

A5A1

AUDIO 1 ASSEMBLY

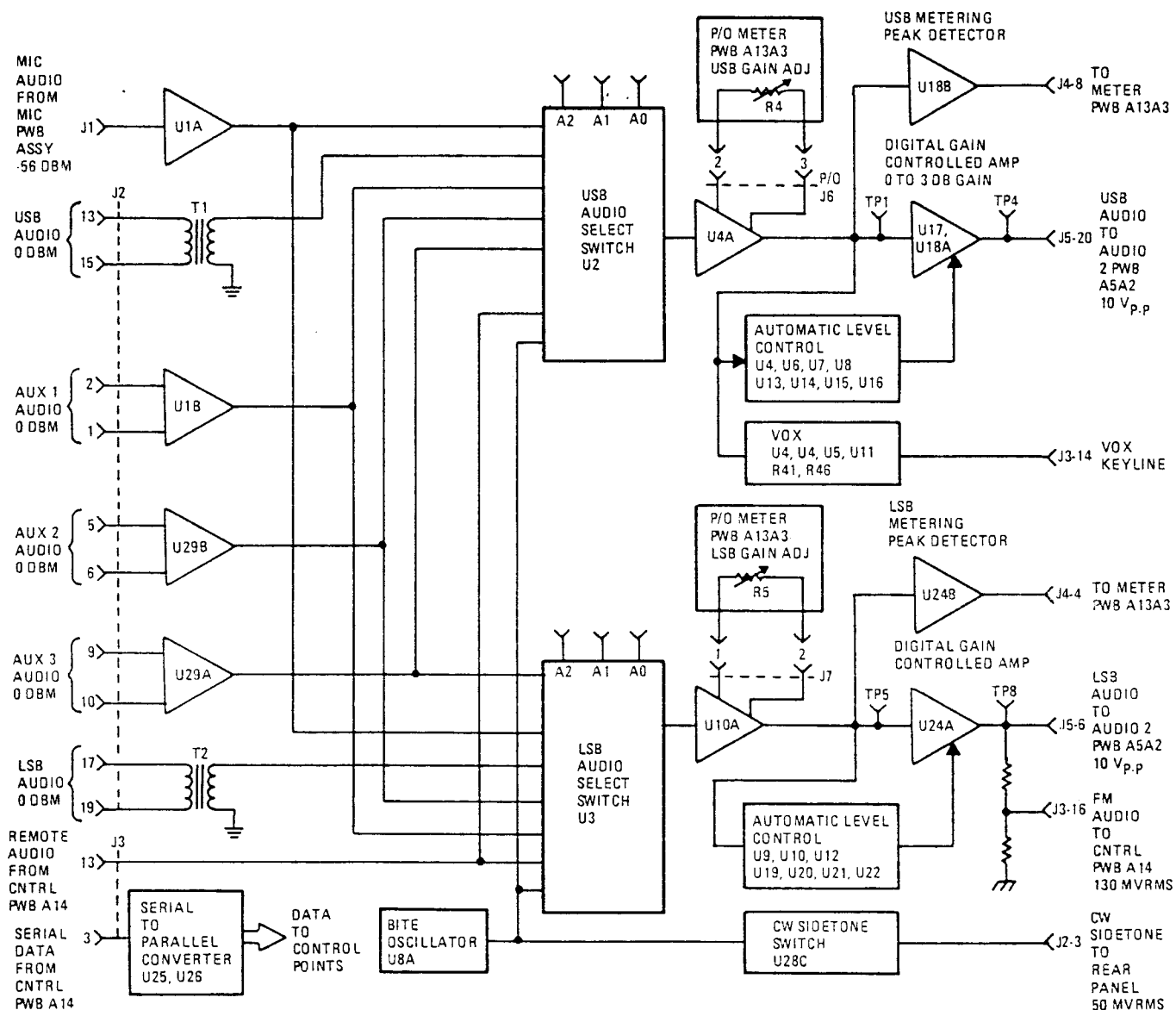


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AUDIO 1 ASSEMBLY A5A1

1. GENERAL DESCRIPTION

Audio 1/Audio 2 Assembly A5 consists of the following two PWBs:

- Audio 1 Motherboard Assembly A5A1 (10121-5410)
- Audio 2 Assembly A5A2 (10121-5450)

Figure 1 shows the relative position of the A5A1 assembly in the exciter chassis

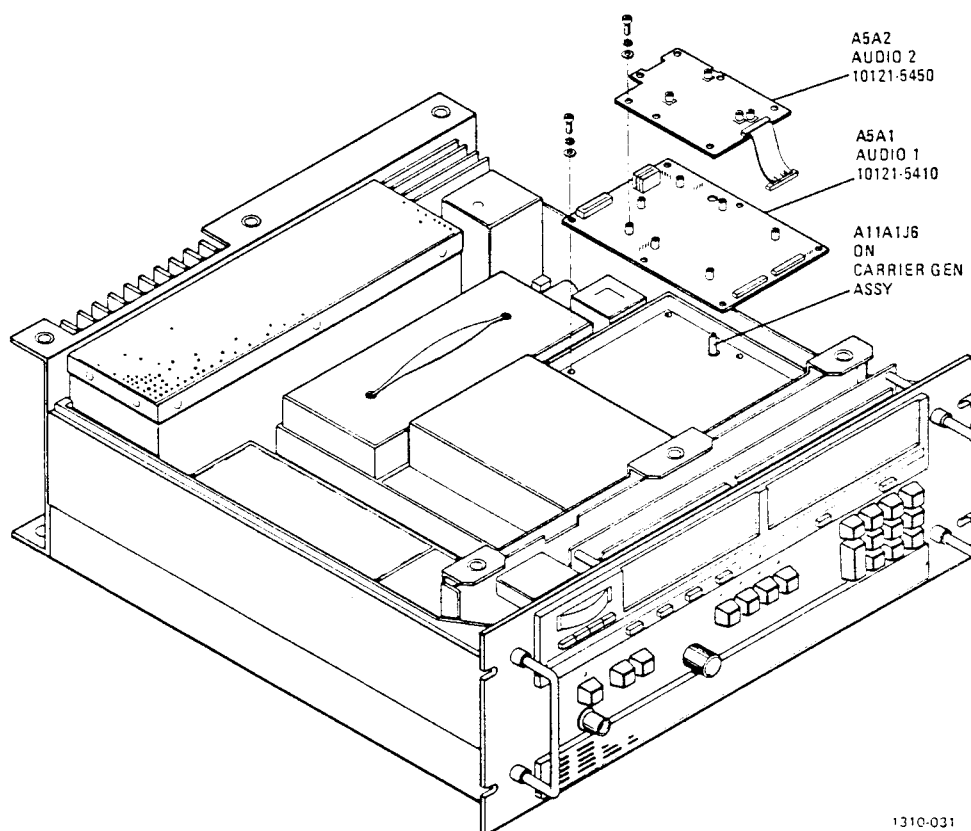


Figure 1. Audio 1 Motherboard Assembly

Audio 1 assembly A5A1 serves as the input to the exciter signal path. It supplies a processed audio output for each sideband to the balanced modulators of the A5A2 assembly. The Audio 1 assembly circuits provide the following functions:

- Audio source selection for each sideband signal path.
- ALC/Manual gain control for each sideband
- VOX operation (USB path only)
- Logarithmic detection of audio levels for metering
- BITE oscillator/CW sidetone generation
- FM audio output (LSB path only)

2. INTERFACE CONNECTIONS

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

Table 1. Audio 1 Assembly A5A1 Interface Connections

Connector	Function	Characteristics
J1-1	MIC Input	150-ohm nominal; -56 dBm nominal
J1-2	Index Key	
J1-3	MIC GND Return	
J2-1	AUX 1 Audio	600-ohm balanced; 0 dBm nominal
J2-2	AUX 1 Audio	600-ohm balanced; 0 dBm nominal
J2-3	CW Sidetone	600-ohm unbalanced; 50 mV _{rms}
J2-4	Ground	
J2-5	AUX 2 Audio	600-ohm balanced; 0 dBm nominal
J2-6	AUX 2 Audio	600-ohm balanced; 0 dBm nominal
J2-7	Spare	
J2-8	Ground	
J2-9	AUX 3 Audio	600-ohm balanced; 0 dBm nominal
J2-10	AUX 3 Audio	600-ohm balanced; 0 dBm nominal
J2-11	Spare	
J2-12	Spare	
J2-13	USB Audio	600-ohm balanced; 0 dBm nominal
J2-14	USB Audio CT	
J2-15	USB Audio	600-ohm balanced, Trans.; 0 dBm nominal
J2-16	Spare	
J2-17	LSB Audio	600-ohm balanced, Trans.; 0 dBm nominal

Table 1. Audio 1 Assembly A5A1 Interface Connections (Cont.)

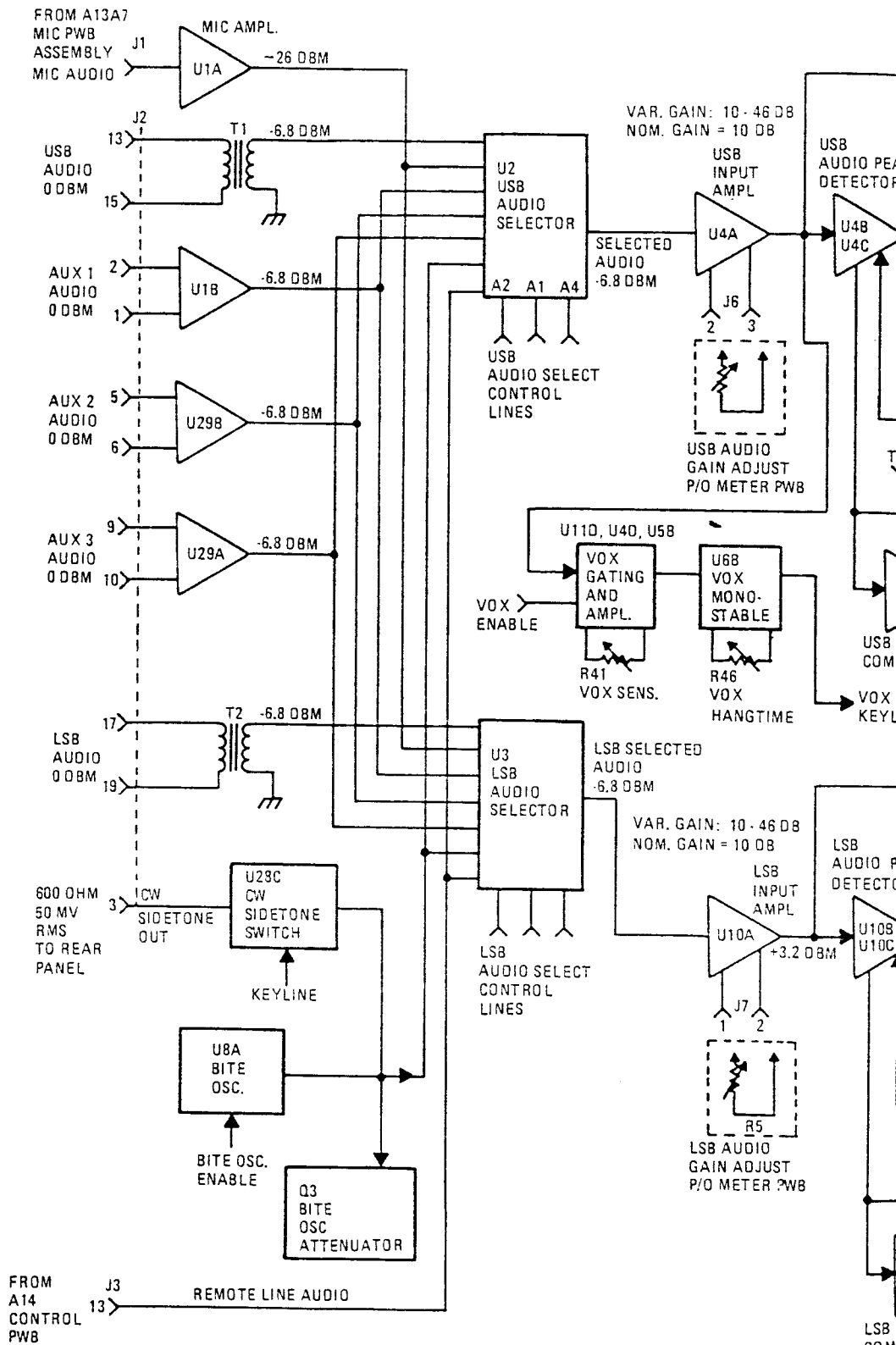
Connector	Function	Characteristics
J2-18	LSB Audio CT	600-ohm balanced, Trans.; 0 dBm nominal
J2-19	LSB Audio	
J2-20	Spare	
J3-1	Rear Serial Data	0 - 5 Vdc Logic
J3-2	Serial Clock	0 - 5 Vdc Logic
J3-3	A5 Serial Check	0 - 5 Vdc Logic
J3-4	Rear Serial Enable	0 - 5 Vdc Logic
J3-5	Spare	
J3-6	USB ALC BITE	
J3-7	USB IF BITE	
J3-8	LSB ALC BITE	
J3-9	LSB IF BITE	
J3-10	Rem. Line Audio GND	
J3-11	Spare	
J3-12	Spare	
J3-13	Spare	
J3-14	VOX Keyline	0 Vdc Active
J3-15	Ground	
J3-16	FM Audio	130 mV _{rms} nominal
J3-17	Spare	
J3-18	Power, -15 Vdc	
J3-19	Internal Keyline	0 Vdc Active
J3-20	Power, + 15 Vdc	
J3-21	Spare	
J3-22	Clip Enable	+ 5 Vdc Enables clipping
J3-23	Spare	
J3-24	Spare	
J4-1	Log Amp Input	
J4-2	Spare	
J4-3	Ground	
J4-4	LSB Meter Dc	
J4-5	Spare	
J4-6	Spare	
J4-7	Log Amp Output	

