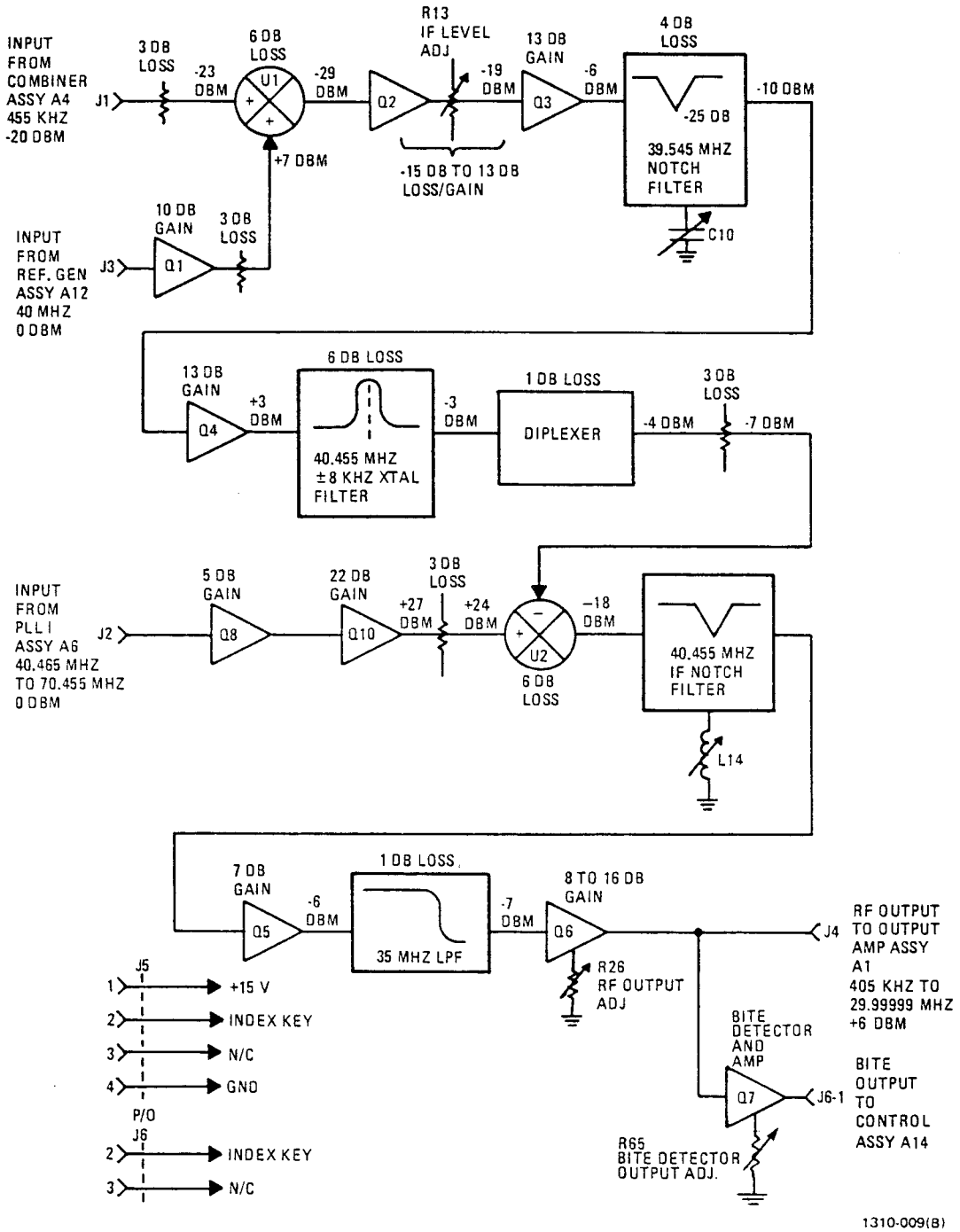
A2
CONVERTER ASSEMBLY



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CONVERTER ASSEMBLY A2

1. GENERAL DESCRIPTION

Converter Assembly A2 is a single PWB assembly and its position is shown in figure1. This assembly up converts the 455 kHz combiner output to an intermediate frequency (IF) of 40.455 MHz. This IF signal is then gain adjusted and processed by a 39.545 MHz notch and ± 8 kHz wide, 40.455 MHz filter to remove undesired mixing products. This processed signal is then down converted to an RF output signal in the range of 405 kHz to 29.99999 MHz. The exact output frequency is determined by the operating frequency of the variable local oscillator (LO) signal driving the down converter. This LO signal itself is a function of the operator-selected exciter output frequency.

