

19-3-56

Antenna Calculations

Frequency range 450-550 KC

Center frequency 500 KC = 600 meters wavelength

Total length of wire resonator at $\frac{3}{2}$ wavelength

Velocity of propagation 95%

Total length of wire 2800 feet

Horizontal flat top 2000 feet

Length of center feed line 400 ft

Height of center of antenna 0.20 wavelength

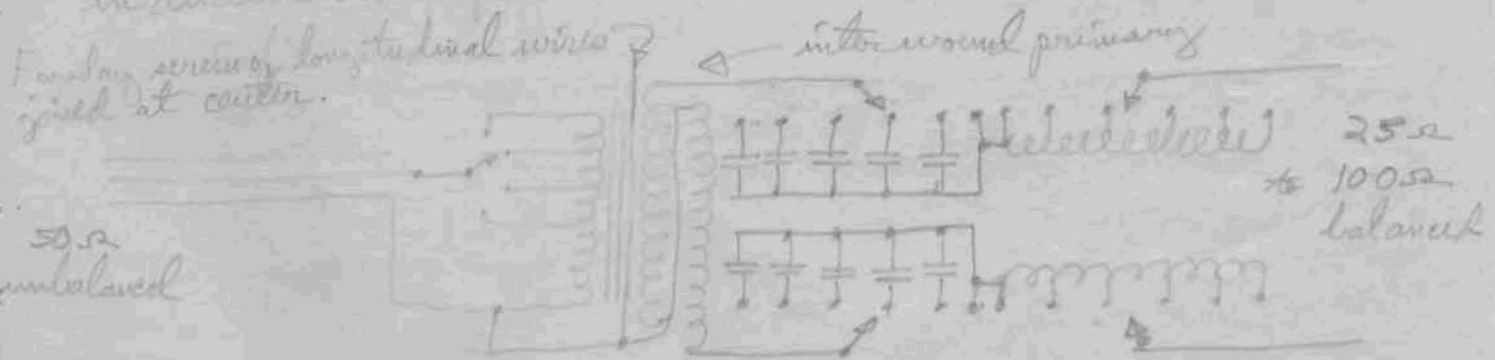
Center impedance of antenna 5000 Ω approx.

Ground cable impedance 50 Ω approx

Center feed line impedance 500 Ω approx.

Transformer at bottom 1 to 1 ratio approx,
with balanced to unbalanced connections and taps

Tuner at bottom to provide variable amounts of
inductive and capacitive reactance to tune over range.



ratio adjustable from
0.7:1 to 1.4:1

19-3-56

Center feed line 500 ohms.

Wire $71,036'' = .108''$ diameter

$$Z = 276 \log_{10} \frac{2S}{d} \quad \text{or} \quad S = \frac{d}{2} \log^{-1} \frac{Z}{276} = \frac{.108}{2} \log^{-1} \frac{500}{276}$$

$$S = .054 \log^{-1} 1.812 = .054 \cdot 65 = 3\frac{1}{2}'' \text{ (rather close spacing)}$$

~~Let $S = 5\frac{1}{4}''$, $Z = 546 \Omega$ (quite notable value)~~

Let $S = 4\frac{1}{4}''$, $Z = 522 \Omega$ (also a good value)

Let drums be 11" I.D., 20" O.D., 5" wide

Mean turn length = 4.06 ft.

Winding space $4\frac{1}{2}''$ deep.

Center feed line may be wound 3 turns side by side on each layer. 40 layers possible. Thus drum can hold 487 ft of line which is ample.

Ground line is way 0.405" diameter. Each layer will be 12 turns. 11 layers possible. Thus drum can hold 536 ft of line which is ample.

Antenna wire 1000 ft $\frac{1}{8}''$ dia flex. wire rope.

Let drums be 10" O.D., 6" I.D., 5" wide.

Mean turn length 2.1 ft. 40 turns/layer, 16 layers, 640 turns max.

Possible to get 1343 ft on drum or 1000 ft with $\frac{3}{4}$ volume factor and random winding.

