER

All Serial Nos.

PREFERRED REPLACEMENT FOR R11

In the event of field replacement of R11 the MARKER OFFSET control, replace with HP Part No 2100-3347.

A new part number has been set up to distinguish between high and low torque potentiometers.

Update your Service Manual to show this change.

KM/mm

2/73 - 14

HEWLETT hp PACKARD

Europe 7 rue du Bois-du-Lan, 1217 Meyrin 2, Switzerland Cable "HEWPACKSA" Tel (022) 41 54 00
United States 333 Logue Avenue, Mountain View, California 94040 Tel (415) 968 9200

SERVICE NOTE

Supercedes : None

HP MODEL 3702B I.F./BB RECEIVER

All Serial Nos.

PREFERRED REPLACEMENT FOR I.F. ATTENUATOR

In the event of field replacement of the I.F. ATTENUATOR replace with :

3702B	03702-7314
3702B OP 002	- 03702-7317
3702B OP 003	- 03702-7318
3702B OP 004	- 03702-7319

In order to extend the I.F. INPUT range the attenuator steps have been changed to 1,2,4,8,16.

Update your service manual to show this change.

KM/mm

2/73 - 14

HEWLETT hp PACKARD

Europe 7 rue du Bois du Lan, 1217 Meyrin 2, Switzerland Cable "HEWPACKSA" Tel (022) 41 54 00
United States 333 Logue Avenue, Mountain View, California 94040 Tel (415) 968 9200

SERVICE NOTE

Supercedes : None

HP MODEL 3702B I.F./BB RECEIVER

All Serial Nos.

PREFERRED REPLACEMENT OF A6 Q1 AND A6 Q2

In the event of field replacement of A6 Q1 or A6 Q2 replace with 1854-0590.

Difficulty has been experienced due to transistor parameter variation with manufacturer and the use of 1854-0590 eliminates the problem.

Update your Service Manual to show this change.

KM/mm

2/73 - 14

HEWLETT hp PACKARD

Europe - 7 rue du Bois-du-Lan - 1217 Meyrin 2 - Switzerland - Cable - HEWPACH SA - Tel. (022) 41 54 00
United States - 1501 Page Avenue - Mountain View - California 94040 - Tel. (415) 968-9700

SERVICE NOTE

Supercedes : None

HP MODEL 3702B IF/BB RECEIVER
Serial Nos below 1136U00124

REMOVAL OF CROSSTALK BETWEEN Y1 AND Y2 TRACES

Trouble may be experienced with crosstalk between the Y1 and Y2 displays when either is positioned well off the screen.

To eliminate the problem replace the following parts :

A3Q3 with Hp Part No 1855-0081
A3Q6 with Hp Part No 1855-0081
A3CR3 with Hp Part No 1902-3066
A3CR4 with Hp Part No 1902-3066
A3CR5 with Hp Part No 1902-3066
A3CR6 with Hp Part No 1902-3066

Update your Service Manual to indicate this change.

KMcD/mm/W.A. 1/73 - 14

HEWLETT hp PACKARD

Europe: 7 rue du Bois-du-Lan, 1217 Meyrin 2, Switzerland: Cable: "HEWPACKSA" Tel: (022) 41 54 00
United States: 333 Logue Avenue, Mountain View, California 94040. Tel: (415) 968-9200

PRODUCTION MEMO

To: hp Service Facilities

From: hp Limited, South Queensferry

Subject: hp 3702B IF/BB Receiver

UNDERRATED CAPACITOR IN A2 ASSEMBLY A2C12

Serial No:s below 1317U-00381
except 1251U-00373
1251U-00378
1251U-00379

On the above serial numbers A2C12 is underrated and should be replaced with 100μF 20V, hp Part Number 0180-0098.

This change should be implemented whenever instruments become available.

Update the service manual parts list to show this change.

KMcD/WA

7/73-14

HEWLETT hp PACKARD

SERVICE NOTE

Supercedes : None

HP MODEL 3702B IF/BB RECEIVER

All Serial Nos

PREFERRED REPLACEMENT FOR A4,CR3,CR4,CR5,CR6,CR7.

In Order to eliminate possible noise problems the prefered replacements for the following diodes are :-

A4CR3 HP Part No 1902-1264
A4CR4 HP Part No 1902-0626
A4CR5 HP Part No 1902-1263
A4CR6 HP Part No 1902-1263
A4CR7 HP Part No 1902-1263

Update your Service Manual to show this change.

KMcD/mm

1/73 - 14

HEWLETT hp PACKARD

Europe: 7 rue du Bois-du-Lan, 1217 Meyrin 2, Switzerland. Cable: "HEWPACKSA" Tel: (022) 41 54 00
United States: 332 Logue Avenue, Mountain View, California 94040. Tel: (415) 968-9200

SERVICE NOTE

Supercedes : None

HP MODEL 3702B IF/BB RECEIVER

Serial Nos below 1242U00251-

IMPROVEMENT IN MARKER DISPLAY

The following modification improves the performance of the marker generator and allows A5R15 to be adjusted to provide narrower markers.