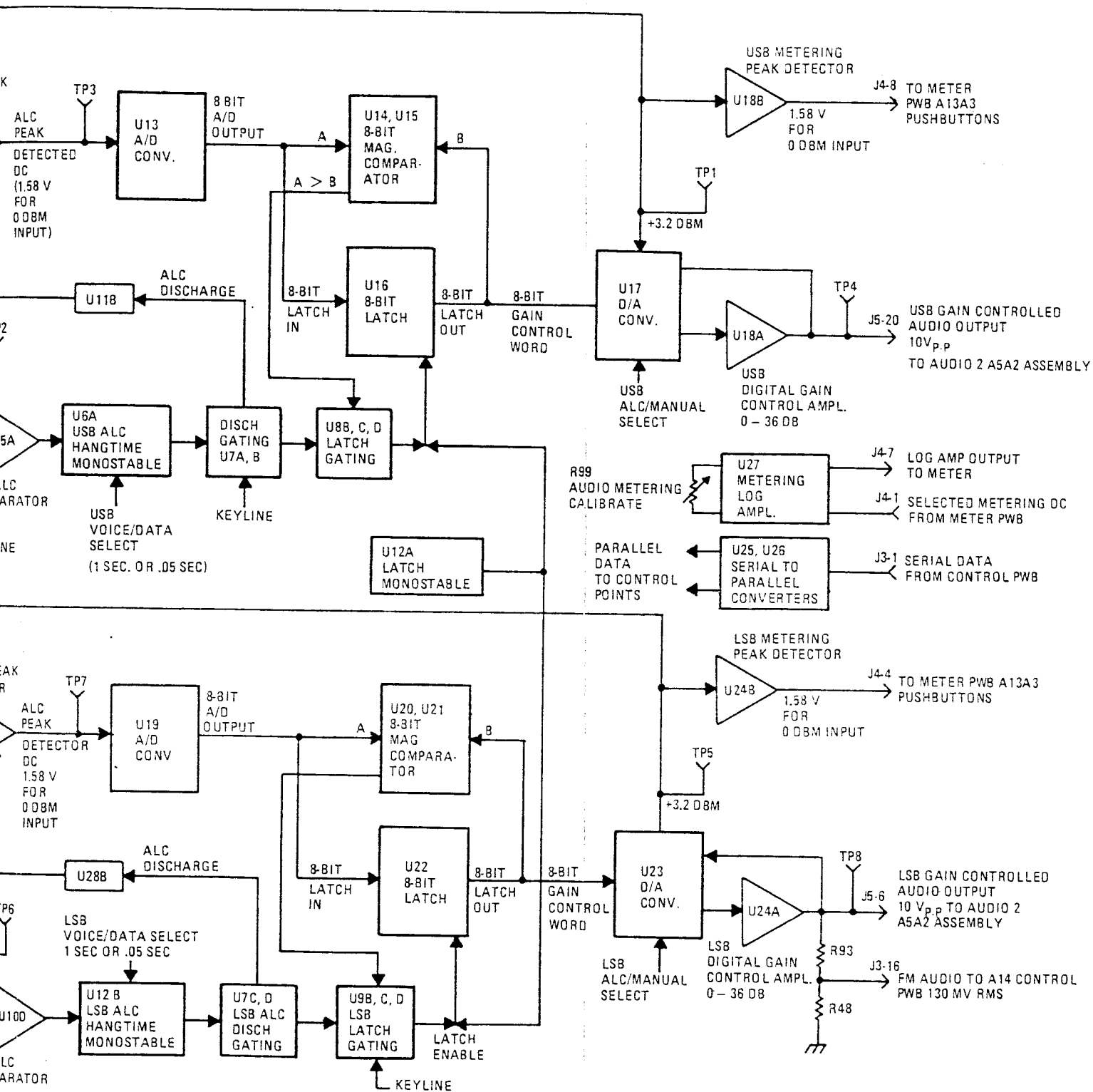
Table 1. Audio 1 Assembly A5A1 Interface Connections (Cont.)

Connector	Function	Characteristics
J4-8	USB Meter Dc	
J5-1	Clip Enable	+ 5 Vdc Enable clipping
J5-2	Spare	
J5-3	LSB Carrier Select	+ 5 Vdc Enables LSB carrier
J5-4	Spare	
J5-5	Spare	
J5-6	LSB Audio	10 V _{p-p} , nominal
J5-7	Spare	
J5-8	Spare	
J5-9	LSB IF BITE	
J5-10	USB IF BITE	
J5-11	Power, + 5 Vdc	
J5-12	LSB ALC BITE	
J5-13	USB ALC BITE	
J5-14	Spare	
J5-15	Power, -15 Vdc	
J5-16	Spare	
J5-17	Power, + 15 Vdc	
J5-18	Ground	
J5-19	USB Carrier Select	+ 5 Vdc enables USB carrier
J5-20	USB Audio	10 V _{p-p} , nominal
J6-1	Index Key	
J6-2	USB Audio Gain	
J6-3	USB Audio Gain USB Return	
J7-1	LSB Audio Gain	
J7-2	LSB Audio Gain LSB Return	
J7-3	Index Key	

3. A5A1 CIRCUIT DESCRIPTIONS

Figure 2 is a block diagram of the Motherboard circuit.





1310-032(A)

Figure 2. Motherboard Assembly A5A1 Functional Diagram

NOTE

Where circuitry of the USB and LSB signal paths are identical, the USB signal path is described with corresponding components of the LSB signal path included in parenthesis.

3.1 Audio Inputs/Audio Selection

The A5A1 assembly accepts audio signal inputs from any of seven selectable sources. Five balanced 600-ohm inputs are provided at J2. Microphone audio is applied at J1. Table 2 summarizes input characteristics. Remote Line Audio is externally derived and is applied via the Control Board to J2.

Table 2. Audio Inputs

Input	Type	Access	Nom Input
USB	600-ohm balanced; Transformer	Rear Panel	0 dBm
LSB	600-ohm balanced; Transformer	Rear Panel	0 dBm
AUX 1	600-ohm balanced; Differential Amplifier	Rear Panel	0 dBm
AUX 2	600-ohm balanced; Differential Amplifier	Rear Panel	0 dBm
AUX 3	600-ohm balanced; Differential Amplifier	Rear Panel	0 dBm
MIC	150-ohm nominal	Front Panel	-56 dBm

MIC amplifier U1A provides a nominal 30 dB gain. Differential amplifiers U1B, U29A, and U29B and audio transformers T1 and T2 each incur a nominal 6.8 dB loss. Audio selectors U2 and U3 are one of eight switches which route the desired audio source to the USB and LSB signal paths. Source selection for each sideband path is controlled by the Control Board Assembly microprocessor. Table 3 lists the required logic on audio select inputs U2-1, 16, and 15 (U3-1, 16, and 15) which allow the desired audio source to pass to the audio selector output U2-8 (U3-8).

Table 3. Audio Source Select Logic

Selected Audio Source for USB Path	Selected Audio Source for LSB Path	U2 Select Lines			U3 Select Lines		
		A0	A1	A2	A0	A1	A2
USB	LSB	0	0	0	0	0	0
MIC	MIC	0	0	1	0	0	1
AUX 1	AUX 1	0	1	0	0	1	0
AUX 2	AUX 2	0	1	1	0	1	1
AUX 3	AUX 3	1	0	0	1	0	0
BITE OSC.	BITE OSC.	1	0	1	1	0	1
REM. LINE AUD.	REM. LINE AUD.	1	1	0	1	1	0
NONE (MUTE)	NONE (MUTE)	1	1	1	1	1	1

USB Audio Input T1 is dedicated to the USB signal path and cannot be selected for LSB transmission. LSB Audio Input T2 is dedicated to the LSB path and cannot be selected for USB transmission. All other audio inputs are selectable for either or both sideband signal paths.

3.2 ALC Circuit

Each sideband audio path contains identical hang-type Automatic Level Control (ALC) circuits which establish the gain of the audio signal path. The ALC circuit sets the gain so that the audio output is 10 Vp-p for the largest input level applied. U18A (U24A) is configured with A/D converter U17 (U23) to form a digitally controlled variable gain amplifier. All other ALC circuitry controls or supports this amplifier. Audio peak detector U4B and U4C (U10B and U10C), in conjunction with Digital Peak Detector U13, U14, U15, and U16 (U19, U20, U21, and U22), establish the eight-bit digital word applied to D/A converter U17 (U23). When the input signal level falls, monostable multivibrator U6A (U12B) and gates U7A and U7B (U7C and U7D) control the ALC hangtime and gain recovery. Gates U8B, U8C, and U8D (U9B, U9C, and U9D) control latching of the eight-bit digital gain control word into latch U16 (U22). ALC circuit operation can be defeated to yield manual gain control. Directions for programming ALC vs. manual operation are included in the Control PWB Assembly A14 section of this manual.

3.2.1 Audio Input Amplifier

The selected audio signal appearing at U2-8 (U3-8) is low-pass filtered by R21 and C18 (R70 and C43) and coupled to U4A (U10A). The gain of U4A (U10A) may be adjusted over a nominal range of 10 dB to 46 dB via potentiometer R4 (R5) on Meter PWB Assembly A13A3. These potentiometers are accessed, by the operator, at the exciter front panel. When the potentiometers are adjusted fully clockwise, the ALC circuit will control audio input levels within the range of -26 dBm to +10 dBm.

3.2.2 Audio Peak Detector

U4B and U4C (U10B and U10C) are configured as a precision halfwave rectifier circuit. C48 (C47) charges to the peak level of the audio signal present at U4-1 (U10-1) and the resulting dc voltage at TP3 (TP7) is presented to A/D converter U13 (U19). The peak detector maintains this dc output until the input signal level falls and fails to return to the previous peak level after a specific length of time called the ALC hangtime. After this hangtime is over, the gain recovery circuit is activated.

3.2.3 Gain Recovery Circuit

The gain recovery circuit is responsible for resetting audio path gain when the input signal drops below its previous peak. When the input signal level falls, gain is increased in step recovery fashion. After an initial hangtime, approximately 10 dB of audio gain is restored. The initial hangtime period may be programmed for Voice (1 second) or Data (50 milliseconds) operation as described in the Control PWB Assembly A14 section of this manual. If the input signal has fallen by more than 10 dB, full gain recovery will occur after a fixed secondary hangtime period of approximately 4 seconds.

Stepped gain restoration is achieved by partial discharge (if necessary, full discharge) of C48 (C47). Discharging is performed by activation of switch U11B (U28B). When a steady or increasing audio signal level is present, U4B (U10B) consistently recharges C48 (C47) by producing negative voltage pulses at U4-7 (U10-7). These pulses are amplified by U5A (U10D) and applied as trigger pulses to hangtime monostable multivibrator U6A (U12B). As long as the input signal level does not fall, the hangtime monostable multivibrator will be continuously triggered. Its output U6-6 (U12-6) will remain active high. This logic passes through discharge control gates U7A and U7B (U7C and U7D) and appears at ALC discharge switch U11B (U28B). When the input signal level falls, triggering of U6A (U12B) stops. If the input signal does not return to its previous peak level within the initial hangtime period, the U6A (U12B) output will go low at the end of the initial hangtime period. This causes a short pulse to be applied to ALC discharge switch U11B (U28B) via discharge gates U7A

and U7B (U7C and U7D). The discharge switch is closed only for this short pulse time and only partially discharges C48 (C47) to yield an approximate 10 dB gain recovery. R38 and C23 (R88 and C51) control the duration of the discharge pulse. If the input signal has fallen by more than 10 dB, further discharge of C48 (C47) is necessary to yield further gain recovery. Approximately 4 seconds after the partial discharge is completed, discharge switch U11B (U28B) is closed and held in that state until the gain has recovered to the level appropriate for the new lower input level. Sufficient discharge of the ALC capacitor is signalled by the reappearance of negative voltage pulses at U4-7 (U10-7) which in turn retrigger U6A (U12B). R39 and C24 (R89 and C52) set the secondary hangtime to 4 seconds.

3.2.4 Digital Peak Detector

A/D converter U13 (U19) converts the dc output of the audio peak detector to a corresponding eight-bit word which is applied to D/A converter U17 (U23) via latch U16 (U22). Latch U16 (U22) holds the largest magnitude eight-bit word produced by A/D converter U13 (U19). The latch ignores smaller A/D outputs unless an ALC discharge (gain recovery) is in progress. U14 and U15 (U20 and U21) are configured as an eight-bit magnitude comparator which compares the present latch contents to the present A/D converter output. If the A/D converter outputs a word which is larger than that in the latch, the magnitude comparator activates gate U8B (U9B) allowing clock pulses supplied by U13-19 (U19-19) to pass through U8D (U9D). These pulses clock the larger word into the latch and stop when the latched word equals the present A/D output word. If the A/D converter outputs a smaller word than that in the latch, no clock pulses are applied unless an ALC discharge is in progress. ALC discharge activity is signalled by a logic low at U7-4 (U7-11), the same signal which activates ALC discharge switch U11B (U28B) as described in paragraph 3.2.3. When ALC discharge is occurring, clock pulses are applied to latch U16 (U22) via U8D (U9D). These pulses continuously clock the present A/D converter output word into the latch regardless of its magnitude for the duration of the discharge.

