

INSTRUCTION MANUAL
FOR
LC-2-TR
SPEECH PROCESSOR
used with
DRAKE TR-3, TR-4 TR-4C^{TR-6} TRANSCEIVERS

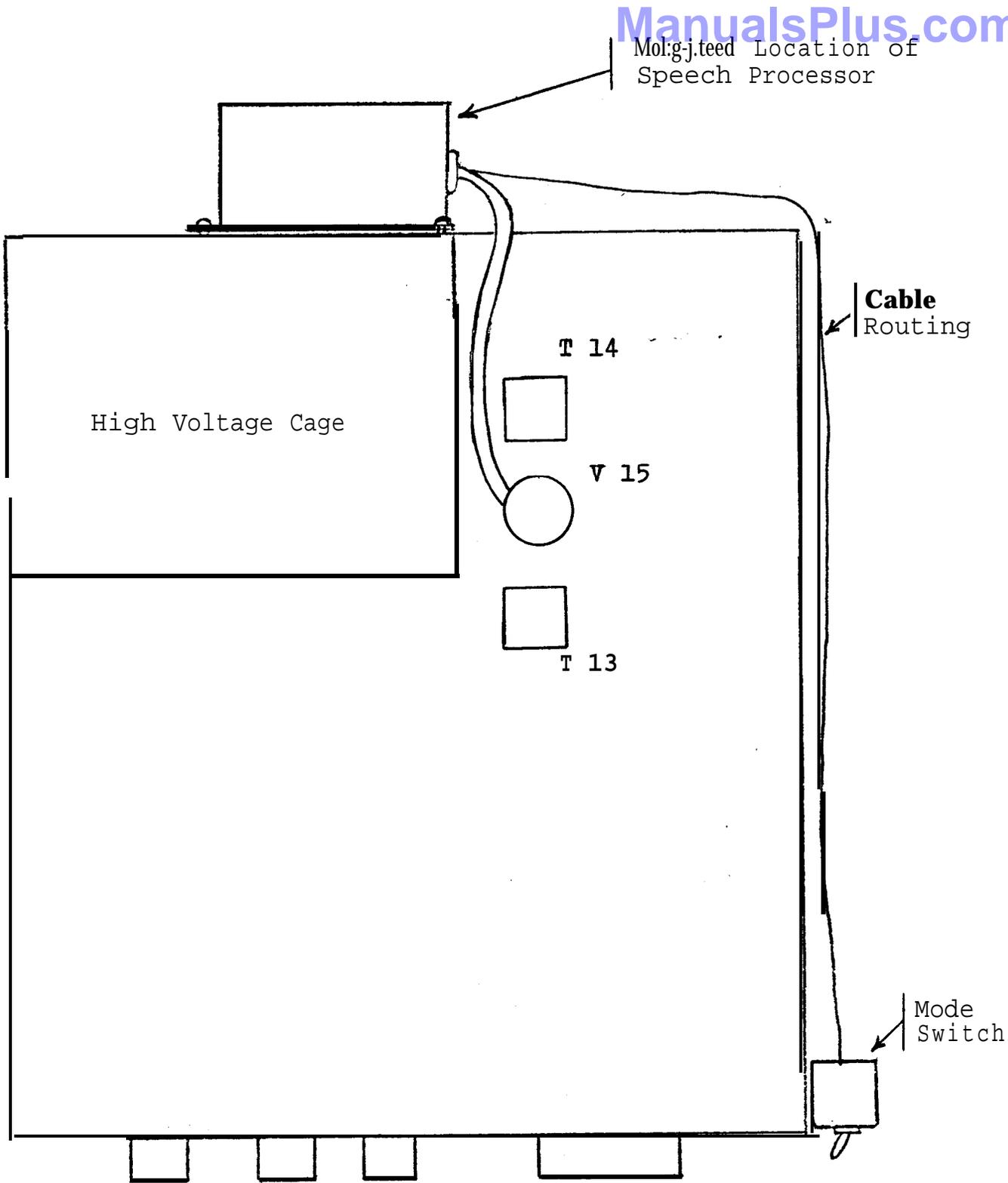
DX ENGINEERING
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INTRODUCTION

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.
- (2) Remove the three upper screws which hold the cover on each side of the transceiver. Remove the cover by lifting first at the rear and then at the front.
- (3) Refer to the top view on the next page. Position the speech processor at the top edge of the rear wall of the high voltage cage so that the holes in the mounting bracket are aligned with holes in the cage and mount it there, using the sheet metal screws provided, or the existing screws.
- (4) Remove the tube shield from V15. Remove V15 and install it in the extender socket attached to the speech processor. ~~Replace the tube shield over the tube.~~
- (5) Carefully press the extender socket into the tube socket vacated by V15.
- (6) Dress the cables as shown in the top view. In the TR-4C the cable is dressed over the top of the rear panel.
- (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 X position.
 - c) FUNCTION switch to X-CW.
 - 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.



