

A5A2

AUDIO 2 ASSEMBLY

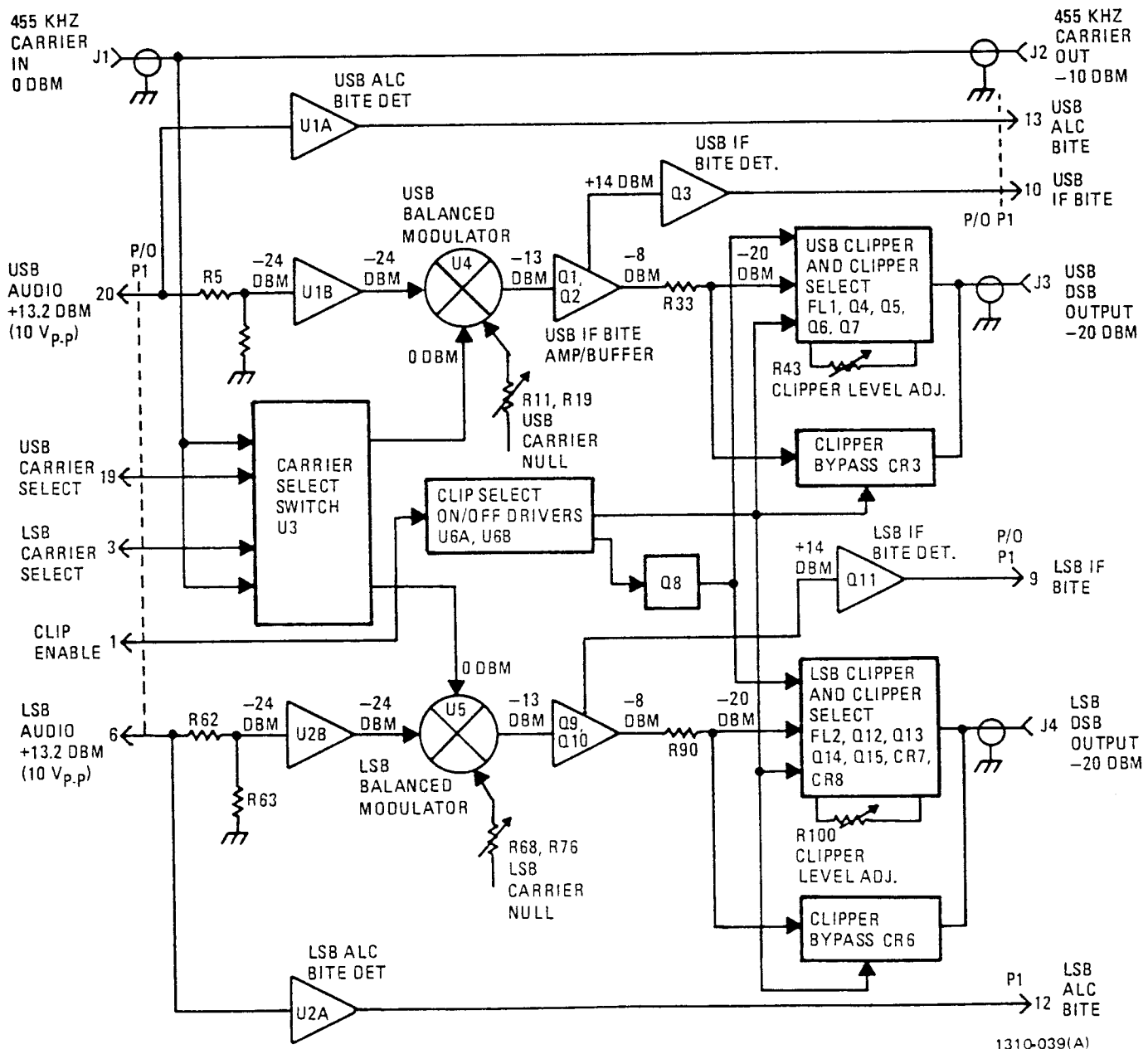


TABLE OF CONTENTS

Paragraph		Page
1	General Information	1
2	Interface Connections	1
3	Audio 2 PWB Assembly A5A2 Circuit Description	2
3.1	ALC BITE Detector	2
3.2	Balanced Modulator	2
3.3	Carrier Select Switch	2
3.4	IF BITE Amplifier/Output Buffer	3
3.5	Clipper Circuit	3
3.6	Carrier Attenuator	4
4	Maintenance	4
4.1	USB Carrier Null Adjustment	4
4.2	LSB Carrier Null Adjustment	5
4.3	Clipper Adjust	6
5	Parts List, Component Locations, and Schematic Diagram	7

LIST OF FIGURES

Figure		Page
1	USB/LSB Carrier Null Setup	4
2	Typical Carrier Null Spectrum Analyzer Display	5
3	Audio 2 Assembly A5A2 Component Locations (10121-5450)	13
4	Audio 2 Assembly A5A2 Schematic Diagram (10121-5451 Rev.F)	15

LIST OF TABLES

Table		Page
1	Audio 2 Assembly A5A2 Interface Connections	1
2	Audio 2 PWB Assembly A5A2 Carrier Select Logic	3
3	Audio 2 Assembly A5A2 Parts List	7

AUDIO 2 ASSEMBLY A5A2

1. GENERAL INFORMATION

Audio 2 Assembly A5A2 (10121-5450) translates each of the two gain controlled audio outputs of the A5A1 assembly to 455 kHz. The output produced for each sideband path is a double sideband (DSB) suppressed carrier signal centered on 455 kHz. The two outputs are sent to the A4 assembly for filtering and further processing. The A5A2 assembly is mounted over the A5A1 assembly. Refer to figure 1 of the A5A1 subsection for the A5A2 assembly location.