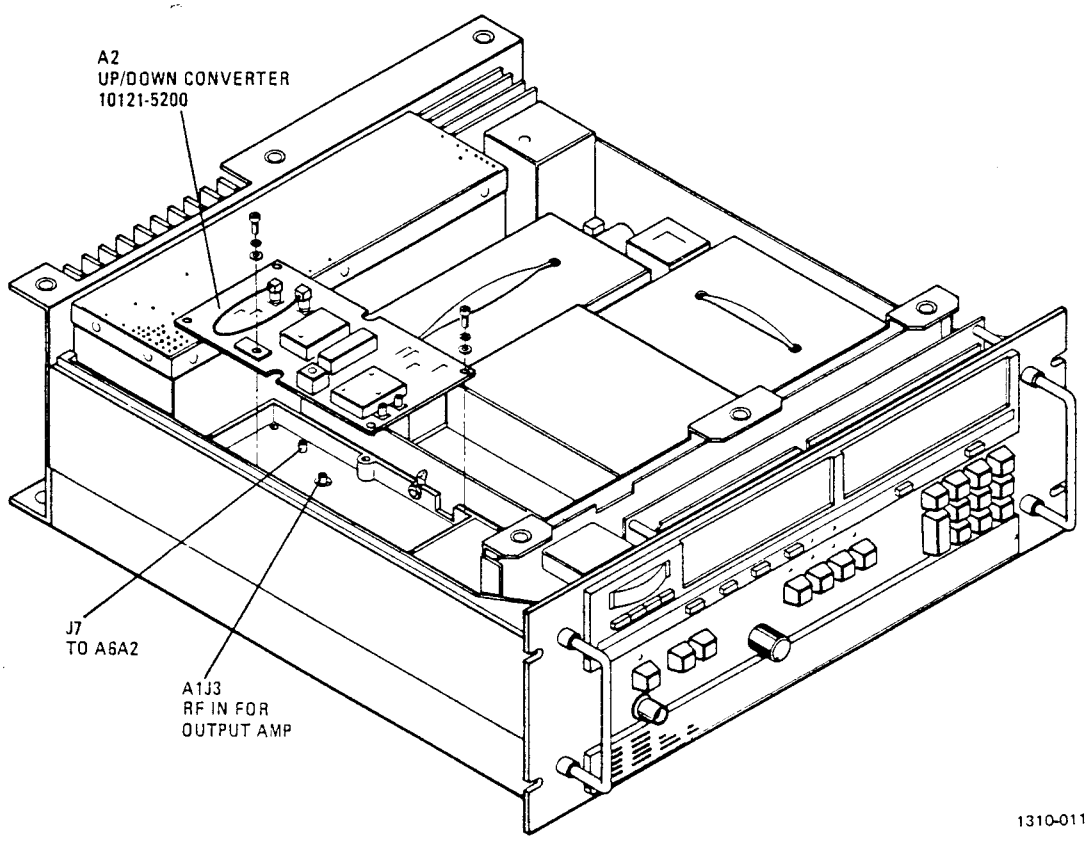

Figure 1. Converter Assembly A2 Location

Signal processing of the RF output band produces the following desired effects:

a. Removal of undesired down conversion-mixing products via the 40.455 MHz notch and the 35 MHz low pass filter (LPF)

b. Establishment of the exciter in-band noise characteristics via the low noise amplifier (LNA)

c. Amplification to a nominal PWB output level of + 6 dBm

The assembly itself is secured via four mounting screws and one heatsink plate screw. To remove assembly, remove all screws, RF and control connectors, and use the cable tie mounted through the PWB to pull the PWB away from a mating connector located under the PWB.

2. INTERFACE CONNECTIONS

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

Table 1. Converter Assembly A2 Interface Connections

Connector	Function	Characteristics
J1	455 kHz Input	455 kHz information, -20 dBm PEP, 50 ohms
J2	Second LO Input	40.465 to 70.455 MHz, 0 dBm, 50 ohms
J3	First LO Input	40.000 MHz, 0 dBm, 50 ohms
J4	RF Output	405 kHz to 29.99999 MHz, + 6 dBm into 50 ohms
J5-1	Dc Power	+ 15 Vdc, approximately 550 mA
J5-2	Index Key	No connection
J5-3	Dc Power	+ 24 Vdc, no connection
J5-4	Ground	
J6-1	BITE Output	Approximately .5 to 1 Vdc for 6 dBm PEP Output
J6-2	Index Key	No connection
J6-3	Spare	No connection

3. CIRCUIT DESCRIPTION

3.1 40.455 MHz IF Chain

Up conversion of the 455 kHz information from the Combiner Assembly occurs at double balanced mixer U1. U1 has two inputs:

a. 455 kHz from the Combiner Assembly, padded by 3 dB (R9 through R11) to a -23 dBm level at the IF port.

b. 40.000000 MHz from the Reference Generator Assembly, amplified by Q1 to + 10 dBm and padded down by R6, R7, and R8 to + 7 dBm at the LO port.

U1 output is a double sideband (DSB) signal whose 40 MHz carrier is suppressed. The two sidebands are at a nominal level of -29 dBm (each) at frequencies of 40 MHz ± 455 kHz. The desired frequency is the 40.455 MHz product, and the undesired 39.545 MHz image frequency product will be removed in later processing stages.

The assembly itself is secured via four mounting screws and one heatsink plate screw. To remove assembly, remove all screws, RF and control connectors, and use the cable tie mounted through the PWB to pull the PWB away from a mating connector located under the PWB.

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This DSB signal is then amplified by Q2, whose output level to subsequent stages is set by IF Level Adjust R13 in order to produce a nominal -7 dBm 40.455 MHz signal to mixer U2. Q2 can provide up to + 13 dB of gain. Q2 output is nominally -19 dBm.

Note that Q2 and all preceding circuitry is shielded by top and bottom covers on the PWB. These covers prevent the 40 MHz LO and 39.545 MHz image frequencies from radiating, and must be properly secured with all mounting hardware. Metal finger-stocks located under FL1, prevent ground plane conduction around the filter by returning any signals on the PWB ground plane to chassis ground; they must be in place.

Q3 provides another + 13 dB of gain, resulting in a level of -6 dBm applied to an image trap consisting of 39.545 MHz crystal Y1 and associated circuitry. This highly selective narrow-band notch helps provide image rejection by shunting the image signal to ground.

Insertion loss of the trap is -4 dB, and is minimized by adjusting peaking capacitor C10 for a maximum output.

A -10 dBm signal from the image trap is fed to Q4, which amplifies the desired signal to + 3 dBm. Thermistor R20 provides temperature compensation for the 40.455 MHz IF chain by increasing the Q4 gain slightly as the temperature increases. 40.455 MHz crystal filter FL1 provides a nominal -65 dB rejection to undesired signals outside its ± 8 kHz bandwidth, with an inband insertion loss of 6 dB maximum.

A diplexer provides a constant 50-ohm termination at all frequencies for FL1 and down converter U2. The diplexer itself has 1 dB of inband insertion loss. The diplexer feeds a 3 dB pad (R53-R55), which provides a 40.455 MHz IF input signal to U2 with a nominal level of -7 dBm.

3.2 40.465 - 70.455 MHz LO Amplifier

40.465 - 70.455 MHz LO injection for U2 is supplied from PLL I Assembly to the Converter Assembly at J2 at 0 dBm. R36 and the low input impedance of common base stage Q8 provides a nominal 50-ohm match to the input signal. Q8 provides 5 dB of voltage gain from J2 to the T1 tap point at R42 (approximately 1.3 V_{pp}). Power amplifier Q10 supplies 22 dB of voltage gain from R42 to the output of T3, developing approximately 15 V_{pp} at the 3 dB pad (R49 - R51) input. The power level into this 50-ohm pad is nominally + 27 dBm, so that the U2 LO port is supplied with a signal level of approximately + 24 dBm.

