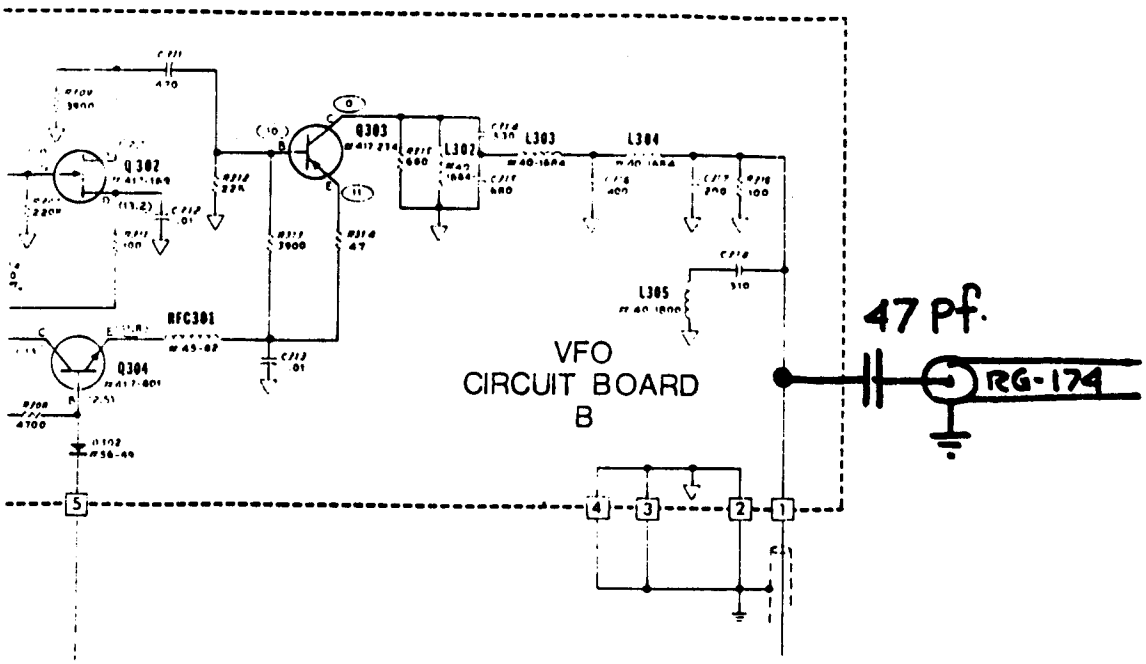
TORRESTRONICS, INC.

MATING INSTRUCTIONS

NOTE: THESE MATING INSTRUCTIONS ARE PROVIDED TO HELP YOU CONNECT THE TK-1 TO YOUR SYSTEM. ALL MATING SHOULD BE DONE USING RG-174 OR SIMILAR RF CABLE. DO NOT USE AUDIO SHIELDED CABLE. IF YOU HAVE ANY DIFFICULTIES, PLEASE WRITE US FOR ASSISTANCE.

MATING THE TK-1 TO THE HEATHKIT HR-1680 RECEIVER

To: All HR-1680 Series



Note: Ref. is made to HR-1680 Assembly Manual & Schematics.
Ref. is made to the TK-1 Assembly Manual.

( ) Locate a 47 pf. disc. capacitor 50 VDC or better, two feet of RG-174 and a phono socket.
( ) Connect one side of the capacitor to Pin 1 of the VFO Board; the other side of the capacitor is connected to the center conductor of the RG-174 cable. Make sure to insulate both sides of the capacitor as to not short to chassis ground. The shield of the cable is connected to Pin 2 or any other convenient ground.
( ) Route this cable to the back of the receiver and using one of the spare phono sockets connect both the shield and the center conductor to such socket.
( ) Make a mating cable, using two phono sockets on RG-174 ; length is not critical but route the cable away from the antenna input.
( ) To program, follow the outlined procedure given on p. 17 of the TK-1 Assembly and Operation Manual
( ) Programming is complete.

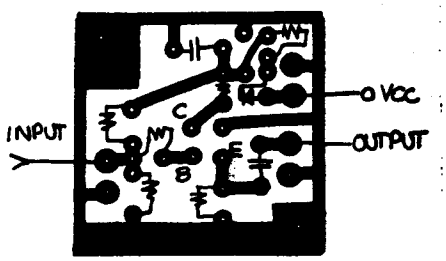
Note: When switching from band to band, the readout when beating against the crystal calibrator should read the same. If not, adjust the coils on the HFO board for each band. Coils are L401, L402 to L406.

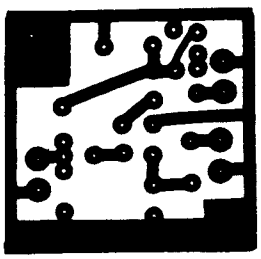
TORRESTRONICS, INC.
4850 Hollywreath Ct.
Dayton, OH. 45424
513-236-2534

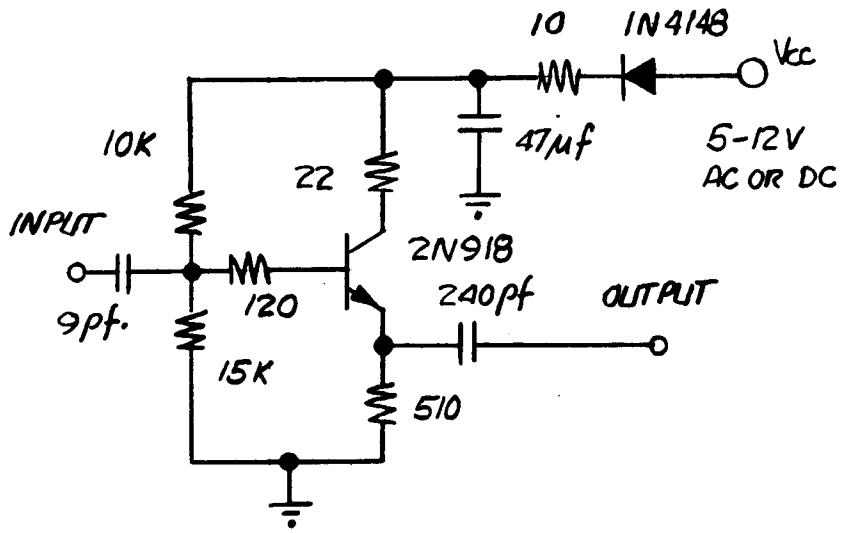
BUFFER AMPLIFIER CIRCUIT FOR THE TK-1 READOUT

PURPOSE: To eliminate some of the high impedance coupling problems between the TK-1 Universal Digital Frequency Readout and some receivers.

CIRCUIT: The circuit consists of a quasi-emitter follower designed to operate at very high frequencies with a beta of 10 or more. The bandwidth-gain product of the transistor used(2N918) exceeds 600 MHZ. and provides a unit voltage gain. Coupling to the input of the amplifier is made via a 9 to 12 pf capacitor, thus representing an equivalent reactance of 3Kohms in series with the imput impedance of the emitter follower. Such loading is extremely useful for receivers like the Drake 2B or transceivers like the TR-3. The circuit is intended to be located inside the host radio and power to such amplifier is any voltage between 5V to 12V either AC or DC. Such voltage range makes the circuit adaptable to almost any receiver or transceiver and power coupling could be obtained by just connecting the circuit to the filament voltage of most receiver or transceivers. The circuit will use in the vicinity of 5 ma. of supply current. The output of the circuit is intended to drive a coaxial line(RG-174 or equivalent) to the TK-1 input. Caution: Do not use audio cable to couple buffer ckt. to the TK-1. A simple PC Board layout is given below on a 1 to 1 scale. All resistors are 1/4 w. and are all standing on the PC board; the 50 uf. cap. is a Dipped Tant., other capacitors are disc. or silver micas.

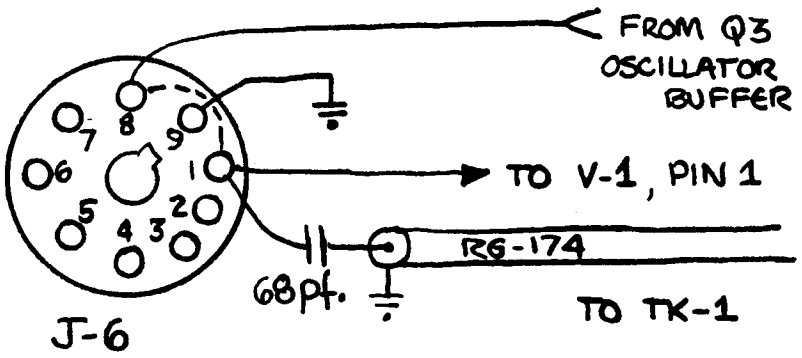






MATING THE TK-1 TO YOUR SWAN 500 TRANSCEIVER

To: All Swan 500 series including A, B, and C.