A RF clipper circuit is included in each sideband path, providing an adjustable clipping level from 3 dB to 15 dB. Two versions of Audio 2 Assembly A5A2 are available. Version 10121-5450-02 includes a mechanical filter just ahead of each clipper circuit where version 10121-5450-01 substitutes a resistive pad for the filter. The -02 version is preferred for clipping voice transmissions while the -01 version should be installed for clipped data transmission. Clipping is enabled by the CLIP pushbutton on the exciter front panel.

Additionally, Audio 2 PWB Assembly A5A2 contains circuits providing the following functions:

- Automatic Level Control (ALC) BITE peak detection for each sideband
- IF BITE peak detection for each sideband
- Individual ON/OFF control of 455 kHz carrier injection to balanced modulators of each sideband path
- ON/OFF control of power supply for clipper circuits
- -10 dBm 455 kHz carrier output to A4

2. INTERFACE CONNECTIONS

Table 1 lists the various input/output connections and other relevant data.

Table 1. Audio 2 Assembly A5A2 Interface Connections

Connector	Function	Characteristics
J1	455 kHz Input	0 dBm, nominal
J2	455 kHz Output	-10 dBm, nominal
J3	USB DSB Output	-20 dBm, PEP, nominal
J4	LSB DSB Output	-20 dBm PEP, nominal
P1-1	Clip Enable	+ 5 V enables; 0 V disables
P1-2	Spare	
P1-3	LSB Carrier Select	+ 5 V selects; 0 V not selected
P1-4, P1-5	Spare	
P1-6	LSB Audio Input	10 V _{p-p} , nominal
P1-7, P1-8	Spare	

Table 1. Audio 2 Assembly A5A2 Interface Connections (Cont.)

Connector	Function	Characteristics
P1-9	LSB IF BITE	
P1-10	USB IF BITE	
P1-11	Power, + 5 Vdc	
P1-12	LSB ALC BITE	
P1-13	USB ALC BITE	
P1-14	Spare	
P1-15	Power, -15 Vdc	
P1-16	Spare	
P1-17	Power, + 15 Vdc	
P1-18	Ground	
P1-19	USB Carrier Select	
P1-20	USB Audio Input	
		+ 5 V selects; 0 V not selected
		10 V _{p-p} , nominal

3. AUDIO 2 PWB ASSEMBLY A5A2 CIRCUIT DESCRIPTION

NOTE

Where the design of circuits of the USB and LSB paths are identical, the following descriptions refer to components of the LSB path within parenthesis.

3.1 ALC BITE Detector

The nominal 10 V_{p-p} audio input signal at P1-20 (P1-6) is attenuated by R1 and R2 (R58 and R59) and applied to ALC BITE Detector U1A (U2A) whose dc output is sent to the A14 assembly via P1-13 (P1-12) for evaluation during BITE testing.

3.2 Balanced Modulator

U4 (U5) is configured as a balanced modulator operating with high level carrier injection (0 dBm). The circuit translates the audio output of the A5A1 assembly to form a DSB suppressed carrier signal centered on 455 kHz. The audio input signal enters at P1-20 (P1-6), is attenuated by R5 and R6 (R62 and R63), buffered by U1B (U2B), and coupled to the balanced modulator at U4-4 (U5-4). The 455 kHz carrier is applied at U4-8 (U5-8) via carrier select switch U3. R11 and R19 (R68 and R76) are part of a nulling circuit and are adjusted to yield maximum suppression of the 455 kHz carrier as observed at balanced modulator output U4-12 (U5-12).

3.3 Carrier Select Switch

U3 is a quad bilateral switch configured to allow individual ON/OFF control of carrier injection to the balanced modulators. USB Carrier Select (J2-19) and LSB Carrier Select (J2-3) control the switch. The logic states of these carrier select lines are controlled by the Control Board Assembly A14 microprocessor in accordance with the selected exciter mode of transmission. Table 2 details the carrier select logic states for the selected mode.

Table 2. Audio 2 PWB Assembly A5A2 Carrier Select Logic

Mode	J2-19 USB Carrier Select	J2-13 LSB Carrier Select	USB Carrier Injection	LSB Carrier Injection
CW	0	0	OFF	OFF
AFSK	1	0	ON	OFF
AM, AME	1	0	ON	OFF
USB	1	0	ON	OFF
LSB	0	1	OFF	ON
ISB	1	1	ON	ON
FM	0	0	OFF	OFF
FSK	0	0	OFF	OFF
MCW	1	0	ON	OFF

When the USB (LSB) carrier is selected, the 455 kHz carrier signal is passed through switch U3 to U3-6 (U3-14) and injected at the USB (LSB) balanced modulator at U4-8 (U5-8).