Q9 and associated circuitry provide base current for Q10, resulting in a Q10 collector current of 300 mA. Diode CR1 provides thermal stabilization for Q9 base current. Resistor pair R46 and R47 form a series current sense circuit for the Q10 collector current. For example, if the Q10 collector current tends to increase, the voltage drop across R46 and R47 increases, and therefore emitter voltage at Q9 drops. This action drives Q9 towards cutoff, with a corresponding decrease in Q9 base and collector current. Since Q9 collector current is the same as the Q10 base current, the Q10 collector current will also decrease back towards its nominal value.

Note that although Q10 will easily withstand short operating periods during which it is not connected to the heatsink, it should normally be operated with the heatsink plate securely fastened to the chassis.

3.3 405 kHz to 29.99999 MHz

Double balanced mixer U2 down converts the 40.455 MHz information to the exciter output frequency range of 405 kHz to 29.99999 MHz. U2 is a very high level mixer (LO drive = 24 dBm) and provides a low distortion -13 dBm output at the RF port due to a -6 dB conversion loss. Like U1, U2 output contains the LO feed-through and image frequencies. These undesired products, however, are sufficiently removed in frequency from the desired .4 to 30 MHz band that they can be adequately filtered by low pass filters (LPF) on this assembly as well as the Output Amplifier Assembly.

Conversion spurious products are effectively controlled by:

a. The high quality characteristics of the mixer.

b. Shielding of the RF chain to prevent the 40.465 to 70.455 MHz high level LO from radiating into the RF chain.

c. The 40.455 MHz IF trap (L14, C27) at U2 output.

The RF output of the down converter is applied to LNA Q5 at a nominal level of -13 dBm. Q5 supplies a nominal 7 dB of gain, and should normally be operated with the RF chain shield cover and heatsink cup securely in place. Constant current source Q11 maintains Q5 drain current at 18 mA, while Q12 provides a degree of temperature compensation for Q11. Thermistor R30 provides temperature compensation for the RF chain signal level.

T4 transforms the LNA high impedance output to a lower impedance in order to drive the succeeding LPF. This LPF provides at least 25 dB attenuation to undesired signals outside its passband, with a -3 dB cutoff frequency of about 35 MHz. Passband insertion loss is less than 1 dB.

Output stage Q6 gain can be varied from 8 to 16 dB via RF output adjust R26, and is set in conjunction with R13 to provide a nominal + 6 dBm level at the PWB output. This signal is then fed via a chassis cutout hole and a mating connector directly to the RF Output Amplifier Assembly.

Note that RF output connector J4 is mounted under the PWB, and is not accessible from the top. In order to access this connector, you must:

a. Remove the PWB following the instructions listed at the end of the General Description section.

or

b. Remove all five mounting screws from the Output Amplifier Assembly as well as the Output Amplifier Assembly itself, and access J4 through the chassis cutout.

3.4 BITE Circuit

Built In Test Equipment (BITE) amplifier and detector stage Q7 monitors the RF output signal level, and produces a dc output voltage proportional to this level. C29/C30 sample the signal, Q7 amplifies it, and CR2, CR3, R35, and C34 convert it to a dc signal. The detector output is adjustable via R65 to accommodate the RF output signal levels required in various system applications of the Exciter.

This BITE level is monitored by the Control Board Assembly whenever the operator chooses to perform a BITE test. At that time, a CW signal is fed through preceding signal chain assemblies and a -20 dBm signal at 455 kHz is presented to J1. Assuming all Converter Assembly circuitry is functional and the RF output level has previously been set to + 6 dBm, a BITE level of at least .5 Vdc will appear at J6-1. The Control Board Assembly will recognize this as a valid level, and proceed to test other assemblies. If the BITE level is lower, indicating a possible A2 fault, an appropriate error message will appear on the exciter display.

4. MAINTENANCE

4.1 General Information

The following adjustments should not be performed as routine maintenance procedures, but only when a PWB failure and subsequent repair indicates a definite need to realign the assembly outside the factory. (Note that all PWBs are factory aligned prior to shipment.)

All tests described here assume the following:

a. The A2 assembly is securely mounted in the chassis with all mounting hardware and internal shield covers secured.

b. The A1 assembly has been removed to allow access to J4, the RF output connector.

c. The exciter itself is functional, and can supply:

1. + 15 Vdc power at J5

2. 40.465 to 70.455 MHz LO at 0 dBm

3. 40 MHz LO at 0 dBm

4. 455 kHz IF at -20 dBm

In order to supply the 455 kHz IF, the exciter must be set to Signal Generator mode as described in the System Interface Assembly A18 section of this manual.

4.2 Signal Path Alignment Procedure

a. Set exciter operating frequency to 10 MHz.

b. Check that all three signal levels are the same as described above in paragraph 4.1, General Information.

c. Connect equipment as shown in figure 2. The RF output measuring equipment may be:

1. A 50-ohm input RF voltmeter (Boonton 92C or equivalent)

2. A 50-ohm input spectrum analyzer (HP-8553B or equivalent)

d. Set L14 core fully clockwise (cw). Do not jam the core at the coil bottom.

e. Set R13 (IF Level Adjust) and R26 (RF Output Adjust) fully clockwise (maximum output level).

f. Adjust C10 (39.545 MHz Trap Adjust) for a peak output signal. For -20 dBm input, the RF output should be + 12 dBm nominally.

g. Adjust R26 for a level 3 dB lower than that noted in step f.

h. Adjust R13 for + 6 dBm output level.

i. Adjust R65 for an output of 0.8 Vdc at J6-1.

j. Test is complete. Note that L14, L18, and L19 are factory preset and should not be adjusted.

5. PARTS LIST, COMPONENT LOCATIONS, AND SCHEMATIC DIAGRAM

Parts used on Converter Assembly A2 are listed in table 2. The component locations are shown in figure 3. Figure 4 is the schematic diagram for the assembly.