To implement this modification the following parts are required :

HP Part No	Description	Quantity
0122-0601	Voltage Variable Capacitor	1
0150-0091	Capacitor 1.5pF	2
0160-0644	Capacitor 100pF	1
0160-0662	Capacitor 51pF	1
0698-3441	Resistor 215 Ohm	1
0757-0280	Resistor 1K	2
03701-731	Inductor Variable	1
9170-0817	Ferrite bead	2
0360-0124	Pins	4

Instruments above serial number 1205U-00211 are already partially modified on A25.

HEWLETT hp PACKARD

Europe: 7 rue du Bois-du-Lan, 1217 Meyrin 2, Switzerland: Cable: "HEWPACKSA" Tel: (022) 41 54 00
United States: 333 Logue Avenue, Mountain View, California 94040. Tel: (415) 968-9200

MODIFICATION PROCEDURE

1. Remove instrument top and bottom covers
2. Replace A5R14 with 1K hp Part No 0757-0280
3. Remove A25 P.C. board from casting
4. Remove and discard A25 C1, C5, C6, L1, R22, CR1
5. Fit and solder pins to P.C. Board as indicated in Fig.1.
6. Modify P.C. Board track as indicated in Fig.2.
7. Replace A25 C1, C5, C6, L1, R22, CR1, and fit new parts A25 R46 and C30 as follows :

   R22 .... 215 Ohm HP Part no 0698-3441

   C30 .... 51pF HP Part no 0160-0662

   C30 is connected in parallel with R22 with both parts soldered to the pins fitted in (5). Fit a ferrite bead to each leg of C30. See Fig.1.

   CR1 .... HP Part no 0122-0601

   C1 .... 100pF HP Part no 0160-0644

   R46 .... 1K HP Part no 0757-0280

   The anode end of CR1 and one leg of C1 is soldered to pins fitted in (5). R46 is soldered to pins. See Fig.1.

   C5 .... 1.5pF HP Part no 0150-0091

   C6 .... 1.5pF HP Part no 0150-0091

   L1 .... HP Part no 03701-731 (Ensure correct location)

8. Replace A25 board in casting.

CALIBRATION

1. Set the 3710A controls :

Sweep Width	50 MHz
Sweep	Int
I.F. Frequency	70 MHz
I.F. Attenuator	10dB
Line	ON

   Set the 3716A/3715A controls :

B.B. Frequency	OFF

Set ... / Cont ...

Calibration

1. (Cont)

Set the 3702B controls :

Y1 Display	REF
Y2 Display	I.F.
Y1 Gain	Counter Clockwise
Y2 Gain	Counter Clockwise
Y1 Position	Mid-travel
Y2 Position	Mid-travel
Markers	Sliding
Marker Offset	10
Sweep Source	Int I.F.
Line	ON

2. Connect the 3710A I.F. OUTPUT to the 3702B I.F. INPUT and adjust the 3702B IF ATTENUATOR for an on scale meter reading.

3. Set the BLANKING to OFF and adjust the X-PHASE SHIFT to superimpose the markers on the forward and return traces. It is possible that only the centre marker will be displayed at this stage. Set the BLANKING to ON.

4. Set the MARKER OFFSET to 0 and adjust A25 L1 to superimpose all three markers in the centre. Use the MARKER ZERO as a fine control and adjust it so that the sliding markers move from the centre before the MARKER OFFSET control reaches 0.5 MHz.

5. Set the MARKERS switch to SLIDING & COMB and set the MARKER OFFSET to 20.

6. Using the 2 MHz marker comb as standard adjust A5 R54 to superimpose the sliding markers on the 20 MHz comb marker.

7. Recheck marker zero as in (4) and reset MARKER ZERO if necessary and repeat (6)

8. ... Cont / ...

8. Check the calibration of the MARKER OFFSET control against the 2 MHz comb markers for an accuracy of ±0.5 MHz up to 20 MHz and ±0.75 MHz 20 to 25 MHz. If necessary adjust A25 L1 slightly, reset MARKER ZERO and repeat 5 through 8 as necessary.

9. Set the MARKERS switch to comb and adjust A5 R15 for the narrowest markers consistent with a solid marker display over the whole sweep and check for solid marker display with the MARKERS switch in COMB + SLIDING and SLIDING . Readjust A5 R15 if necessary.

