

GLB PRESET CHANNEL SELECTOR

Channel selection on the 400 B is done by entering binary numbers into the programmable divider, ($\frac{1}{2}N$). The conversion of decimal to binary is accomplished by means of the special 10 position rotary switches. These are designed to make the proper electrical connections in the switch wafers.

In order to utilize one switch to program multiple channels we use silicone diodes to convert from decimal to binary.

The $\frac{1}{2}N$ uses a binary format 1, 2, 4, 8. To convert these four numbers to decimal they must be connected to give the 1 to 9 required for switching. This will be done by connecting these four lines with diodes. A connection to each line will result in the numbers 1, 2, 4, 8, . For the remaining 3, 5, 6, 7, 9 we use a combination of these binary inputs. A combination of the 1 and 2 line will result in the number 3. The 1 and 4 line - 5, the 2 and 4 line - 6, the 1, 2 and 4 line - 7. The 8 and 1 line - 9.

Fig. 1 shows the diode matrix board. It consists of a double sided PC board with copper traces running vertical on one side and horizontal on the other side. Holes are drilled thru the board to connect diodes from the vertical to the horizontal traces. The 400 B uses 10 preset lines from the switches to the - N, to cover from 144MHz to 147.990 MHz. 144 MHz is preset permanently in the -N circuit. 145, 146 and 147 MHz are preset with the MHz switches on the front panel. Two lines are used for this, the binary 1 and 2. For 145 MHz we preset #1, 146 preset #2, 147, preset 1&2.

The matrix board consists of 10 horizontal traces on the bottom side and 18 vertical traces on the top side. The 10 horizontal traces are used for the MHz, 100 KHz and 10 KHz presets and are connected to the diode strip on the panel switches. The 18 vertical traces are connected to the 2 deck 10 position preset switch. 9 traces and 1 deck of the switch will be used for transmit presets and 9 traces and one deck will be used for the receive presets. Any combination can be programmed for transmit and receive.

PROGRAMMING THE DIODE MATRIX

Before starting construction of the matrix, make a list of the frequencies and diode combinations. A chart has been provided, Fig. 2, to list channels, transmit and receive, switch positions and diode combinations.

Fig. 3 shows a sample of 146.34 transmit 146.94 receive, 146.40 transmit and 147.00 receive. Switch position 1, 146.34 transmit. 144 MHz in the 400B is permanently programmed. To obtain 146 MHz, we add a diode in the #2 MHz line. Follow the #1 switch position line to the 100 KHz column and put an "X" in the #1 and #2 box.

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Next we need 146.34. To obtain the 4, we go to the 10 KHz column, switch position #1 and add a diode in the #4 column. Follow the #1 switch position line to the 10 KHz column and put an "x" in the #4 box.

For 146.94 receive, go down the table to switch position #1 for receive. Put an "x" in the MHz column, #2 Box. This gives us 146 MHz. For .9 put an "X" in the 100 KHz column #1 box and #8 box. We now have 146.9 MHz. To obtain the 4, put an "X" in the 10 KHz column, #4 box.

We now have 146.94. Fig. 3 also shows 146.40 transmit and 147.00 receive. For zero's no diodes are required. Fig. 4 shows diode connections for various frequencies. For simplex frequencies, program the transmit position, and strap the same switch position on receive with a jumper wire. No diodes are required on the receive side for simplex operation.

Using the chart in Fig. 2, fill in the channel combinations you desire. After you have double checked the chart you can proceed to insert the diodes in the matrix board.

Bend the diodes per Fig. 5. The 1/8" lead at the cathode end of the diode will be inserted thru a hole in the PC board to engage one of the horizontal preset traces. The anode end of the diode is bent at right angles even with the cathode end of the diode and placed on top of the vertical switch position trace. It is advisable to clamp the matrix board securely with the vertical traces on top.

Starting with switch position 1, transmit, insert the diodes one at a time starting with the MHz line. Insert the cathode end into the hole to the proper MHz line. Orient the bent anode end on top of the switch position trace and solder this end to the trace. Do not solder the cathode end on the bottom side of the board at this time. Program the transmit positions soldering only the top leads. With all the positions programmed, check each line for proper diode orientation and position. When satisfied everything is correct, turn the board over and solder the cathode leads on the bottom traces.