Monostable multivibrator U12A applies a clock pulse to latch U16 (U22) at 2.5 second intervals thereby forcing the latch to copy the present A/D converter output word regardless of relative magnitudes or ALC discharge activity.

3.2.5 Digitally Controlled Output Amplifier

D/A converter U17 (U23) and current to voltage converter U18A (U24A) are configured as a digitally controlled amplifier whose eight-bit gain control word is supplied by latch U16 (U22). The magnitude of the eight-bit word applied to U17 (U23) determines the gain of the amplifier. The amplifier, in conjunction with the audio peak detector and digital peak detector circuits, automatically sets its gain to yield an audio output level of 10 V_{p-p} for the largest audio input signal level encountered. The eight-bit control word will vary from decimal values of 4 to 255 for corresponding audio input levels from -26 dBm to +10 dBm. A control word magnitude of 255 indicates that A/D converter U13 (U19) is receiving the largest possible dc input (+5 V) from the audio peak detector, corresponding to an audio input level of +10 dBm. In this case, the gain of the amplifier is set to unity and the output is 10 V_{p-p}. Smaller audio input levels will yield correspondingly smaller magnitude control words and will set the gain in inverse proportion to the smaller input level. The output of amplifier U18A (U24A) is presented to the balanced modulators of the Audio 2 Assembly A5A2 for translation to 455 kHz.

3.3 Manual Gain Control

Upon command from Control PWB Assembly A14, the outputs of latch U16 (U22) are disabled (high impedance state) by a logic high at U16-1 (U22-1). The latch outputs are pulled down by R121 (R122) yielding a gain control word of decimal magnitude 4 applied to D/A converter U17 (U23). This word increases the gain of the output amplifier to maximum, leaving the gain of the audio path to be manually set by the operator via front panel adjustments. The front panel adjustment controls the gain of U4A (U10A) as described in paragraph 3.2.1. The Audio 1 PWB may be programmed for ALC or manual gain control as described in the Control PWB Assembly A14 section of this manual.

3.4 VOX Circuit

The USB audio path contains a traffic detector consisting of U4D, U5B, U6B, and U11D. The VOX circuit is enabled and disabled according to programming as described in the Control PWB Assembly A14 section of this manual. When VOX is enabled, switch U11D is off, allowing the full magnitude of the audio signal at U4-1 to be applied to buffer U4D. The buffered audio is amplified by U5B, whose gain is adjustable by the operator at R41, VOX Sensitivity Adjust. For an audio input level in the range -26 dBm to +10 dBm, R41 is adjusted so that the output of U5B is large enough to trigger monostable multivibrator U6B. Upon triggering, VOX Keyline U6B goes low to key the exciter. If the input signal level falls below the adjusted threshold, the VOX Keyline will remain active for a delay time period set by adjustment of R46, VOX Hangtime Adjust. The delay time is nominally adjustable from 100 milliseconds to 3.0 seconds.

3.5 Audio Metering Detector/Amplifier

The Audio 1 PWB provides metering voltages proportional to the logarithm of the audio input level in each sideband path. U18B (U24B) is a half-wave peak detector which produces a dc output equal to the peak value of the audio signal at J6-2 (J7-2). The detected dc voltages for each sideband are sent to Meter PWB Assembly A13A3 where front panel pushbutton switches select which of the two metering dc voltages (USB or LSB) is returned to logarithmic amplifier U27. Logarithmic amplifier U27 produces a dc output proportional to the log of the selected dc input and returns the processed dc to Meter PWB Assembly A13A3 to display the audio input level on the front panel meter.

3.6 BITE Oscillator

U8A produces a nominal 0 to 5 V square wave used as an audio signal source during BITE testing. The oscillator is activated from the Control PWB Assembly by a logic high at U8-1. This logic high is also applied to switch U11A (U28D) to set the output of U4A (U10A) at a fixed level (as required for BITE testing). During BITE testing, Control PWB Assembly A14 commands selection of the BITE oscillator as an audio source by applying the proper audio select logic signals as listed in table 3. Q3 is activated during BITE testing to yield a lower BITE oscillator output used in verifying proper ALC circuit gain recovery.

3.7 CW Sidetone

The BITE oscillator tone provides an audio signal which may be monitored during CW transmission. When CW mode is selected, the BITE oscillator is active and, upon keying of the exciter, its output is gated through U28C to the rear panel.

3.8 Control Circuit

U25 and U26 are eight-bit, serial-to-parallel converters which accept a serial data stream from Control PWB Assembly A14 and distribute the received data to the various Audio 1 PWB circuits. The Control PWB Assembly A14 microprocessor determines the proper data to be sent to U25 and U26 for desired programming of Audio 1 PWB operations.

3.9 FM Audio

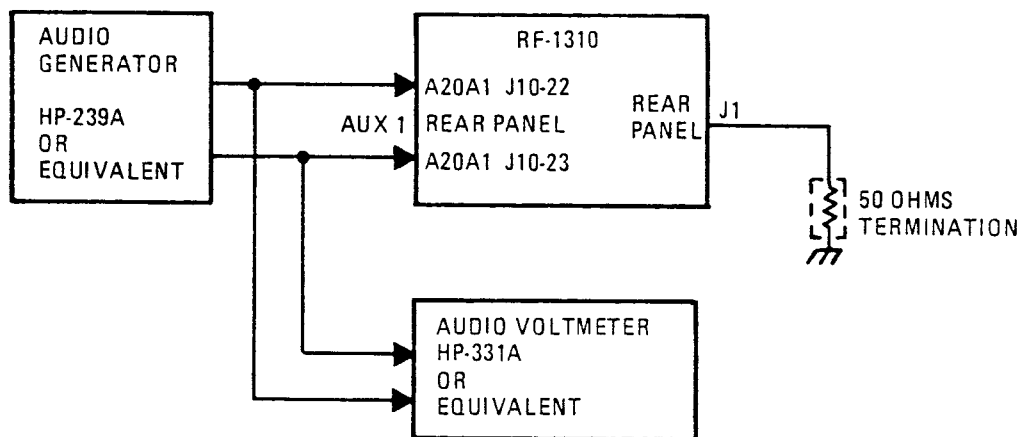
The gain controlled output of U24A is attenuated by R93 and R48 and sent to Carrier Generator PWB Assembly A11 via Control PWB Assembly A14 for production of FM signals.

4. MAINTENANCE

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

4.1 Audio Metering Calibration

- a. Connect equipment as shown in figure 3. Set audio generator to 1 kHz, -30 dBm.



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Figure 3. Audio Metering Calibration Setup

- b. Set meter function front panel pushbuttons to USB.
- c. Set RF-1310 front panel controls as follows:
 - FUNCTION switch to NORM
 - MODE to USB
 - USB audio source to AUX 1
 - USB Audio Level Adjust fully clockwise
- d. Adjust R99 to a -30 dBm reading on front panel meter. Audio metering calibration is now complete.

4.2 BITE Test

Activate RF-1310 self test. Exciter must pass all tests associated with the A5A1 assembly. Refer to section 5 maintenance section of this manual for explanation of A5 assembly BITE fault codes. Test is now complete.

5. PARTS LIST, COMPONENT LOCATIONS, AND SCHEMATIC DIAGRAM

All replaceable components of Motherboard assembly A5A1 are listed in table 4. Component locations are shown in figure 4. The Audio 1 Motherboard assembly schematic diagram is shown in figure 5.

Table 4. Audio 1 Motherboard Assembly A5A1

Ref. Desig.	Part Number	Description
A5A1	10121-5410	AUDIO NO.1 ASSEMBLY
C1	C26-0025-100	CAP 10UF 20% 25V TANT
C2	M39014/02-1310	CAP .1UF 10% 100V CER-R
C3	M39014/02-1310	CAP .1UF 10% 100V CER-R
C4	CK05BX101K	CAP 100PF 10% 200V CER
C5	M39014/02-1320	CAP .47UF 10% 50V CER-R
C6	M39014/02-1320	CAP .47UF 10% 50V CER-R
C7	M39014/02-1320	CAP .47UF 10% 50V CER-R
C8	M39014/02-1320	CAP .47UF 10% 50V CER-R
C9	M39014/02-1320	CAP .47UF 10% 50V CER-R
C10	M39014/02-1320	CAP .47UF 10% 50V CER-R
C11	CK06BX223K	CAP .022UF 10% 100V CER
C12	CK06BX223K	CAP .022UF 10% 100V CER
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
C17	C26-0025-339	CAP 3.3UF 20% 25V TANT
C18	CK06BX103K	CAP .01UF 10% 200V CER
C19	M39014/02-1310	CAP .1UF 10% 100V CER-R
C20	M39014/02-1310	CAP .1UF 10% 100V CER-R
C21	C26-0025-339	CAP 3.3UF 20% 25V TANT
C22	C26-0025-339	CAP 3.3UF 20% 25V TANT
C23	M39014/02-1310	CAP .1UF 10% 100V CER-R
C24	C26-0025-100	CAP 10UF 20% 25V TANT
C25	M39014/02-1310	CAP .1UF 10% 100V CER-R
C26	C26-0016-689	CAP 6.8UF 20% 16V TANT
C27	C26-0025-339	CAP 3.3UF 20% 25V TANT
C28	CK05BX152K	CAP 1500PF 10% 100V CER
C29	M39014/02-1310	CAP .1UF 10% 100V CER-R
C30	M39014/02-1310	CAP .1UF 10% 100V CER-R
C31	C26-0025-339	CAP 3.3UF 20% 25V TANT
C32	C26-0025-339	CAP 3.3UF 20% 25V TANT
C33	CK06BX333K	CAP .033UF 10% 100V CER
C34	CK06BX103K	CAP .01UF 10% 200V CER

Table 4. Audio 1 Motherboard Assembly A5A1 (Cont.)

Ref. Desig.	Part Number	Description
C35	M39014/02-1310	CAP .1UF 10% 100V CER-R
C36	C26-0025-100	CAP 10UF 20% 25V TANT
C37	M39014/02-1310	CAP .1UF 10% 100V CER-R
C38	C26-0025-100	CAP 10UF 20% 25V TANT
C39	C26-0025-100	CAP 10UF 20% 25V TANT
C40	M39014/02-1310	CAP .1UF 10% 100V CER-R
C41	C26-0025-100	CAP 10UF 20% 25V TANT
C42	C26-0025-100	CAP 10UF 20% 25V TANT
C43	CK06BX103K	CAP .01UF 10% 200V CER
C44	C26-0025-339	CAP 3.3UF 20% 25V TANT
C45	M39014/02-1310	CAP .1UF 10% 100V CER-R
C46	M39014/02-1310	CAP .1UF 10% 100V CER-R
C47	M39014/02-1320	CAP .47UF 10% 50V CER-R
C48	M39014/02-1320	CAP .47UF 10% 50V CER-R
C49	C26-0025-339	CAP 3.3UF 20% 25V TANT
C50	C26-0025-339	CAP 3.3UF 20% 25V TANT
C51	M39014/02-1310	CAP .1UF 10% 100V CER-R
C52	C26-0025-100	CAP 10UF 20% 25V TANT
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	C26-0025-339	CAP 3.3UF 20% 25V TANT
C59	C26-0025-339	CAP 3.3UF 20% 25V TANT
C60	C26-0025-339	CAP 3.3UF 20% 25V TANT
C61	C26-0025-100	CAP 10UF 20% 25V TANT
C63	C26-0025-339	CAP 3.3UF 20% 25V TANT
C64	C26-0025-100	CAP 10UF 20% 25V TANT
CR1	1N6263	DIODE .40W 60V HOT CARR
CR2	1N6263	DIODE .40W 60V HOT CARR
CR3	1N4454	DIODE 200mA 75V SW
CR4	1N4454	DIODE 200mA 75V SW
CR5	1N4454	DIODE 200mA 75V SW
CR6	1N4454	DIODE 200mA 75V SW
CR7	1N4454	DIODE 200mA 75V SW
CR8	1N4454	DIODE 200mA 75V SW
CR9	1N4454	DIODE 200mA 75V SW
CR10	1N4454	DIODE 200mA 75V SW
CR11	1N4454	DIODE 200mA 75V SW
CR12	1N4454	DIODE 200mA 75V SW
CR13	1N4454	DIODE 200mA 75V SW
CR14	1N6263	DIODE .40W 60V HOT CARR
CR15	1N4454	DIODE 200mA 75V SW
CR16	1N4454	DIODE 200mA 75V SW

Table 4. Audio 1 Motherboard Assembly A5A1 (Cont.)