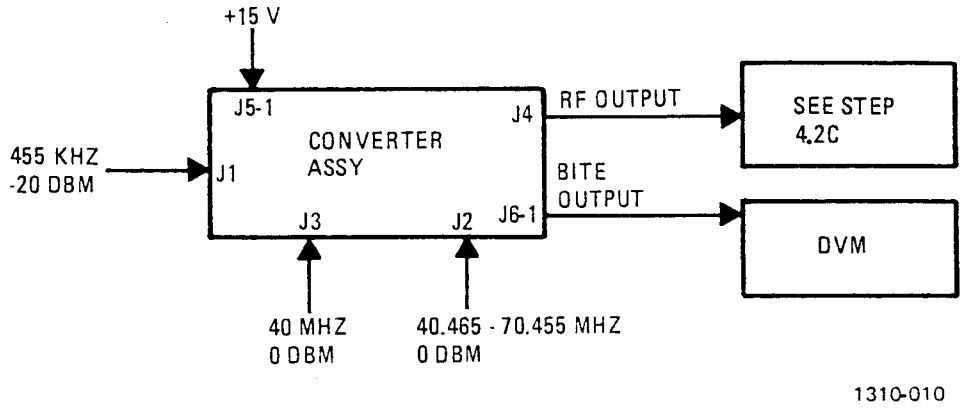


Figure 2. Signal Path Alignment

Table 2. Converter Assembly A2 Parts List

Ref. Desig.	Part Number	Description
A2	10121-5200	CONVERTER ASSEMBLY
4	850-0038	SHIELD
5	10121-5206	COVER, TOP, PWB
6	MP-0121	CLIP, MTG, SPRING STEEL
7	10073-5211	PLATE,HEATSINK
8	E70-0001-007	INSL BEO TO-5 X.015 THK
21	Z60-0013-004	HEATSINK CUP
C1	CK06BX103K	CAP .01UF 10% 200V CER
C2	CK06BX103K	CAP .01UF 10% 200V CER
C3	CK06BX103K	CAP .01UF 10% 200V CER
C4	CK06BX103K	CAP .01UF 10% 200V CER
C5	CK06BX103K	CAP .01UF 10% 200V CER
C6	CK06BX103K	CAP .01UF 10% 200V CER
C7	CK06BX103K	CAP .01UF 10% 200V CER
C8	CK06BX103K	CAP .01UF 10% 200V CER
C9	CK06BX103K	CAP .01UF 10% 200V CER
C10	C84-0003-008	CAP, VAR 3-15PF
C11	CK06BX103K	CAP .01UF 10% 200V CER
C12	CK06BX103K	CAP .01UF 10% 200V CER
C13	CK06BX103K	CAP .01UF 10% 200V CER
C14	CK06BX103K	CAP .01UF 10% 200V CER
C15	CK06BX103K	CAP .01UF 10% 200V CER
C16	CM05CD150J03	CAP 15PF 5% 500V MICA
C17	CM05FD361J03	CAP 360PF 5% 500V MICA

Table 2. Converter Assembly A2 Parts List (Cont.)

Ref. Desig.	Part Number	Description
C18	M39014/02-1320	CAP .47UF 10% 50V CER-R
C19	M39014/02-1320	CAP .47UF 10% 50V CER-R
C20	M39014/02-1320	CAP .47UF 10% 50V CER-R
C21	CK06BX103K	CAP .01UF 10% 200V CER
C22	CK06BX103K	CAP .01UF 10% 200V CER
C23	C26-0025-339	CAP 3.3UF 20% 25V TANT
C24	CK06BX103K	CAP .01UF 10% 200V CER
C25	M39014/02-1320	CAP .47UF 10% 50V CER-R
C26	M39014/02-1320	CAP .47UF 10% 50V CER-R
C27	CM05CD150J03	CAP 15PF 5% 500V MICA
C28	M39014/02-1320	CAP .47UF 10% 50V CER-R
C29	CM05CD120J03	CAP 12PF 5% 500V MICA
C30	CM05CD050J03	CAP MICA
C31	CK06BX103K	CAP .01UF 10% 200V CER
C32	CK06BX103K	CAP .01UF 10% 200V CER
C33	CK06BX103K	CAP .01UF 10% 200V CER
C34	CK06BX103K	CAP .01UF 10% 200V CER
C35	C26-0025-100	CAP 10UF 20% 25V TANT
C36	CK06BX103K	CAP .01UF 10% 200V CER
C37	CK06BX103K	CAP .01UF 10% 200V CER
C38	CK06BX103K	CAP .01UF 10% 200V CER
C39	C26-0025-339	CAP 3.3UF 20% 25V TANT
C40	CK06BX103K	CAP .01UF 10% 200V CER
C41	M39014/02-1310	CAP .1UF 10% 100V CER-R
C42	C26-0025-339	CAP 3.3UF 20% 25V TANT
C43	M39014/02-1310	CAP .1UF 10% 100V CER-R
C44	CK06BX103K	CAP .01UF 10% 200V CER
C45	CK06BX103K	CAP .01UF 10% 200V CER
C46	CK06BX103K	CAP .01UF 10% 200V CER
C47	C26-0025-339	CAP 3.3UF 20% 25V TANT
C48	CK06BX103K	CAP .01UF 10% 200V CER
C49	M39014/02-1310	CAP .1UF 10% 100V CER-R
C50	CK06BX103K	CAP .01UF 10% 200V CER
C51	M39014/02-1310	CAP .1UF 10% 100V CER-R
C52	C26-0025-339	CAP 3.3UF 20% 25V TANT
C53	CM05ED390J03	CAP 39PF 5% 500V MICA
C54	CK06BX103K	CAP .01UF 10% 200V CER
C55	CM05CD100D03	CAP 10PF +-.5PF 500V MICA
C56	CM05FD111J03	CAP 110PF 5% 500V MICA
C57	CM05FD121J03	CAP 120PF 5% 500V MICA
C58	CM05FD300J03	CAP MICA
C59	CM05ED430J03	CAP 43PF 5% 500V MICA
C60	M39014/02-1320	CAP .47UF 10% 50V CER-R
C61	CK05BX102K	CAP 1000PF 10% 200V CER
C62	C26-0025-339	CAP 3.3UF 20% 25V TANT
C63	M39014/02-1310	CAP .1UF 10% 100V CER-R

Table 2. Converter Assembly A2 Parts List (Cont.)