In the same manner program the receive positions of the board. When all the diodes positions are checked, proceed to the wiring of the matrix board.

NOTE: Color coded 10 wire ribbon cable is used for matrix and switch connections. These 10 wires are brown, #1, Red #2 ect. Each color will be referred to in the instructions by its color code number.

- Step 1. Cut a piece of 10 wire ribbon cable 7" long. With an xacto knife make a 1/4" cut between each wire in the cable at each end. Using the template Fig. 6, pull the wires apart starting with the #1 color coded brown wire. Cut wires as shown and strip 1/8" and tin each wire.
- Step 2. On the opposite end of the cable, separate wires by cutting between each wire with an xacto knife and pull the wires apart to a length of 1-1/2".

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- Step 3. Starting with the #1 coded wire, vertical trace side of the board up. #1 wire goes thru the #2 MHz line and solders to the horizontal trace. #2 wire in #1 MHz line and down to the "O" coded wire.
- Step 4. Next cut a 6-1/2" length of ribbon cable. Separate wires as in step 1. Remove the black wire from the cable by carefully pulling it apart from the rest of the ribbon. This will leave a 9 wire ribbon. Using the template in Fig. 6, separate the wires on one end. Cut per template strip each wire 1/8" and tin each wire.
- Step 5. Separate the wires on the opposite end of this cable to a length of 1" Strip each wire 1/8" and tin.
- Step 6. This cable is now soldered to the matrix board 9 transmit positive with vertical traces up the cable starting with the brown wires a position 1 upper left-hand side of board. Insert brown wire from bottom of the board thru #1 position and solder to trace. Insert red in #2, orange #3 etc., soldering each wire. These 9 wires will now be soldered to the rear deck of the preset switch. Brown wire solders to #1 position, red to #2 position etc.
- Step 7. Cut a 4-1/2" length of ribbon cable. Separate wires as in step 1. Remove black wire as in step 4. Using the template in Fig. 6 separate the wires 1/8" and tin.
- Step 8. Separate the wires on the opposite end of this cable to a length of 1-1/2". Strip each wire 1/8" and tin.
- Step 9. Solder this cable to the matrix board in the 9 receive traces starting the brown wire in #1 position, red wire in #2 position, etc. The opposite end of this cable will now solder to the receive (front) deck of the preset switch. Brown to position #1, Red wire to position 2, etc.
- Step 10. Check all switch connections.

INSTALLATION OF THE MATRIX BOARD INTO THE 400B

1. Remove the 4 main board mtg screws.
2. Remove the receive toggle switch S8.
3. Unsolder the wire from the middle lug on switch S7 and S8.
4. Drill a 1/4" hole in the front panel. Position shown in Fig. 8.
5. Drill two ~~3/32~~ 3/32" holes in the main PC board using dimensions in Fig. 11.
6. Mount the 2, #2 standoffs on the main board with the two 2-56x 1/4" screws and #2 lock washers.
7. Solder the wire from E10 on the main board to the common lug of the transmit deck of the preset switch. This is the rear deck.

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8. Solder the wire from E9 on the main board to the common lug of the receive deck of the preset switch. This is the front deck.
9. Cut, strip 1/8 and tin an 8" length of wire. Solder one end to the #10 position lug on the transmit deck of the preset switch. Solder the other end to the center lug of S7.
10. Cut, strip 1/8" and 1-1/2" length of wire. Solder one end to the #10 position lug on the receive deck of the preset switch. Solder the other end to the center lug of Switch S8.
11. Fasten the matrix board with the 18 switch wires on the bottom of board toward the rotary switches on the two stand offs on the main board using 2, #2 screws washes.
12. Wire the 10 wires from the preset lines to the diode terminal strip. Use the chart Fig. 9 to wire to the diode terminal strip.
13. Mount the rotary preset switch in the original receive switch mounting hole per Fig. 10.
14. Mount the receive toggle switch S7 in the 1/4" hole previously drilled in the front panel.
15. Assemble the skirt to the knob. There are three projections on the skirt. These fit into three holes in the knob. The knob has a collet type locking feature. Tighten the screw in the end of the knob. When complete, press in the red plastic cap to cover the screw.
16. Turn the rotary switch to position 10. Install skirted knob with "O" at this position. Do not tighten knob. Mark a reference point on the front panel at the "O" position. Replace the knob and tighten.