Ref. Desig.	Part Number	Description
CR17	1N4454	DIODE 200mA 75V SW
CR18	1N6263	DIODE .40W 60V HOT CARR
CR19	1N6263	DIODE .40W 60V HOT CARR
CR20	1N6263	DIODE .40W 60V HOT CARR
CR21	1N4454	DIODE 200mA 75V SW
CR22	1N4454	DIODE 200mA 75V SW
CR23	1N4454	DIODE 200mA 75V SW
CR24	1N4454	DIODE 200mA 75V SW
CR25	1N4454	DIODE 200mA 75V SW
CR26	1N4454	DIODE 200mA 75V SW
CR27	1N4454	DIODE 200mA 75V SW
CR28	1N4454	DIODE 200mA 75V SW
CR29	1N4454	DIODE 200mA 75V SW
CR30	1N4454	DIODE 200mA 75V SW
CR31	1N4454	DIODE 200mA 75V SW
CR32	1N6263	DIODE .40W 60V HOT CARR
CR33	1N4454	DIODE 200mA 75V SW
CR34	1N4454	DIODE 200mA 75V SW
CR35	1N4454	DIODE 200mA 75V SW
CR36	1N6263	DIODE .40W 60V HOT CARR
CR37	1N6263	DIODE .40W 60V HOT CARR
CR38	1N5235B	DIODE 6.8V 5% .5W ZENER
CR39	1N5235B	DIODE 6.8V 5% .5W ZENER
CR40	1N5235B	DIODE 6.8V 5% .5W ZENER
CR41	1N5235B	DIODE 6.8V 5% .5W ZENER
J1	J46-0032-001	RECEPTACLE, 3 PIN
J2	J46-0013-020	HEADER, PROTECTED, 20 PIN
J3	J46-0013-024	RECEPTACLE, 24 PIN
J4	J46-0032-008	CONN, 8 PIN
J5	J46-0013-020	HEADER, PROTECTED, 20 PIN
J6	J46-0032-001	RECEPTACLE, 3 PIN
J7	J46-0032-004	CONN, 4 PIN
JMP1	MP-1142	CIRCUIT JUMPER
JMP2	MP-1142	CIRCUIT JUMPER
Q1	2N2222A	XSTR SS/GP NPN TO-18
Q2	2N2222A	XSTR SS/GP NPN TO-18
Q3	2N2222A	XSTR SS/GP NPN TO-18
R1	R65-0003-151	RES, 150 5% 1/4W CAR FILM
R2	R65-0003-392	RES, 3.9K 5% 1/4W CAR FILM
R3	R65-0003-681	RES, 680 5% 1/4W CAR FILM
R4	R65-0003-682	RES, 6.8K 5% 1/4W CAR FILM
R5	R65-0003-103	RES, 10K 5% 1/4W CAR FILM
R6	R65-0003-133	RES, 13K 5% 1/4W CAR FILM
R7	R65-0003-133	RES, 13K 5% 1/4W CAR FILM
R8	R65-0003-622	RES, 6.2K 5% 1/4W CAR FILM

Table 4. Audio 1 Motherboard Assembly A5A1 (Cont.)

Ref. Desig.	Part Number	Description
R9	R65-0003-622	RES,6.2K 5% 1/4W CAR FILM
R10	R65-0003-133	RES,13K 5% 1/4W CAR FILM
R11	R65-0003-133	RES,13K 5% 1/4W CAR FILM
R12	R65-0003-622	RES,6.2K 5% 1/4W CAR FILM
R13	R65-0003-622	RES,6.2K 5% 1/4W CAR FILM
R14	R65-0003-133	RES,13K 5% 1/4W CAR FILM
R15	R65-0003-133	RES,13K 5% 1/4W CAR FILM
R16	R65-0003-622	RES,6.2K 5% 1/4W CAR FILM
R17	R65-0003-622	RES,6.2K 5% 1/4W CAR FILM
R18	R65-0003-181	RES,180 5% 1/4W CAR FILM
R19	R65-0003-181	RES,180 5% 1/4W CAR FILM
R20	R65-0003-473	RES,47K 5% 1/4W CAR FILM
R21	R65-0003-122	RES,1.2K 5% 1/4W CAR FILM
R22	R65-0003-104	RES,100K 5% 1/4W CAR FILM
R23	R65-0003-103	RES,10K 5% 1/4W CAR FILM
R24	RN55D2002F	RES,20.0K 1% 1/8W MET FLM
R25	RN55D2002F	RES,20.0K 1% 1/8W MET FLM
R26	R65-0003-105	RES,1.0M 5% 1/4W CAR FILM
R27	R65-0003-103	RES,10K 5% 1/4W CAR FILM
R28	R65-0003-101	RES,100 5% 1/4W CAR FILM
R29	R65-0003-104	RES,100K 5% 1/4W CAR FILM
R30	R65-0003-821	RES,820 5% 1/4W CAR FILM
R31	R65-0003-103	RES,10K 5% 1/4W CAR FILM
R32	R65-0003-153	RES,15K 5% 1/4W CAR FILM
R33	R65-0003-473	RES,47K 5% 1/4W CAR FILM
R34	R65-0003-473	RES,47K 5% 1/4W CAR FILM
R35	R65-0003-334	RES,330K 5% 1/4W CAR FILM
R36	R65-0003-682	RES,6.8K 5% 1/4W CAR FILM
R37	R65-0003-101	RES,100 5% 1/4W CAR FILM
R38	R65-0003-824	RES,820K 5% 1/4W CAR FILM
R39	R65-0003-624	RES,620K 5% 1/4W CAR FILM
R40	R65-0003-333	RES,33K 5% 1/4W CAR FILM
R41	R30-0008-105	RES,VAR,PCB 1M 1/2W 10%
R42	R65-0003-153	RES,15K 5% 1/4W CAR FILM
R43	R65-0003-473	RES,47K 5% 1/4W CAR FILM
R44	R65-0003-473	RES,47K 5% 1/4W CAR FILM
R45	R65-0003-223	RES,22K 5% 1/4W CAR FILM
R46	R30-0008-105	RES,VAR,PCB 1M 1/2W 10%
R47	RN55D2493F	RES,249K 1% 1/8W MET FLM
R48	R65-0003-392	RES,3.9K 5% 1/4W CAR FILM
R49	R65-0003-473	RES,47K 5% 1/4W CAR FILM
R50	R65-0003-471	RES,470 5% 1/4W CAR FILM
R51	R65-0003-102	RES,1.0K 5% 1/4W CAR FILM
R52	R65-0003-153	RES,15K 5% 1/4W CAR FILM
R53	R65-0003-103	RES,10K 5% 1/4W CAR FILM

Table 4. Audio 1 Motherboard Assembly A5A1 (Cont.)

Ref. Desig.	Part Number	Description
R54	R65-0003-224	RES,220K 5% 1/4W CAR FILM
R55	R65-0003-823	RES,82K 5% 1/4W CAR FILM
R56	R65-0003-473	RES,47K 5% 1/4W CAR FILM
R57	R65-0003-102	RES,1.0K 5% 1/4W CAR FILM
R58	R65-0003-474	RES,470K 5% 1/4W CAR FILM
R59	R65-0003-823	RES,82K 5% 1/4W CAR FILM
R60	RN55D6192F	RES,61.9K 1% 1/8W MET FLM
R61	R65-0003-103	RES,10K 5% 1/4W CAR FILM
R62	R65-0003-101	RES,100 5% 1/4W CAR FILM
R63	R65-0003-472	RES,4.7K 5% 1/4W CAR FILM
R64	R65-0003-103	RES,10K 5% 1/4W CAR FILM
R65	R65-0003-473	RES,47K 5% 1/4W CAR FILM
R66	R65-0003-333	RES,33K 5% 1/4W CAR FILM
R67	R65-0003-333	RES,33K 5% 1/4W CAR FILM
R68	R65-0003-333	RES,33K 5% 1/4W CAR FILM
R69	R65-0003-473	RES,47K 5% 1/4W CAR FILM
R70	R65-0003-122	RES,1.2K 5% 1/4W CAR FILM
R71	R65-0003-104	RES,100K 5% 1/4W CAR FILM
R72	R65-0003-103	RES,10K 5% 1/4W CAR FILM
R73	RN55D2002F	RES,20.0K 1% 1/8W MET FLM
R74	RN55D2002F	RES,20.0K 1% 1/8W MET FLM
R75	R65-0003-105	RES,1.0M 5% 1/4W CAR FILM
R76	R65-0003-103	RES,10K 5% 1/4W CAR FILM
R77	R65-0003-101	RES,100 5% 1/4W CAR FILM
R78	R65-0003-104	RES,100K 5% 1/4W CAR FILM
R79	R65-0003-821	RES,820 5% 1/4W CAR FILM
R80	R65-0003-103	RES,10K 5% 1/4W CAR FILM
R81	R65-0003-153	RES,15K 5% 1/4W CAR FILM
R82	R65-0003-473	RES,47K 5% 1/4W CAR FILM
R83	R65-0003-473	RES,47K 5% 1/4W CAR FILM
R84	R65-0003-334	RES,330K 5% 1/4W CAR FILM
R85	R65-0003-682	RES,6.8K 5% 1/4W CAR FILM
R86	R65-0003-102	RES,1.0K 5% 1/4W CAR FILM
R87	R65-0003-101	RES,100 5% 1/4W CAR FILM
R88	R65-0003-824	RES,820K 5% 1/4W CAR FILM
R89	R65-0003-624	RES,620K 5% 1/4W CAR FILM
R90	R65-0003-224	RES,220K 5% 1/4W CAR FILM
R91	R65-0003-103	RES,10K 5% 1/4W CAR FILM
R92	R65-0003-473	RES,47K 5% 1/4W CAR FILM
R93	R65-0003-104	RES,100K 5% 1/4W CAR FILM
R94	R65-0003-101	RES,100 5% 1/4W CAR FILM
R95	R65-0003-473	RES,47K 5% 1/4W CAR FILM
R96	R65-0003-473	RES,47K 5% 1/4W CAR FILM
R97	R65-0003-473	RES,47K 5% 1/4W CAR FILM
R98	R65-0003-124	RES,120K 5% 1/4W CAR FILM

Table 4. Audio 1 Motherboard Assembly A5A1 (Cont.)

Ref. Desig.	Part Number	Description
R99	R30-0008-504	RES,VAR,PCB 500K 1/2W 10%
R100	RN55D4021F	RES,4020 1% 1/8W MET FLM
R101	R65-0003-333	RES,33K 5% 1/4W CAR FILM
R102	R65-0003-333	RES,33K 5% 1/4W CAR FILM
R103	RN55D7502F	RES,75.0K 1% 1/8W MET FLM
R104	R65-0003-303	RES,30K 5% 1/4W CAR FILM
R105	R65-0003-154	RES,150K 5% 1/4W CAR FILM
R106	R65-0003-223	RES,22K 5% 1/4W CAR FILM
R107	R65-0003-623	RES,62K 5% 1/4W CAR FILM
R108	R65-0003-622	RES,6.2K 5% 1/4W CAR FILM
R109	R65-0003-103	RES,10K 5% 1/4W CAR FILM
R110	R65-0003-242	RES,2.4K 5% 1/4W CAR FILM
R111	R65-0003-302	RES,3.0K 5% 1/4W CAR FILM
R112	RN55D7502F	RES,75.0K 1% 1/8W MET FLM
R113	RN55D7502F	RES,75.0K 1% 1/8W MET FLM
R114	R65-0003-393	RES,39K 5% 1/4W CAR FILM
R115	RN55D6040F	RES,604.0 1% 1/8W MET FLM
R116	RN55D6040F	RES,604.0 1% 1/8W MET FLM
R117	RN55D6040F	RES,604.0 1% 1/8W MET FLM
R118	R65-0003-104	RES,100K 5% 1/4W CAR FILM
R119	R65-0003-103	RES,10K 5% 1/4W CAR FILM
R120	R65-0003-472	RES,4.7K 5% 1/4W CAR FILM
R121	R50-0010-104	RES,10SIP,100K,2.0%, 9RES
R122	R50-0010-104	RES,10SIP,100K,2.0%, 9RES
R123	R65-0003-472	RES,4.7K 5% 1/4W CAR FILM
R124	R65-0003-103	RES,10K 5% 1/4W CAR FILM
R125	R65-0003-472	RES,4.7K 5% 1/4W CAR FILM
R126	R65-0003-103	RES,10K 5% 1/4W CAR FILM
R127	R65-0003-223	RES,22K 5% 1/4W CAR FILM
R128	R65-0003-511	RES,510 5% 1/4W CAR FILM
R129	R65-0003-103	RES,10K 5% 1/4W CAR FILM
R130	R65-0003-104	RES,100K 5% 1/4W CAR FILM
R131	R65-0003-104	RES,100K 5% 1/4W CAR FILM
R132	R65-0003-335	RES,3.3M 5% 1/4W CAR FILM
R133	R65-0003-335	RES,3.3M 5% 1/4W CAR FILM
T1	T60-0004-001	TRANSFORMER
T2	T60-0004-001	TRANSFORMER
TP1	J-0071	TP PWB BRN TOP ACCS .080"
TP2	J-0066	TP PWB RED TOP ACCS .080"
TP3	J-0069	TP PWB ORN TOP ACCS .080"
TP4	J-0070	TP PWB YEL TOP ACCS .080"
TP5	J-0068	TP PWB GRN TOP ACCS .080"
TP6	J-0072	TP PWB BLU TOP ACCS .080"
TP7	J-0073	TP PWB VIO TOP ACCS .080"
TP8	J-0074	TP PWB GRA TOP ACCS .080"

Table 4. Audio 1 Motherboard Assembly A5A1 (Cont.)