Wreck capacity 320 ft $\frac{1}{8}''$ wire rope.

Make spool holding 3 lengths each 300 ft. Three parts each $1\frac{1}{2}''$ wide + 2" deep hold 409 ft possible or 300 ft with $\frac{3}{4}$ volume factor (over)

If change to $\frac{5}{32}$ " wire rope
Which capacity 205 ft.

Small spools each section 200 ft required,
 $1\frac{1}{2}$ " x 2" cross section of winding space,
123 turns possible, Mean turn length 2.1 ft.
258 ft max or 200 ft random wound 78% filled.

Medium spools 12" O.D., 6" I.D., 5" wide
Mean turn length 2.36 ft.
32 turns per layer, 19 layers, 608 turns possible,
1430 ft max or 1000 ft random wound 70% filled.

Wooden Boxes 20x7x12 wide

23/11/56 Insulator test

Single Insulators	Small Doubles	Long Doubles
2990	3030 (stopped)	3020 stopped
2920	2990	
2920	3030 "	
2910		
3020 (stopped)		
3020 (")		
3020 (")		
"		
"		
2930		

20 Feb 57

#1 antenna

W 200, 400, 1100, 1100, 400, 400, 100, E

#2 antenna

W 200, 400, 400, 1100, 1100, 400, 400, 35, 125, E

#3 antenna

W 35, 200, 400, 1100, 1100, 400, 200, ~~100~~ E change to 100
16/3/57

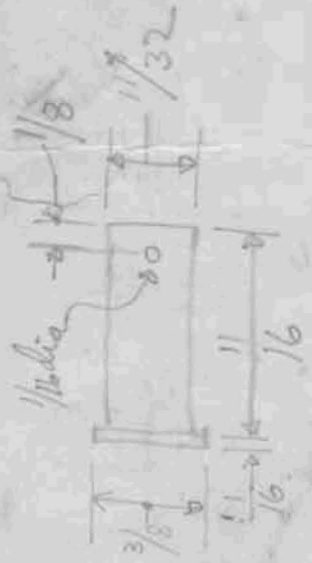
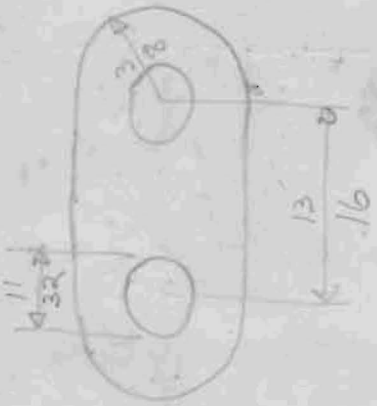
#4 antenna

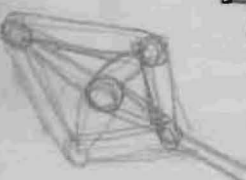
x = bad wire

W 100, 200, ~~300~~, 400, 400, 1100, 1100, 150, 25 E

W 35, 100, 400, 400, 400, 1100, 1100, 200 E revised. 14/4/57

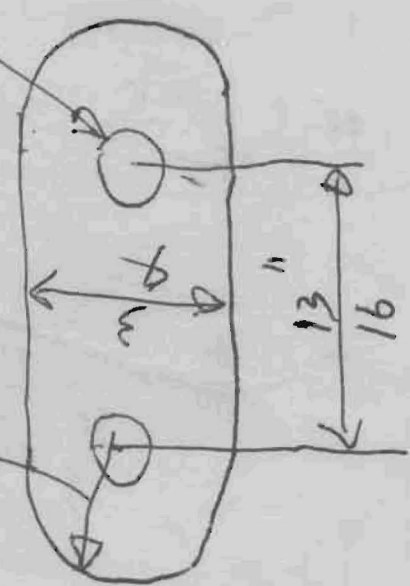
Extra lengths 25, 100, 150, 200, 200, 400, 400 on pole 14/4/57