10. Update Service Manual to show this change.

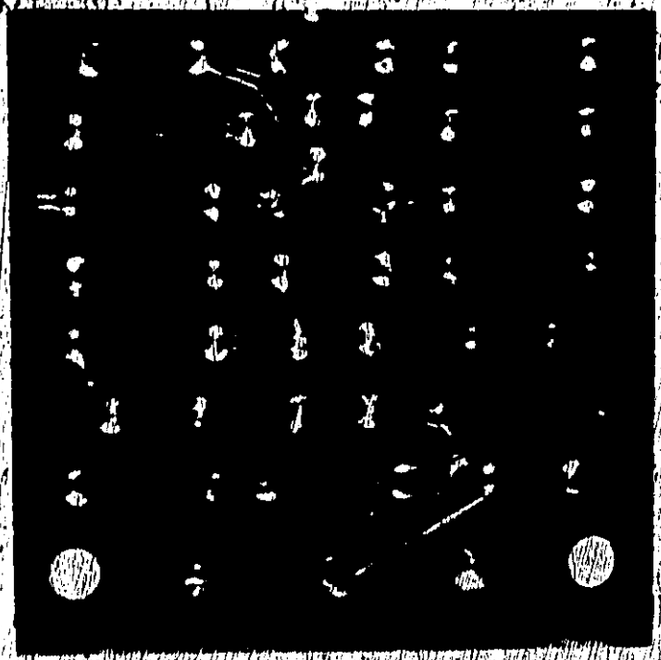


FIGURE 2.

1. Remove track from p.c. board at points A.
2. Fit wire link at point B.

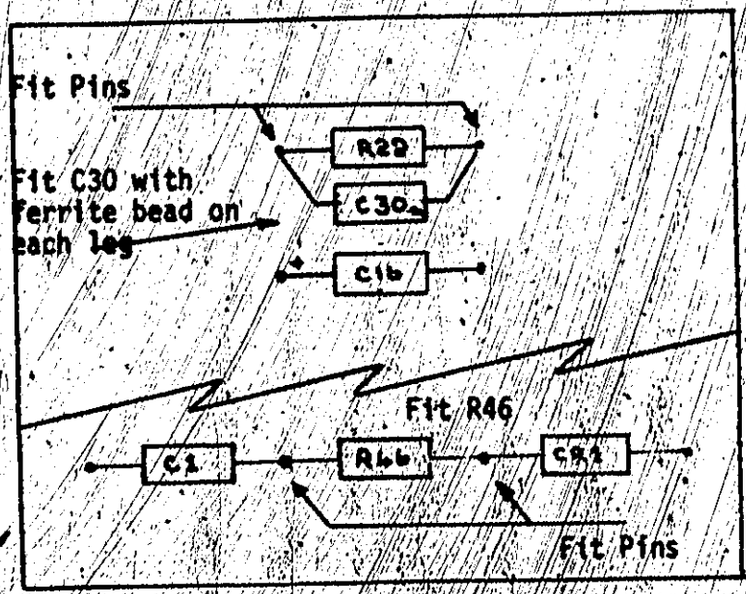


FIGURE 1.

SERVICE NOTE

Supercedes : None

HP MODEL 3702B I.F./BB RECEIVER

ALL SERIAL NOS

PREFERRED REPLACEMENT FOR A2C35

In the event of a replacement being required for A2C35, replace with HP Part No 0150-0052.

This capacitor has a higher voltage rating allowing a greater margin of safety.

Update your service manual to show this change.

KM/mm/WO

2/73 - 14

HEWLETT hp PACKARD

Europe:- 7 rue du Bois-du-Lan, 1217 Meyrin 2, Switzerland: Cable: "HEWPACKSA" Tel: (022) 41 54 00
United States: 333 Logue Avenue, Mountain View, California 94040. Tel: (415)-968-9200

SERVICE NOTE

Supercedes : None

HP MODEL 3702B I.F./BB RECEIVER

All Serial Nos.

PREFERRED | REPLACEMENT FOR R11

In the event of field replacement of R11 the MARKER OFFSET control, replace with HP Part No 2100-3347.

A new part number has been set up to distinguish between high and low torque potentiometers.

Update your Service Manual to show this change.

KM/mm

2/73 - 14

HEWLETT hp PACKARD

Europe: 7 rue du Bois-du-Lan, 1217 Meyrin 2, Switzerland: Cable: "HEWPACKSA" Tel: (022) 41 54 00
United States: 333 Logue Avenue, Mountain View, California 94040. Tel: (415) 968-9200

SERVICE NOTE

Supercedes : None

HP MODEL 3702B I.F./BB RECEIVER

All Serial Nos.

PREFERRED REPLACEMENT FOR I.F. ATTENUATOR

In the event of field replacement of the I.F. ATTENUATOR replace with :

3702B	03702-7314
3702B OP 002	03702-7317
3702B OP 003	03702-7318
3702B OP 004	03702-7319

In order to extend the I.F. INPUT range the attenuator steps have been changed to 1,2,4,8,16.

Update your service manual to show this change.

KM/mm

2/73 - 14

HEWLETT hp PACKARD

Europe: 7 rue du Bois-du-Lan, 1217 Meyrin 2, Switzerland: Cable: "HEWPACKSA" Tel: (022) 41 54 00
United States: 333 Logue Avenue, Mountain View, California 94040. Tel: (415) 968-9200

SERVICE NOTE

Supercedes : None

HP MODEL 3702B I.F./BB RECEIVER

All Serial Nos.

