1 October 1969

TEMPORARY ASSEMBLY INSTRUCTIONS FOR D525-T5 TWO STICK TRANSMITTER

Install all parts on printed circuit boards exactly as shown. Double-check each part to be certain it is the correct part before installing. Be very sure parts are installed in the correct holes.

Use extreme care in soldering. Do not use excessive heat or sensitive parts may be damaged. Use a 30 - 47-1/2 watt pencil iron with a sharp tip. Nothing smaller or larger. Apply enough heat to insure a good solder joint. Cut excess leads after soldering parts in.

After assembly, clean unit with lacquer thinner to remove flux. Inspect very carefully with a high power magnifier (eye loupe) to check for solder between lands, poor solder connections, loose wires, etc. Do not apply power or try to operate equipment until all possible assembly problems are eliminated.

Above all, be very careful of each work step to assure a perfect job.

1. Assemble remainder of electronics on P.C. board as shown on drawing. Note: RF section is pre-assembled and pre-tuned. Do not change these RF adjustments.
2. Assemble 5th channel pot, bracket and wires and install on front of board with No. 4 self-tapping screw.
3. Install charging lamp socket on front of board.
4. Assemble batteries into plastic case. Install batteries, plugs, switch, switch guard, and meter on case. Install antenna fitting with spring clip. Use RTV silicone compound to hold it permanently.
5. Solder short wires into position on P.C. board and meter.
6. Clean circuit side of board with lacquer thinner.
7. Inspect both sides of P.C. board very carefully under magnification, preferably with an eye loupe, for correct parts installation and for possible solder shorts.
8. Using diagonal cutters, cut the small plastic tab off of each of the four control pots on stick assemblies.
9. Attach both stick assemblies and plates to Tx case with 4 screws each. Be sure sticks are positioned so that clutch screws are toward center of case.
10. Solder wires between switch and front of P.C. board. Install .01 capacitor on switch. With switch OFF, connect wires to charging plugs, then solder red and black battery wires to P.C. board.
11. Attach board to case with two machine screws, nuts and lockwashers at top, and two No. 4 self-tapping screws thru front of case into 5th channel bracket.
12. Solder meter leads to marked lands at top of P.C. board.
13. Solder wires to control pots as shown. Be sure and use shrink tubing over pot lugs.
14. Check unit over very carefully to be sure everything is correct before proceeding with final checkout and alignment.

CALIBRATION INSTRUCTIONS

Preliminary Tx Adjustments

Charge batteries for 24 hours before attempting to test and align transmitter.

1. Set arms on all small pots (4) thru (10) to 12 o'clock position.
2. Rotate the four main control pots so that the black wire lugs are approximately at center (12 o'clock), or straight out.

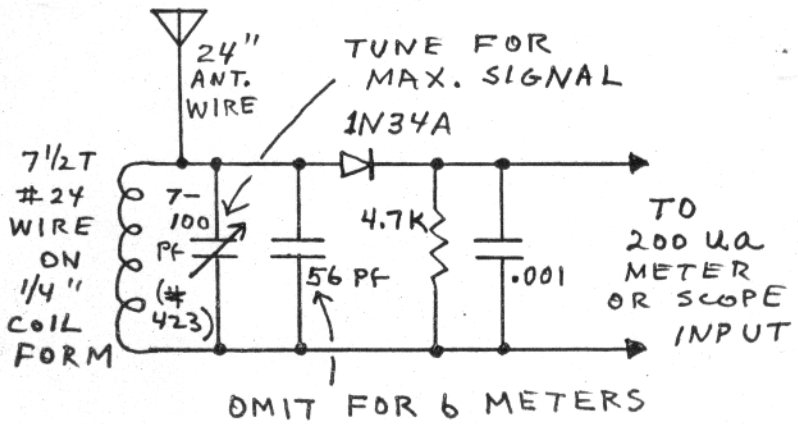
3. Rotate screws on both trimmer capacitors clockwise until tight - do not force. Rotate screw on osc trimmer (1) 1/4 turn counterclockwise. Rotate output trimmer (2) 1/2 turn CCW.
4. Set slug in antenna coil (3) flush with top of coil.