PROGRAMMING PROCEDURE

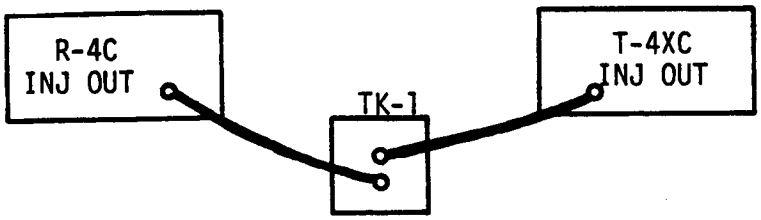
1. Locate the accessory socket on your transceiver; it is normally on the rear panel. This socket is identified as J-6.
2. Locate some shielded cable(like RG-174 or similar), careful not to use audio shielded cable. Cut to the desired length and connect a phono socket to one end.
3. Locate a 68 pf disc capacitor and connect the center conductor of the shielded cable to one end of the capacitor. The other end of the capacitor is connected to Pin 1 of J-6. The shield of the cable is connected to Pin 9 of the J-6 socket.
4. Make sure that all signal wires are not shorted to ground.
5. Programming is complete.

NOTES:

a. If you do not have an external VFO you must short Pin 8 to Pin 1 of the J-6 socket.
b. If you do have an external VFO, your readout will give you the readings of your transceiver VFO, external VFO or separate combinations depending on the switch setting of your external VFO controls. See your Swan manual.
c. For programming numbers in the TK-1 please refer to the TK-1 manual, section on Programming.

MATING TK-1 TO DRAKE TWINS

TO: R-4, R-4A, R-4B, R-4C
T-4X, T-4XB, T-4XC



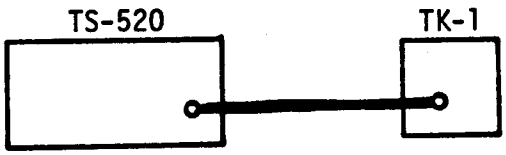
PROGRAMMING PROCEDURE

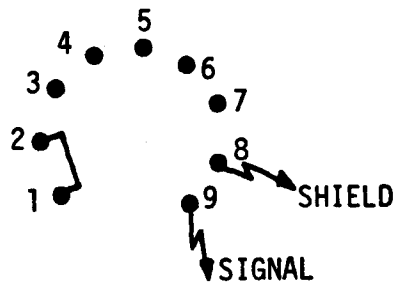
a. Set receiver to 14,000 KHZ and zero beat with the calibrator
b. Set your displays on the TK-1 to read 000.0
c. Plug your radio (receiver) and read 645.0
d. Disconnect your receiver from TK-1 and program 355.0
e. Connect your receiver; TK-1 should follow dial.

f. Programming is completed

MATING THE TK-1 TO KENWOOD TS-520

TO: TS-520, TS-820





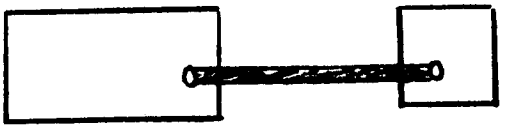
Connection is made on the external VFO 9 pin socket. Connect signal to Pin 9, Gnd to Pin 8; Pin 1 & 2 must be shorted together.

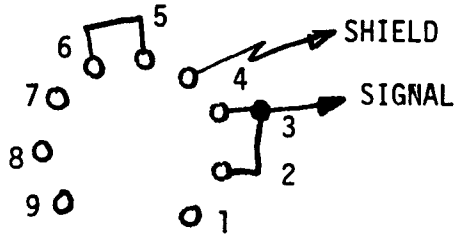
PROGRAMMING PROCEDURE

a. Set receiver to 14,000 KHZ and zero beat with the calibrator
b. Set your displays on F_A to read 000.0
c. Connect your transceiver to TK-1 and read 500.0 (depends if you are on USB or LSB)
d. Disconnect your transceiver and program 500.0 on your TK-1
e. Connect your transceiver; TK-1 should follow dial. This transceiver counts down.
f. Program all 000.0 on F_B. You will use this channel when on the 3.5 MHZ or 28.5 MHZ band.

MATING THE TK-1 TO THE ATLAS PRODUCTS

TO: 180, 215, 210, 215X, 210X





SOCKET AS SEEN FROM TOP

PROGRAMMING PROCEDURE

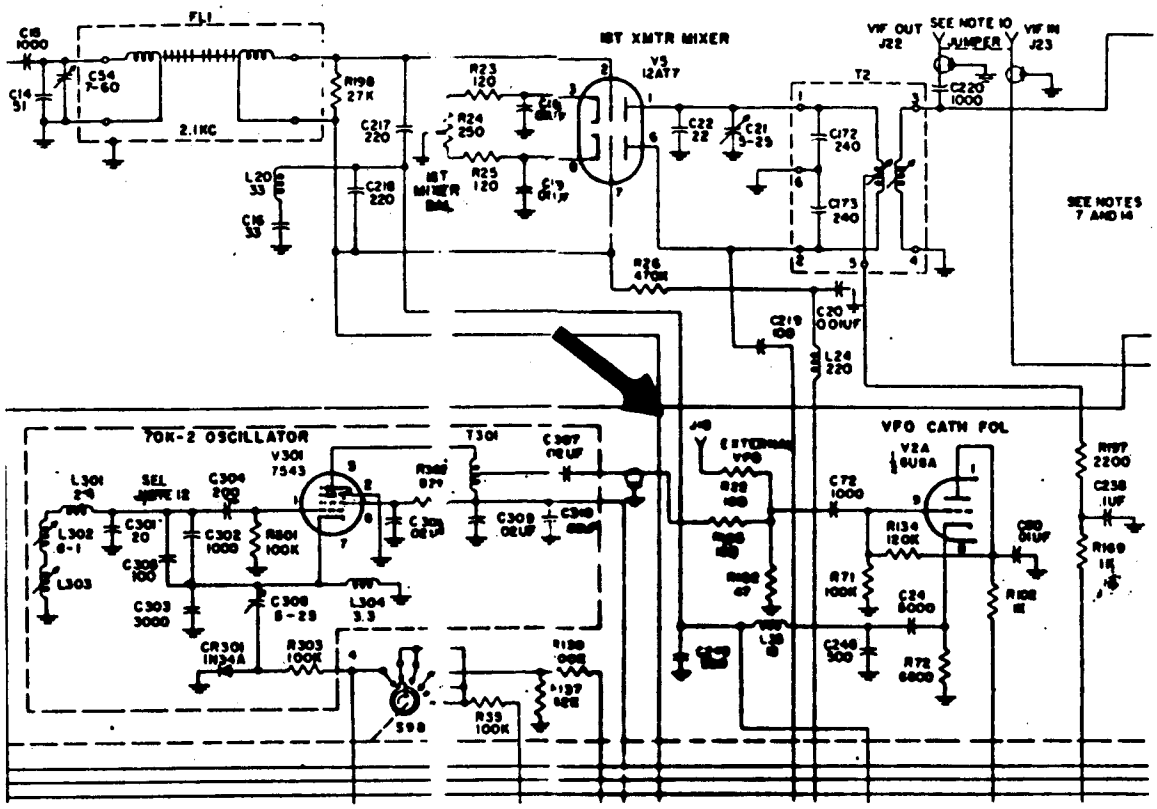
a. You will need a 9 Pin plug, a piece of small coax(RG-58) or similar, a phono plug(RCA audio type).
b. Locate the 9 Pin External Oscillator socket in the rear of the transceiver and remove the two wire connections between pins 2 and 3 and pins 5 and 6.
c. In the new 9 Pins plug, connect pins 2 and 3 together and likewise connect pin 5 and 6 together by soldering short pieces of wire. Solder the coax cable center conductor to pin 3 and the shield to pin 4. At the other end of the coax cable connect the RCA phono plug. This cable now provides the hook up to your TK-1.
d. Using the frequency select switch in position F_A program the following numbers from left to right in your TK-1 for the following bands. 1.8 MHZ., 3.5 MHZ., 7MHZ.

   478.4
e. Using the frequency select switch in position F_B program the following numbers from left to right in your TK-1 for the following bands. 14MHZ., 21MHZ., 28MHZ.

   521.7
f. Before connecting the transceiver to your TK-1, calibrate your radio using the calibrator.
g. The TK-1 should be set for the UP-COUNTING MODE.
h. Programming is complete.

MATING THE TK-1 TO THE COLLINS KWM-2

TO: KWM-2 SERIES, ALL MODS.