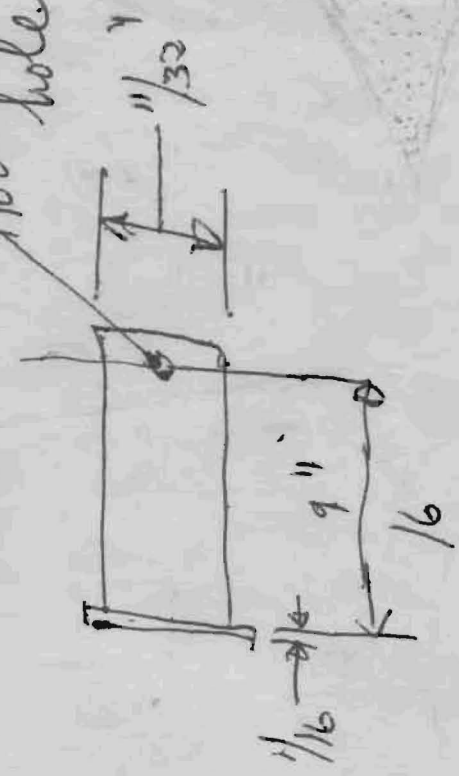


$\frac{3}{8}$ " Rod.

$\frac{11}{32}$ " dia



$\frac{11}{16}$ " dia hole



$\frac{11}{8}$
 $\frac{11}{8}$
 $\frac{11}{4}$
 $\frac{11}{1}$

$\frac{3}{16}$
 $\frac{1}{16}$

$$570 \times C = 600 \text{ m} = 1970 \text{ ft}$$

$$1 \text{ electrical degree} = \frac{1970}{360} = 5.5 \text{ ft}$$

$$1 \text{ cable degree} = 6.6 \times 5.5 = 3.68 \text{ ft}$$

$$4 \text{ cable} = 1.09 \text{ electrical degree}$$

300 ft

150

75

37.5

18.75

9.375

4.688

~~4~~

~~10 pairs available~~

~~5 pairs available~~

508 = 138° of tangent available

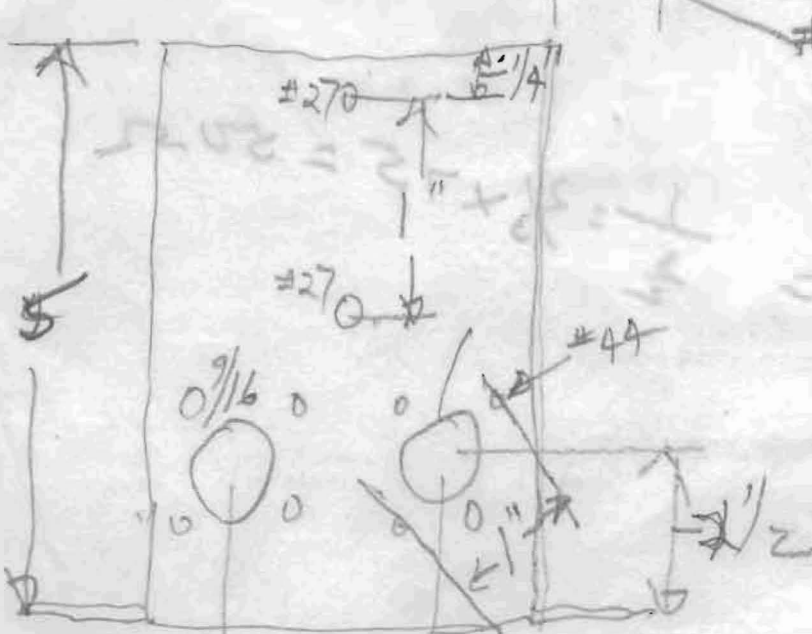
$\frac{508}{368}$ in slope of 1.09 electrical degree