Transmitter RF Alignment

Tx RF section is factory tuned and sealed and should normally not require adjustment. If required, adjustment procedures are as follows:

1. Extend antenna fully, and turn on Tx switch.
2. Using a field strength meter, adjust oscillator trimmer (1) for maximum peak output, then rotate trimmer about 5 degrees more clockwise to lock oscillator.
3. Adjust output trimmer (2) for peak RF. This peak will not be extremely sharp, so watch meter carefully.
4. Tune slug (3) for peak RF. Recheck trimmer (2), then slug (3).
5. Place a small transistor radio near the Tx antenna. If Tx logic is operating, a distinctive buzz will be audible in radio. This note will change as control sticks are moved.

For more accurate tuning results, we recommend use of a tuned demodulator circuit such as shown below. Output waveforms and peak RF tuning points can be observed visually on the scope. Perform steps above while watching scope for variations in waveform and amplitudes.



Check frequency of Tx output on a frequency meter to assure frequency tolerance of .005%. Note: FCC Regulations stipulate that RF tuning be performed by a licensed first or second class commercial radio operator.

TRANSMITTER LOGIC CALIBRATION

For precise calibration of Tx logic, an accurately calibrated oscilloscope is required. Connect scope ground to Tx minus land on LH side of P.C. board. Connect scope probe to test points (A) thru (G) in turn to observe control waveforms. Perform adjustments with antenna installed, but collapsed.

1. Adjust small pot (4) for 7 millisecond timing pulse at point (A).
2. Waveforms at (B) thru (F) must be adjusted for a control pot variation of 1 to 2 milliseconds, 1.5 milliseconds with controls in neutral. Position of large control pots (not control sticks) determines total width of the pulse, while the related small pots adjusts the total swing width variation of the pulse. In each case, these two controls are interrelated, so an adjustment of one will necessitate a small readjustment of the other, until pulse width and variation are correct.

3. Check pulse width at test point (B). Move both the aileron control stick and its trim lever fully right and note width of pulse. Move stick and trim to opposite extreme and check pulse width. If total swing is less than one millisecond, rotate arm on small pot (5) counterclockwise until desired swing is obtained. Check pulse again in each extreme. If overall pulse width is not sufficient, hold trim lever and rotate control pot (5) slightly counterclockwise. Recheck pulse width. Once pulse width is about right, readjust small pot (5) for one millisecond swing. Continue adjustments until aileron pulse width and travel are perfect.
4. Calibration of the next four channels is performed in exactly the same manner, using the correct related control and adjustment pots. Exception: If the auxiliary control pot requires adjustment, the plastic control lever must be removed, the nut loosened, and the pot moved to its desired position. Reinstall control arm. Adjust auxiliary channel for a total of one millisecond swing with lever in extremes (no trim on this channel).
5. With scope on test point (G), adjust small pot (10) for a 325 microsecond pulse width at widest point. A total of six pulses should be observed at this point, followed by a long timing pulse.