Ref. Desig.	Part Number	Description
U1	I30-0035-000	IC 072 OP AMP PLASTIC
U2	I09-0011-001	IC 508A PLASTIC CMOS
U3	I09-0011-001	IC 508A PLASTIC CMOS
U4	I30-0038-001	IC 347 OP AMP PLASTIC
U5	I30-0035-000	IC 072 OP AMP PLASTIC
U6	I01-0000-353	IC 4538B PLASTIC CMOS
U7	I01-0000-003	IC 4001B PLASTIC CMOS
U8	10121-5412	IC SCHMITT TRIGGER
U9	I01-0000-351	IC 4093B PLASTIC CMOS
U10	I30-0038-001	IC 347 OP AMP PLASTIC
U11	I06-0002-001	IC DG211 PLASTIC CMOS
U12	I01-0000-353	IC 4538B PLASTIC CMOS
U13	I03-0011-000	IC ADC0804 PLASTIC CMOS
U14	I01-0000-308	IC 4585B PLASTIC CMOS
U15	I01-0000-308	IC 4585B PLASTIC CMOS
U16	I05-0019-000	IC 74C374 CERAMIC CMOS
U17	I03-0012-000	IC AD7523 PLASTIC CMOS
U18	I30-0035-000	IC 072 OP AMP PLASTIC
U19	I03-0011-000	IC ADC0804 PLASTIC CMOS
U20	I01-0000-308	IC 4585B PLASTIC CMOS
U21	I01-0000-308	IC 4585B PLASTIC CMOS
U22	I05-0019-000	IC 74C374 CERAMIC CMOS
U23	I03-0012-000	IC AD7523 PLASTIC CMOS
U24	I30-0035-000	IC 072 OP AMP PLASTIC
U25	I01-0000-156	IC 4094B PLASTIC CMOS
U26	I01-0000-156	IC 4094B PLASTIC CMOS
U27	I30-0038-001	IC 347 OP AMP PLASTIC
U28	I06-0002-001	IC DG211 PLASTIC CMOS
U29	I30-0035-000	IC 072 OP AMP PLASTIC
VR1	I12-0005-005	IC VR 78L05 +5V .10A 10
VR2	1N5228B	DIODE 3.9V 5% .5W ZENER

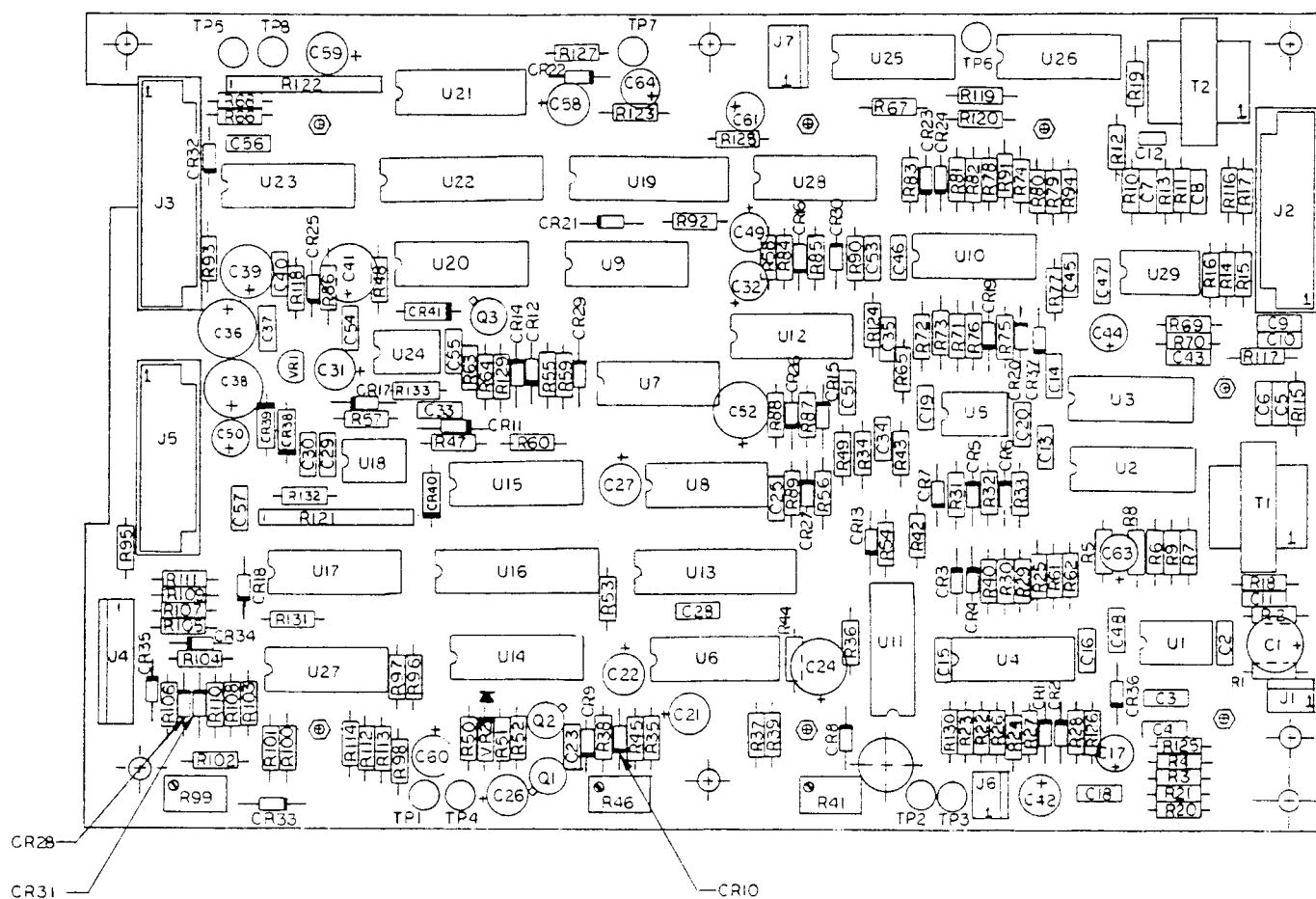
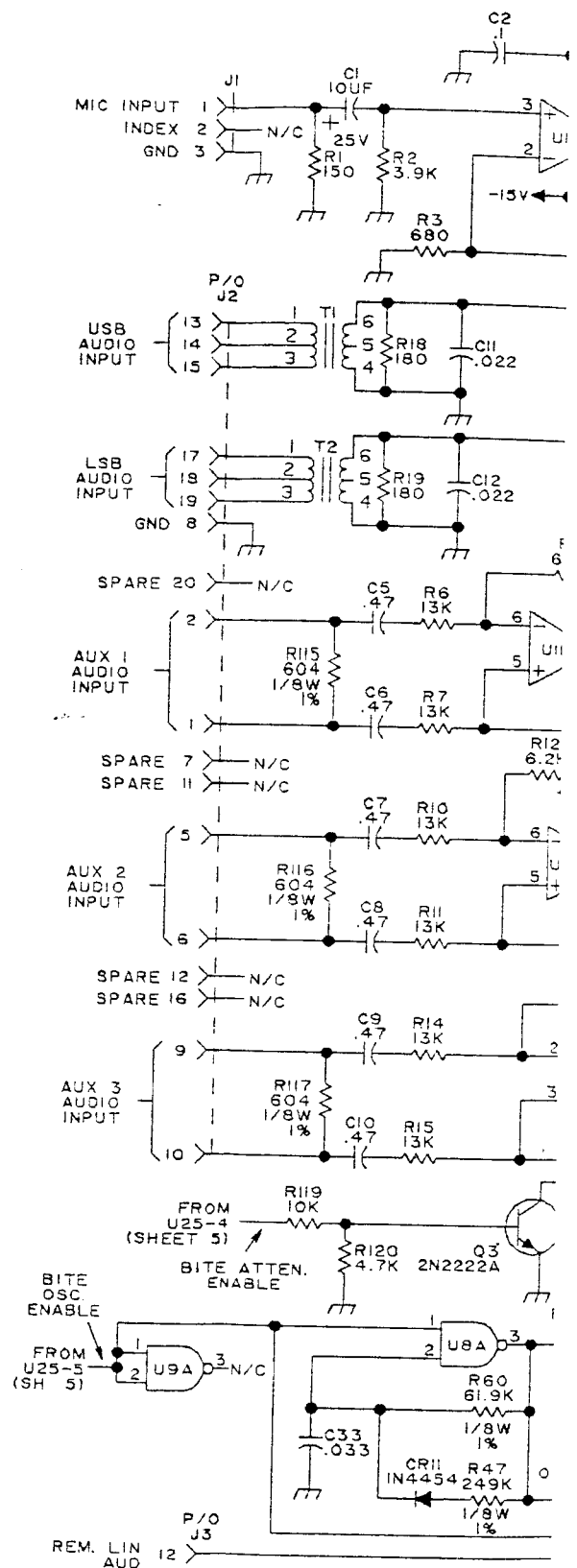
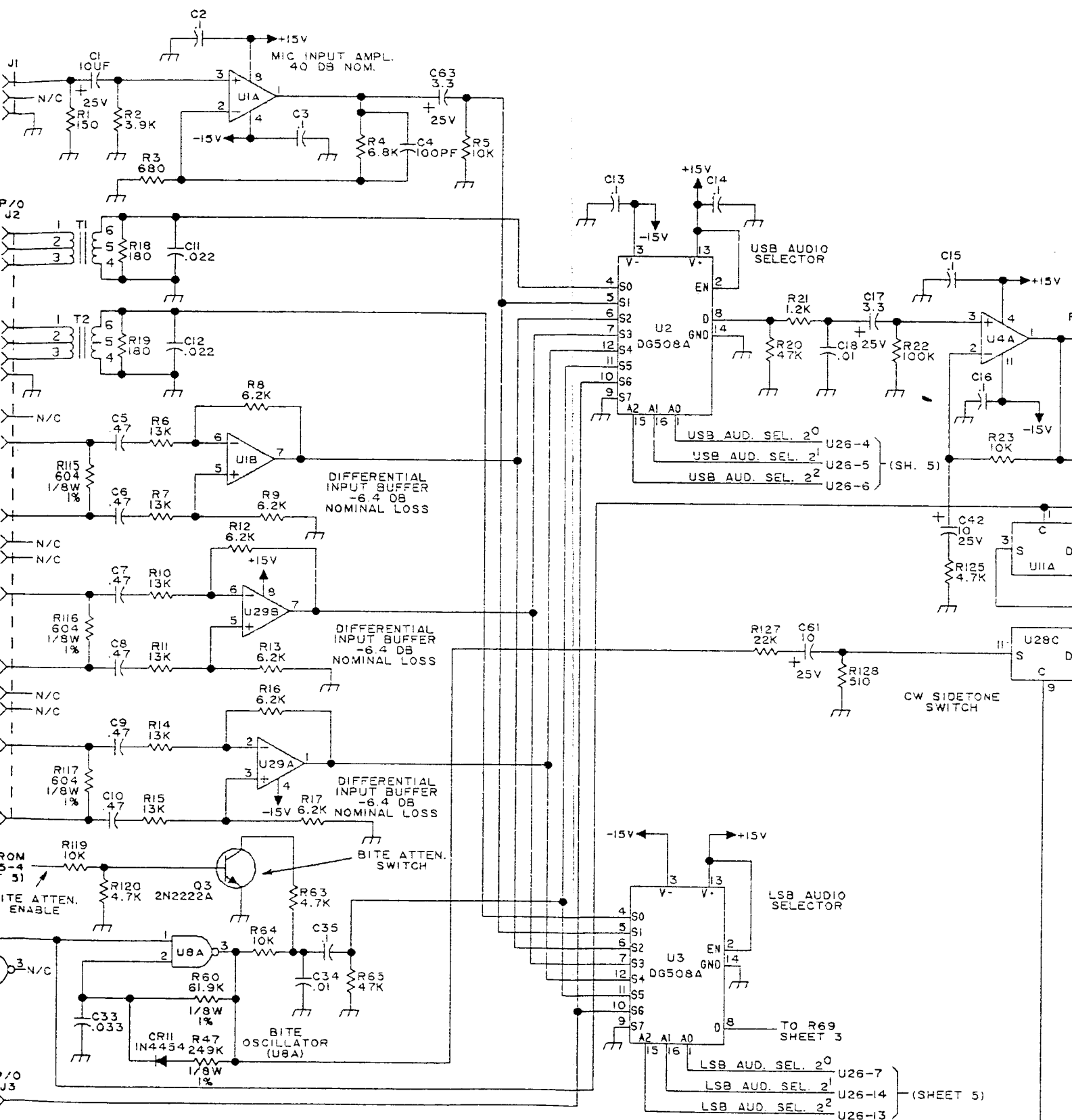


Figure 4. Audio 1 Motherboard Assembly A5A1 Component Locations (10121-5410)

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.