3.4 IF BITE Amplifier/Output Buffer

Q1 and Q2 (Q9 and Q10) comprise a feedback pair which amplifies the balanced modulator output U4-12 (U5-12). The amplifier provides two outputs, each yielding a different gain. The collector of Q2 (Q10) yields a nominal gain of 28 dB and is applied to IF BITE detector Q3 (Q11). The detector output is a dc voltage proportional to the signal level at the balanced modulator output and is sent to Control Board Assembly A14 via P1-10 (P1-9) for evaluation during BITE testing. The second feedback pair amplifier output is at the emitter of Q2 (Q10) and yields a gain of 5 dB. This output is coupled via C64 to the input of the clipper circuit.

3.5 Clipper Circuit

A bypassable clipper comprises the last active stage of Audio 2 Assembly A5A2 signal path. The clipper circuit is enabled/bypassed by the CLIP pushbutton on the exciter front panel. Enabling and bypassing is affected by the high/low state of Clip Enable line P1-1. When Clip Enable is low (Bypass), comparator output U6-7 is at +15 volts, thereby turning on Clip Bypass Diode CR3 (CR6) which then provides a direct signal path from Q2 (Q10) emitter to the USB (LSB) DSB output J3 (J4). Additionally, when Clip Enable is low (Bypass), U6-1 is at +15 volts, thereby turning off Q8. This removes +15 volts power normally supplied to clipping amplifier Q4 and Q5 (Q12 and Q13), thereby entirely disabling the clipper circuit. Moreover, the +15 V at U6-7 turns on CR5 (CR8), shunting any clipper output to ground and shuts off CR4 (CR7), thereby opening the clipper output path.

When clipping is selected, Clip Enable is high (+5 V) and U6-7 and U6-1 are at -15 volts turning off CR3 (CR6), opening the bypass path. CR5 (CR8) is off (open) and CR4 (CR7) is on (closed), thereby providing a signal path from the clipper output to the USB (LSB) DSB output J3 (J4). Additionally, Q8 is on, yielding +15 volts supplied to clipping amplifier Q4 and Q5 (Q12 and Q13).

When clipping is enabled, the signal passes from Q2 (Q10) emitter, through FL1 (FL2) into clipping amplifier Q4 and Q5 (Q12 and Q13) whose output peaks are clipped by Q6 and Q7 (Q14 and Q15). The gain of the clipping amplifier is adjustable at R43 (R100), thereby yielding a variable clipping level from 3 dB to 15 dB. Clipped output passes through R42 (R99) and CR4 (CR7) to the DSB output J3 (J4).

3.6 Carrier Attenuator

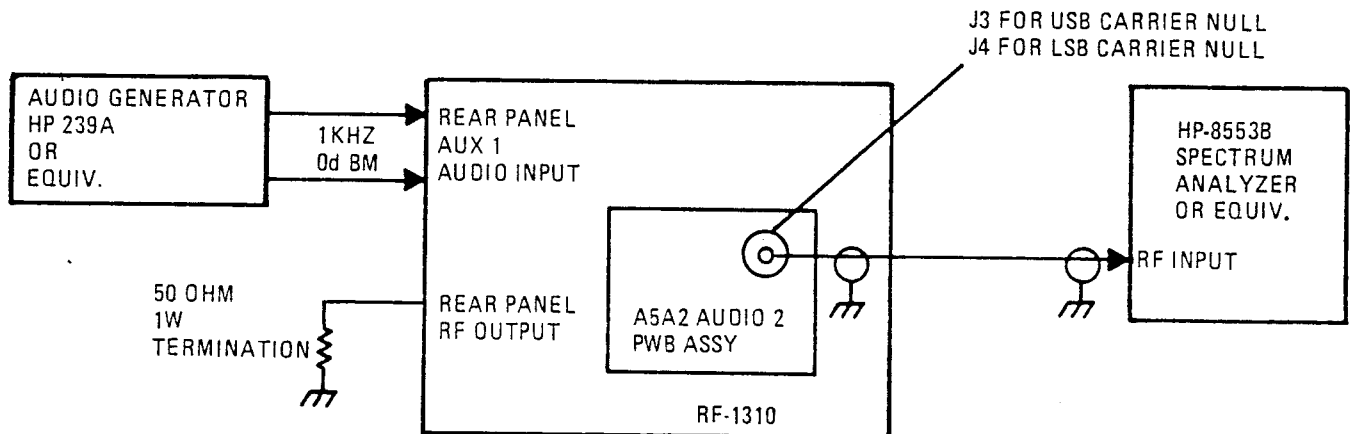
R56 and R57 attenuate the 0 dBm 455 kHz carrier input (J1) to a level of -10 dBm. The attenuated carrier is output via J2 to Combiner PWB Assembly A4 where it is used for carrier reinsertion in AM, and reduced carrier modes.

4. MAINTENANCE

The following adjustments should not be made as routine maintenance procedures, but only when a failure indicates a definite need. All tests and adjustments are performed with all assembly connections in normal contact unless otherwise specified.

4.1 USB Carrier Null Adjustment

- Refer to the Control PWB Assembly A14 subsection of this manual and program the AUX 1 Audio Input for ALC operation and voice time constant.
- Adjust the USB audio input level potentiometer on the exciter front panel fully clockwise.
- Connect equipment as shown in figure 1. Remove orange-sleeved cable from J3 and attach separate cable from J3 to spectrum analyzer.