When the preset switch is in the "O" position the regular front panel switches are engaged. When the preset switch is set at any of the 1 to 9 channel positions the regular panel switches are disengaged and the frequency is controlled by the preset switch.

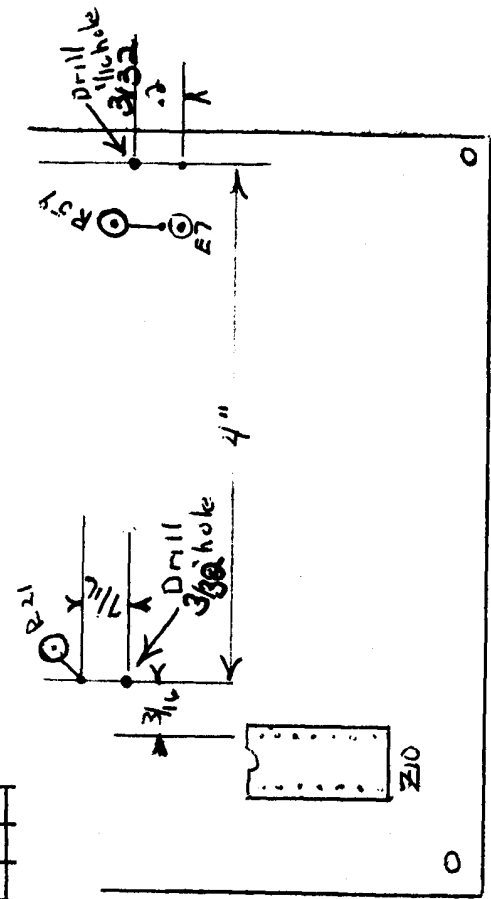
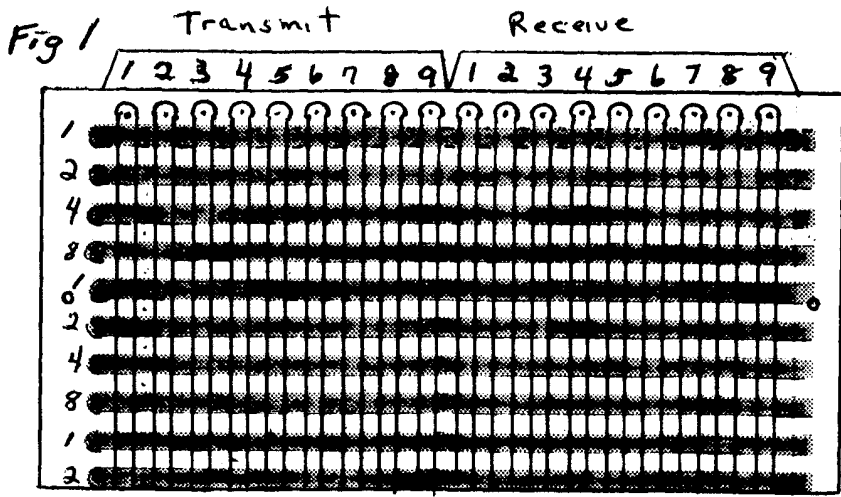


Fig. 11

Fig. 2

| SW Pos | xmit Freq | MHz | | | | | | | |
|--------|-----------|---------|---|--------|---|---------|---|--------|---|
| | | 100 KHz | | 10 KHz | | 100 KHz | | 10 KHz | |
| | | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 |
| 1 | 146.10 | | | | | | | | |
| 2 | 146.16 | | | | | | | | |
| 3 | 146.19 | | | | | | | | |
| 4 | 146.34 | | | | | | | | |
| 5 | 146.37 | | | | | | | | |
| 6 | 146.43 | | | | | | | | |
| 7 | 146.52 | | | | | | | | |
| 8 | 147.81 | | | | | | | | |
| 9 | 147.96 | | | | | | | | |
| SW Pos | Rec Freq | | | | | | | | |
| 1 | 146.70 | | | | | | | | |
| 2 | 146.76 | | | | | | | | |
| 3 | 146.79 | | | | | | | | |
| 4 | 146.94 | | | | | | | | |
| 5 | 146.97 | | | | | | | | |
| 6 | 147.03 | | | | | | | | |
| 7 | 146.52 | | | | | | | | |
| 8 | 147.21 | | | | | | | | |
| 9 | 147.36 | | | | | | | | |