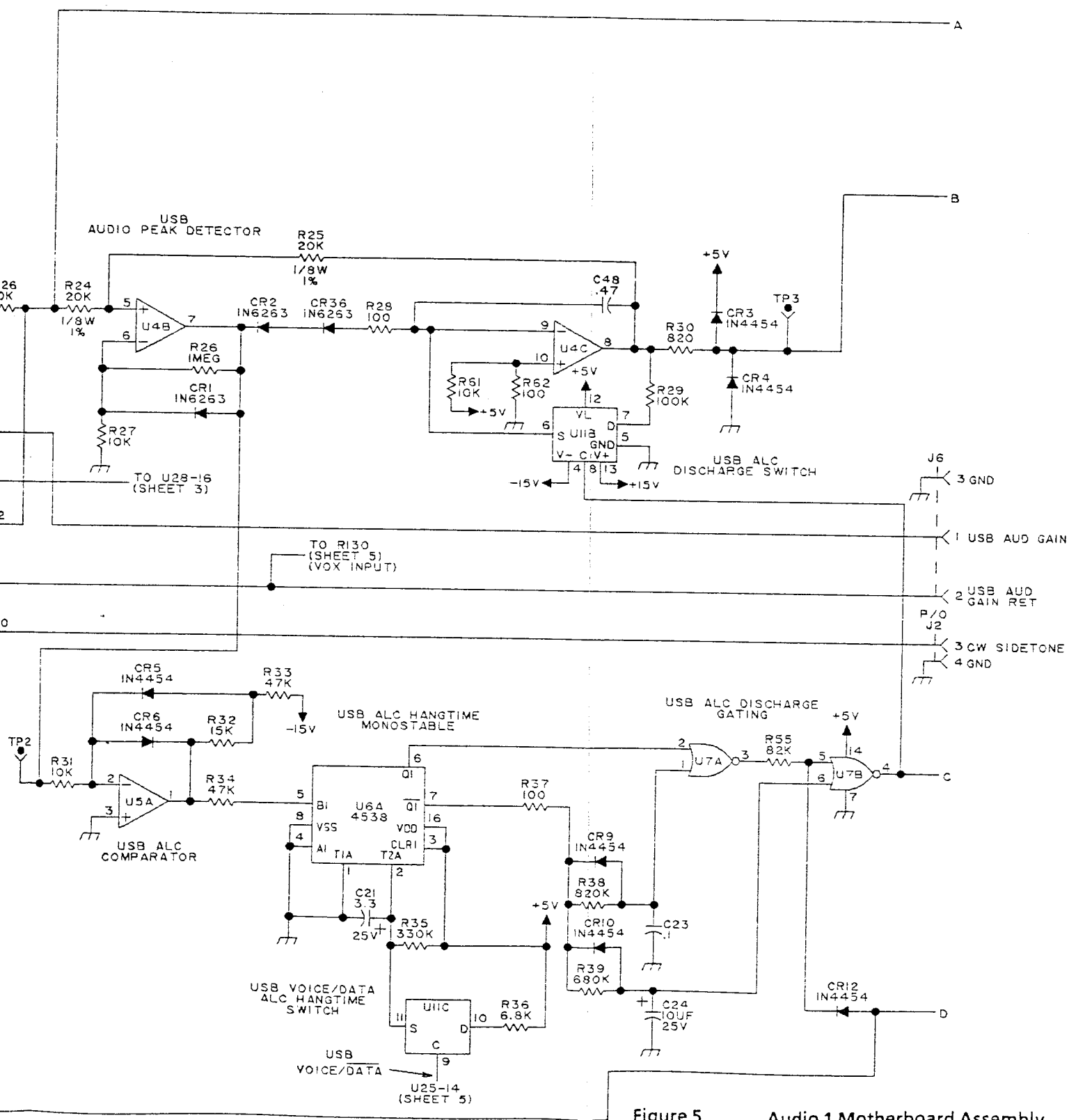
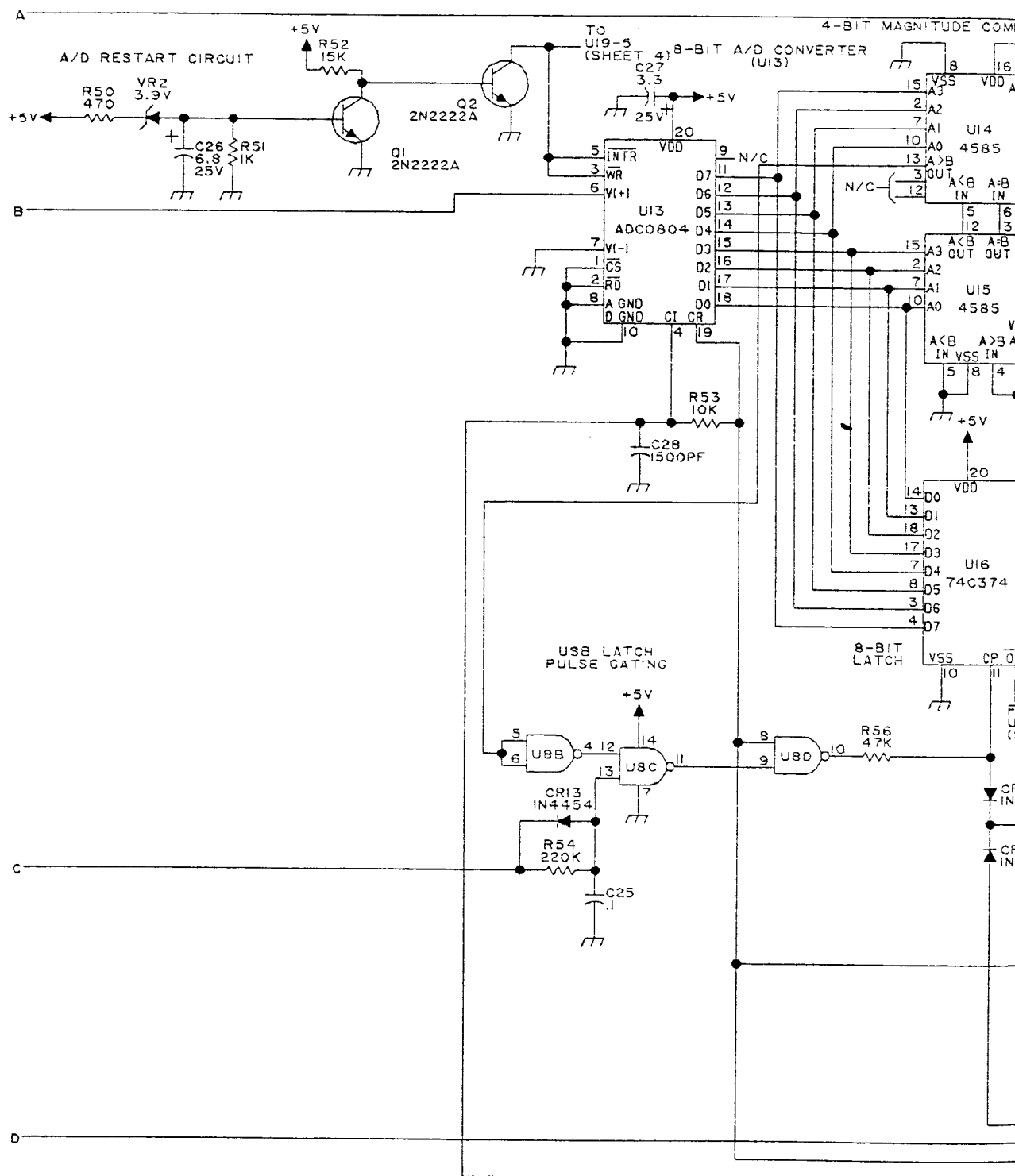


Figure 5. Audio 1 Motherboard Assembly
A5A1 Schematic Diagram
(10121-5411 Rev. J) (Sheet 1 of 5)



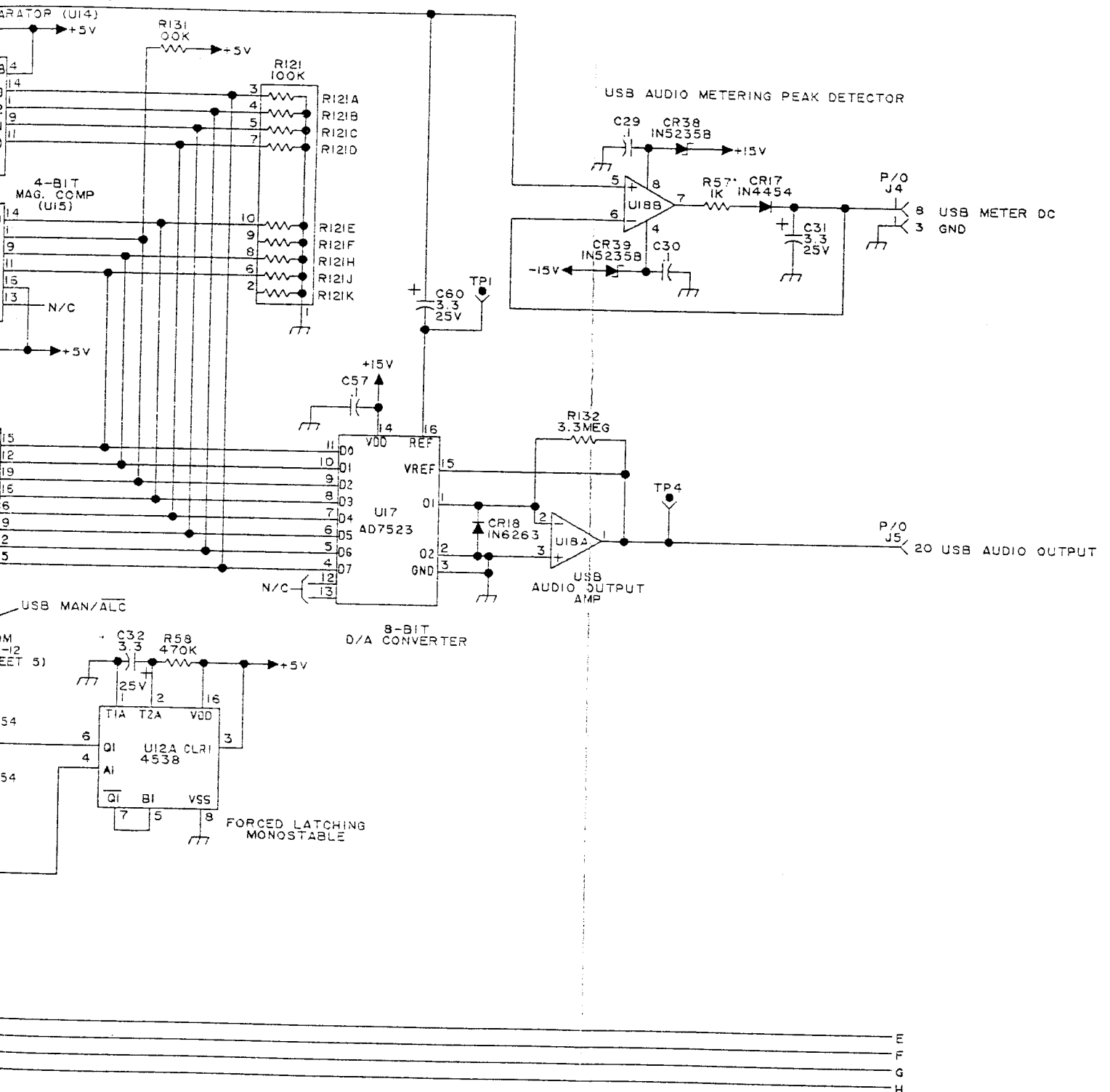
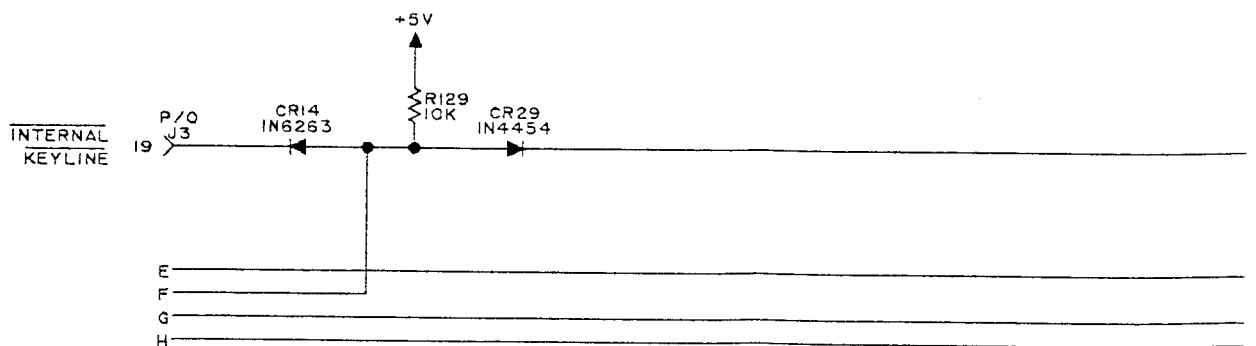
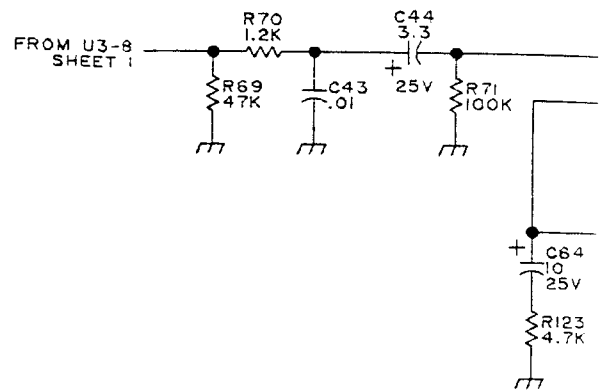
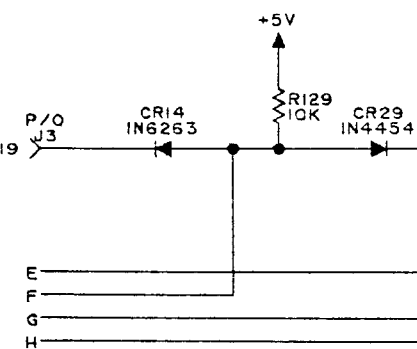
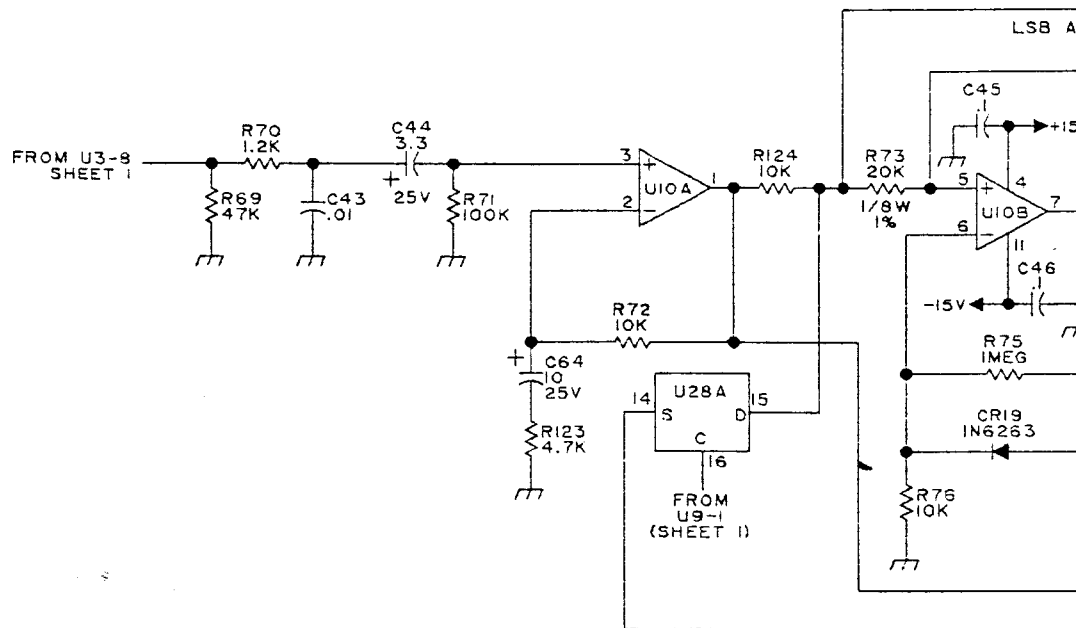