1310-071

Figure 1. USB/LSB Carrier Null Setup

- Set spectrum analyzer controls:
 - Center frequency to 455 kHz

- Reference level to -26 dBm
- Scan width to 10 kHz

Set audio generator to 1 kHz, 0 dBm.

e. Set exciter front panel controls:

- Function - NORM
- Mode - USB
- Carrier - None
- Frequency - 2 MHz
- Audio - AUX 1

f. Terminate exciter rear panel RF output to a 50 ohm, 1 watt termination or equivalent.

g. Key exciter PTT line and observe spectrum analyzer display similar to that in figure 2. Adjust spectrum analyzer scan width, bandwidth, and sweep time to allow clear definition of the residual 455 kHz carrier.

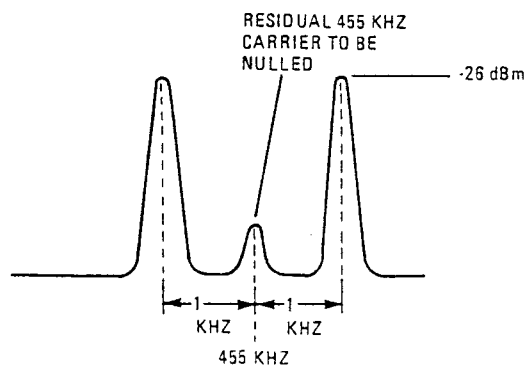


Figure 2. Typical Carrier Null Spectrum Analyzer Display

- h. Alternately adjust R11 and R19 for lowest observable level of 455 kHz carrier.
- i. USB carrier null complete. Disconnect spectrum analyzer from J3 and reconnect orange-sleeved cable to J3.

4.2 LSB Carrier Null Adjustment

- a. Refer to the Control Board Assembly A14 subsection of this manual and program the AUX 1 Audio Input for ALC operation and voice time constant.
- b. Adjust the LSB audio input level potentiometer on the exciter front panel fully clockwise.

- c. Connect equipment as shown in figure 1. Remove yellow-sleeved cable from J4 and attach separate cable from J4 to spectrum analyzer.
- d. Set spectrum analyzer controls:
 - Center frequency to 455 kHz
 - Reference level to -26 dBm
 - Scan width to 10 kHzSet audio generator to 1 kHz, 0 dBm.
- e. Set exciter front panel controls:
 - Function - NORM
 - Mode - LSB
 - Carrier - None
 - Frequency - 2 MHz
 - Audio - AUX 1
- f. Terminate exciter rear panel RF output to a 50 ohm, 1 W termination or equivalent.
- g. Key exciter PTT line and observe spectrum analyzer display similar to that of figure 2. Adjust spectrum analyzer scan width, bandwidth, and sweep time to allow clear definition of the residual 455 kHz carrier.
- h. Alternately adjust R76 and R68 for lowest observable level of 455 kHz carrier.
- i. LSB carrier null complete. Disconnect spectrum analyzer from J4 and reconnect yellow-sleeved cable to J4.

4.3 CLIPPER ADJUST

- a. Connect equipment as shown in figure 1. Remove coax from J3 for USB or J4 for LSB. Attach separate cable from J3 (J4) to the spectrum analyzer.
- b. Set R43 (R100) to full counterclockwise position.
- c. Push the CLIP pushbutton switch on the front panel. A two tone signal and harmonics should appear.
- d. Adjust R43 (R100) fully clockwise.
- e. The two tone signal should change by no more than + 3 dB and the harmonics should increase in amplitude.
- f. Adjust R43 (R100) to increase the peak to average power ratio as desired.

- g. Disconnect the spectrum analyzer from J3 (J4) and reconnect the coax to J3 (J4).
- h. Push the CLIP switch to off.

5. PARTS LIST, COMPONENT LOCATIONS, AND SCHEMATIC DIAGRAM

All replaceable components are listed in table 3. Component locations are shown in figure 3. Figure 4 is the schematic diagram of the Audio 2 assembly circuit.

Table 3. Audio 2 Assembly A5A2 Parts List

Ref. Desig.	Part Number	Description
A5A2	10121-5450	AUDIO NO. 2 ASSEMBLY
C1	C26-0025-339	CAP 3.3UF 20% 25V TANT
C2	M39014/02-1310	CAP .1UF 10% 100V CER-R
C3	M39014/02-1310	CAP .1UF 10% 100V CER-R
C4	C26-0025-339	CAP 3.3UF 20% 25V TANT
C5	C26-0025-339	CAP 3.3UF 20% 25V TANT
C6	C26-0025-339	CAP 3.3UF 20% 25V TANT
C7	M39014/02-1310	CAP .1UF 10% 100V CER-R
C8	C26-0025-339	CAP 3.3UF 20% 25V TANT
C9	M39014/02-1310	CAP .1UF 10% 100V CER-R
C10	CK06BX103K	CAP .01UF 10% 200V CER
C11	M39014/02-1310	CAP .1UF 10% 100V CER-R
C12	M39014/02-1310	CAP .1UF 10% 100V CER-R
C13	M39014/02-1310	CAP .1UF 10% 100V CER-R
C14	M39014/02-1310	CAP .1UF 10% 100V CER-R
C15	M39014/02-1310	CAP .1UF 10% 100V CER-R
C16	M39014/02-1310	CAP .1UF 10% 100V CER-R
C19	M39014/02-1310	CAP .1UF 10% 100V CER-R
C20	M39014/02-1310	CAP .1UF 10% 100V CER-R
C21	M39014/02-1310	CAP .1UF 10% 100V CER-R
C22	M39014/02-1310	CAP .1UF 10% 100V CER-R
C23	M39014/02-1310	CAP .1UF 10% 100V CER-R
C24	M39014/02-1310	CAP .1UF 10% 100V CER-R
C25	M39014/02-1310	CAP .1UF 10% 100V CER-R
C26	M39014/02-1310	CAP .1UF 10% 100V CER-R
C27	M39014/02-1310	CAP .1UF 10% 100V CER-R
C28	C26-0025-339	CAP 3.3UF 20% 25V TANT
C29	C26-0025-339	CAP 3.3UF 20% 25V TANT
C30	C26-0025-339	CAP 3.3UF 20% 25V TANT
C31	C26-0025-339	CAP 3.3UF 20% 25V TANT
C32	M39014/02-1310	CAP .1UF 10% 100V CER-R
C33	M39014/02-1310	CAP .1UF 10% 100V CER-R
C34	C26-0025-339	CAP 3.3UF 20% 25V TANT
C35	C26-0025-339	CAP 3.3UF 20% 25V TANT
C36	C26-0025-339	CAP 3.3UF 20% 25V TANT