Fig. 6

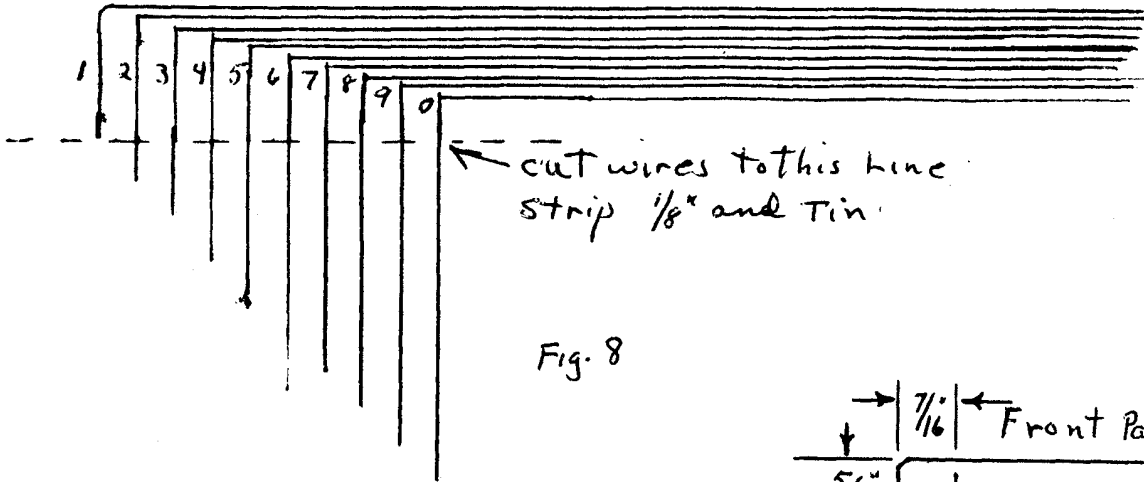


Fig. 8

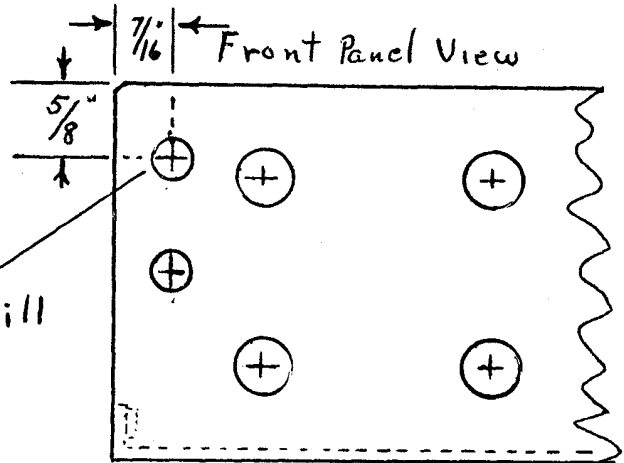


Fig. 7

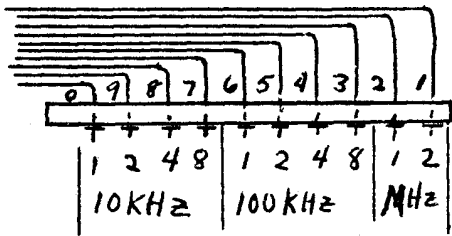
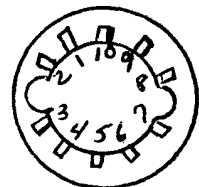
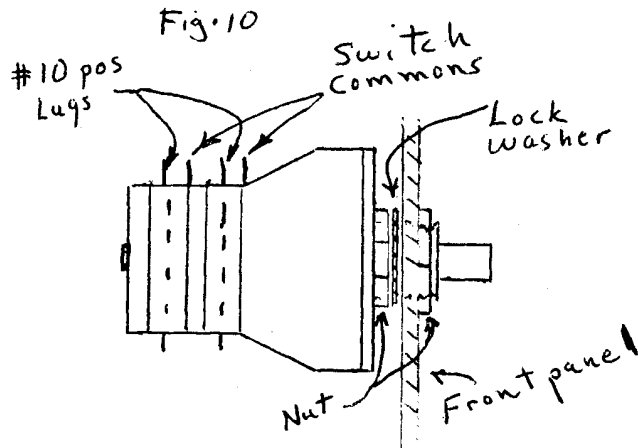