RECEIVER ALIGNMENT

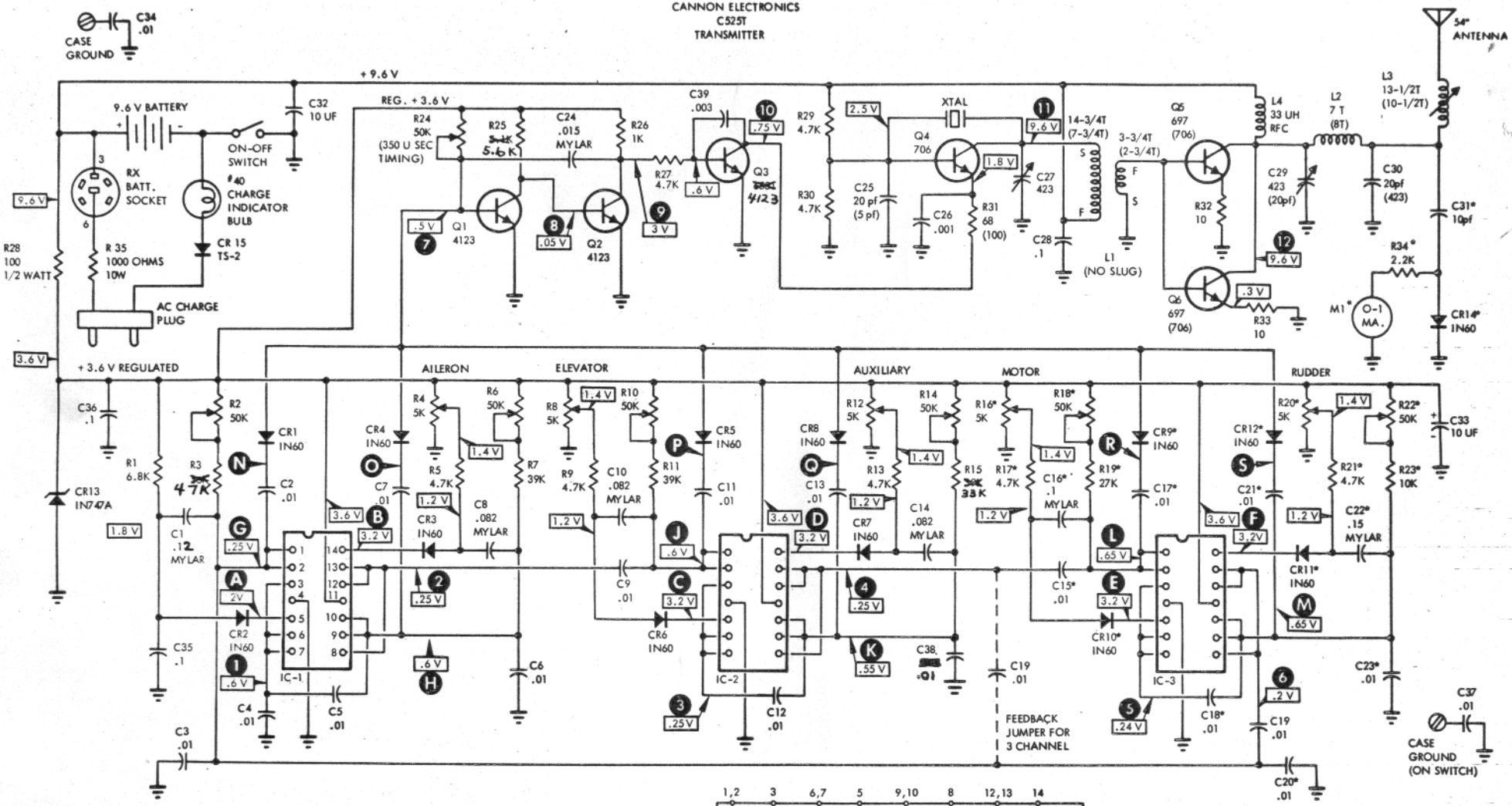
If operating correctly, receiver can be aligned without a scope. However, Tx must be aligned and operating properly first. Plug operating servo into receiver and connect battery. Start with transmitter (antenna collapsed) near receiver and move control stick. Tune antenna coil, RF coil and I.F. transformers until servo operates. Move Tx a few feet away and adjust each coil again for center of its tuning range.

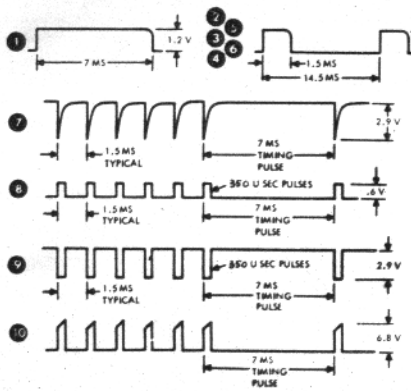
Remove Tx antenna. Move Tx close to receiver antenna until servo operates. Move away slightly until control is lost. At this Tx position, carefully tune each I.F. in turn until operation is regained. Continue moving Tx away and tuning until all I.F. cans are peaked. Then tune the two front end coils in turn in the same manner until maximum range is obtained. At maximum range, recheck each coil for peak tuning. Install Rx case top and repeak the two front end coils for maximum range.