235 ft

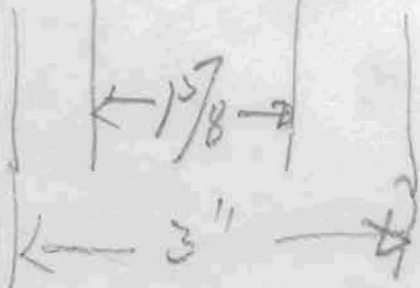
235 ft

358
128
64
32
16
8
4

508 ft

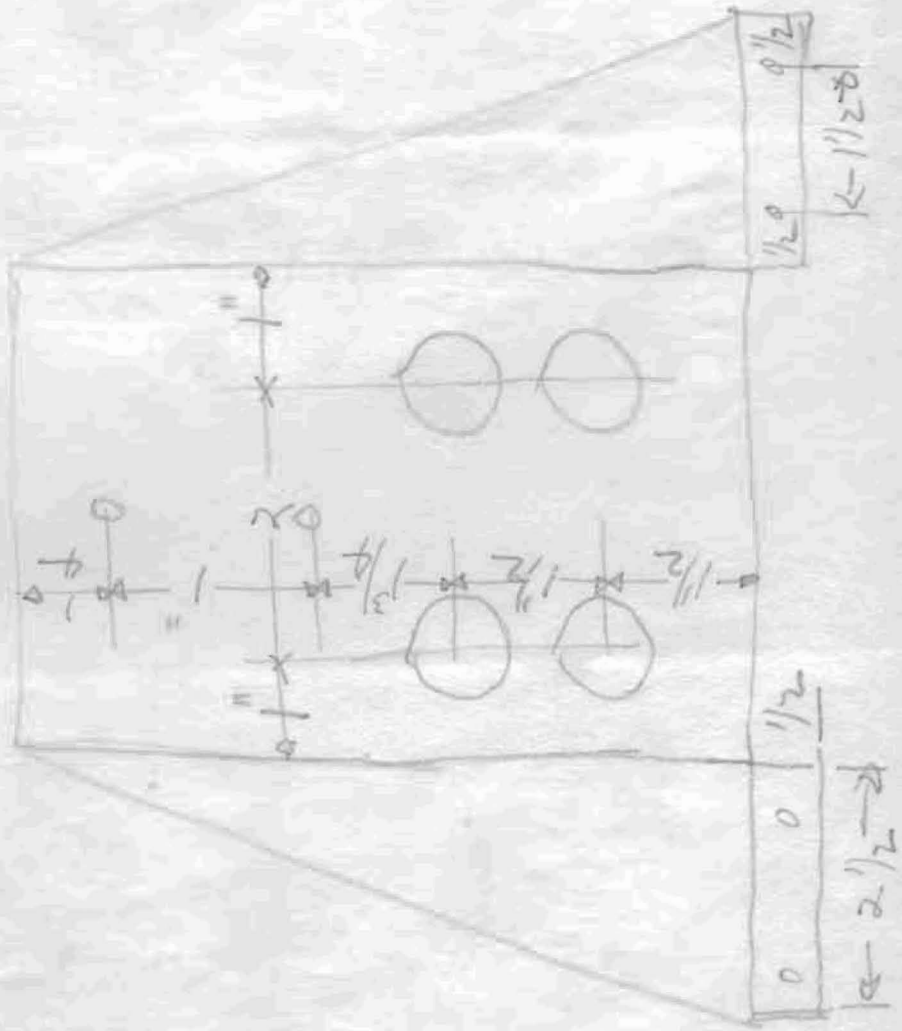


#27



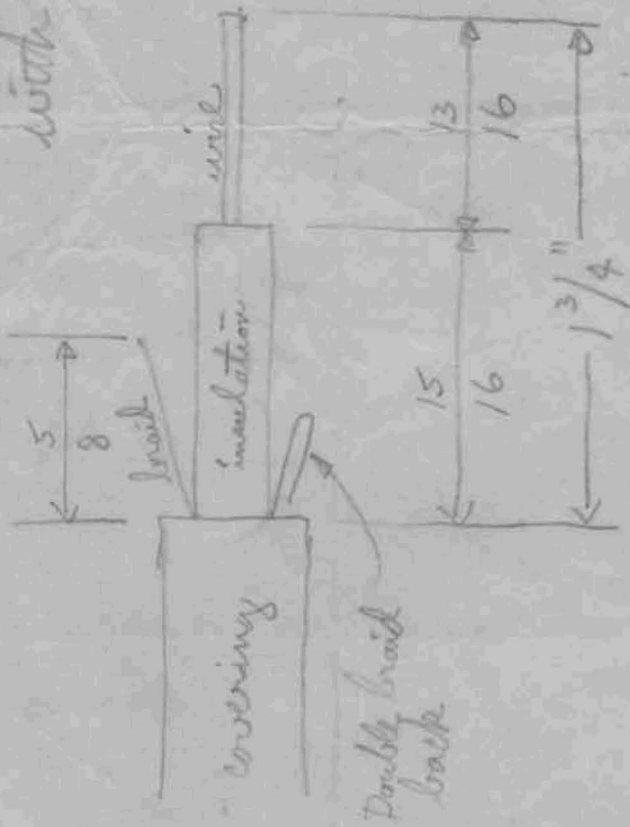
1 pc 7x 4 1/2

Antenna Input to RCVR
Four receptacles + relay.



1 pc 6/12/9

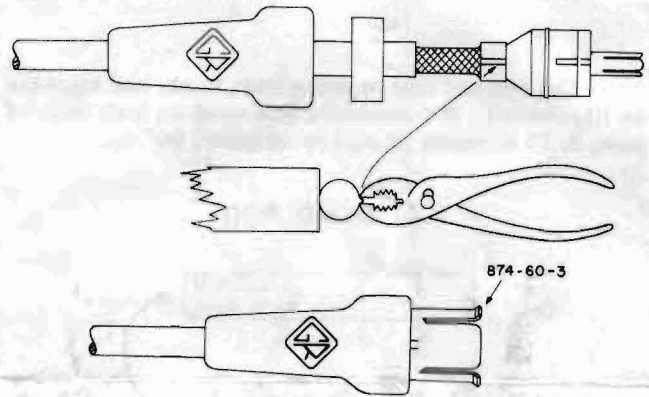
Cable end for use
with ANA connector



**ASSEMBLY INSTRUCTIONS GENERAL RADIO
TYPE 874-C, -C8, or -C9 CABLE CONNECTOR (Cont)**

Slide outer transition piece (874-63 or 874-63-2) up to insulating bead (874-70); align keyways, and arrange braid over small end. Cover with cable ferrule (FEC-3 or -9) and crimp in place. Crimping can be easily accomplished by holding ferrule against a sturdy surface and pinching and pushing simultaneously with a pair of ordinary gas pliers as illustrated.