PREFERRED REPLACEMENT OF A6 Q1 AND A6 Q2

In the event of field replacement of A6 Q1 or A6 Q2 replace with 1854-0590.

Difficulty has been experienced due to transistor parameter variation with manufacturer and the use of 1854-0590 eliminates the problem.

Update your Service Manual to show this change.

KM/mm

2/73 - 14

HEWLETT hp PACKARD

Europe: 7 rue du Bois-du-Lan, 1217 Meyrin 2, Switzerland: Cable: "HEWPACKSA" Tel (022) 41 54 00
United States: 333 Logue Avenue, Mountain View, California 94040. Tel: (415) 968-9200

3702B-9A

SERVICE NOTE

Supercedes:
3702B-9

HP MODEL 3702B I.F./B.B. RECEIVER

FIELD REPLACEMENT OF A4 ASSEMBLY

In the event of the A4 assembly having to be replaced proceed as follows:

SERIAL NO'S BELOW 1205U-00191
proceed as detailed below.

SERIAL NO'S 1205U-00191 TO 1242U-00250
replace directly with 03702-7173

SERIAL NO'S 1242U-00251 TO 1330U-00495
replace 03702-70005 with 03702-70001

PARTS REQUIRED

HP Part No.	Description	Quantity
2100-3298	Resistor Var. Dual Concentric 50K Lin - 50K Lin	1
0757-0427	Resistor 1.5K	1

PROCEDURE

1. Remove the top and bottom and left hand side covers.
2. Remove R3 the X-GAIN/SPECTRUM WIDTH control and replace it with 2100-3298.
3. Reverse the positions of the VIOLET wires and the WHITE/BLACK/RED wire on the X-POSITION control potentiometer.
4. Reverse the positions of the VIOLET wire and the WHITE/BLACK wire on the X-Phase SHIFT control.

WI[illegible]/WO

5/74-14.

HEWLETT hp PACKARD

Europe: 7 rue du Bois-du-Lan, 1217 Meyrin 2, Switzerland: Cable: "HEWPACKSA" Tel: (022) 41 54 00
United States: 333 Logue Avenue, Mountain View, California 94040. Tel: (415) 968-9200

Procedure (cont.)

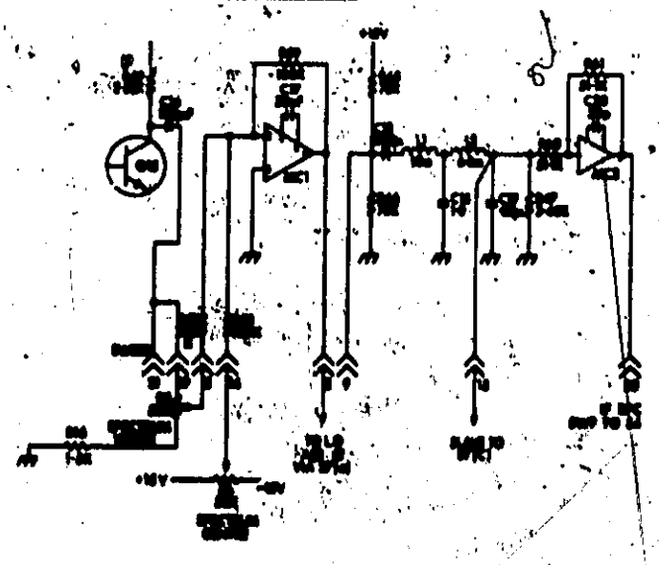
5. Reverse the positions of the VIOLET wires and the WHITE/BLACK/RED wires on the SPECTRUM CENTRE control.
6. On the underside of the instrument remove and discard the following components.
   1. The capacitor between XA5 pin 10 and XA4 pin 9.
   2. The inductor between XA4 pin 9 and XA3 pin 5.
   3. The capacitor between XA3 pin 5 and XA3 pin 10.
   4. The inductor between XA3 pin 4 and XA2 pin 6.
7. Fit 1.5K resistor R16 between XA3 pin 13 and XA3 pin 21.
8. Remove the WHITE/ORANGE/VIOLET wire from XA4 pin 19 and resolder to XA3 pin 21.
9. Remove the WHITE/GREEN/VIOLET wire from XA4 pin 20 and resolder to XA4 pin 19.
10. Remove the PINK wire and the WHITE/ORANGE coded cable from XA4 pin 15 and resolder to XA4 pin 20.
11. Remove the ORANGE coded cable from XA3 pin 4 and resolder to XA4 pin 9. If the ORANGE coded cable is too short leave it connected to XA3 pin 4 and fit a wire link from XA3 pin 4 to XA4 pin 9.
12. On the top side of the instrument reverse the position of the GREEN and the WHITE wires from the A2 Assembly to the CRT.