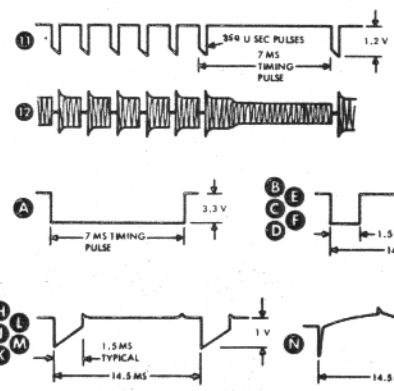
Rough tuning can be performed with the oscilloscope connected to detector diode CR 3 (1N60). Place Tx (antenna off) in a position to provide a definite signal output from detector. Adjust all coils for maximum amplitude. Perform final tuning as described in paragraph above.

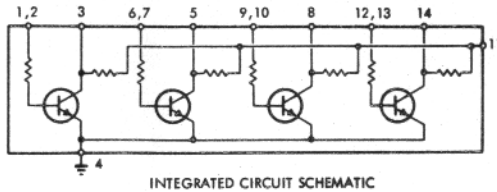
Once Rx is aligned, Tx antenna off range should be 1 - 10 feet or more. Ground range, antenna on but retracted, should be 300-500 feet, with aircraft 2 to 3 feet off the ground. Ground range, antenna extended should be 2000 feet or more. Note: RF emission from 3-channel and single stick transmitters is extremely low without an antenna. Do not be alarmed if this situation exists; make range checks with antenna installed.

CANNON ELECTRONICS
C525T
TRANSMITTER









INTEGRATED CIRCUIT SCHEMATIC

NOTES

1. ALL MEASUREMENTS IN RESPECT TO NEGATIVE (-).
2. DC VOLTAGES SHOWN IN BOXES.
3. VOLTAGE READINGS TAKEN WITH 20K OHMS-PER-VOLT MULTIMETER.
4. VOLTAGES MAY VARY ± 20%.
5. VOLTAGES AND WAVEFORMS TAKEN WITH ALL CONTROLS IN NEUTRAL.
6. WAVEFORMS TAKEN WITH TEKTRONIX 503 OSCILLOSCOPE WITH CALIBRATED AMPLITUDE AND TIME BASE.
7. CAPACITOR VALUES IN MFD UNLESS NOTED.
8. VALUES FOR 6 METER VERSION SHOWN IN PARENTHESIS ().
9. *ASTERISK INDICATES PARTS NOT USED ON 3 CHANNEL MODEL.
10. TEST POINTS 1 THRU 12 ARE ETCHED ON PC BOARD.