Table 3. Audio 2 Assembly A5A2 Parts List (Cont.)

Ref. Desig.	Part Number	Description
C37	M39014/02-1310	CAP .1UF 10% 100V CER-R
C38	C26-0025-339	CAP 3.3UF 20% 25V TANT
C39	CK068X103K	CAP .01UF 10% 200V CER
C40	M39014/02-1310	CAP .1UF 10% 100V CER-R
C41	M39014/02-1310	CAP .1UF 10% 100V CER-R
C42	M39014/02-1310	CAP .1UF 10% 100V CER-R
C43	M39014/02-1310	CAP .1UF 10% 100V CER-R
C44	M39014/02-1310	CAP .1UF 10% 100V CER-R
C45	M39014/02-1310	CAP .1UF 10% 100V CER-R
C46	M39014/02-1310	CAP .1UF 10% 100V CER-R
C47	M39014/02-1310	CAP .1UF 10% 100V CER-R
C50	M39014/02-1310	CAP .1UF 10% 100V CER-R
C51	M39014/02-1310	CAP .1UF 10% 100V CER-R
C52	M39014/02-1310	CAP .1UF 10% 100V CER-R
C53	M39014/02-1310	CAP .1UF 10% 100V CER-R
C54	M39014/02-1310	CAP .1UF 10% 100V CER-R
C55	M39014/02-1310	CAP .1UF 10% 100V CER-R
C56	M39014/02-1310	CAP .1UF 10% 100V CER-R
C57	M39014/02-1310	CAP .1UF 10% 100V CER-R
C58	M39014/02-1310	CAP .1UF 10% 100V CER-R
C59	M39014/02-1310	CAP .1UF 10% 100V CER-R
C60	M39014/02-1310	CAP .1UF 10% 100V CER-R
C61	M39014/02-1310	CAP .1UF 10% 100V CER-R
C62	M39014/02-1310	CAP .1UF 10% 100V CER-R
C64	M39014/02-1310	CAP .1UF 10% 100V CER-R
C65	M39014/02-1310	CAP .1UF 10% 100V CER-R
C66	CK068X472K	CAP 4700PF 10% 200V CER
C67	CK068X472K	CAP 4700PF 10% 200V CER
CR1	1N4454	DIODE 200mA 75V SW
CR2	1N4454	DIODE 200mA 75V SW
CR3	D12-0008-001	DIODE 2.5W 1200V PIN SW
CR4	D12-0008-001	DIODE 2.5W 1200V PIN SW
CR5	D12-0008-001	DIODE 2.5W 1200V PIN SW
CR6	D12-0008-001	DIODE 2.5W 1200V PIN SW
CR7	D12-0008-001	DIODE 2.5W 1200V PIN SW
CR8	D12-0008-001	DIODE 2.5W 1200V PIN SW
CR9	1N4454	DIODE 200mA 75V SW
JMP1	MP-1142	JUMPER, MOLDED, 1/4 W
JMP2	MP-1142	JUMPER, MOLDED, 1/4 W
J1	J-0031	CONN SMB VERT PCB F
J2	J-0031	CONN SMB VERT PCB F
J3	J-0031	CONN SMB VERT PCB F
J4	J-0031	CONN SMB VERT PCB F
L1	MS75085-13	COIL 330UH 10% FXD RF
L2	MS75085-13	COIL 330UH 10% FXD RF
L3	MS75085-13	COIL 330UH 10% FXD RF
L4	MS75085-13	COIL 330UH 10% FXD RF

Table 3. Audio 2 Assembly ASA2 Parts List (Cont.)

