

Preliminary

INSTRUCTION MANUAL

FOR

LC-2-T4X

SPEECH PROCESSOR

used with

T-4X, B, C

DX ENGINEERING

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Pasadena, Calif. 91106

INTRODUCTION

The function of the DX Engineering Speech Processor is to increase the average power of a single sideband voice signal while keeping the peak amplitudes constant. An instantaneously acting amplitude limiter (RF clipper) provides more gain for the lower amplitude components of the voice while limiting the peaks. Maintaining voice quality while increasing the average power occurs because most of the distortion products fall outside the desired voice bandwidth. The limiter stage is followed by a crystal filter which effectively eliminates all first order and most second order and higher harmonic distortion. Typically, 20 db of compression is used, resulting in 6 db or more increase in average power while maintaining normal intelligibility.

INSTALLATION

- (1) To avoid possibility of shock, unplug the line cord of the transceiver.^{mitter.}
- (2) Remove the three upper screws which hold the cover on each side of the transceiver.^{mitter.} Remove the cover by lifting first at the rear and then at the front.
- (3) Refer to the top view on the next page. Remove the two small screws at the top edge of the rear wall of the high voltage cage. Position the speech processor so that the holes in the mounting bracket are aligned with the screw holes and mount it there, using the original screws, *or sheet metal screws provided.*
- (4) Remove the tube shield from V2. This will not be used when the processor is installed.
- (5) Remove V2 and install it in the extender socket attached to the speech processor. Be sure it is firmly seated in the socket.
- (6) Carefully press the extender socket into the tube socket vacated by V2. Dress the cable over the top of the rear panel as shown in the top view.
- (7) Position the processor switch to the OUT position. Tune and load the transmitter in the normal fashion.
- (8) Set the controls as follows:
 - a) XMTR GAIN fully counterclockwise.
 - b) SIDEBAND in the LOWER position.
 - c) FUNCTION switch to TUNE
 - d) Processor mode switch OUT.
- (9) Briefly rotate the XMTR GAIN clockwise until the plate current reads .20 amp. If this occurs at or near your normal XMTR GAIN setting, installation is complete. If not, proceed below.

(10) If transmitter gain appears to be low, it will be necessary to make an adjustment on the transmitter. Set the XMTR GAIN control so that plate current reads approximately .15 amp. Using the tuning tool provided or an equivalent, adjust the core of T2 for maximum plate current. T2 is located just in front of V2. As the plate current rises, lower the XMTR GAIN control to keep the plate current near .15 amp.

(11) Replace the top cover of the transceiver and attach with the original screws. Attach the processor mode switch as shown in the figure, with the two screws which normally hold the upper and lower covers in place.

Note: When speech processing is used, gain of the transmitter is considerably higher than normal. For this reason it may be desirable to recheck or readjust the Carrier Balance, using the normal procedures.

OPERATION

Operation of the DX ENGINEERING Speech Processor is very simple. Only two controls need be considered. One is the processor mode switch, and the other is the XMTR GAIN control on the transceiver.