Ref. Desig.	Part Number	Description
CR1	1N4454	DIODE 200mA 75V SW
CR2	1N6263	DIODE .40W 60V HOT CARR
CR3	1N6263	DIODE .40W 60V HOT CARR
CR4	1N5228B	DIODE 3.9V 5% .5W ZENER
FL1	10073-7000	FILTER,40.455 MHZ
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
J5	J46-0032-004	CONN ,4 PIN
J6	J46-0032-001	RECEPTACLE,3 PIN
L1	MS75084-14	COIL 15.0UH 10% FXD RF
L2	MS14046-4	COIL 10UH 10% FXD RF
L3	MS75084-12	COIL 10UH 10% FXD RF
L4	MS75084-3	COIL 1.8UH 10% FXD RF
L5	MS75084-3	COIL 1.8UH 10% FXD RF
L6	MS14046-4	COIL 10UH 10% FXD RF
L7	MS75084-12	COIL 10UH 10% FXD RF
L8	MS75084-12	COIL 10UH 10% FXD RF
L9	MS75083-13	COIL 1.0UH 10% FXD RF
L10	L05-0001-005	INDUCT MOLD .054 UH 5%
L11	MS90538-20	COIL 220UH 5% FXD RF
L12	MS90538-20	COIL 220UH 5% FXD RF
L13	MS90538-20	COIL 220UH 5% FXD RF
L14	L11-0004-013	INDUCT SH VAR .900-1.1 UH
L15	MS90538-20	COIL 220UH 5% FXD RF
L16	MS75083-13	COIL 1.0UH 10% FXD RF
L17	L08-0001-001	CHOKE W B 50 MHZ
L18	10121-7004	INDUCTOR .130UH
L19	10121-7005	INDUCTOR .247UH
L20	MS75084-12	COIL 10UH 10% FXD RF
L21	MS75083-1	COIL .10UH 10% FXD RF
L22	MS75084-12	COIL 10UH 10% FXD RF
L23	MS75084-11	COIL 8.2UH 10% FXD RF
Q1	2N5109	XSTR RFPWR NPN TO-39
Q2	2N5109	XSTR RFPWR NPN TO-39
Q3	2N5109	XSTR RFPWR NPN TO-39
Q4	2N5109	XSTR RFPWR NPN TO-39
Q5	Q35-0004-001	XSTR JFET U431
Q6	2N5109	XSTR RFPWR NPN TO-39
Q7	Q35-0003-000	XSTR U310 JFET HIGH GM
Q8	2N3866	XSTR SS/RF NPN TO-39
Q9	2N4037	XSTR SS/RF NPN TO-39
Q10	Q25-0014-000	XSTR RFPWR
Q11	2N2222A	XSTR SS/GP NPN TO-18
Q12	2N2222A	XSTR SS/GP NPN TO-18

Table 2. Converter Assembly A2 Parts List (Cont.)

Ref. Desig.	Part Number	Description
R1	R65-0003-162	RES,1.6K 5% 1/4W CAR FILM
R2	R65-0003-471	RES,470 5% 1/4W CAR FILM
R3	R65-0003-301	RES,300 5% 1/4W CAR FILM
R4	R65-0003-829	RES,8.2 5% 1/4W CAR FILM
R5	R65-0003-101	RES,100 5% 1/4W CAR FILM
R6	R65-0003-301	RES,300 5% 1/4W CAR FILM
R7	R65-0003-180	RES,18 5% 1/4W CAR FILM
R8	R65-0003-301	RES,300 5% 1/4W CAR FILM
R9	R65-0003-301	RES,300 5% 1/4W CAR FILM
R10	R65-0003-180	RES,18 5% 1/4W CAR FILM
R11	R65-0003-301	RES,300 5% 1/4W CAR FILM
R12	R65-0003-560	RES,56 5% 1/4W CAR FILM
R13	R-2203	RES,VAR,PCB 100 .5 20%
R14	R65-0003-362	RES,3.6K 5% 1/4W CAR FILM
R15	R65-0003-112	RES,1.1K 5% 1/4W CAR FILM
R16	R65-0003-829	RES,8.2 5% 1/4W CAR FILM
R17	R65-0003-151	RES,150 5% 1/4W CAR FILM
R18	R65-0003-182	RES,1.8K 5% 1/4W CAR FILM
R19	R65-0003-621	RES,620 5% 1/4W CAR FILM
R20	D40-0004-002	THERM,510,5%
R21	R65-0003-629	RES,6.2 5% 1/4W CAR FILM
R22	R65-0004-470	RES,47 5% 1/2W CAR FILM
R23	R65-0003-510	RES,51 5% 1/4W CAR FILM
R24	R65-0003-510	RES,51 5% 1/4W CAR FILM
R25	R65-0003-220	RES,22 5% 1/4W CAR FILM
R26	R-2201	RES,VAR,PCB 20 .5W 20%
R27	R65-0003-152	RES,1.5K 5% 1/4W CAR FILM
R28	R65-0003-271	RES,270 5% 1/4W CAR FILM
R29	R65-0003-240	RES,24 5% 1/4W CAR FILM
R30	D40-0004-003	THERM,1K, 5%
R31	R65-0003-750	RES,75 5% 1/4W CAR FILM
R32	R65-0003-473	RES,47K 5% 1/4W CAR FILM
R33	R65-0003-821	RES,820 5% 1/4W CAR FILM
R34	R65-0003-102	RES,1.0K 5% 1/4W CAR FILM
R35	R65-0003-103	RES,10K 5% 1/4W CAR FILM
R36	R65-0003-270	RES,27 5% 1/4W CAR FILM
R37	R65-0003-519	RES,5.1 5% 1/4W CAR FILM
R38	R65-0003-221	RES,220 5% 1/4W CAR FILM
R39	R65-0003-102	RES,1.0K 5% 1/4W CAR FILM
R40	R65-0003-272	RES,2.7K 5% 1/4W CAR FILM
R41	R65-0003-100	RES,10 5% 1/4W CAR FILM
R42	R65-0003-101	RES,100 5% 1/4W CAR FILM
R43	R65-0003-681	RES,680 5% 1/4W CAR FILM
R44	R65-0003-301	RES,300 5% 1/4W CAR FILM
R45	R65-0003-272	RES,2.7K 5% 1/4W CAR FILM

Table 2. Converter Assembly A2 Parts List (Cont.)