Figure 5. Audio 1 Motherboard Assembly
A5A1 Schematic Diagram
(10121-5411 Rev. J) (Sheet 2 of 5)





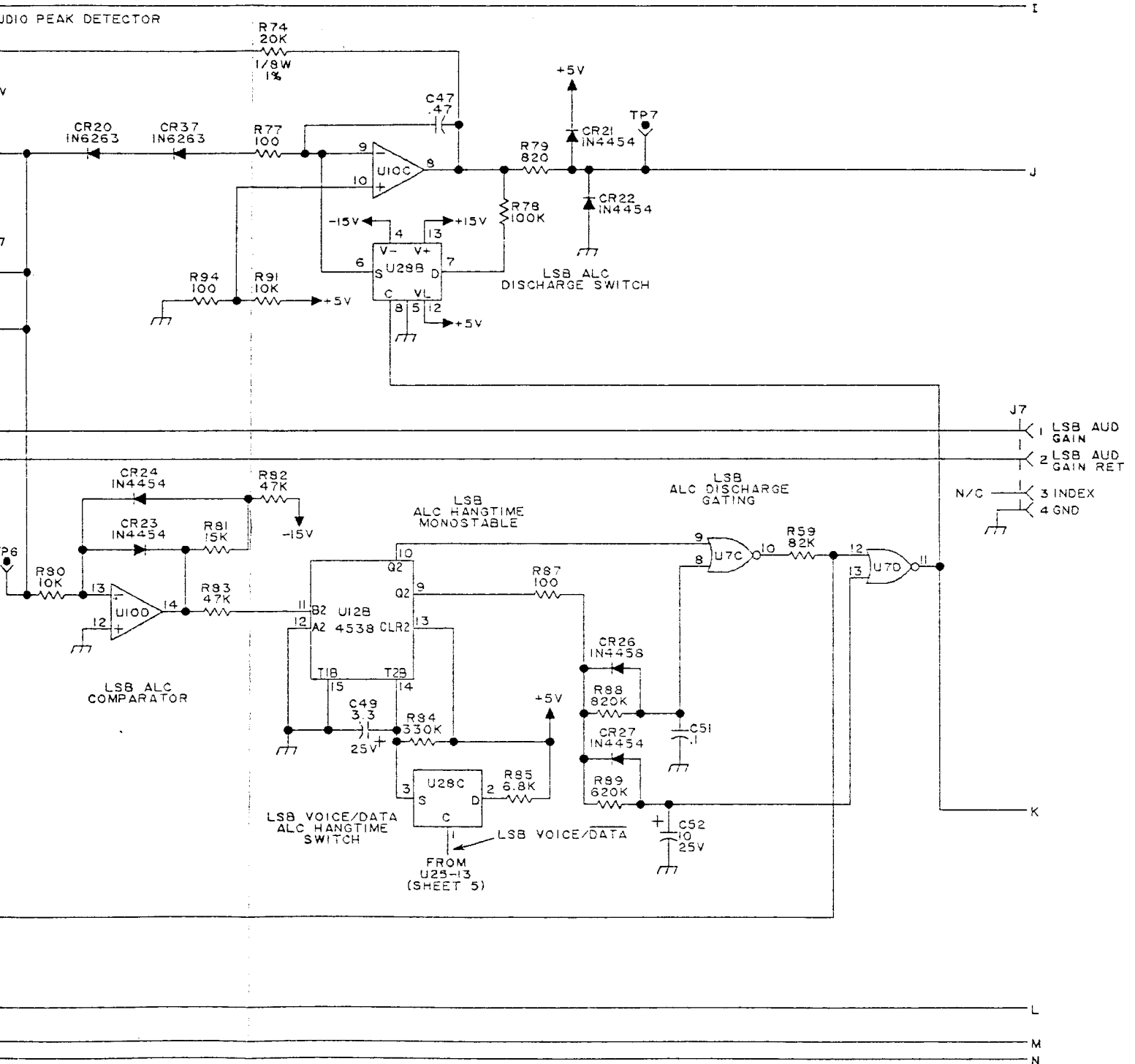
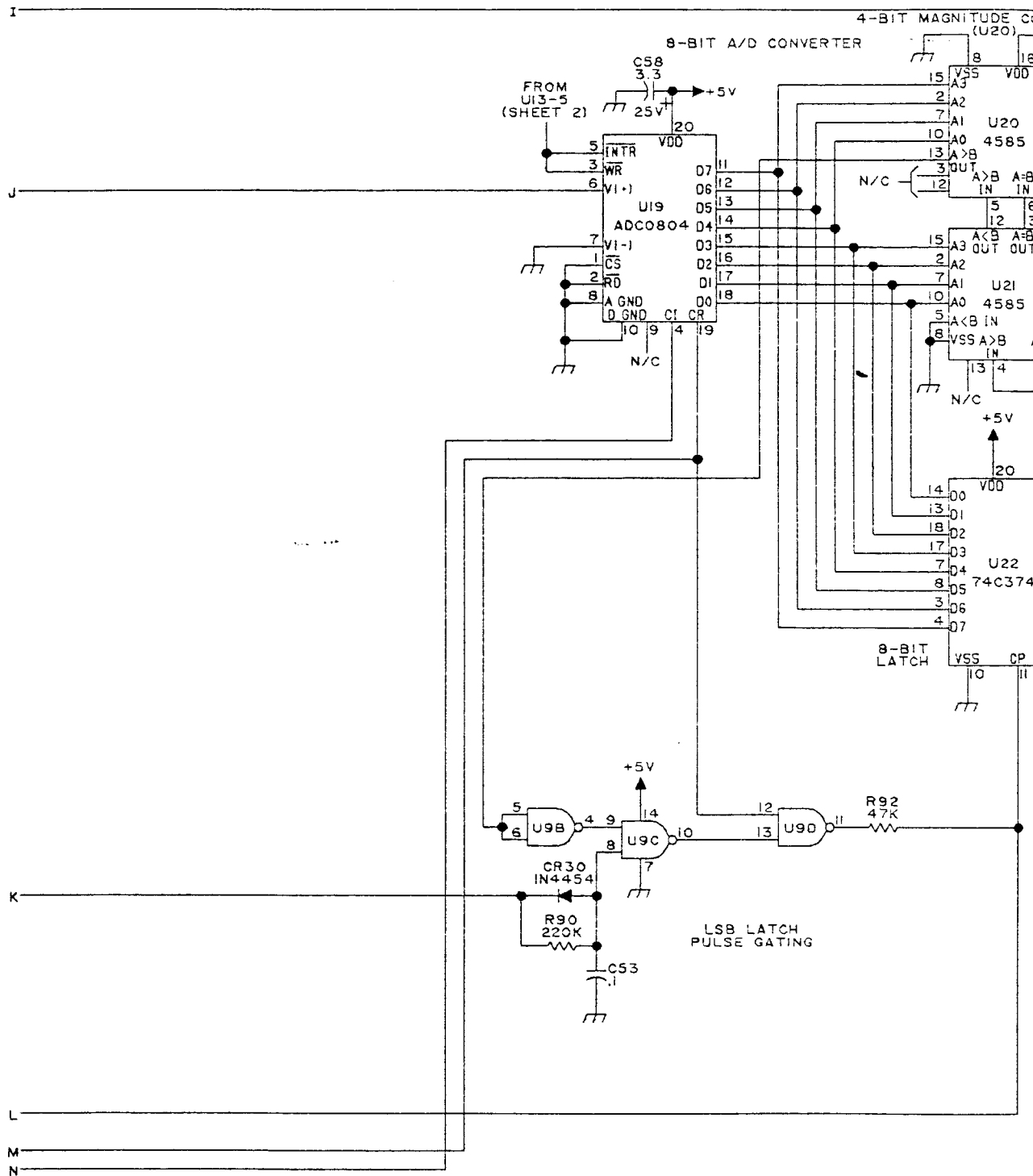


Figure 5. Audio 1 Motherboard Assembly
A5A1 Schematic Diagram
(10121-5411 Rev. J) (Sheet 3 of 5)