PROGRAMMING PROCEDURE

a. Connect a low capacitance shielded cable(RG-58 or RG-178) to your Collins unit. This cable is connected to J 18 External VFO output connector.
b. If such connector is not available in the back of your unit, then connect the cable across R-162 which is a 47 ohm resistor. Loading of the TK-1 is minimal since its input impedance is much greater than such value.
c. Set your Collins unit to the edge of the 20 meter band and use the calibrator to verify that you are indeed at 14.000 MHZ.
d. Set your TK-1 displays to 000.0; plug the shielded cable and note the indicated frequency. Subtract such number from 000.0 and that the number you must set with the DIP switches inside the TK-1.
e. Move your dial and verify that the TK-1 is tracking your dial; if not you are counting in the opposite direction. Refer to your Programming section on the Assembly and Operation Manual.
f. Programming is complete.

MATING THE TK-1 TO THE HEATHKIT SB-102 TRANSCEIVER

To: All SB-102 Series.

Reference: Assembly and Operating Manual for the TK-1.
Assembly and Instruction Manual for the SB-102.

PROGRAMMING PROCEDURE:

( ) Locate the following components: 47 pf. capacitor, one phono jack, some shielded cable(RG-174 or similar), insulating sleeving.
( ) Locate the output of the LMO, which is normally on the center top of the transceiver. This output goes to the Frequency Control Switch(Wafer type, Pin 2).
( ) Connect one side of the 47 pf. capacitor to Pin 2 of this Wafer switch; the other side is connected to the center conductor of the shielded cable. Use insulating sleeving to prevent the bare cap. wires from shorting to ground. Shield goes to chassis ground.
( ) Route the shielded cable to the bottom part of the transceiver and connect the other side of the cable to any of the spare sockets provided by Heathkit. They are normally labelled A or B.
( ) Connect the other phono jacks to another piece of the same shielded cable; this cable will be used to interconnect the SB-102 to the TK-1.
( ) For programming, refer to the Assembly and Operating Manual for the TK-1, page 17.
( ) Programming is complete.

MATING THE TK-1 TO THE DRAKE 2B & 2C RECEIVERS

To: All Drake 2B and Drake 2C series.

Reference: Assembly and Operating Manual for the TK-1
Assembly and Instruction Manual for the Drake 2B or 2C.

Note: These receivers were designed as "minimum component count" units and because of that, no buffer circuits were incorporated into their design. The result is that most of the circuit functions are high input impedance and susceptible to loading(greater than 100 Kohms).

( ) Mating must be done using the Buffer Amplifier; this amp. is located inside the receiver and will serve as a sending unit. It will provide minimum loading since coupling is done via a 9 pf. capacitor.
( ) Connect one side of the 9 pf. capacitor to Pin 2 of V3 tube, which is the 2nd Mixer and VFO. The other side of the capacitor goes to the Buffer Amplifier.
( ) Output of the Buffer amplifier is connected to a phono socket on the back of the receiver. Use RG-174 or similar shielded cable from the amplifier to the back panel of the receiver.
( ) Connect another cable to the TK-1 using two phono sockets.
( ) Refer to the Operating Manual for the TK-1, p. 17 for programming.
( ) Programming is complete.

MATING THE TK-1 TO THE TEMPO ONE TRANSCEIVER

To: Tempo One Transceiver Series*

Reference: Tempo One Instruction Manual and Schematic.
Operating Manual for the TK-1.

PROGRAMMING PROCEDURE:

( ) On the back of your transceiver, locate Accessory socket J9.

( ) To Pin 3 of J9, connect a 47 pf. disc. capacitor. The other side of this capacitor is connected to the center conductor of a shielded RF cable(RG-174) or similar.

( ) The shield of the mating cable is connected to Pin 2 of J9 or any other accessible chassis ground point.

( ) Follow procedures outlined in the TK-1 Operating Manual for programming the TK-1(page 17).

( ) Note: * Not all Tempo One's were created equal. Check your schematic diagram for the following number: 366001. If different write to Torrestronics for mating information.

MATING THE TK-1 TO THE KENWOOD R-300 RECEIVER

To: All Kenwood R-300 Series.

Reference: Kenwood Instruction Manual.
TK-1 Operating Manual.

PROGRAMMING PROCEDURE:

( ) On the back of your R-300 receiver, using one of the plates covering the accessory holes, drill a 1/4" hole to mount a phono socket.

( ) Locate transistor Q2 on the "green" PC board, which is at the bottom of your receiver. This board has many RF cans. Q2 is located on the corner facing the board connector.

( ) From the "hot" side of the 470 ohms resistor, connect a 150 pf. disc. capacitor. The other side of the capacitor is connected to the center conductor of a small piece of RG-174 RF shielded cable. The shield is soldered to any convenient ground(chassis) point.

( ) With the receiver disconnected from the TK-1, program on either F_A or F_B the number 545.0. Connect your receiver and see if it follows the dials; if not, flip the position of the rear panel switch to the opposite direction. See page 17 on TK-1 manual for programming information.

MATING THE TK-1 TO THE COLLINS 75S-( ) SERIES

To: All 75S-( ) Series and 32S-( ) exciters.

Reference: Operating Manuals for the Collins
Operating Manual for the TK-1

Note: For transceive operation, a patch cable(RG-174 or similar) is connected from J2 (VFO OUTPUT) jack in the 75S-( ) to J8 (VFO INPUT) jack in the 32S-( ) exciter.

INSTALLATION:

( ) To install the TK-1 to your Collins, unplug the patch cord from J8 in the exciter and plug it into the back input phono jack(either one) of the TK-1. From the other jack on the TK-1 run a patch cable to J2 of the receiver.

PROGRAMMING THE TK-1:

( ) Set all switches to the "on" position to display all zeros.

( ) Connect the VFO OUTPUT cable of the 75S-( ) receiver and set your dial to 14.0000 MHZ. using your crystal calibrator in your receiver.

( ) Your display should be reading * 301.0. To make your display read 000.0, disconnect the 75S-( ) from the TK-1 and program 699.0. Select from the panel switch F_A for this programming number.

( ) Now place the front panel switch in the "down" position (F_B) and program 899.0.

( ) Connect your 75S-( ) receiver and it should read 000.0 in the F_A position and 200.0 in the F_B position.

( ) Set your bandswitch to 3C and the emission switch to "AM" and tune in WWV at around "200" on your dial. Tune for zero beat (no tone) and note the reading on the TK-1. It should be reading 400.0 on F_B and 200.0 on F_A. If not, adjust C-5 trimmer on the oscillator board of the TK-1 until it does.

* Rear panel switch you should have in the down positon since the 75S counts down.

Note: The above information was submitted to us by Len Kraus, W9QPR. We gratefully acknowledge such material.

MODIFYING THE TK-1 FOR DC OPERATION

Purpose: To make the TK-1 operational from 8 to 15 Volts Direct Current sources(minimum of 1 ampere required).

Parts Needed: Diode, 1N4001, 50 PIV 1 Amp (RS 276-1101)
Toggle Switch, DPDT, small (RS 275-613)
In line fuse holder (RS 270-025)
Fuse, 1A (RS 270-1223)
Grommet(RS 64-3025)
Shrink tubing or electrical tape

Reference: TK-1 Operating Manual, pages 7,8,15.

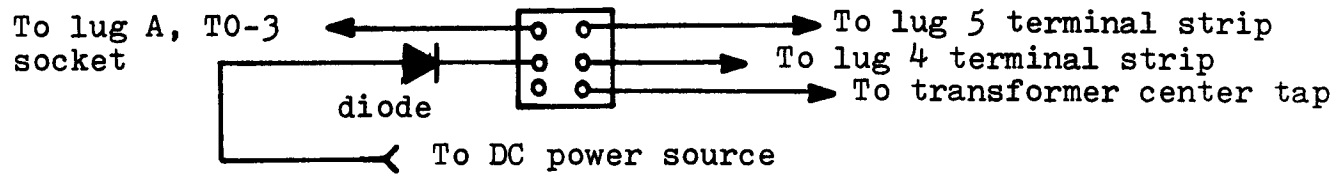
( ) Under the present toggle switch mounted on the back panel (this switch is used for UP/DN count direction), drill a 1/4" hole to mount the new switch.

( ) Drill a hole large enough to accomodate the rubber grommet selected to insulate the new power cord from the chassis. Drill this new hole directly on top of the present line cord retainer hole. This will be the DC wire.

( ) Mount the toggle switch, DPDT.

( ) Disconnect the center tap transformer wire from lug 4 of the TK-1 terminal strip, see page 7 of TK-1 manual.