Ref. Desig.	Part Number	Description
R46	RCR32G100JM	RES,10 5% 1W CAR COMP
R47	RCR32G100JM	RES,10 5% 1W CAR COMP
R48	R65-0003-201	RES,200 5% 1/4W CAR FILM
R49	R65-0003-301	RES,300 5% 1/4W CAR FILM
R50	R65-0004-180	RES,18 5% 1/2W CAR FILM
R51	R65-0003-301	RES,300 5% 1/4W CAR FILM
R52	R65-0003-680	RES,68 5% 1/4W CAR FILM
R53	R65-0003-301	RES,300 5% 1/4W CAR FILM
R54	R65-0003-180	RES,18 5% 1/4W CAR FILM
R55	R65-0003-301	RES,300 5% 1/4W CAR FILM
R56	R65-0003-222	RES,2.2K 5% 1/4W CAR FILM
R57	R65-0003-751	RES,750 5% 1/4W CAR FILM
R58	R65-0003-431	RES,430 5% 1/4W CAR FILM
R59	R65-0003-629	RES,6.2 5% 1/4W CAR FILM
R60	R65-0003-910	RES,91 5% 1/4W CAR FILM
R61	R65-0003-430	RES,43 5% 1/4W CAR FILM
R62	R65-0003-152	RES,1.5K 5% 1/4W CAR FILM
R63	R65-0003-680	RES,68 5% 1/4W CAR FILM
R64	R65-0003-162	RES,1.6K 5% 1/4W CAR FILM
R65	R30-0008-102	RES,0-1K VARIABLE
T1	10073-7005	TRANSFORMER, RF, FIXED
T2	10073-7005	TRANSFORMER, RF, FIXED
T3	10073-7010	TRANSFORMER, RF, FIXED
T4	10073-7010	TRANSFORMER, RF, FIXED
U1	I51-0003-003	MIXER DB 50mW 500MHZ
U2	10075-0021	MIXER DB SRA-1H
Y1	10085-5425	CRYSTAL, 39.545MHZ