Slip outer conductor (874-60-3) over bead (874-70) and outer transition piece so that keys engage keyways. Thread up coupling nut (874-62), and stretch rubber cord guard (874-71 or 874-727) over coupling nut (874-62).

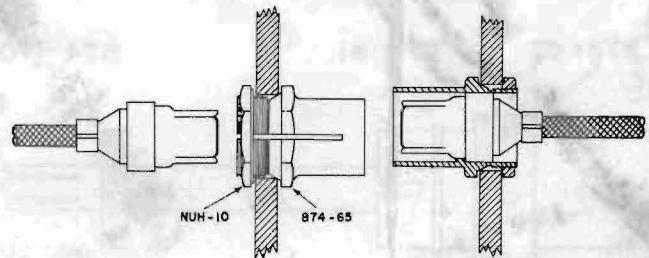


ASSEMBLY INSTRUCTIONS

**GENERAL RADIO TYPE 874-P, -P8, -P9, -PC, -PC8
or -PC9 PANEL CONNECTOR**

Assemble connector to cable same as 874-C, 874-C8, or 874-C9 but less rubber cord guard. Mount panel adaptor (874-65 without cap, 874-211 with cap) through 15/16-inch clearance hole in panel, leaving nut (NUH-10) loose.

Slide connector assembly into panel adaptor until pierced key engages keyway in connector assembly. Clamp in place by tightening nut (NUH-10).