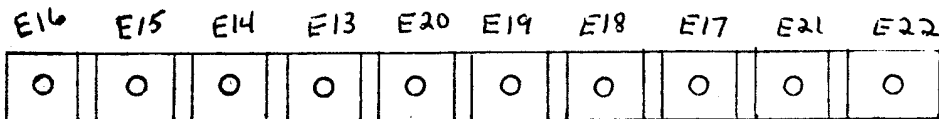
Fig. 9

| Color | Term Strip | Later Models |
|-------|------------|--------------|
| 1 | - E 22 | E22 |
| 2 | - E 21 | E21 |
| 3 | - E 17 | E20 |
| 6 | - E 18 | E17 |
| 4 | - E 19 | E19 |
| 5 | - E 20 | E18 |
| 7 | - E 13 | E16 |
| 0 | - E 14 | E13 |
| 8 | - E 15 | E15 |
| 9 | - E 16 | E14 |

Blue Switches



Rear View



Diode Strip on 400B

Fig. 3

| SW Pos | Transmit freg | MHz | | 100 KHz | | | | 10 KHz | | | |
|--------|---------------|-----|---|---------|---|---|---|--------|---|---|---|
| | | 1 | 2 | 1 | 2 | 4 | 8 | 1 | 2 | 4 | 8 |
| 1 | 146.34 | | X | X | X | | | | | X | |
| 2 | 146.40 | | X | | | X | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| | Receive freg | | | | | | | | | | |
| 1 | 146.94 | | X | X | | | X | | | X | |
| 2 | 147.00 | X | X | | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |

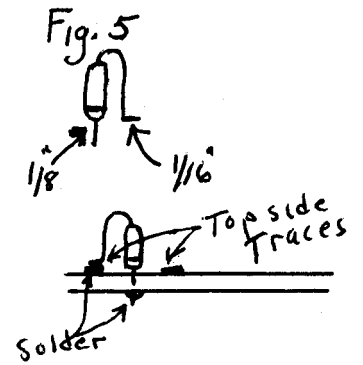
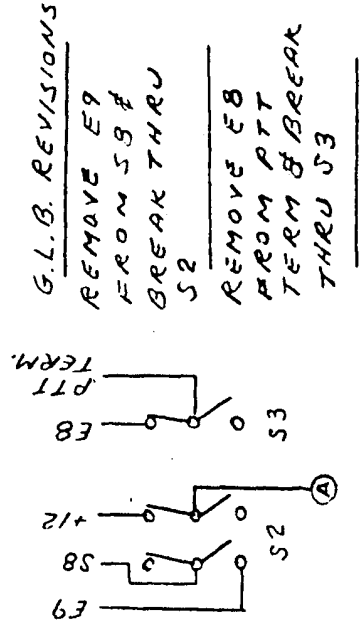
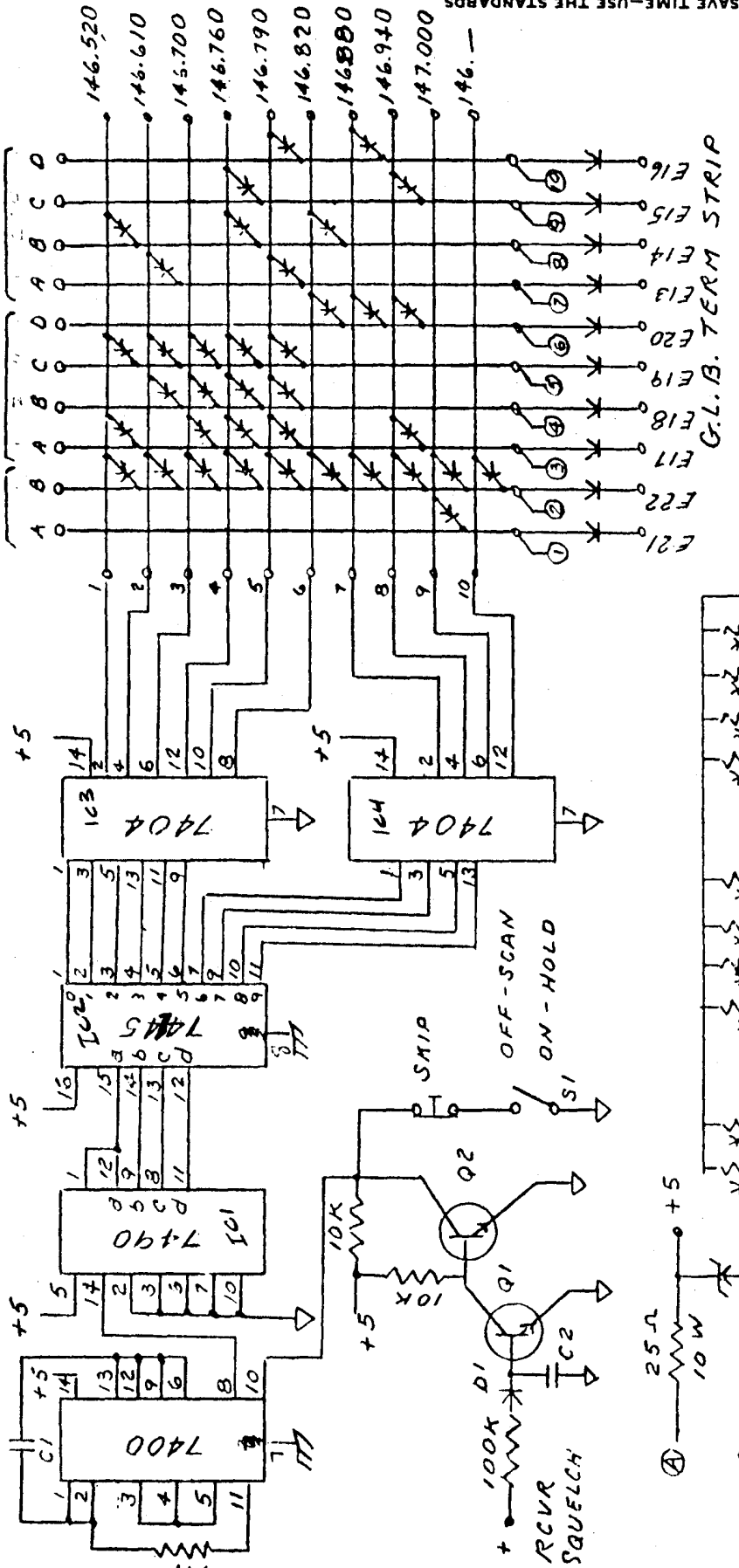


Fig. 4

| | Transmit | | | | | | | | | Receive | | | | | | | | | |
|------------|----------|---|---|---|---|---|---|---|---|---------|---|---|---|---|---|---|---|---|--|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
| 10 KHz | 1 | * | | * | | | | | | * | | * | | | | | | | |
| | 2 | * | * | | | | | | | * | * | | | | | | | | |
| | 4 | | * | | | | | | | | * | | | | | | | | |
| | 8 | | | * | | | | | | | | * | | | | | | | |
| 100 KHz | 1 | * | * | * | | | | | | * | * | * | | | | | | | |
| | 2 | | | | | | | | | * | * | * | | | | | | | |
| | 4 | | | * | | | | | | * | * | * | | | | | | | |
| | 8 | | | | | | | | | | | | | | | | | | |
| MHz | 1 | | | | | | | | | | | * | | | | | | | |
| | 2 | * | * | * | * | | | | | * | * | * | * | | | | | | |

| | | | | | |
|--------|---|--------|-------|---|--------|
| Xmit 1 | - | 146.13 | Rec 1 | - | 146.73 |
| SW 2 | - | 146.16 | SW 2 | - | 146.76 |
| Pos 3 | - | 146.19 | Pos 3 | - | 146.79 |
| Pos 4 | - | 146.40 | Pos 4 | - | 147.00 |

MEG 100KC 10KC



SCANNER FOR GLB

10KC

100KC

MEG