Ref. Desig.	Part Number	Description
L5	MS75085-13	COIL 330UH 10% FXD RF
L6	MS75085-13	COIL 330UH 10% FXD RF
P1	10073-7072	RIBBON CABLE, 20 COND
Q1	2N2222A	XSTR SS/GP NPN TO-18
Q2	2N2222A	XSTR SS/GP NPN TO-18
Q3	2N2222A	XSTR SS/GP NPN TO-18
Q4	2N2222A	XSTR SS/GP NPN TO-18
Q5	2N2222A	XSTR SS/GP NPN TO-18
Q6	2N2222A	XSTR SS/GP NPN TO-18
Q7	2N2907A	XSTR SS/GP PNP TO-18
Q8	2N2907A	XSTR SS/GP PNP TO-18
Q9	2N2222A	XSTR SS/GP NPN TO-18
Q10	2N2222A	XSTR SS/GP NPN TO-18
Q11	2N2222A	XSTR SS/GP NPN TO-18
Q12	2N2222A	XSTR SS/GP NPN TO-18
Q13	2N2222A	XSTR SS/GP NPN TO-18
Q14	2N2222A	XSTR SS/GP NPN TO-18
Q15	2N2907A	XSTR SS/GP PNP TO-18
Q16	2N2222A	XSTR SS/GP NPN TO-18
Q17	2N2222A	XSTR SS/GP NPN TO-18
R1	R65-0003-333	RES,33K 5% 1/4W CAR FILM
R2	R65-0003-243	RES,24K 5% 1/4W CAR FILM
R3	R65-0003-223	RES,22K 5% 1/4W CAR FILM
R4	R65-0003-102	RES,1.0K 5% 1/4W CAR FILM
R5	RN55D5362F	RES,53.6K 1% 1/8W MET FLM
R6	RN55D8250F	RES,825.0 1% 1/8W MET FLM
R7	R65-0003-333	RES,33K 5% 1/4W CAR FILM
R8	R65-0003-202	RES,2.0K 5% 1/4W CAR FILM
R9	R65-0003-101	RES,100 5% 1/4W CAR FILM
R10	R65-0003-102	RES,1.0K 5% 1/4W CAR FILM
R11	R30-0008-101	RES,VAR,PCB 10 1/2W 20%
R12	R65-0003-392	RES,3.9K 5% 1/4W CAR FILM
R13	R65-0003-101	RES,100 5% 1/4W CAR FILM
R14	R65-0003-102	RES,1.0K 5% 1/4W CAR FILM
R15	R65-0003-101	RES,100 5% 1/4W CAR FILM
R16	R65-0003-472	RES,4.7K 5% 1/4W CAR FILM
R17	R65-0003-152	RES,1.5K 5% 1/4W CAR FILM
R18	R65-0003-472	RES,4.7K 5% 1/4W CAR FILM
R19	R30-0008-503	RES,VAR,PCB 50K 1/2W 10%
R20	R65-0003-104	RES,100K 5% 1/4W CAR FILM
R21	R65-0003-101	RES,100 5% 1/4W CAR FILM
R22	R65-0003-242	RES,2.4K 5% 1/4W CAR FILM
R23	R65-0003-242	RES,2.4K 5% 1/4W CAR FILM
R24	R65-0003-471	RES,470 5% 1/4W CAR FILM
R25	R65-0003-392	RES,3.9K 5% 1/4W CAR FILM

Table 3. Audio 2 Assembly A5A2 Parts List (Cont.)

Ref. Desig.	Part Number	Description
R26	R65-0003-103	RES,10K 5% 1/4W CAR FILM
R27	R65-0003-821	RES,820 5% 1/4W CAR FILM
R28	R65-0003-682	RES,6.8K 5% 1/4W CAR FILM
R29	R65-0003-101	RES,100 5% 1/4W CAR FILM
R30	R65-0003-105	RES,1.0M 5% 1/4W CAR FILM
R31	R65-0003-101	RES,100 5% 1/4W CAR FILM
R32	R65-0003-334	RES,330K 5% 1/4W CAR FILM
R33	R65-0003-151	RES,150 5% 1/4W CAR FILM
R34	R65-0003-272	RES,2.7K 5% 1/4W CAR FILM
R35	R65-0003-272	RES,2.7K 5% 1/4W CAR FILM
R36	R65-0003-103	RES,10K 5% 1/4W CAR FILM
R37	R65-0003-510	RES,51 5% 1/4W CAR FILM
R38	R65-0003-102	RES,1.0K 5% 1/4W CAR FILM
R39	R65-0003-102	RES,1.0K 5% 1/4W CAR FILM
R40	R65-0003-220	RES,22 5% 1/4W CAR FILM
R41	R65-0003-511	RES,510 5% 1/4W CAR FILM
R42	R65-0003-152	RES,1.5K 5% 1/4W CAR FILM
R43	R-2213	RES,VAR,PCB 100K .5 20%
R44	R65-0003-752	RES,7.5K 5% 1/4W CAR FILM
R45	R65-0003-151	RES,150 5% 1/4W CAR FILM
R46	R65-0003-430	RES,43 5% 1/4W CAR FILM
R47	R65-0003-392	RES,3.9K 5% 1/4W CAR FILM
R48	R65-0003-392	RES,3.9K 5% 1/4W CAR FILM
R49	R65-0003-102	RES,1.0K 5% 1/4W CAR FILM
R50	R65-0003-102	RES,1.0K 5% 1/4W CAR FILM
R51	R65-0003-102	RES,1.0K 5% 1/4W CAR FILM
R52	R65-0003-333	RES,33K 5% 1/4W CAR FILM
R53	R65-0003-333	RES,33K 5% 1/4W CAR FILM
R54	R65-0003-473	RES,47K 5% 1/4W CAR FILM
R55	R65-0003-333	RES,33K 5% 1/4W CAR FILM
R56	R65-0003-121	RES,120 5% 1/4W CAR FILM
R57	R65-0003-680	RES,68 5% 1/4W CAR FILM
R58	R65-0003-333	RES,33K 5% 1/4W CAR FILM
R59	R65-0003-243	RES,24K 5% 1/4W CAR FILM
R60	R65-0003-223	RES,22K 5% 1/4W CAR FILM
R61	R65-0003-102	RES,1.0K 5% 1/4W CAR FILM
R62	RN55D5362F	RES,53.6K 1% 1/8W MET FLM
R63	RN55D8250F	RES,825.0 1% 1/8W MET FLM
R64	R65-0003-333	RES,33K 5% 1/4W CAR FILM
R65	R65-0003-202	RES,2.0K 5% 1/4W CAR FILM
R66	R65-0003-101	RES,100 5% 1/4W CAR FILM
R67	R65-0003-102	RES,1.0K 5% 1/4W CAR FILM
R68	R30-0008-101	RES,VAR,PCB 10 1/2W 20%
R69	R65-0003-101	RES,100 5% 1/4W CAR FILM
R70	R65-0003-102	RES,1.0K 5% 1/4W CAR FILM
R71	R65-0003-392	RES,3.9K 5% 1/4W CAR FILM