TOP View OF TRANSCEIVER

(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 amp. Using the tuning tool provided or an equivalent, adjust the core of T 13 for maximum plate current. 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 5B, OUT, and X. 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/X switch on the transceiver. That is, when the SIDEBAND/X switch is in the SIDEBAND position, the processor mode switch should be moved to **5B**. Similarly, when the SIDEBAND/X switch is used to select the X sideband, the speech processor mode switch should be moved to the X 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 TR 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.

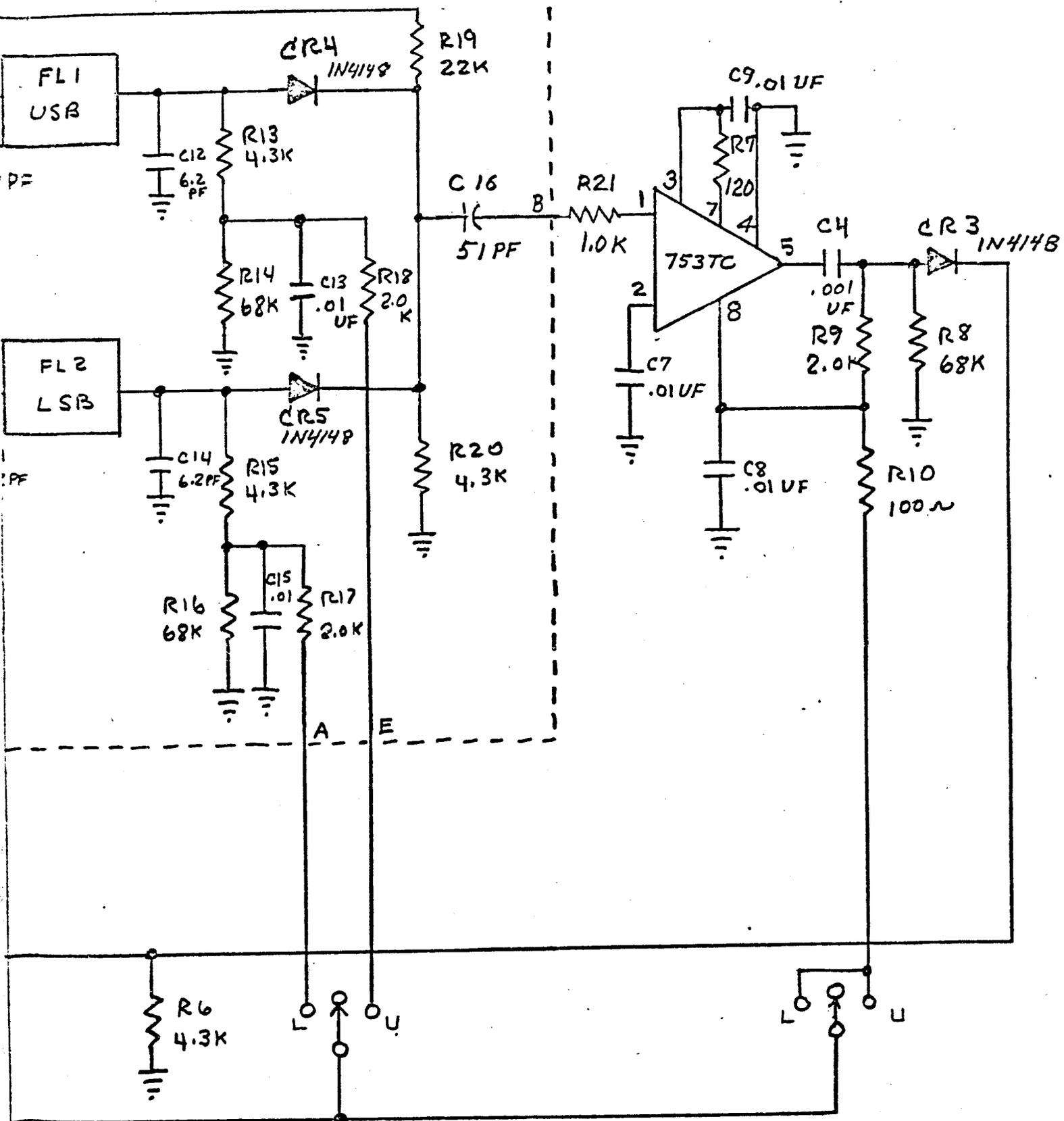
PARTS LIST

| 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, R21 | Resistor | 10K 200 ohm 1/4 W, 5% |
| R10, R21, R7 | 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, Elec- trolytic | 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 USB | 9.0-2.4 U/L, A1790 |
| FL2 | Crystal Filter LSB | 9.0-2.4 U/L, A1800 |
| S1 | Switch, Miniature | DPDT, Center Off |
| P1 | Plug, Header | Vector #P-7 |
| SO1 | Socket | Vector #50-7PC |
| | Printed Circuit Board | |
| | Cover Assembly | |
| | Lid Assembly | |