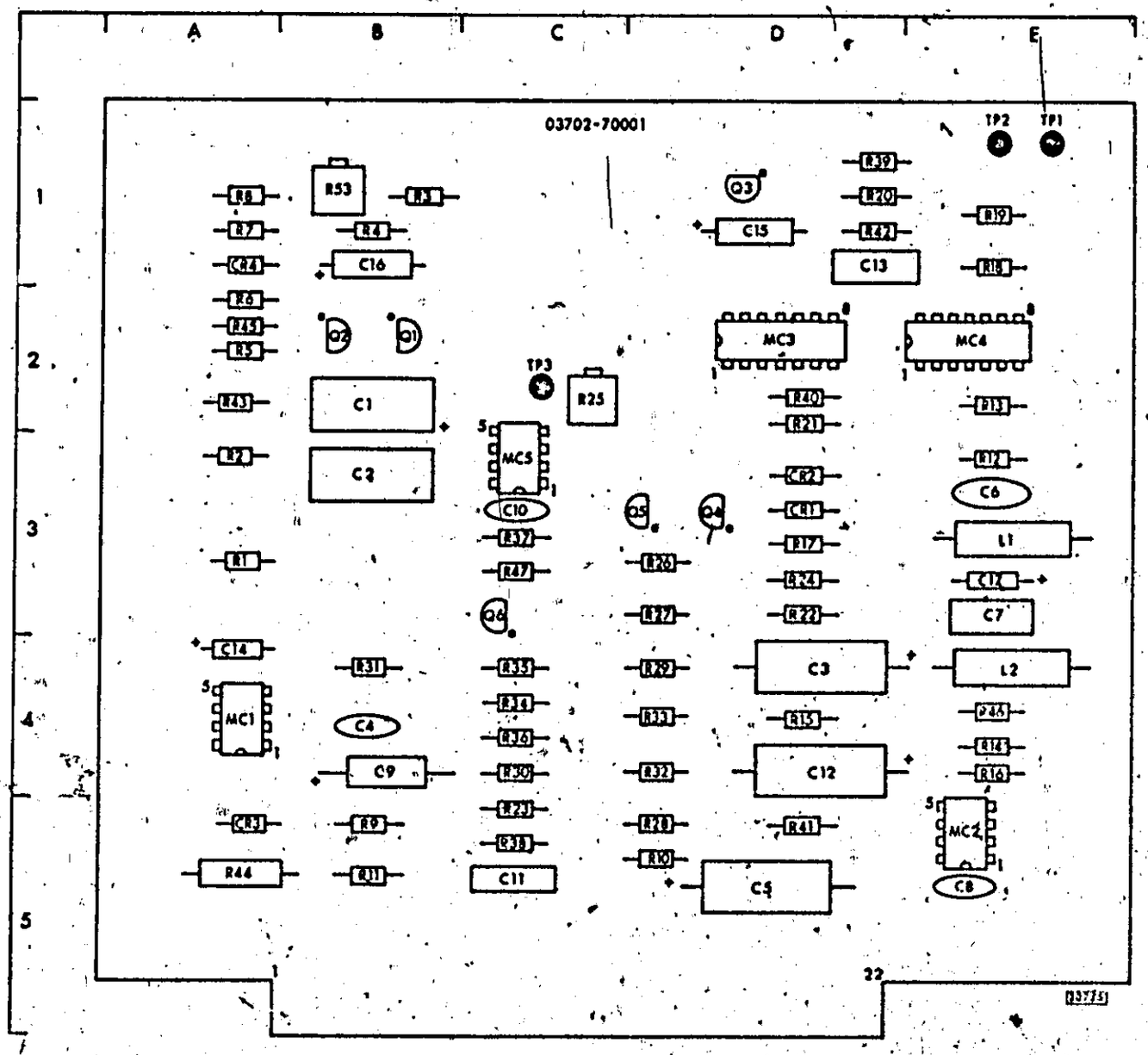
This change is necessary since the filter components fitted on the underside of the instrument are now incorporated on the A4 Assembly. A phase reversal of the sweep is also incorporated on the A4 Assembly and necessitates reversing the connections from A2 to the CRT, and the wiring of the X-POSITION and SPECTRUM CENTRE controls. The SPECTRUM control circuitry has also been redesigned.