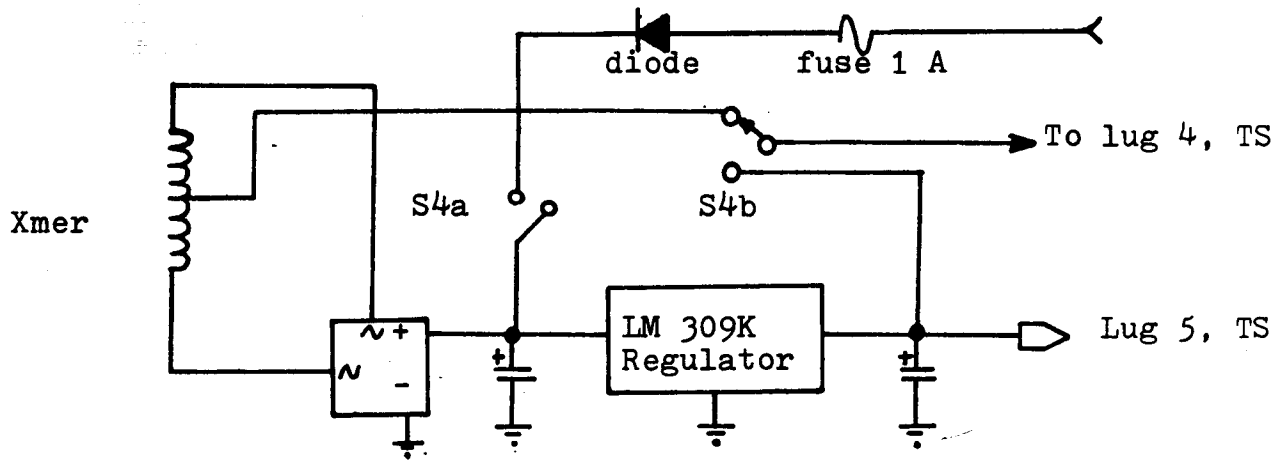
( ) Wire new switch as shown below(this is backview from switch):



( ) Mount the new wire through the grommet. The red wire, positive, is connected to the anode of the diode. Use shrink tubing or tape isolate this junction from chassis ground.

( ) Connect the ground wire, black, of the DC cord to the phono socket ground located on the back panel.

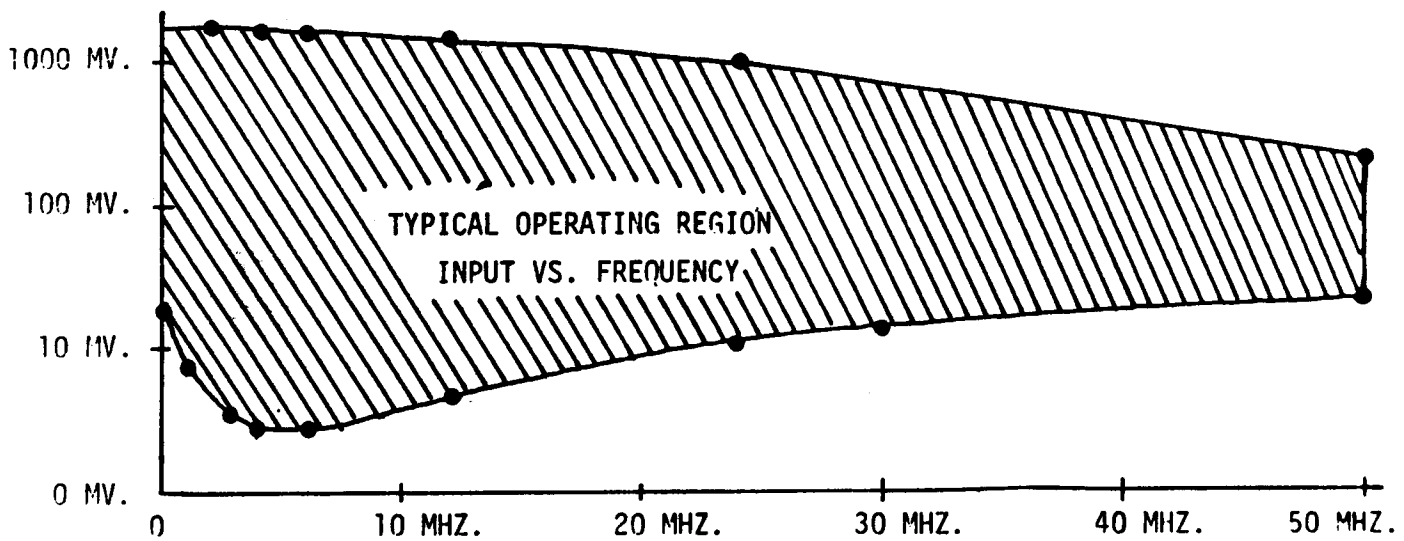
( ) When the switch is in the UP position, the unit will operate on AC; when in the DN position, it will operate on DC.



TORRESTRONICS, INC.

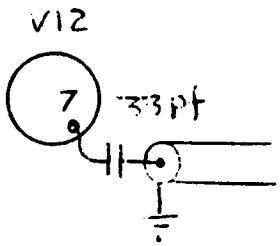
UNIVERSAL DIGITAL FREQUENCY READOUT TK-1

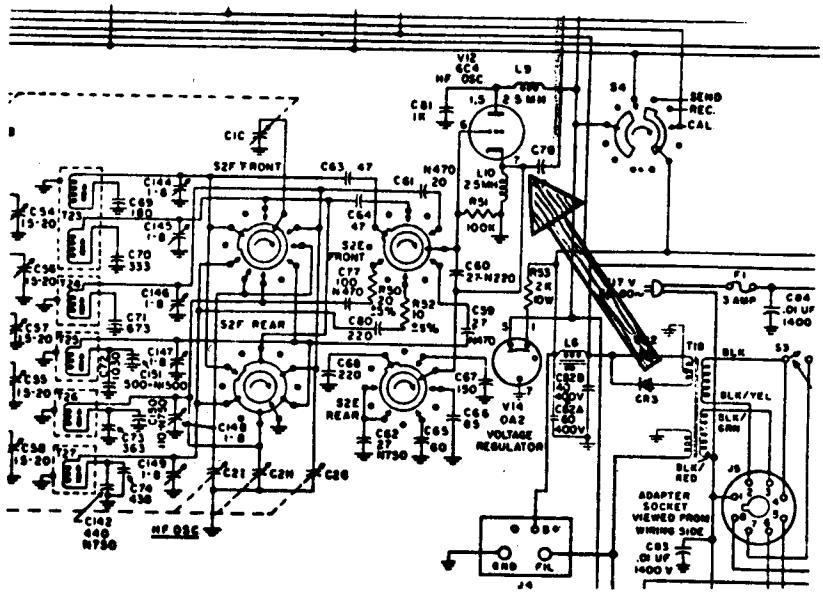
FREQUENCY	THRESHOLD	MAX. SIGNAL
500 KHZ.	18 MV.	3000 MV.
1 MHZ.	9 MV.	3000 MV.
3 MHZ.	5.6 MV.	3000 MV.
4 MHZ.	4 MV.	3000 MV.
4.3 MHZ.	3.8 MV.	3000 MV.
6 MHZ.	5 MV.	3000 MV.
12 MHZ.	6 MV.	1600 MV.
24 MHZ.	10 MV.	1100 MV.
30 MHZ.	13 MV.	1000 MV.
50 MHZ.	29 MV.	250 MV.
55 MHZ.	29 MV.	N/A
60 MHZ.	36 MV.	N/A



MATING THE TK-1 TO THE HAMMARLUND MODEL HQ-180 RECEIVER

TO: HQ-180 ALL SERIES





PROGRAMMING PROCEDURE:

a. Connect a shielded cable(RG-58 or RG-174) to Pin 7 of the HF OSC. tube in your radio(6C4).
b. The center conductor of this shielded cable is connected to a 33 pf. capacitor. The other side of this capacitor is connected to Pin 7 of V12, which is the 6C4 tube.
c. Using the DIP switches in your TK-1 program the following numbers:

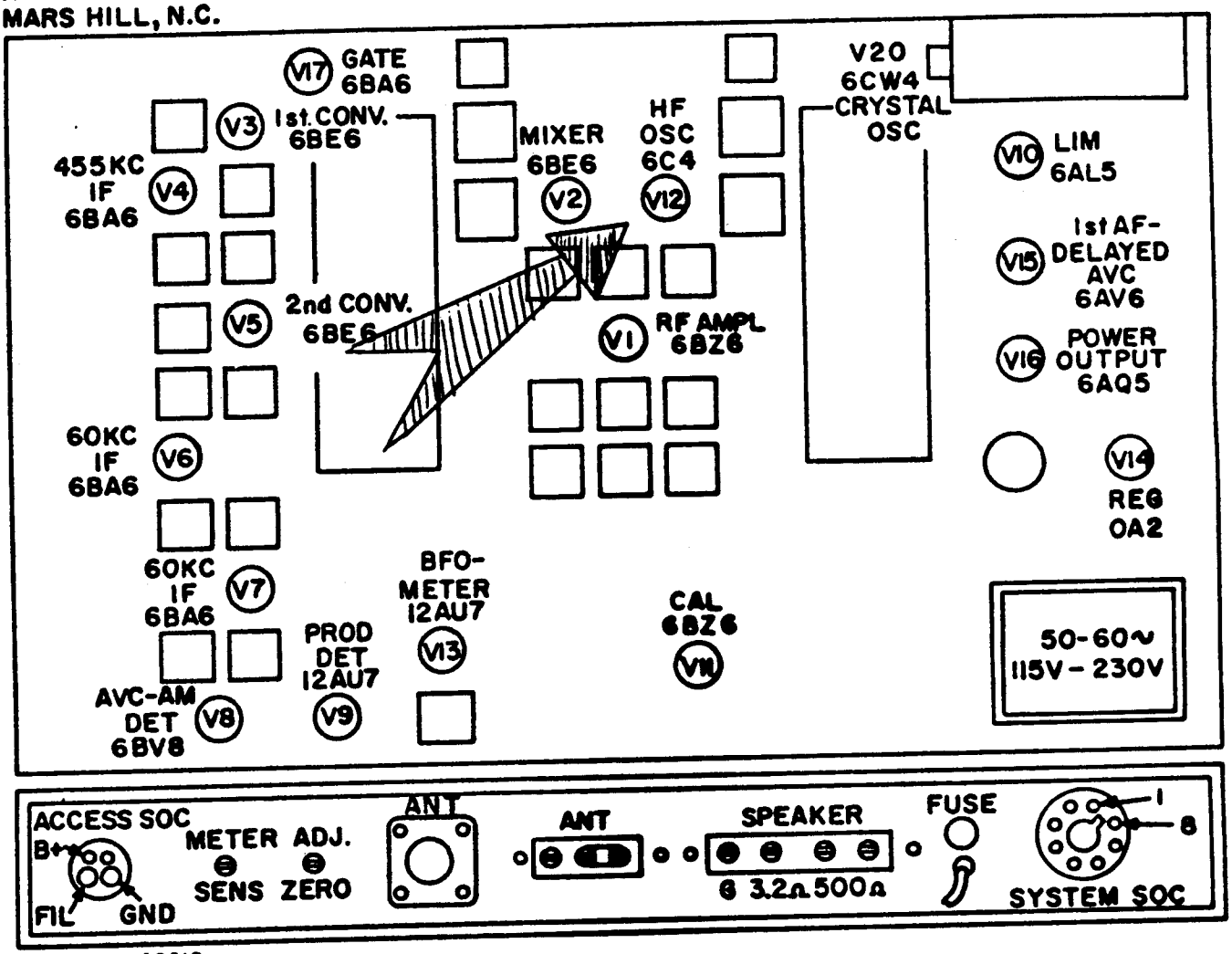
.54 to 7.85 MHZ.	USE	545.0	for F_A
7.85 to 30.00 MHZ.	USE	965.0	for F_B

d. Connect the shielded cable to the TK-1 using a phono plug.
e. PROGRAMMING IS COMPLETE.

BAND	Frequencies in KCS						
MCS	RF	1st OSC	1st IF	2nd OSC	2nd IF	3rd OSC	3rd IF
.54 - 1.05	S	S ∠ 455	455	(Amplifier Stage)		395	60
1.05 - 2.05	S	S ∠ 455	455	(Amplifier Stage)		395	60
2.05 - 4.0	S	S ∠ 455	455	(Amplifier Stage)		395	60
4.0 - 7.85	S	S ∠ 455	455	(Amplifier Stage)		395	60
7.85 - 15.35	S	S ∠ 3035	3035	2580	455	395	60
15.35 - 30.0	S	S ∠ 3035	3035	2580	455	395	60

HAMMARLUND MFG. CO.
MARS HILL, N.C.

MODEL NO. HQ-180-AX



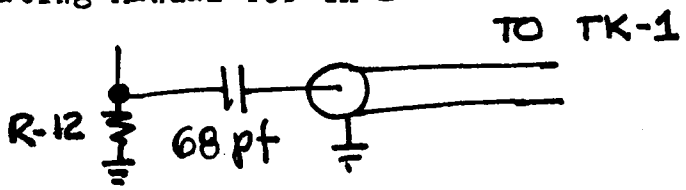
PT. 2418-2-00010

TUBE LOCATION LABEL

MATING THE TK-1 TO YOUR REALISTIC DX-160

TO: All DX-160 Receivers

Refer to: Instruction Manual for the DX-160 (Cat No. 20-152)
Assembly and Operating Manual for TK-1



PROGRAMMING PROCEDURE

1. Remove top cover of your DX-160. Looking from the "front" of your receiver, locate resistor R 12 which is a 1500 ohm value. It is located on the right edge of the printed circuit board.
2. Connect to the side of the resistor that goes to Q4 (the other side is grounded) a 22 pico-farad disc capacitor. The other side of the capacitor is used to drive the shielded cable that goes to your TK-1. Use RG-174 or RG-58 to feed the signal from your radio to the TK-1. DO NOT USE AUDIO CABLE.
3. On either F_A or F_B program on your TK-1 the number 545.0

   While programming this number do not connect your TK-1 to your receiver.
4. Locate a known AM station on the standard broadcast band (Band B) or go to WWV on the 10 MHZ band and check the accuracy of your receiver.
5. Programming is complete.

Notes:

a. For this receiver you only use one set of programmed numbers. The other side of the switch, F_A or F_B can be used for mating a different type receiver to your TK-1.
b. Keep the shielded cable away from the antenna terminals on your receiver; such action will minimize the "birdies" associated with digital systems.
c. As you go up in frequency, like close to 30 MHZ you will notice that your bandspread becomes more sensitive. This is normal and such performance is highly augmented by your digital readout.
d. An alternate approach to the shielded cable is to drill a hole in the back of your receiver and mount an RCA phono socket similar to the one on the TK-1. Fabricate a shielded cable with phono jacks at each end and connect the two units together. Such approach will permit you to disconnect the TK-1 without having unterminated wires out of your receiver.

MATING THE TK-1 TO YOUR HEATHKIT HW-100, 101

To: All HW-100, HW-101 Transceiver Series.

Refer to: Assembly Manual for HW-100, HW-101.
Assembly and Operating Manual for TK-1.

PROGRAMMING PROCEDURE:

1. Parts needed: Phono socket(2), short piece of RG-174 or equivalent shielded cable for RF, 22 pf. capacitor disc.

2. Instal phono socket in "spare" hole at the back of your transceiver.

3. Connect a 22 pf. capacitor to the cathode of tube V5 A (Transmitter mixer). Cathode is on Pin 7. For a shorter run to the back of your transceiver, you can also connect the capacitor to Pin 7 on V 12 A which is the 2nd RX Mixer.

4. Connect the other end of the capacitor to the center conductor of the shielded cable.

5. Connect the other end of the shielded cable to the phono socket, center conductor and shield.

6. Using F_A on your TK-1 preset the display to read 500.0 when no input is connected to the TK-1. This setting will be used for bands that start at 000.0 to 500.0 like 7.000 or 14.000.

7. Using F_B on your TK-1 preset the display to read 000.0 when no input is connected to the TK-1. This setting will be used for bands that start at 500.0 to 000.0 like 3.500 or 28.500.