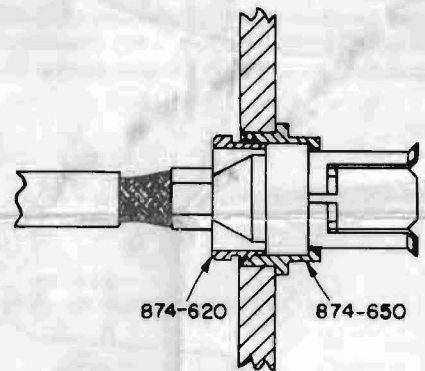
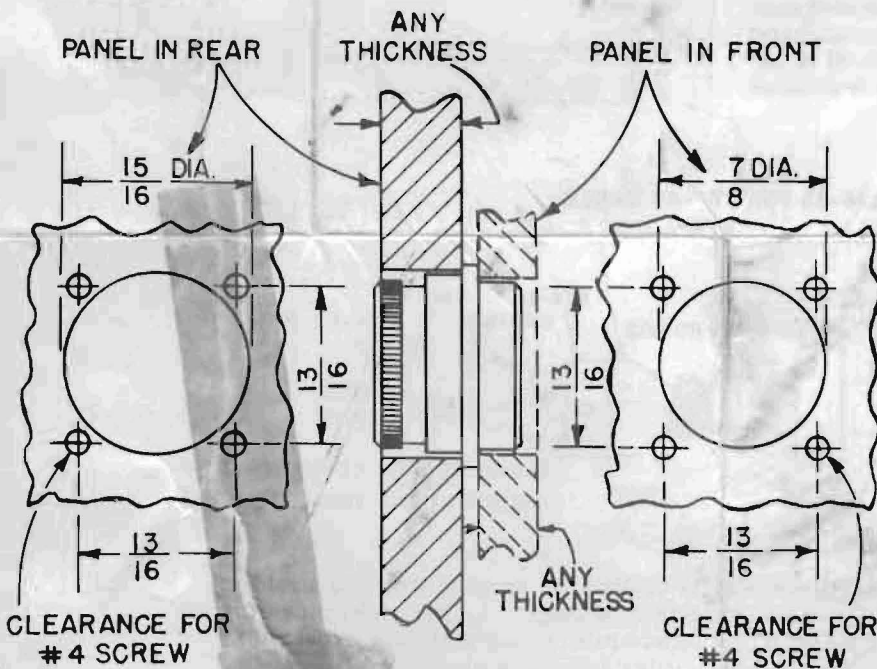
ASSEMBLY INSTRUCTIONS

GENERAL RADIO TYPE 874-PB, -PB8, or -PB9 PANEL CONNECTOR

Mount panel adaptor through 15/16-inch (panel in rear) or 7/8-inch (panel in front) clearance hole as shown in the diagram, using four #4 screws provided.

Remove the knurled retaining nut and slide this nut back over the cable. Then assemble connector to cable the same as Type 874-C, -C8, or -C9 but less rubber cord guard.

Slide connector assembly into the panel adaptor as far as it will go. Take care that the Type 874 Connector is properly oriented so that the panel adaptor tooth engages the groove on the side of the cable connector. Tighten up knurled retaining nut (see diagram).



U.S. Patent No. 2,548,457

Form 703-G

December, 1955

Printed in U.S.A.

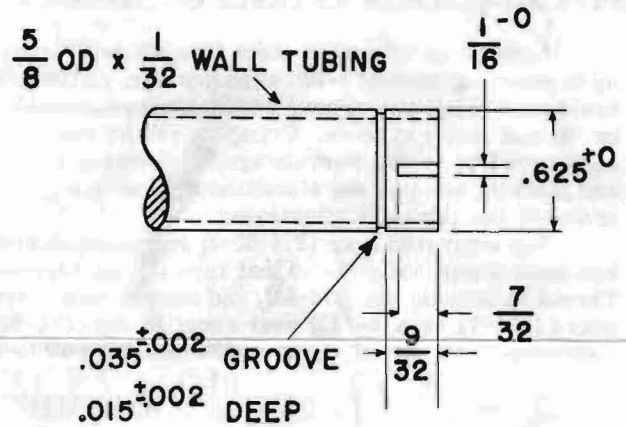
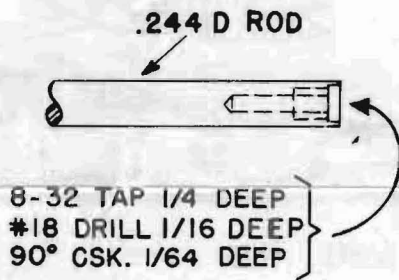
GENERAL RADIO COMPANY
CAMBRIDGE MASSACHUSETTS