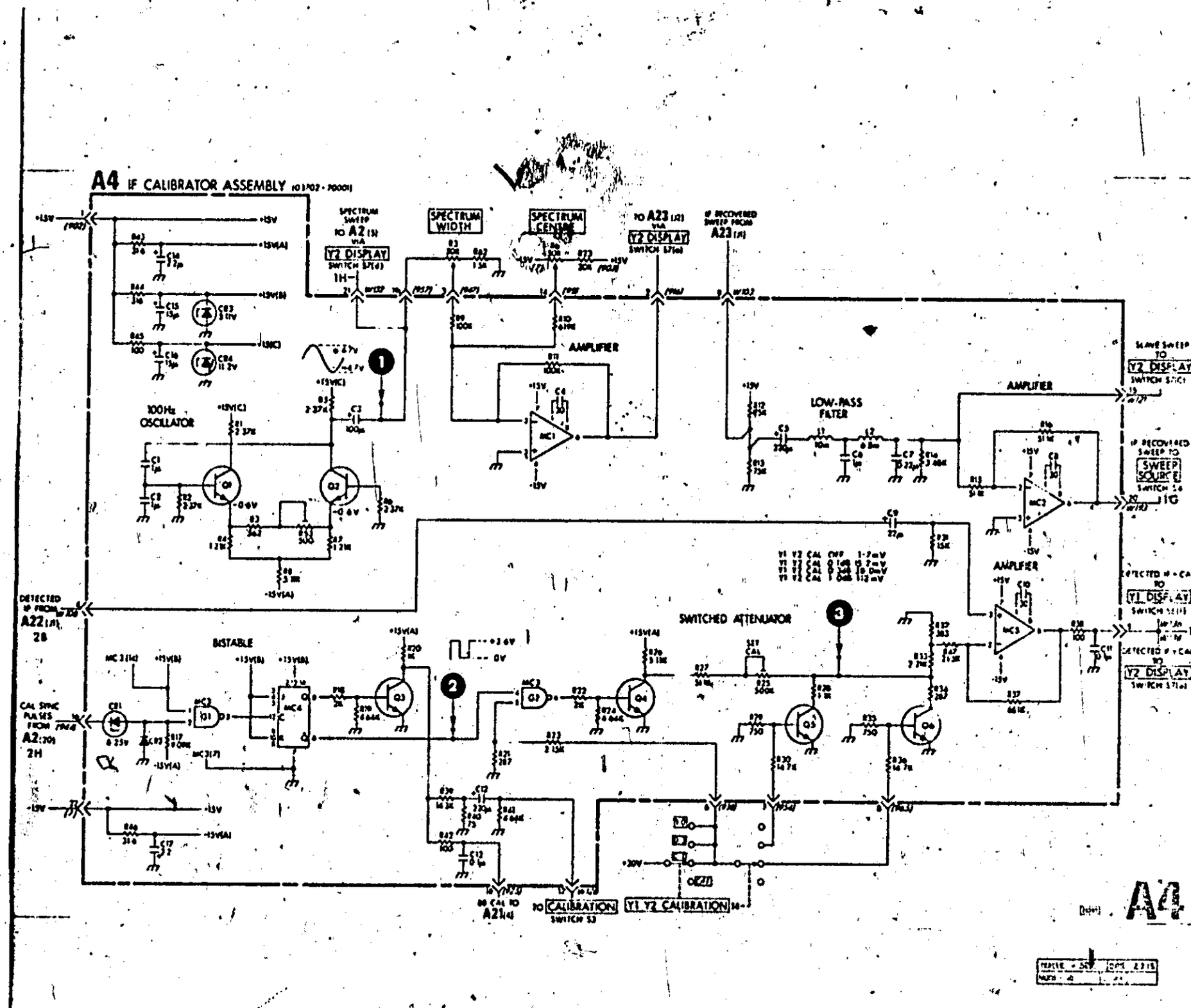
A partial schematic of A4 showing these changes is included in this service note. Also included in this service note is a full schematic of A4 03702-70001 and a component location diagram.

Update your service manual to show these changes.

MODIFICATION TO A4 BOARD




A
B
C
D
E
1
2
3
4
5
03702-70001
TP1
TP2
TP3
R53
R25
C1
C2
C3
C4
C5
C6
C7
C8
C9
C10
C11
C12
C13
C14
C15
C16
L1
L2
MC1
MC2
MC3
MC4
MC5
Q1
Q2
Q3
Q4
Q5
Q6
1
22


A4 IF CALIBRATOR ASSEMBLY
SPECTRUM SWEEP TO A2 VIA Y2 DISPLAY SWITCH
SPECTRUM WIDTH
SPECTRUM CENTRE
TO A23 VIA Y2 DISPLAY SWITCH
IF RECOVERED SWEEP FROM A23
100Hz OSCILLATOR
AMPLIFIER
LOW-PASS FILTER
AMPLIFIER
SAME SWEEP TO Y2 DISPLAY SWITCH
IF RECOVERED SWEEP TO SWEEP SOURCE SWITCH
DETECTED IF FROM A22
BISTABLE
SWITCHED ATTENUATOR
AMPLIFIER
DETECTED IF + CAL TO Y1 DISPLAY SWITCH
DETECTED IF + CAL TO Y2 DISPLAY SWITCH
CAL SYNC PULSES FROM A2
+15V
-15V
+15V(A)
-15V(A)
+15V(B)
+15V(C)
0 CAL TO A21
TO CALIBRATION SWITCH
Y1,Y2 CALIBRATION

SERVICE NOTE

Supercedes : None

HP MODEL 3702B I.F./BB RECEIVER

Serial Nos below 1206U-00191

FIELD REPLACEMENT OF A2 ASSEMBLY 03702-7165

In the event of field replacement of the A2 Assembly the position of the GREEN and WHITE wires of the flying leads from the board to the CRT must be reversed.