Table 3. Audio 2 Assembly A5A2 Parts List (Cont.)

Ref. Desig.	Part Number	Description
R72	R65-0003-101	RES,100 5% 1/4W CAR FILM
R73	R65-0003-472	RES,4.7K 5% 1/4W CAR FILM
R74	R65-0003-152	RES,1.5K 5% 1/4W CAR FILM
R75	R65-0003-472	RES,4.7K 5% 1/4W CAR FILM
R76	R30-0008-503	RES,VAR,PCB 50K 1/2W 10%
R77	R65-0003-104	RES,100K 5% 1/4W CAR FILM
R78	R65-0003-101	RES,100 5% 1/4W CAR FILM
R79	R65-0003-242	RES,2.4K 5% 1/4W CAR FILM
R80	R65-0003-242	RES,2.4K 5% 1/4W CAR FILM
R81	R65-0003-471	RES,470 5% 1/4W CAR FILM
R82	R65-0003-392	RES,3.9K 5% 1/4W CAR FILM
R83	R65-0003-103	RES,10K 5% 1/4W CAR FILM
R84	R65-0003-682	RES,6.8K 5% 1/4W CAR FILM
R85	R65-0003-821	RES,820 5% 1/4W CAR FILM
R86	R65-0003-101	RES,100 5% 1/4W CAR FILM
R87	R65-0003-105	RES,1.0M 5% 1/4W CAR FILM
R88	R65-0003-101	RES,100 5% 1/4W CAR FILM
R89	R65-0003-334	RES,330K 5% 1/4W CAR FILM
R90	R65-0003-151	RES,150 5% 1/4W CAR FILM
R91	R65-0003-272	RES,2.7K 5% 1/4W CAR FILM
R92	R65-0003-272	RES,2.7K 5% 1/4W CAR FILM
R93	R65-0003-103	RES,10K 5% 1/4W CAR FILM
R94	R65-0003-510	RES,51 5% 1/4W CAR FILM
R95	R65-0003-102	RES,1.0K 5% 1/4W CAR FILM
R96	R65-0003-102	RES,1.0K 5% 1/4W CAR FILM
R97	R65-0003-220	RES,22 5% 1/4W CAR FILM
R98	R65-0003-511	RES,510 5% 1/4W CAR FILM
R99	R65-0003-152	RES,1.5K 5% 1/4W CAR FILM
R100	R-2213	RES,VAR,PCB 100K .5 20%
R101	R65-0003-752	RES,7.5K 5% 1/4W CAR FILM
R102	R65-0003-151	RES,150 5% 1/4W CAR FILM
R103	R65-0003-430	RES,43 5% 1/4W CAR FILM
R104	R65-0003-392	RES,3.9K 5% 1/4W CAR FILM
R105	R65-0003-392	RES,3.9K 5% 1/4W CAR FILM
R106	R65-0003-102	RES,1.0K 5% 1/4W CAR FILM
R107	R65-0003-102	RES,1.0K 5% 1/4W CAR FILM
R108	R65-0003-102	RES,1.0K 5% 1/4W CAR FILM
R109	R65-0003-103	RES,10K 5% 1/4W CAR FILM
R110	R65-0003-333	RES,33K 5% 1/4W CAR FILM
R111	R65-0003-103	RES,10K 5% 1/4W CAR FILM
R112	R65-0003-103	RES,10K 5% 1/4W CAR FILM
R113	R65-0003-103	RES,10K 5% 1/4W CAR FILM
R114	R65-0003-333	RES,33K 5% 1/4W CAR FILM
R115	R65-0003-103	RES,10K 5% 1/4W CAR FILM
R116	R65-0003-103	RES,10K 5% 1/4W CAR FILM
R117	R65-0003-103	RES,10K 5% 1/4W CAR FILM

Table 3. Audio 2 Assembly A5A2 Parts List (Cont.)