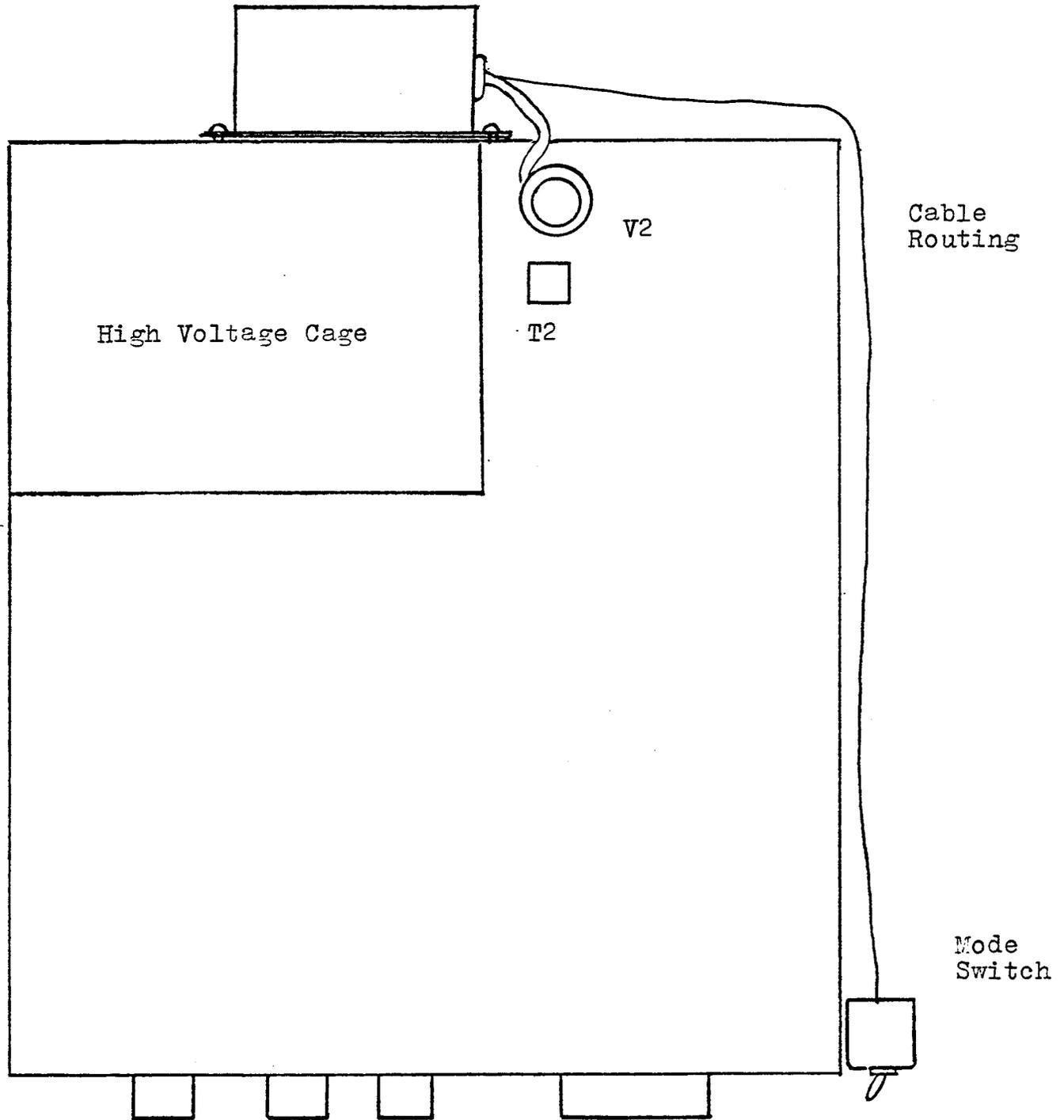
The processor mode switch has three positions, labeled U, OUT, and L. When the switch is in the OUT position, it is effectively out of the transmitter circuit and therefore the set will operate in its normal fashion.

When speech processing is to be used, the switch is moved to the position which matches the position of the SIDEBAND switch on the transceiver. That is, when the SIDEBAND switch is in the LOWER position, the processor mode switch should be moved to L. Similarly, when the SIDEBAND switch is used to select UPPER sideband, the speech processor mode switch should be moved to the U position.