This is necessary to maintain correct display.

See Service Note 3702B-9

KM/mm

2/73 - 14

HEWLETT hp PACKARD

Europe: 7 rue du Bois-du-Lan, 1217 Meyrin 2, Switzerland: Cable: "HEWPACKSA" Tel: (022) 41 54 00
United States: 333 Logue Avenue, Mountain View, California 94040. Tel: (415) 968-9200

SERVICE NOTE

Supercedes : None

HP MODEL 3702B I.F./BB RECEIVER

Serial Nos below 1205U-00191

REDUCTION OF X-POSITION OFFSET WHEN CHANGING X-GAIN

The amount of X-position offset when adjusting the X-GAIN control can be reduced by adding R17 10K HP Part Number 0757-0442.

R17 is fitted between XA2 pin 2 and XA2 pin 10.

Update your Service Manual to show this change.

KW/mm

2/73 - 14

HEWLETT hp PACKARD

Europe: 7 rue du Bois-du-Lan, 1217 Meyrin 2, Switzerland: Cable: "HEWPACKSA" Tel: (022) 41 54 00
United States: 333 Logue Avenue, Mountain View, California 94040. Tel: (415) 968-9200

3702B-12

SERVICE NOTE

Supercedes : None

HP MODEL 3702B I.F./BB RECEIVER

Serial Nos : 1205U-00239
1205U-00240
1205U-00248
1245U-00256
1245U-00258
1245U-00260
1245U-00262
1245U-00263 and above

FIELD REPLACEMENT OF A6 ASSEMBLY

In the event of field replacement of A6 the EHT Assembly, replace with hp Part No 03702-70006.

03702-70006 incorporates modifications to the original assembly which are required on instruments which have been fitted with A27.

KMcD/mm

3-73/14

HEWLETT hp PACKARD

Europe: 7 rue du Bois-du-Lan, 1217 Meyrin 2, Switzerland: Cable: "HEWPACKSA" Tel: (022) 41 54 00
United States: 333 Logue Avenue, Mountain View, California 94040. Tel: (415) 968-9200