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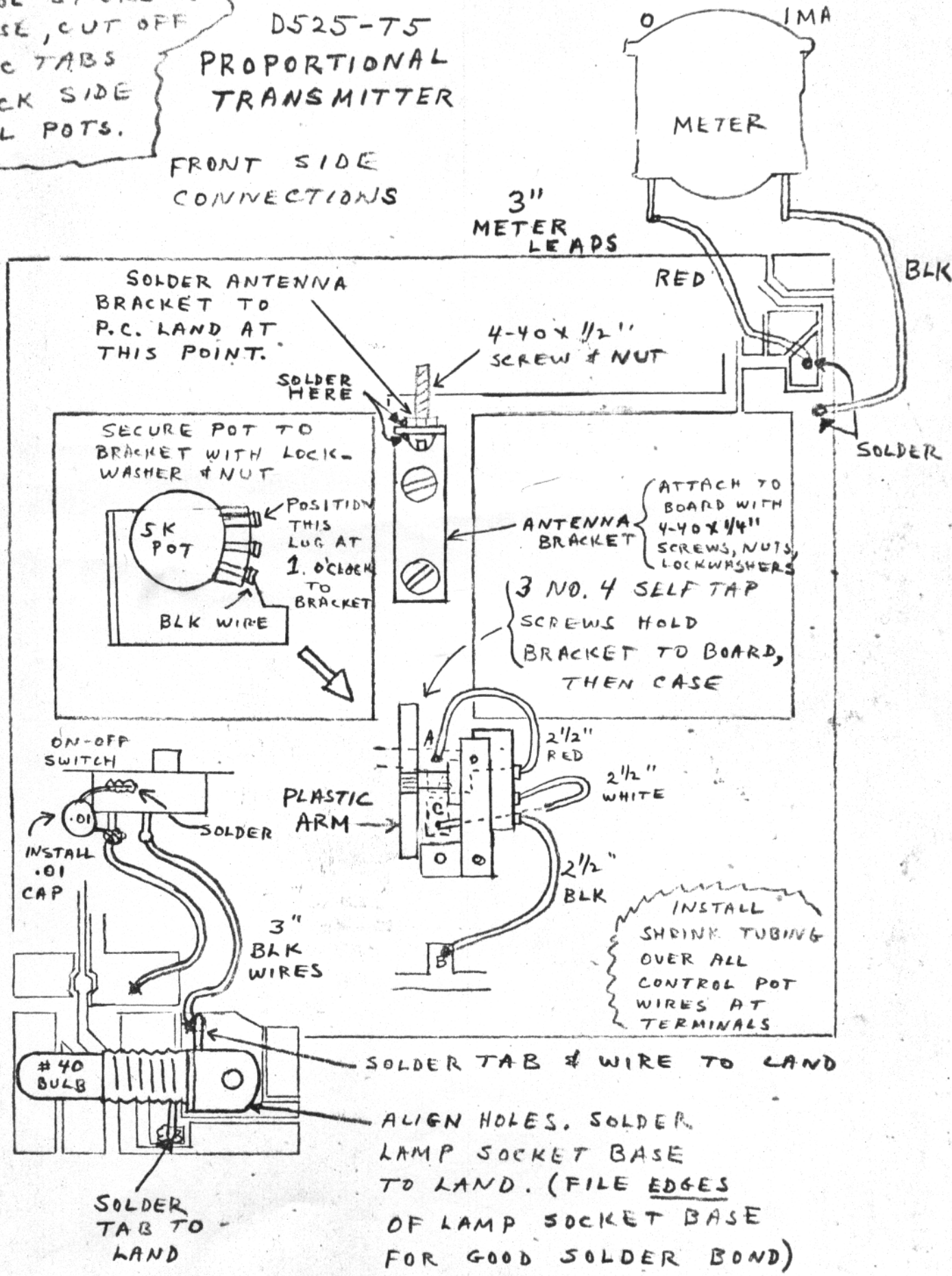
BEFORE INSTALLING CONTROL STICKS IN Tx CASE, CUT OFF PLASTIC TABS ON BACK SIDE OF ALL POTS.