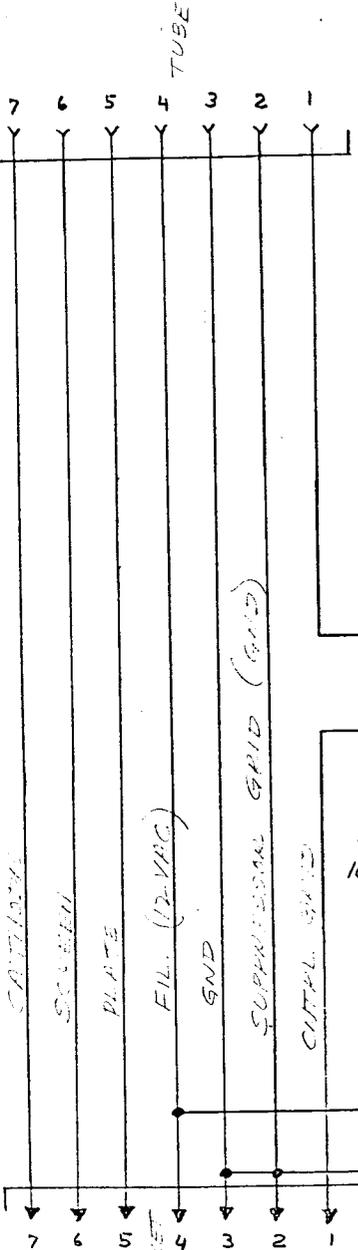
The XMTR GAIN Control does not function as a standard gain control when processing is employed. Instead it functions as a clipping level adjustment. When the control is used at the position which is normal for your microphone, as described in the TX manual, approximately 15-20 db of clipping is employed. Increased degrees of clipping may be used by increasing the XMTR GAIN control.

It should be remembered that increasing the control too far will only raise the ambient (background) noise unnecessarily. The final setting of this control should be made by monitoring the transmitted waveform with an oscilloscope, or by on-the-air checks with an experienced listener.

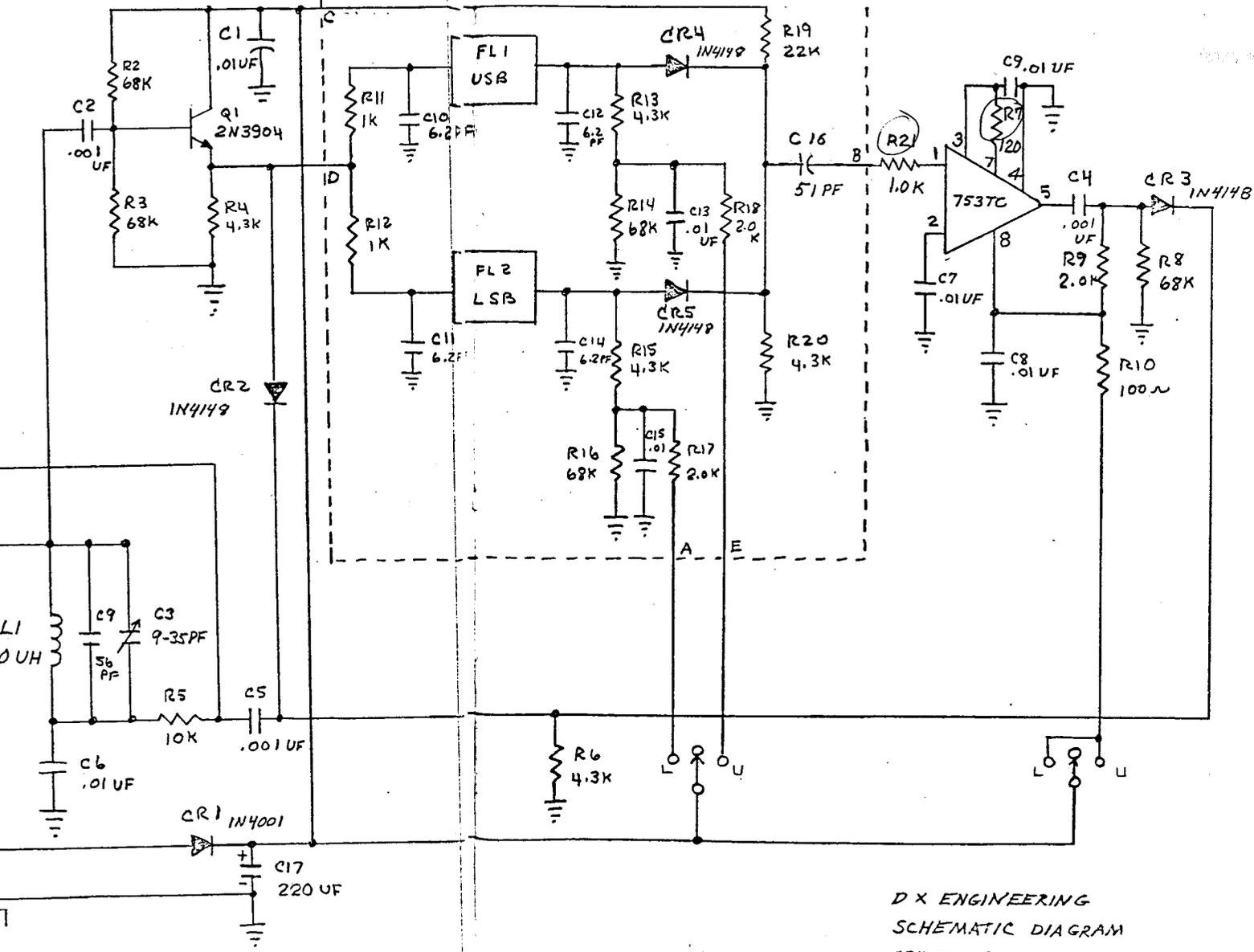
Increased background noise is a by-product of speech compression or clipping. Remember, the purpose of such a processor is to bring the low level voice signals up to the same amplitude as the high level peaks, thereby raising the average power of the transmitter. Since the device cannot discriminate between the human voice, blower noise, background conversations, etc., it may be desirable to use a directional microphone or give some attention to the acoustical layout of the hamshack.