8. Your TK-1 should be set to count down.

9. Programming is complete.

MATING THE TK-1 TO THE TEN-TEC TRITON

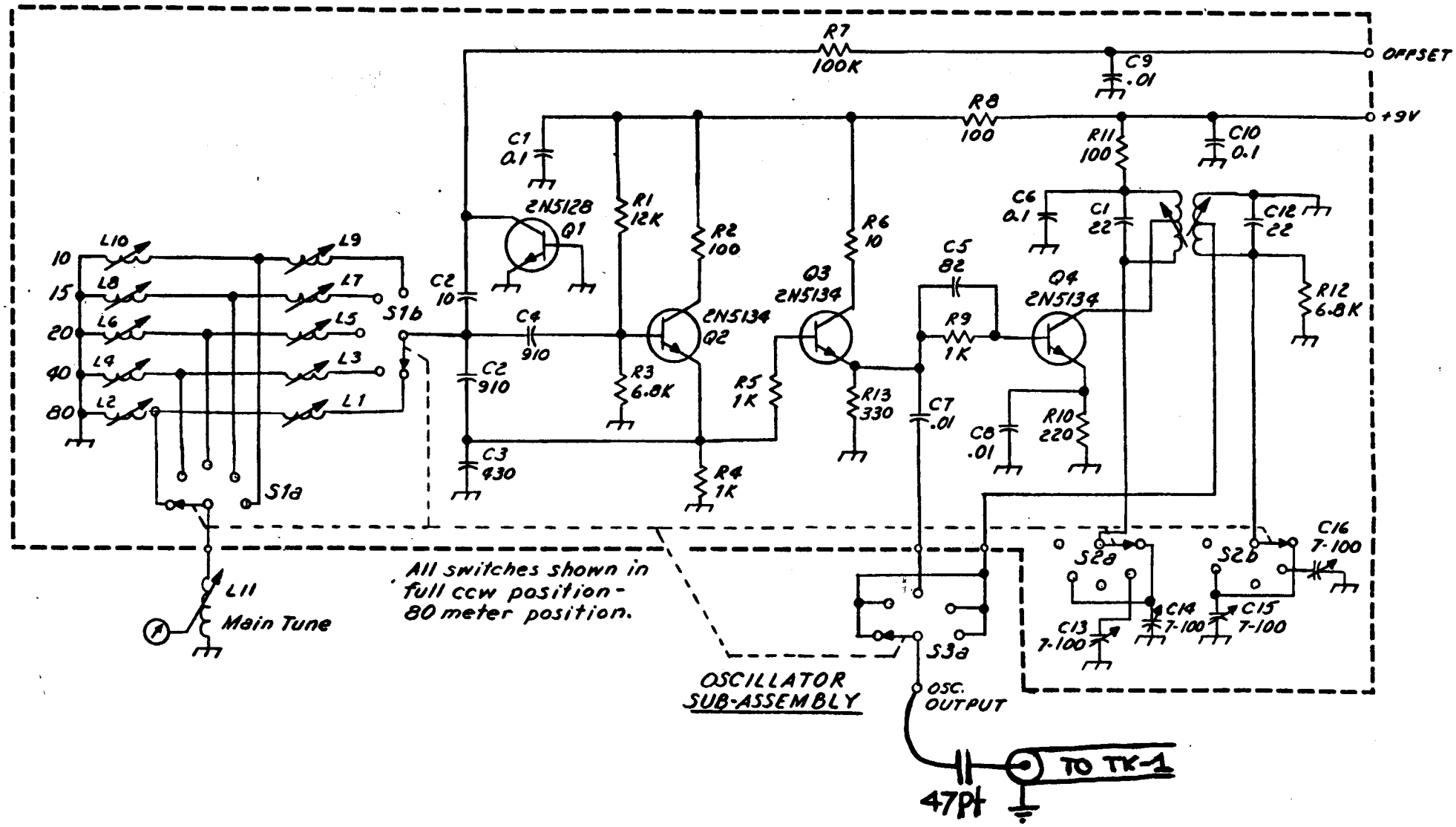
To: Triton I and Triton II Series.

Reference: Triton I & II Owner's Manual, p. 3-10 to 3-12.
TK-1 Assembly and Operating Manual.
Triton I & II Oscillator Sub-Assembly, p. 3-12.

PROGRAMMING PROCEDURE:

a. Locate the Oscillator Sub-Assembly Board and its relation to the S3a wafer switch. To the constant wiper of the S3a switch, a connection will be made to obtain the signal necessary to operate the TK-1.
b. You will need the following materials: one phono socket(similar to the ones on the TK-1), two phono plugs, RG-174 RF shielded cable(length to fit your needs), 47 pf. disc capacitor.
c. Connect the 47 pf. disc. capacitor to the center wiper of your Triton's S3a switch; the other side of the capacitor is connected to the center conductor of the RF shielded cable(RG-174 or similar). Route this cable to the back of your Triton and drill a $\frac{1}{4}$ inch. hole to install the phono socket. The shield is connected to chassis ground on any convenient point next to the wafer switch; on the side of the phono socket, space is provided for such purpose. Connect the center conductor to the phono socket. Make sure that neither the capacitor leads or the center conductor is shorted to ground.
d. Make an interconnecting cable using RG-174 or similar by connecting to such cable two phono plugs. One side of such cable will fit on the back of your Triton, the other side to the TK-1.
e. Using the DIP switches inside the TK-1, program the following numbers:
   F_A .....000.0 F_B.....could be anything.
   Your Triton is designed to give you the following injection frequencies from band to band.
   80 Meters.....12.500 to 13.000 MHZ.
   40 Meters.....16.000 to 16.500 MHZ.
   20 Meters..... 5.000 to 5.500 MHZ.
   15 Meters.....12.000 to 12.500 MHZ.
   10 Meters.....19.000 to 21.000 MHZ.

   After programming such number on the TK-1, make sure the points M & N are shorted together(see TK-1 Programming Section on the Assembly and Operating Manual). Such connection determines the direction of count, either up or down; the Triton is designed to count up.
f. Connect the TK-1 to the Triton and see if the TK-1 follows the Triton's dial.
g. Programming is complete; you could potentially use the F_B channel to program another receiver or transceiver different from the Triton.


R7
100K
C9
.01
OFFSET
R8
100
+9V
C1
.01
2N5128
Q1
R1
12K
R2
100
R6
10
C5
82
C6
.1
C1
22
C12
22
C10
0.1
R11
100
10
15
20
40
80
L10
L9
L8
L7
L6
L5
L4
L3
L2
L1
S1b
S1a
C2
10
C4
910
C2
910
C3
430
R3
6.8K
R4
1K
2N5134
Q2
Q3
2N5134
R5
1K
R13
330
C7
.01
Q4
2N5134
R9
1K
C8
.01
R10
220
R12
6.8K
All switches shown in
full ccw position -
80 meter position.
L11
Main Tune
S2a
S2b
C16
7-100
C13
7-100
C14
7-100
C15
7-100
S3a
OSCILLATOR
SUB-ASSEMBLY
OSC.
OUTPUT
47pf
TO TK-1

MATING THE TK-1 TO YOUR DRAKE SPR-4 RECEIVER

TO: SPR-4 ALL SERIES

You can mate the TK-1 to your SPR-4 by three(3) different ways. In order of preference they are:

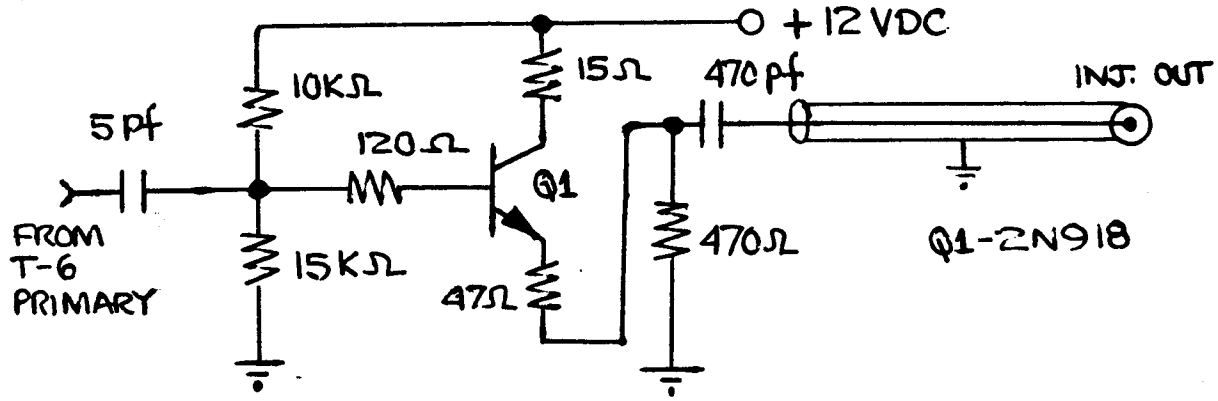
a. PTO FSK connection
b. Buffer mode
c. TA-4 Accessory Unit

PTO-FSK CONNECTION:

a. Please refer to Instruction Manual: Page 17-Figure 5, SPR-4 Schematic
b. Using shielded cable(RG-174 or similar) connect to the PTO at the FSK output. See Schematic Diagram PTO section.
c. This point is accessible by a rubber sleeving located on the PTO housing(cover) and facing T-17 and T-16(Refer to Fig. 5 on page 17).
d. Bring this shielded cable to the back of the receiver. Using an existing hole connect a phono socket. Your TK-1 will connect to this phono socket.
e. Set your TK-1 to read 500.0 on F_A prior to connecting to your receiver. You will use F_A for all bands that start with 000.0 like 15.0 to 15.5 MHZ.
f. Set your TK-1 to read 000.0 on F_B prior to connecting to your receiver. You will use F_B for all bands that start with 500.0 like 9.5 to 10.0 MHZ.
g. Programming is complete.

BUFFER MODE:

a. Fabricate a one transistor buffer circuit as shown:



b. Please refer to the Instruction Manual: Schematic Diagram, page 45-Fig. 19, page 42-Fig. 17.
c. Connect the input to the buffer circuit to the primary of T-6 as shown on Figure 17. Connect Vcc to 12 VDC as shown for the RED wire. Connect ground wire to chassis ground. Bring output, using a shielded cable(RG-174) to the rear of receiver and mount phono socket to chassis using an existing hole.

d. Using either F_A or F_B set your TK-1 prior to connecting to your receiver, to read 355.0 which is the complement of 645 which are the last three digits of your 1st IF, 5645 KHZ. There is no need to switch anything while switching bands; such action is done automatically inside your receiver.
e. Programming is complete.