D525-T5 PROPORTIONAL TRANSMITTER

FRONT SIDE CONNECTIONS



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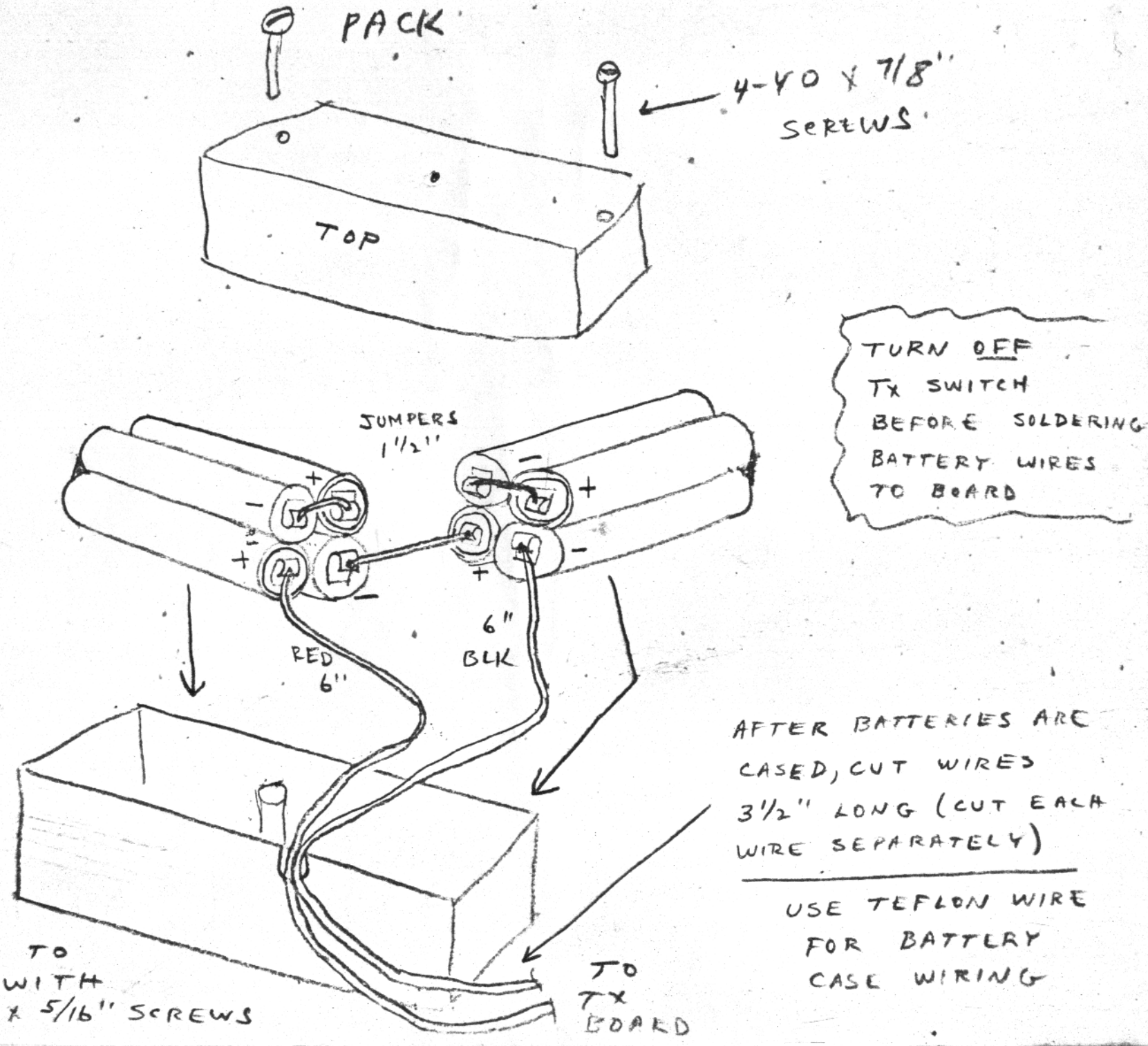
Tx BATT PACK



TURN OFF Tx SWITCH BEFORE SOLDERING BATTERY WIRES TO BOARD

AFTER BATTERIES ARE CASED, CUT WIRES 3 1/2" LONG (CUT EACH WIRE SEPARATELY)