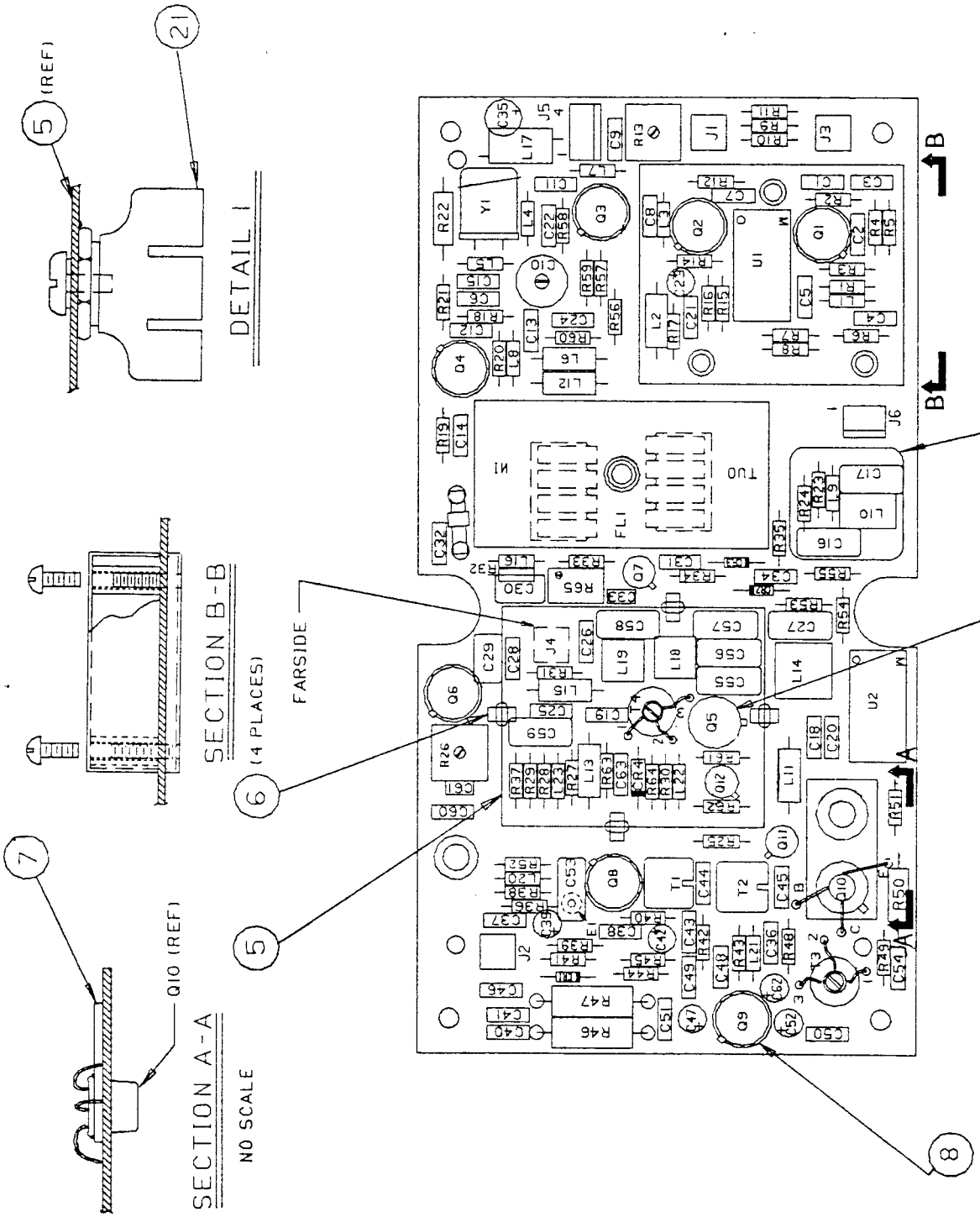
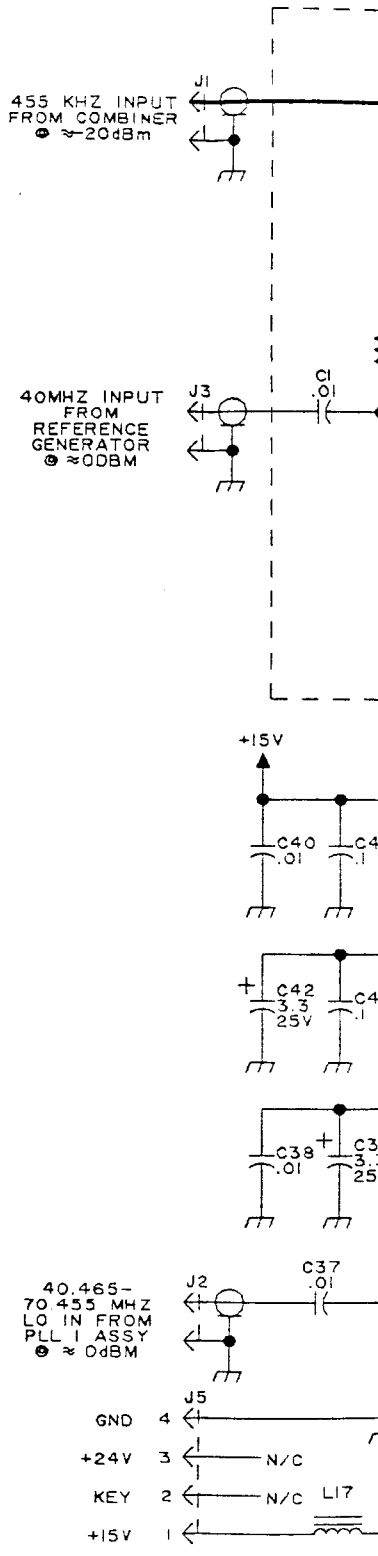
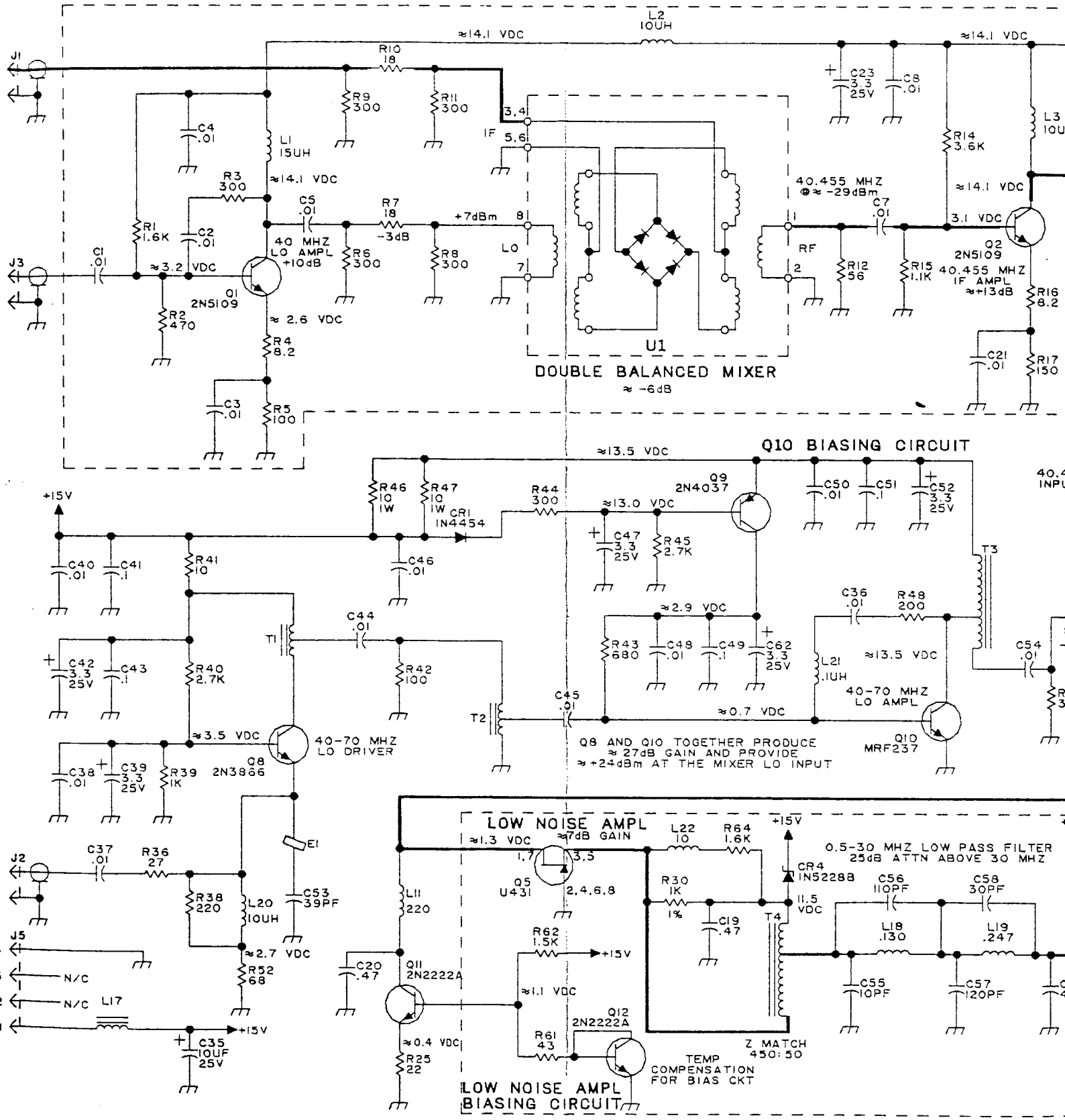


Figure 3. Converter Assembly A2 Component Location (10121-5200)

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, ±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. ALL VOLTAGES AND SIGNAL LEVELS SHOWN ARE NOMINAL VALUES.