TA-4 ACCESSORY UNIT:

a. Installation of the TA-4 should be done by reference to the Instruction Manual.
b. After such installation, connect a shielded cable between your receiver and the TK-1.
c. Using either F_A or F_B set your TK-1 prior to connecting to your receiver, to read 355.0.
d. There is no need to switch anything while switching bands.
e. Programming is complete.

IMPORTANT FACTS YOU SHOULD KNOW

a. Refer to page 13-Figure 4 on your Instruction Manual
b. The PTO-FSK approach uses the signal from your PTO which normally starts at 5.5 when your receiver is at 000.0 and goes to 4.9 MHZ when your receiver is at 500.0
c. The Buffer and TA-4 take their output after the Pre-Mixer. This signal is more accurate than the PTO signal because the band switching crystals are taken into account so you are indeed reading the Injection frequency which is used as an LO for the 1st Mixer. Because of this, no band switching is necessary on the TK-1.
d. We realize it is harder to mate using the Buffer or the TA-4 approach but the end result is a more accurate signal readout since the band switching crystal could be up to 1 KHZ off according to Drake specifications.

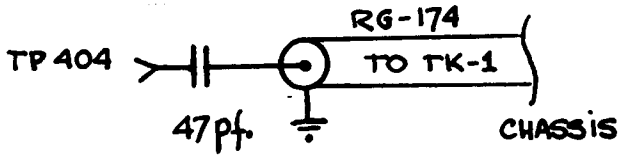
MATING THE TK-1 TO THE YAESU FRG-7 RECEIVER

TO: All Series FRG-7

Reference is made to the following items:
a. Assembly and Operating Manual for the TK-1
b. Schematic Diagram for the FRG-7

PROGRAMMING PROCEDURE:

a. Carefully drill a 1/4" hole in the rear chassis wall of your FRG-7. Be sure that the hole doesn't interfere with the battery retaining shield(in some models).
b. Mount a phono jack and secure to chassis.
c. Using a 47 pf capacitor, connect one end of this capacitor to TP 404(test point). The signal for the TK-1 will come from transistor Q404. Connect the other side of the capacitor to the center conductor of a shielded cable (RG-174 or similar).
d. Using a Phillips screwdriver, back out the screw that attaches the bracket holding the "KHZ" tuning capacitor to the top of the chassis. The shield for the cable is grounded to chassis by this screw.
e. Connect the other side of the shielded cable to the phono jack mounted previously.
f. Connect a shielded cable(RG-174) to the back of your receiver and the other side to the TK-1.
g. Disconnect the short between M & N on the main board of your TK-1. Use a pair of long nose pliers. DO NOT USE A SOLDERING IRON.
h. Program on your TK-1, with the FRG-7 disconnected from the TK-1, the number 545.0.
i. Connect your receiver to the TK-1. Move your "KHZ" VFO and see if the TK-1 follows your dial. They should be reading the same if not tune WWV at 10 MHZ. and make sure the KHZ dial is reading 0. If the TK-1 is not reading the same, following the Programming procedures outlined in Ref. a, re-program the TK-1.
j. Programming is complete.



MATING THE TK-1 TO THE SP600JX RECEIVER

TO: All Series SP600JX

Reference is made to the following items:
a. Assembly and Operating Manual for the TK-1
b. Instruction Manual for the SP600JX Receiver
Fig. 3, Fig. 11, Fig. 13

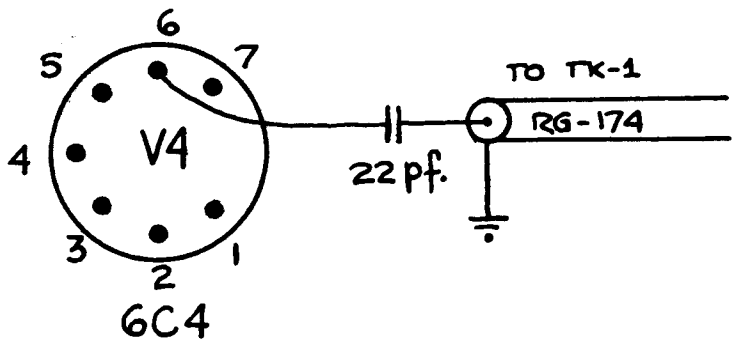
PROGRAMMING PROCEDURE:

a. Using a shielded cable(RG-174 or similar)connect the center conductor to a 22 pf capacitor.
b. The other side of the capacitor is connected to Pin 6 of tube V4(HF Oscillator). The shield of the cable is connected to chassis ground.
c. You can make the shielded cable long enough to reach the TK-1 or you can use an RCA phono socket and make the cable long enough to reach the back of your receiver. This approach will let you disconnect the TK-1 from your receiver.
d. If loading to your receiver occurs check your shielded cable, your capacitor and finally your 6C4 oscillator tube. If the problem persists, then you must build a buffer amplifier for your radio. The amplifier is given in the SPR-4 mating instructions. Not all receivers will need this buffer amplifier.
e. Using the DIP switches in your TK-1 program the following numbers:

.54 to 7.4 MHZ. use 545.0 for F_A (assuming a 455 KHZ. IF)

7.4 & above MHZ. use 965.0 for F_B (assuming a 3035 KHZ IF)

If your IF are different, use the procedure outlined in the Assembly and Operating Manual for TK-1.



MATING THE TK-1 TO THE YAESU FT-101 TRANSCEIVER

To: All FT-101 series A to F.

Reference to: Assembly and Operating Manual for the TK-1, p. 17
Instruction Manual for the FT-101 and Schematic Diagram.

PROGRAMMING PROCEDURE:

( ) Locate a small piece of RF shielded cable(RG-174 or similar) and a phono jack. The length of the cable is not critical; this cable is used to connect the TK-1 to your transceiver. Also locate a 47 pf. disc capacitor 50 VDC or higher working voltage.

( ) Using the jack that is provided with your Yaesu for the 8 Pins accessory socket, located on the back of your transceiver, connect to Pin 6 or 7 one side of your 47 pf. capacitor.

( ) Connect the other side of the 47 pf. capacitor to the center conductor of the shielded cable. Insulating sleeving on the capacitor leads is essential.

( ) Connect the shield of the RF cable to Pin 8 of the Accessory socket. This socket is potentially marked as "External VFO" on some models.

( ) Refer to Programming Procedures for the TK-1 located on p. 17 of the Assembly and Operating Manual for the TK-1.

MATING THE TK-1 TO THE NATIONAL HRO-60

To: All HRO-60 Series.

Reference to: Assembly and Operating Manual for the TK-1, p. 17.
Instruction Manual for the HRO and Schematic.

PROGRAMMING PROCEDURE:

( ) Locate the following components: 22 pf. capacitor, two phono jacks, one phono socket(chassis type) and shielded cable(RG-174 or similar).

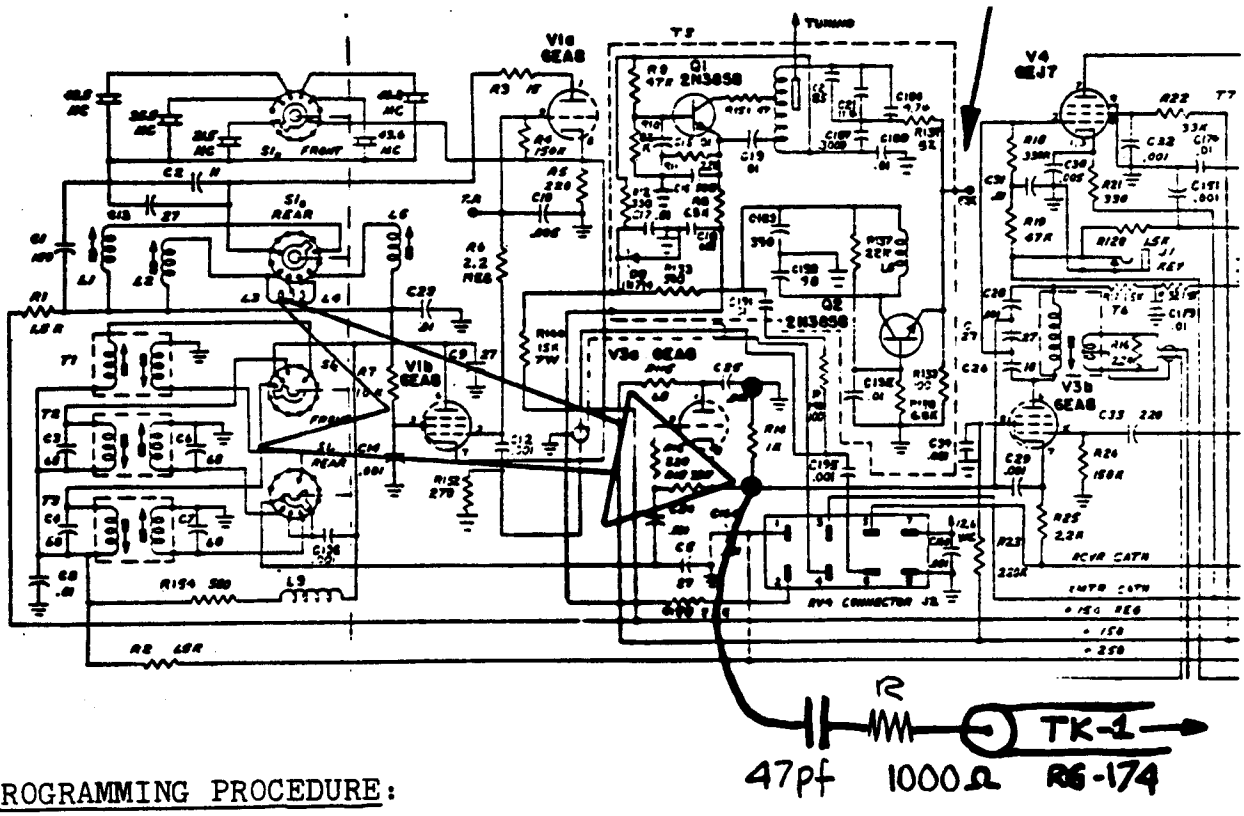
( ) Using the 22 pf. capacitor, connect one side to Pin 1 of tube V3; the other side is connected to the center conductor of the RF cable. The shield of this cable is connected to chassis ground. Bring this cable to the back of the receiver and mount the phono socket. Then connect the shielded cable to it.