USE TEFLON WIRE FOR BATTERY CASE WIRING

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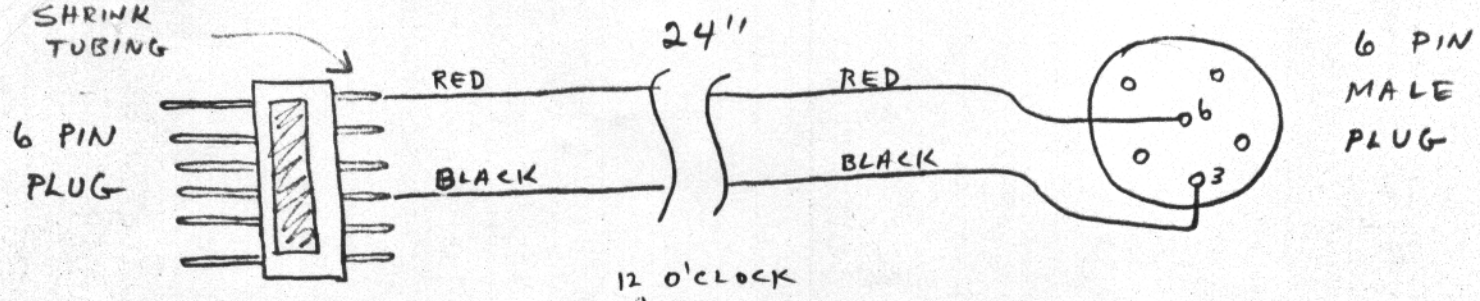
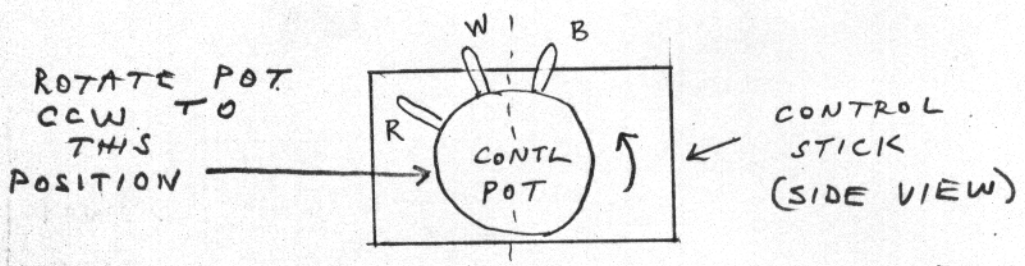
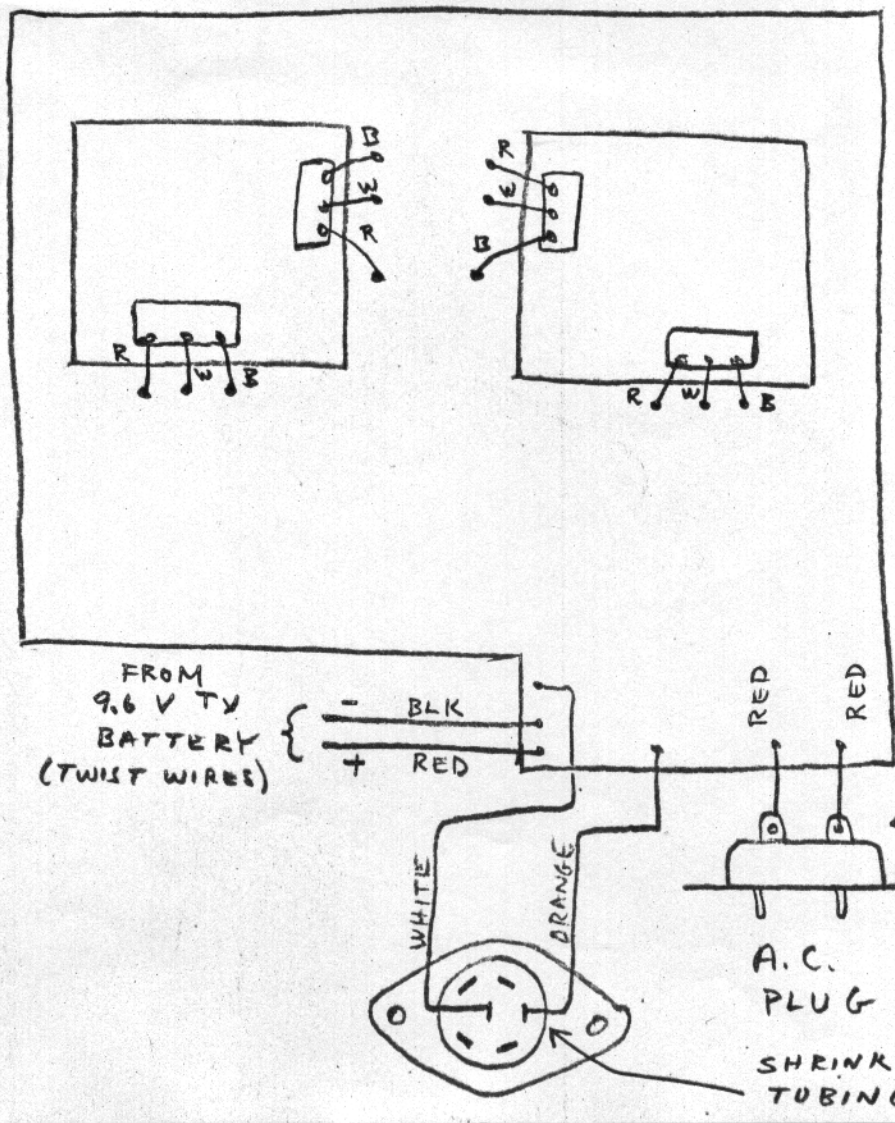
CHARGING CORD





POSITION ALL 4 CONTROL POTS AS SHOWN HERE BEFORE START OF CALIBRATION

TX WIRE CONNECTIONS



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CHARGING CORD FOR 4-PIN PLUGS