J1
J3
J2
J5
N/C
N/C
L17
L2
10UH
≈14.1 VDC
R10
18
R9
300
R11
300
C4
.01
L1
15UH
R3
300
≈14.1 VDC
C5
.01
R7
18
+7dBm
-3dB
8
LO
7
R1
1.6K
C2
.01
40 MHZ
LO AMPL
+10dB
R6
300
R8
300
C1
.01
≈3.2 VDC
Q1
2N5109
R2
470
≈ 2.6 VDC
R4
8.2
C3
.01
R5
100
3,4
IF
5,6
U1
DOUBLE BALANCED MIXER
≈ -6dB
40.455 MHZ
@≈ -29dBm
C7
.01
1
RF
2
R12
56
R15
1.1K
C23
3.3
25V
C8
.01
≈14.1 VDC
R14
3.6K
≈14.1 VDC
3.1 VDC
Q2
2N5109
40.455 MHZ
IF AMPL
≈+13dB
R16
8.2
C21
.01
R17
150
L3
10U
Q10 BIASING CIRCUIT
≈13.5 VDC
+15V
R46
10
1W
R47
10
1W
CR1
IN4454
R44
300
Q9
2N4037
≈13.0 VDC
C47
3.3
25V
R45
2.7K
C50
.01
C51
.1
C52
3.3
25V
C40
.01
C41
.1
R41
10
C46
.01
C44
.01
T1
C42
3.3
25V
C43
.1
R40
2.7K
R42
100
≈2.9 VDC
R43
680
C48
.01
C49
.1
C62
3.3
25V
C36
.01
R48
200
T3
L21
.1UH
≈13.5 VDC
C54
.01
40-70 MHZ
LO AMPL
C45
.01
T2
≈0.7 VDC
≈3.5 VDC
40-70 MHZ
LO DRIVER
Q8
2N3866
C38
.01
C39
3.3
25V
R39
1K
Q8 AND Q10 TOGETHER PRODUCE
≈ 27dB GAIN AND PROVIDE
≈ +24dBm AT THE MIXER LO INPUT
Q10
MRF237
C37
.01
R36
27
E1
R38
220
L20
10UH
C53
39PF
≈2.7 VDC
R52
68
C35
10UF
25V
+15V
LOW NOISE AMPL
≈1.3 VDC
≈7dB GAIN
1,7
3,5
Q5
U431
2,4,6,8
L11
220
L22
10
R64
1.6K
+15V
CR4
IN5228B
11.5
VDC
R30
1K
1%
C19
.47
T4
0.5-30 MHZ LOW PASS FILTER
25dB ATTN ABOVE 30 MHZ
C56
110PF
C58
30PF
L18
.130
L19
.247
C55
10PF
C57
120PF
R62
1.5K
+15V
C20
.47
Q11
2N2222A
≈1.1 VDC
Q12
2N2222A
R61
43
≈0.4 VDC
R25
22
Z MATCH
450:50
TEMP
COMPENSATION
FOR BIAS CKT
LOW NOISE AMPL
BIASING CIRCUIT

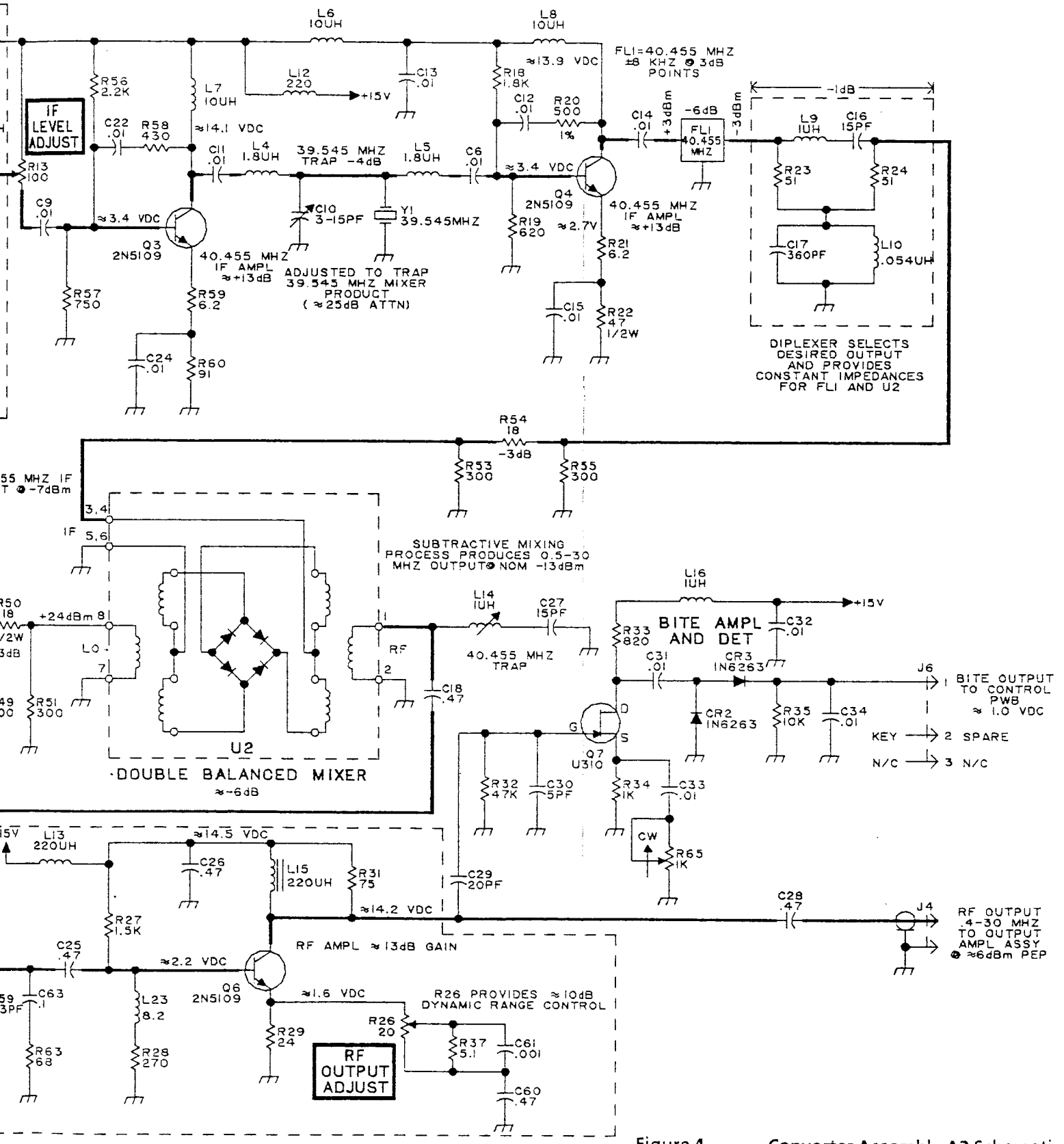


Figure 4. Converter Assembly A2 Schematic Diagram (10121-5201 Rev. G)