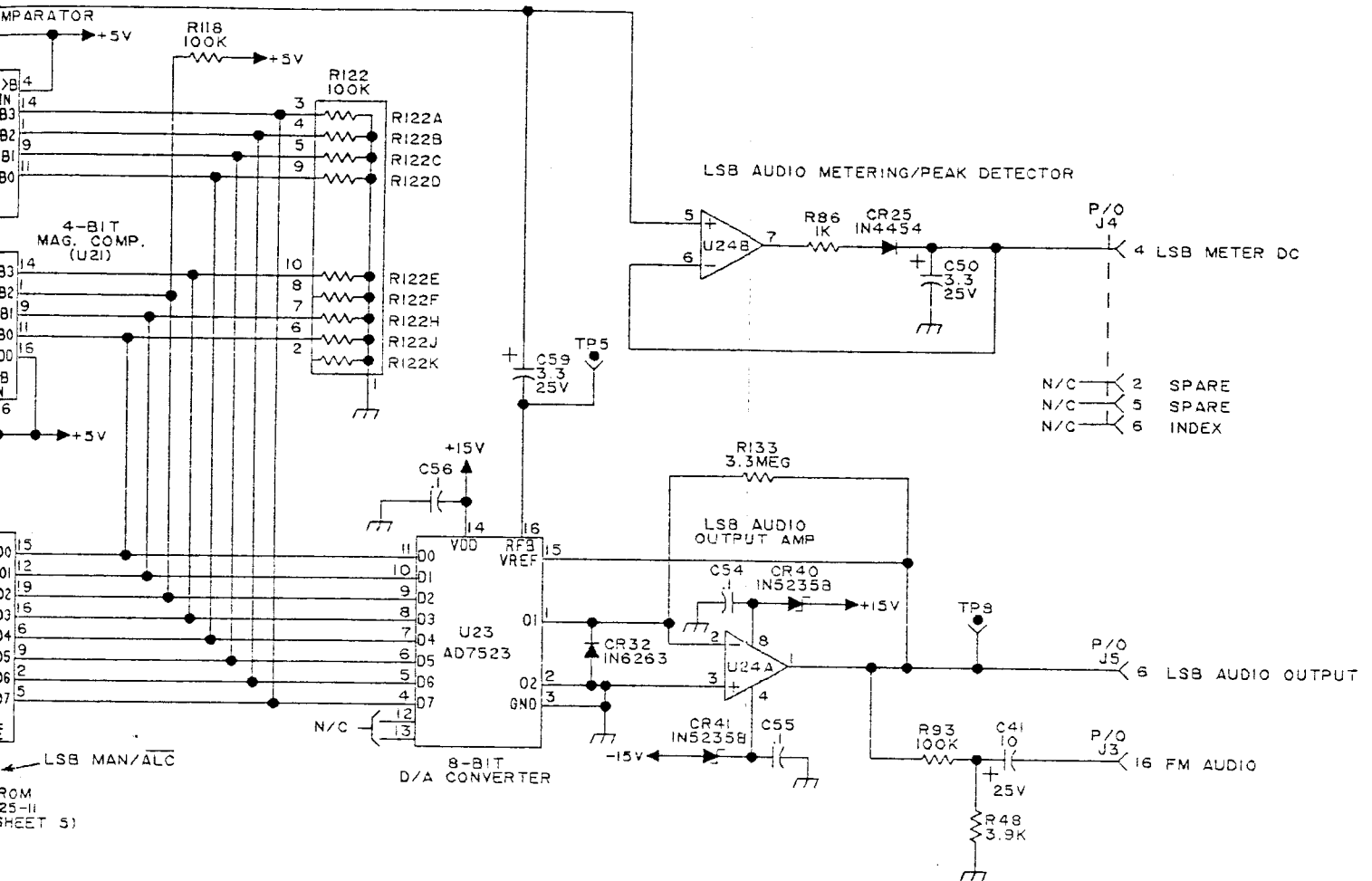
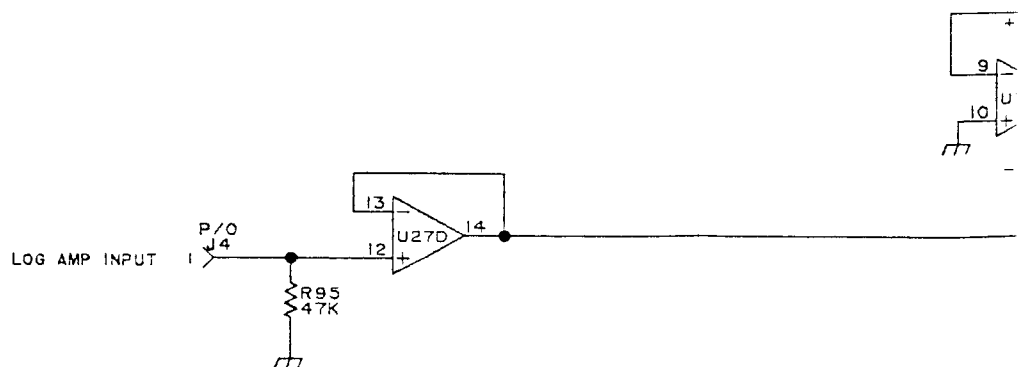
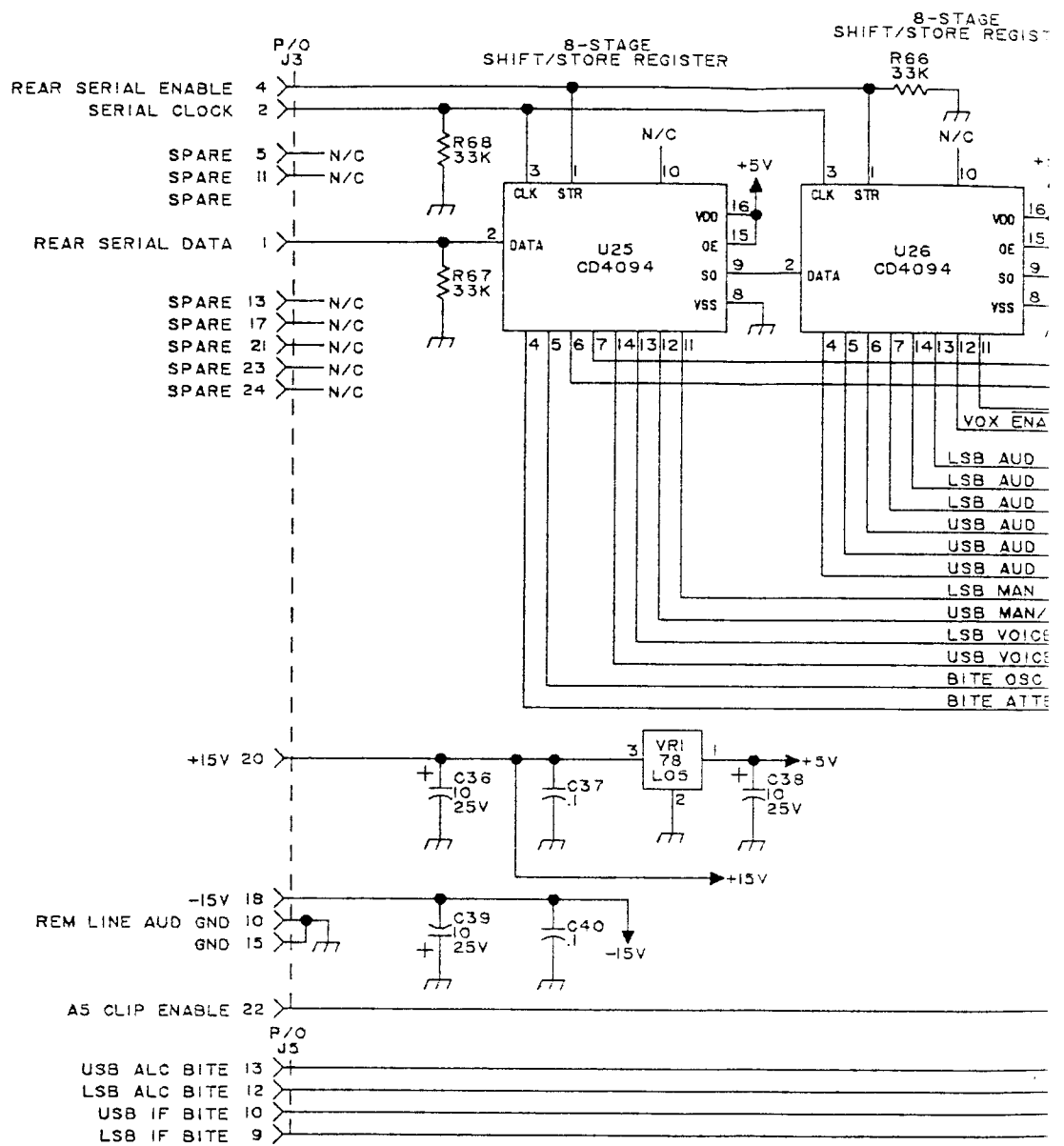
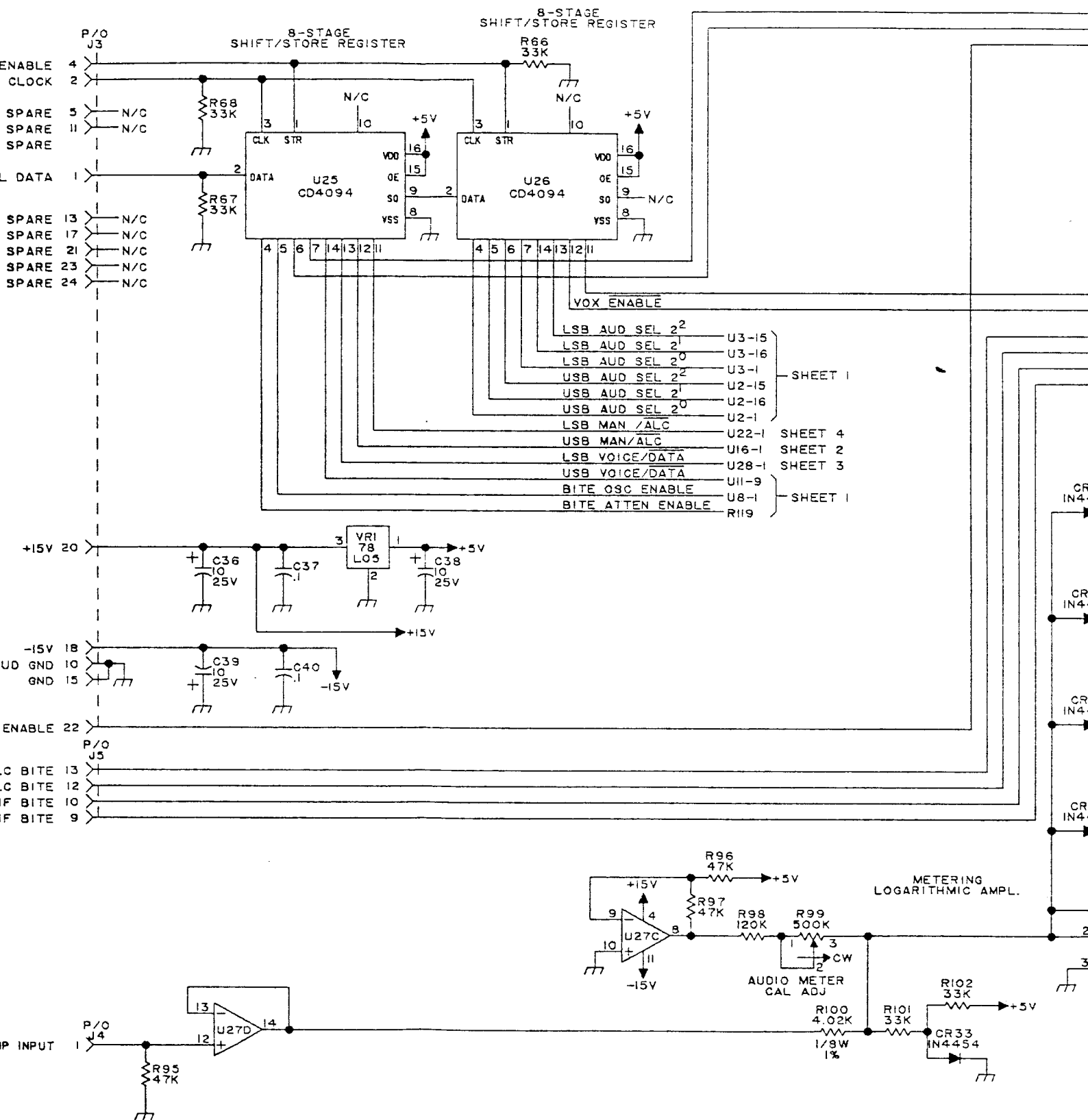


Figure 5. Audio 1 Motherboard Assembly
A5A1 Schematic Diagram
(10121-5411 Rev. J) (Sheet 4 of 5)





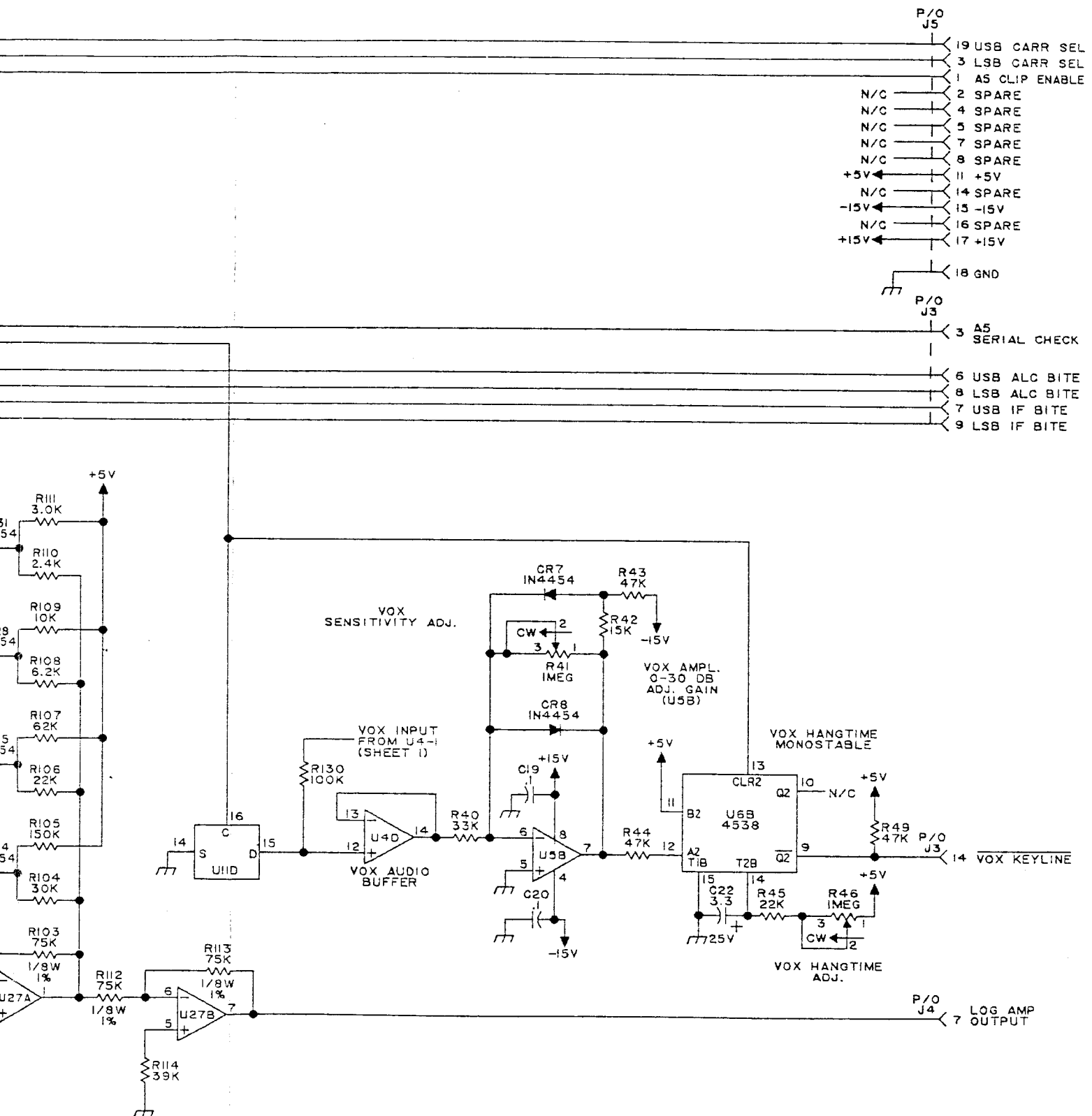


Figure 5. Audio 1 Motherboard Assembly
A5A1 Schematic Diagram
(10121-5411 Rev. J) (Sheet 5 of 5)