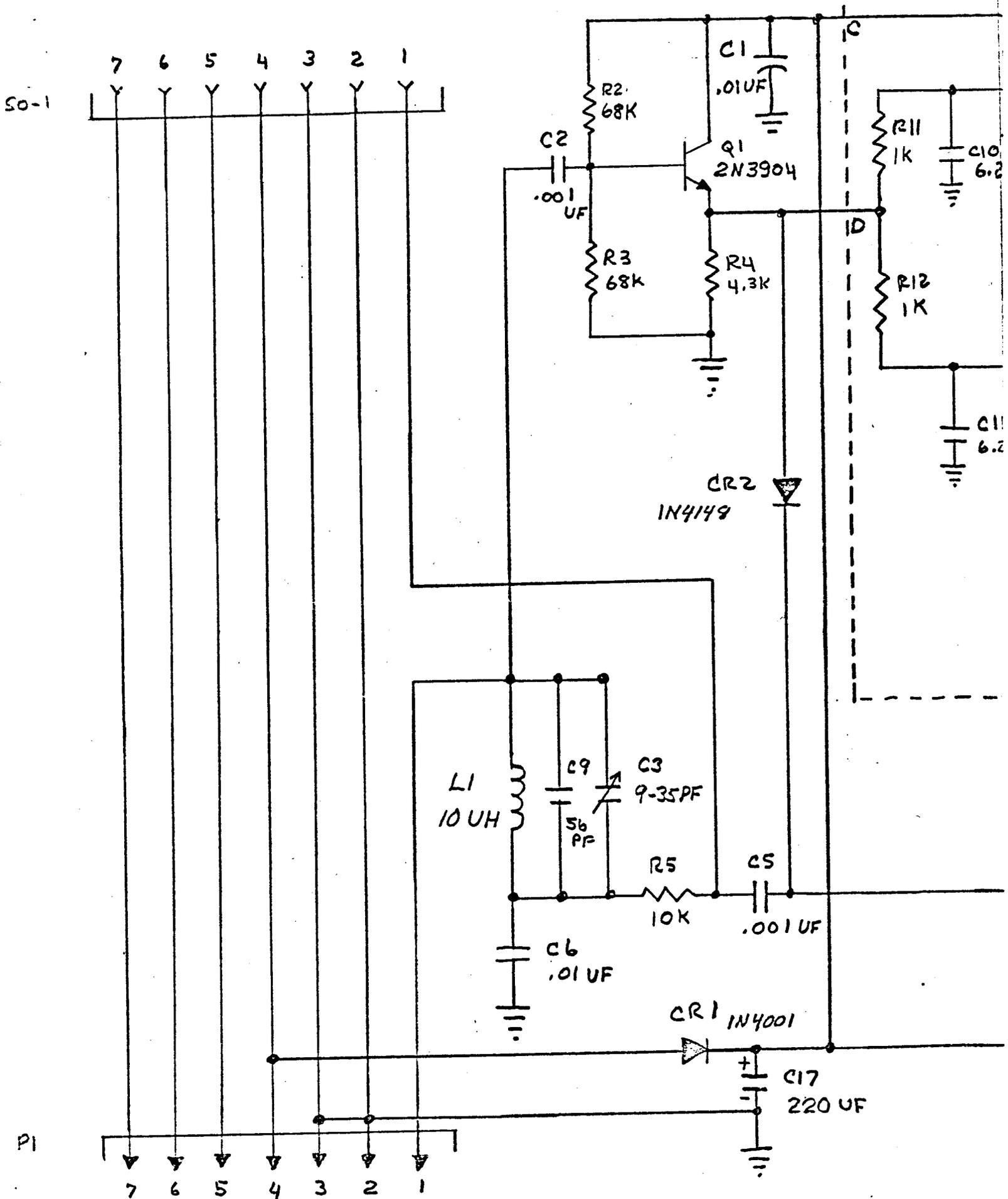
WARRANTY

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.



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



So-1

PI

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