( ) Using another piece of the RF cable, connect two phono jacks to such cable.

( ) Refer to the Programming Section for the TK-1, p. 17 Assembly & Operating Manual for the TK-1.

MATING THE TK-1 TO YOUR DRAKE TRANSCEIVER

To: TR-3 All series
TR-4 All series



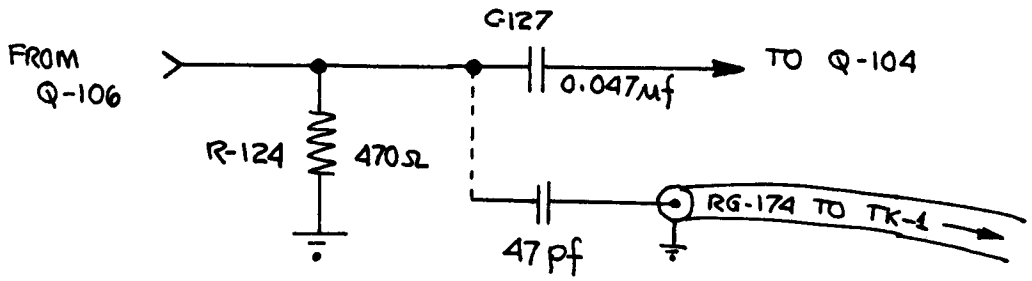
PROGRAMMING PROCEDURE:

( ) Using a 47 pf. disc. capacitor, connect one side to Pin 8(signal) of tube V 3a(6EA8). Connect the other side to a 1 Kohms resistor; the other side of the resistor is connected to the center conductor of a shielded RF cable(RG-174 or similar); the shield of this cable is connected to the transceiver chassis.
( ) Connect a phono plug to the other end of this cable.
( ) Set your transceiver to 14.000 MHZ. and zero beat using the 100 KHZ. calibrator.
( ) Set your TK-1 displays to read 000.0 and connect to your transceiver. The TK-1 should follow the dial if not you are counting in the opposite direction. Refer to "Programming" in the TK-1 manual, p. 17
( ) On 80 meters the direction of count must be reversed; this could be done by installing a toggle switch on the back panel of the TK-1 with connections to M & N on the main board.
( ) Another connecting point is the FSK output as shown. This point is only available on the TR-4 series. Follow Programming procedures outlined in the TK-1 manual.
( ) Note: Connecting to the V 3a tube will give you a more accurate reading than connecting to the FSK output since the V 3a point is an injection signal(PTO plus Bandswitching crystals) and the FSK is just the PTO signal.
( ) On some TR units, the value of R(series resistor) must be reduced to .68 Kohms otherwise a rolling effect will be shown in the TK-1 displays.
( ) Programming is complete.

MATING THE TK-1 TO THE REALISTIC DX-200

To: All DX-200 Receivers

Refer to: Instruction Manual for the DX-200
Assembly and Operating Manual for the TK-1



Programming Procedure:

( ) Remove the cover of your receiver and locate on the printed circuit board the resistor marked R-124. This is a 470 ohm resistor(yellow-violet-brown).

( ) Connect to the side of the resistor that goes to Transistor Q-106(the other side is grounded), a 47 picofarads capacitor (disc, low voltage). The other side of the capacitor is used to drive the shielded cable that goes to your TK-1. Use RG-174 or RG-58 to feed the signal from your radio to the TK-1.

( ) Use the procedure outlined on page 17 of the TK-1 Manual to program your readout.

( ) Locate a know AM station on the standard broadcast band(Band B) or go to WWV on the 10 MHZ band and check the accuracy of your receiver.

( ) Programming is complete.

Notes:

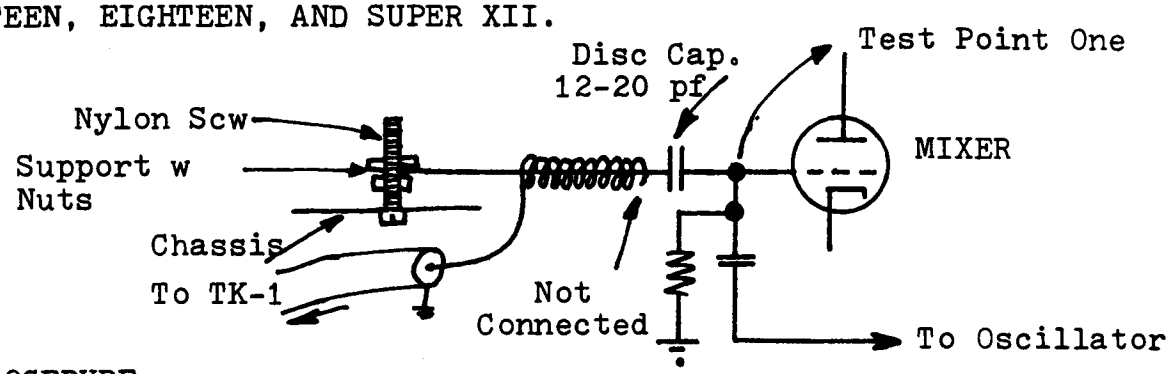
a. Keep the shielded cable away from the antenna terminals on your receiver; such action will minimize the "birdies" associated with digital systems.

b. If you find significant birdies observed can be reduced by inserting a 1000 ohm resistor in series with the line(center conductor of the shielded cable) feeding the TK-1.

c. An alternate approach to the shielded cable is to drill a hole in the back of your receiver and mount an RCA phono socket similar to the ones on the TK-1. Fabricate a shielded cable with phono jacks at each end and connect the two units together. This approach will permit you to disconnect the TK-1 without having unterminated wires out of your receiver.

MATING THE TK-1 TO VERY OLD RECEIVERS

To: HRO-50T, HQ-150, HQ-180, SUPER-PRO SP-200X, MASTERPIECE V, SCOTT PHANTOM, HQ-129X, SR-150 and OTHER Heterodyne RX, like HALLICRAFTERS SX-17, SX-28 and SX-42. Also SCOTTS PHILHARMONIC, SIXTEEN, EIGHTEEN, AND SUPER XII.



MATING PROCEDURE:

( ) Locate the following components: 12 to 20 picofarad disc capacitor, 10" of No. 24 or 26 solid wire(thin telephone wire is OK), an insulated standoff(a good alternative is a nylon screw with two nuts, i.e. 4-40 X 1").

( ) At point one, shown above, connect one side of the disc capacitor. Cut the disc lead short to get the capacitor as close to point one as possible.

( ) Wire five to 10 turns of the insulated wire around the other lead of the disc capacitor.

( ) Provide some mechanical support for the lead having the pick up coil by providing either an insulated standoff or the nylon screw.

( ) Keep the capacitor and coil away from other components adjacent to these items

( ) Using a 12 picofarad capacitor, a No. 26 wire, and 12 turns, at 2 MHZ. the TK-1 counts reliably with an input signal of about 0.1 volts and causing very little loading to a high input impedance point.

Note: We gratefully acknowledge this information which was submitted to us by Mr. Hardy W. Trolander, 1475 President St., Yellow Springs, OH. 45387

Mr. Trolander basic concept is to lightly couple some RF signal out of the mixer being supplied the input signal from the VFO, without loading such stage. The concept is technically sound as is also applicable to other high impedance receivers or transceivers.

( ) Program your TK-1 as per instructions given on p. 17 of the TK-1 Assembly and Operation Manual.