Ref. Desig.	Part Number	Description
R118	R65-0003-103	RES, 10K 5% 1/4W CAR FILM
R119	R65-0003-202	RES, 2K 5% 1/4W CAR FILM
R120	R65-0003-202	RES, 2K 5% 1/4W CAR FILM
TP1	J-0071	TP PWB BRN TOP ACCS .080"
TP2	J-0066	TP PWB RED TOP ACCS .080"
U1	I30-0035-000	IC 072 OP AMP PLASTIC
U2	I30-0035-000	IC 072 OP AMP PLASTIC
U3	I06-0002-001	IC DG211 PLASTIC CMOS
U4	I62-0001-000	IC 1496 BAL MODULATOR
U5	I62-0001-000	IC 1496 BAL MODULATOR
U6	I30-0020-004	IC 2904 OP AMP PLASTIC
VR1	1N4732A	DIODE 4.7V 5% 1W ZENER
VR2	1N4732A	DIODE 4.7V 5% 1W ZENER
VR3	1N4732A	DIODE 4.7V 5% 1W ZENER
VR4	1N4732A	DIODE 4.7V 5% 1W ZENER

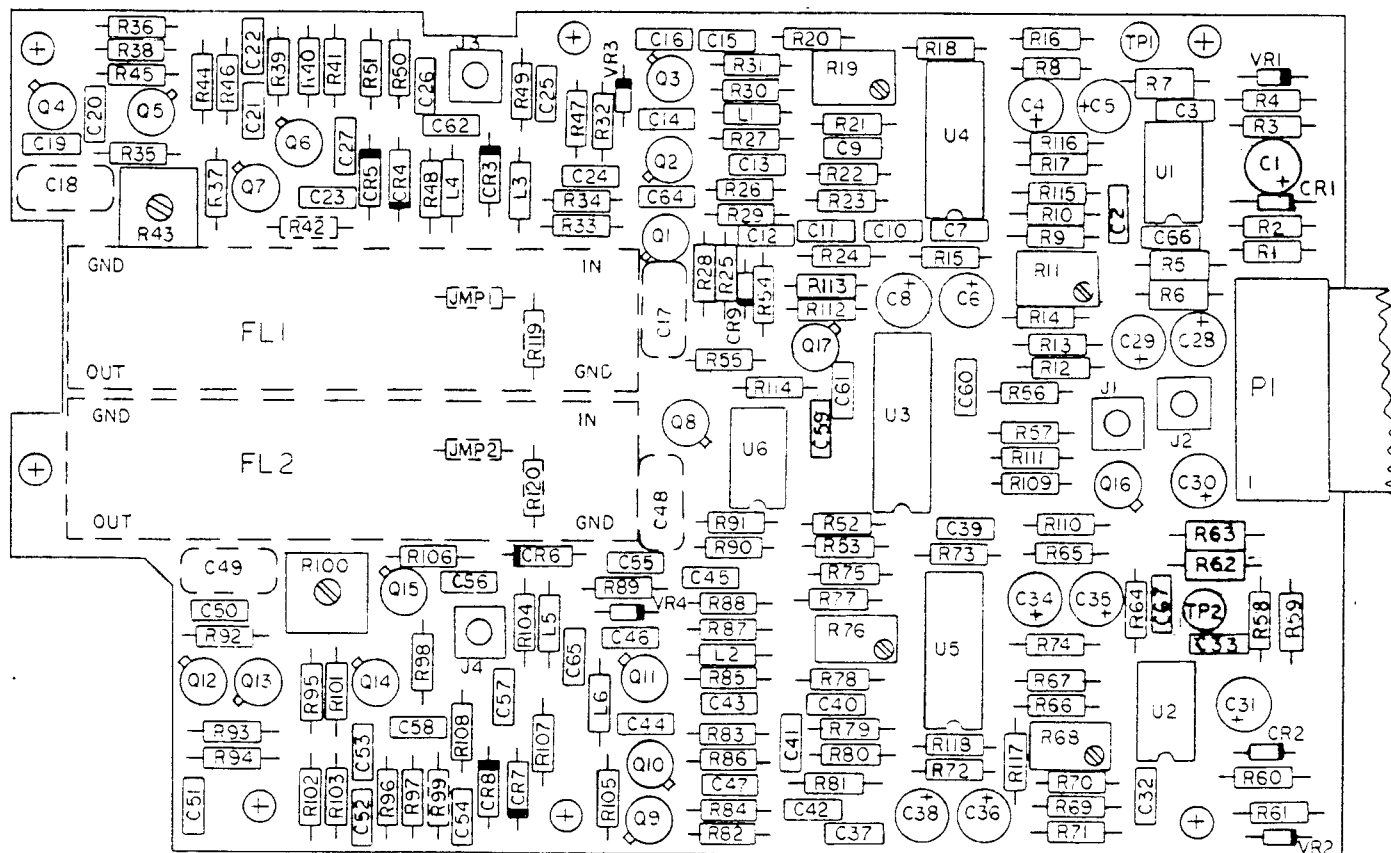


Figure 3. Audio 2 Assembly A5A2 Component Locations (10121-5450)

NOTE: UNLESS OTHERWISE SPECIFIED:

1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. FOR A COMPLETE DESIGNATION, PREFIX WITH UNIT NO. AND/OR ASSEMBLY NO. DESIGNATION.
2. ALL RESISTOR VALUES ARE IN OHMS, 1/4W, $\pm 5\%$.
3. ALL CAPACITOR VALUES ARE IN MICROFARADS.
4. VENDOR PART NO. CALLOUTS ARE FOR REFERENCE ONLY. COMPONENTS ARE SUPPLIED PER PART NO. IN PARTS LIST.
- * 5. WHEN THE OPTIONAL CLIPPER FILTERS FL1 & FL2 ARE INSTALLED, C17 & C18, C48 & C49 ARE ALSO INSTALLED AND JMP1 & JMP2, R119 & R120 ARE NOT USED.