TOP VIEW OF TRANSMITTER

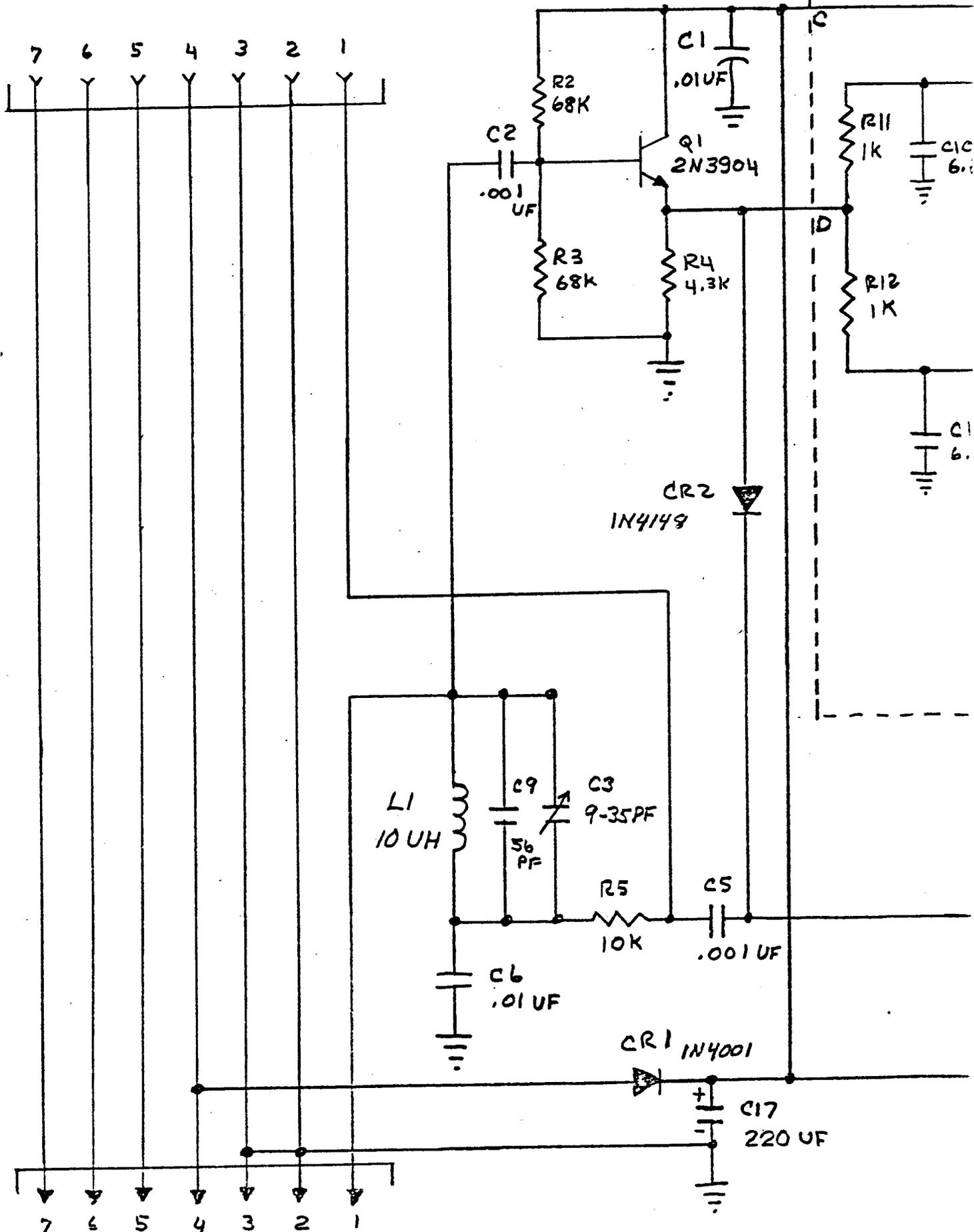


TUBE

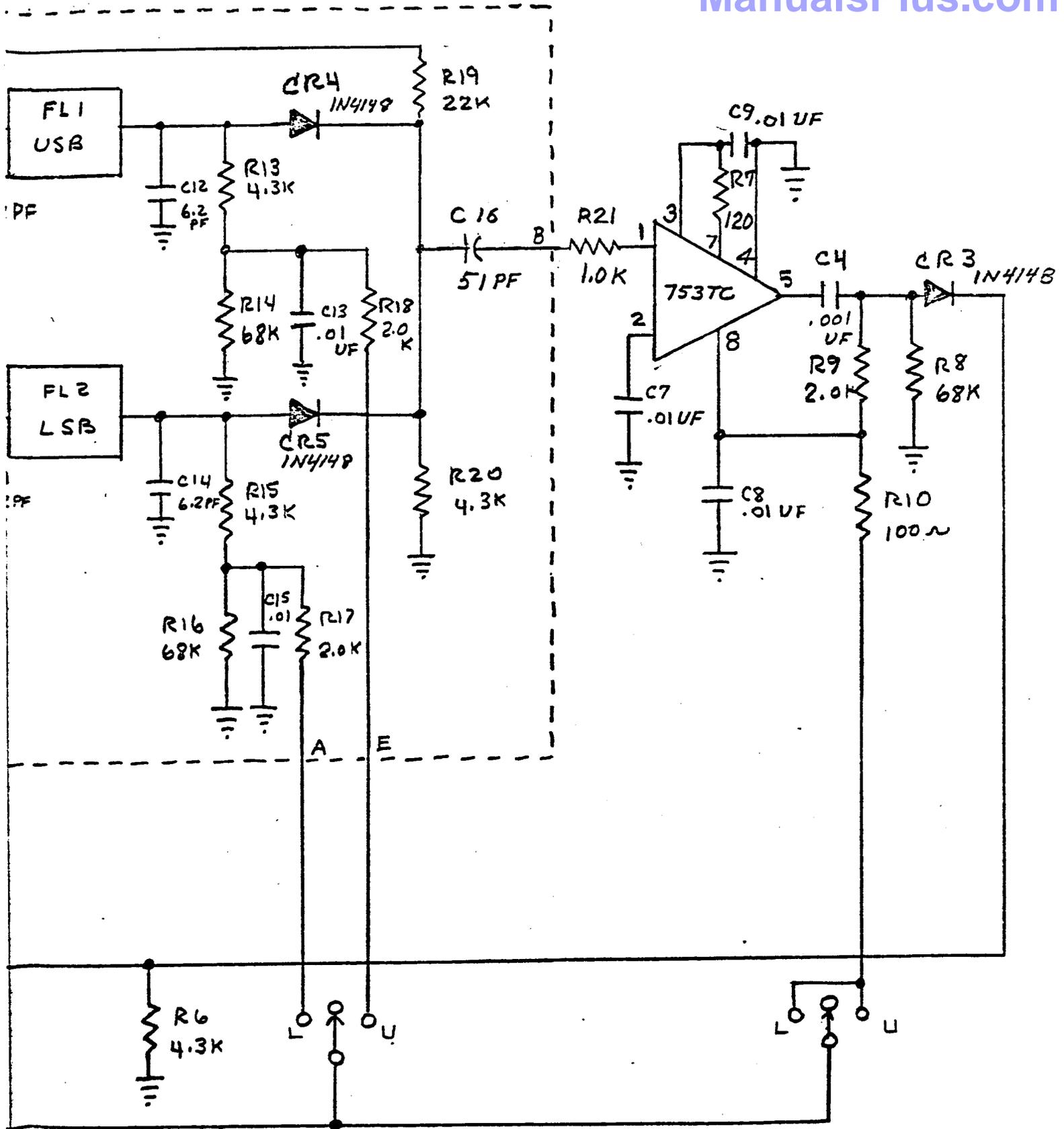


D X ENGINEERING
SCHEMATIC DIAGRAM
SPEECH PROCESSOR - T4X
1-9-75

So-1



P1



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PARTS LIST

Reference Number	Item	Description
R11, R12	Resistor	390 ohm 1/4 W, 5%
R2, R3, R8, R14, R16	Resistor	68K ohm 1/4 W, 5%
R9, R17, R18	Resistor	2K ohm 1/4 W, 5%
R5	Resistor	10K ohm 1/4 W, 5%
R4, R6, R20, R13, R15	Resistor	4.3K ohm 1/4 W, 5%
R19	Resistor	22K ohm 1/4 W, 5%
R7	Resistor	1.0K 200 ohm 1/4 W, 5%
R10, R21	Resistor	120 ohm 1/4 W, 5%
R22	Resistor	300 ohm 1/4 W, 5%