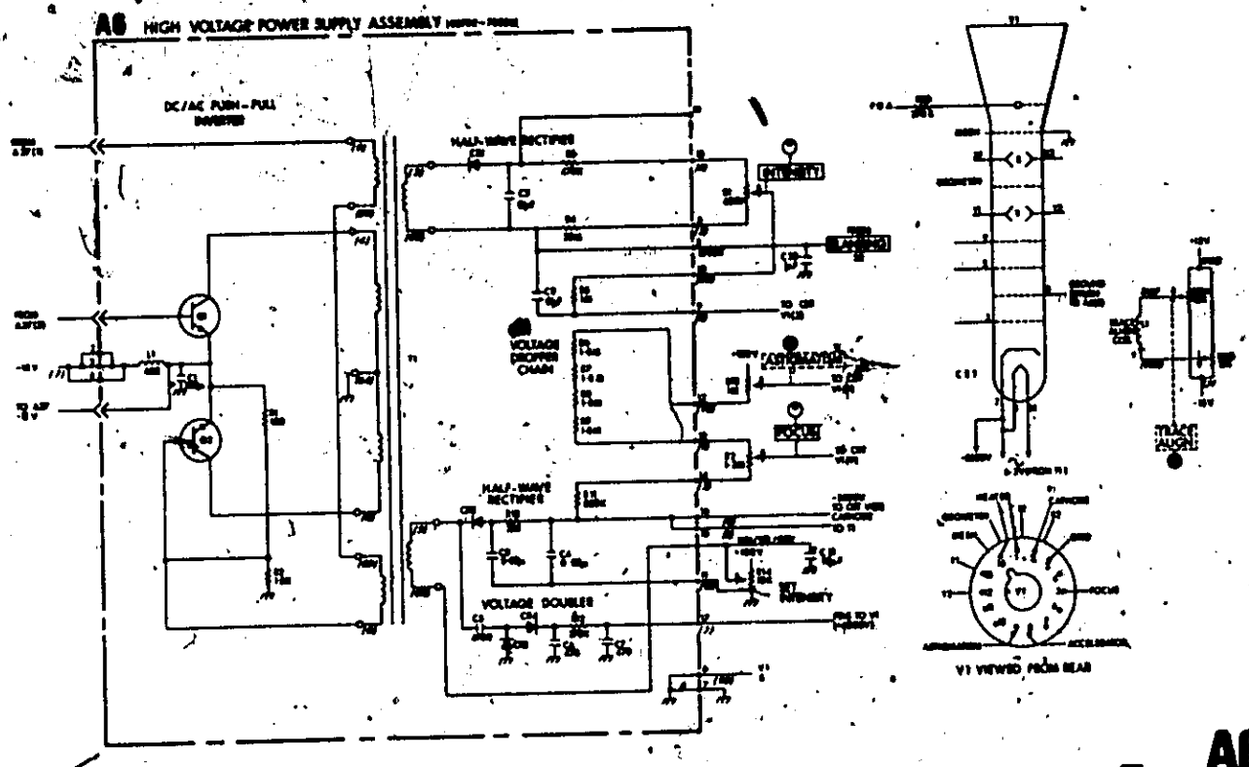
PART NUMBERS FOR 03702-70006

REF.	STOCK NUMBER	DESCRIPTION
C1	0180-0098	C. Fxd 100uF
C2	0160-0174	C. Fxd 0.47uF
C3	0160-0907	C. Fxd .01uF
C3	5040-0401	Support
C4	0160-3907	C. Fxd 0.02uF
C5	0160-0151	C. Fxd 4700PF
C5	5040-0401	Support
C6	0150-0036	C. Fxd 470P
C6	5040-0400	Support
C7	0150-0036	C. Fxd 470P
C7	5040-0400	Support
C8	0160-3907	C. Fxd 0.02u
C9	0160-3958	C. Fxd .1Uf
C11	0160-0907	C. Fxd .01uF
CR1	1901-0142	Diode Si
CR2	1901-0142	Diode Si
CR3	1901-0142	Diode Si
CR4	1901-0142	Diode Si
L1	9140-0051	Ind. Fxd 400uH
MP1	2360-0015	SCW 6-32 x 1
MP2	2420-0003	Nut 6-32
MP3	2190-0018	Lkws No.6
MP4	2260-0001	Nut
MP5	2190-0003	Lknsp
MP6	2390-0007	Scw 6-32 x 5/16
MP7	0362-0042	Lug
Q1	1854-0590	Xstr Si NPN
Q2	1854-0590	Xstr Si NPN
R1	0758-0024	R. Fxd 100 Ohm
R2	0758-0017	R. Fxd 1.5K
R3	0757-0374	R. Fxd 475K
R4	0836-0006	R. Fxd 20M
R5	0757-0059	R. Fxd 1M
R6	0698-1855	R. Fxd 1.8M

Cont / ...

Cont / ...

REF	STOCK NUMBER	DESCRIPTION
R7	0698-1855	R. Fxd 1.8M
R8	0698-1855	R. Fxd 1.8M
R9	0698-1855	R. Fxd 1.8M
R10	0758-0049	R. Fxd 53K
R11	0686-8245	R. Fxd 820K
R12	0758-0102	R. Fxd 270K
T1	03702-7121	Transformer
	03702-3154	P. C. Board Blank



A6

SERVICE NOTE

H.P. MODEL 3702B IF/BB RECEIVER

SERIAL NOS. BELOW 1249U-00281

FIELD REPLACEMENT OF A23 ASSEMBLY

In the event of field replacement of the A23 assembly replace with H.P. Part No. 03702-70002.

WK/oo/WO

2-74/14

HEWLETT hp PACKARD

Europe: 7 rue du Bois-du-Lan, 1217 Meyrin 2, Switzerland: Cable: "HEWPACKSA" Tel: (022) 41 54 00
United States: 333 Logue Avenue, Mountain View, California 94040. Tel: (415) 968-9200

SERVICE NOTE

Supercedes:-
None.

-hp- Model 3702B IF/BB Receiver

Serial Numbers Below 1331U-00736

PREFERRED REPLACEMENT FOR A1CR6 & A1CR9

In the event of failure of A1CR6 and A1CR9 replace with part no. 1884-0012. Previous Thyristor had low surge current rating.

Update your service manual to show this change.

WK/oo/WO

8/74-14

HEWLETT hp PACKARD

Europe: 7 rue du Bois-du-Lan, 1217 Meyrin 2, Switzerland: Cable: "HEWPACKSA" Tel: (022) 41 54 00
United States: 333 Logue Avenue, Mountain View, California 94040. Tel: (415) 968-9200

3702B-15

SERVICE NOTE

Supercedes:
None

-hp- Model 3702B IF/BB RECEIVER

Serial Numbers Below 1331U-00896

FIELD REPLACEMENT OF R6 SPECTRUM CENTRE POTENTIOMETER OR R7 X POSITION POTENTIOMETER

In the event of a replacement being required for R6 or R7 part number 2100-2635, replace with the following:- R VAR 50KΩ 20% part number 2100-3189; NUT part number 2950-0072 Quantity 1; PLAIN WASHER 3050-0014 Quantity 1 and WASHER LOCK part number 2190-0084 Quantity 2.

This provides better alignment of knobs on potentiometers.

Update your service manual to show this change.

WK/oo/74

8/74-14

HEWLETT hp PACKARD

Europe: 7 rue du Bois-du-Lan, 1217 Meyrin 2, Switzerland: Cable: "HEWPACKSA" Tel: (022) 41 54 00
United States: 333 Logue Avenue, Mountain View, California 94040. Tel: (415) 968-9200