C1, C6, C7, C8, C13		
C15	Capacitor, Ceramic	.01 UF, 50VDC
C2, C5, C4, C16	Capacitor, Ceramic	.001 UF, 50VDC
C3	Capacitor, Variable	Erie #538-016D 9-35pf
C9	Capacitor, Mica	39pf, 50VDC
C10, C11, C12, C14	Capacitor, Mica	6.2pf, 50VDC
C17	Capacitor, Electrolytic	220 UF, 20VDC
CR1	Diode	IN4001
CR2, CR3, CR4, CR5	Diode	IN4148
L1	Inductor	10 UH
Q1	Transistor	2N3904
Z1	Integrated Circuit	Fairchild 753TC
FL1	Crystal Filter	5.6-2.4 U/L, A4740
	USB	
FL2	Crystal Filter	5.6-2.4 U/L, A4730
	LSB	
S1	Switch, Miniature	DPDT, Center Off
P1	Plug, Header	Vector #P-7
S01	Socket	Vector #50-7PC
	Printed Circuit Board	
	Cover Assembly	
	Lid Assembly	

WARRANTY

DX Engineering warrants each of its instruments to be free from defects in material and workmanship under normal use and service for a period of one year, commencing with the date of purchase. This warranty does not apply to instruments which have been repaired or altered by others, or to those which have been subject to misuse, negligence or accident, incorrect wiring by others, or installation or use not in accord with instructions furnished by the manufacturer.

In the event of a failure, the original owner will prepay transportation charges to DX Engineering and will include a statement of apparent defect.