NEW YORK
WASHINGTON

CHICAGO
LOS ANGELES

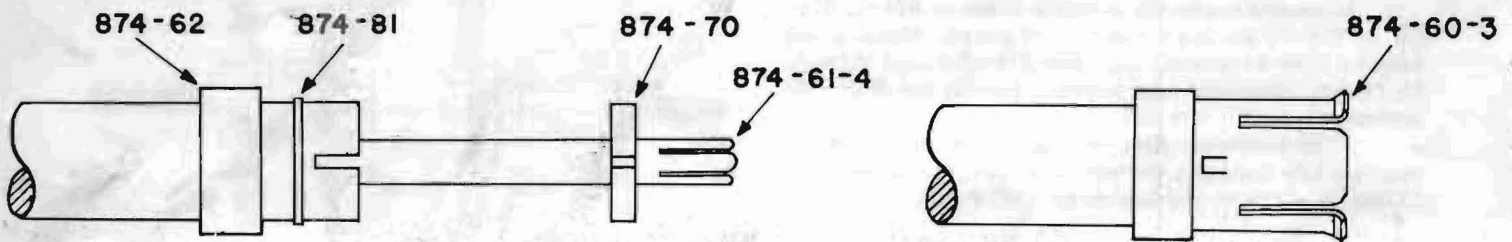
ASSEMBLY INSTRUCTIONS GENERAL RADIO TYPE 874-B BASIC CONNECTOR

Cut rod and tube to make ends flush, and machine as illustrated. If connectors are used on both ends of tube, 1/16 keyways should be oriented 90° apart.



Slide on coupling nut (874-62) and install snap ring (874-81) on tube end. Insert inner conductor (874-61-4) in insulating bead (874-70) and thread into rod end.

Align keyway in insulating bead (874-70) with keyway in tube end. Slip outer conductor (874-60-3) over bead and tube end so that key engages keyway, and thread up coupling nut (874-62).



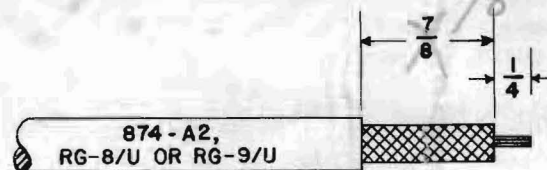
ASSEMBLY INSTRUCTIONS

GENERAL RADIO TYPE 874-C, -C8, or -C9 CABLE CONNECTOR

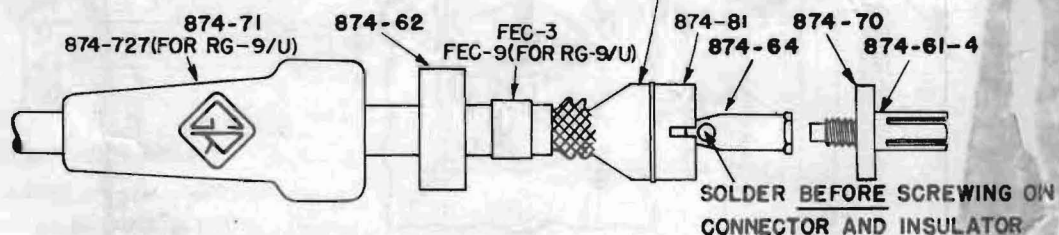
Remove cable jacket and insulation to expose braid and inner conductor to dimensions shown.

Slip on cord guard (874-71 or 874-727) using talc if necessary, coupling nut (874-62) and cable ferrule (FEC-3 or -9). Slide outer transition piece (874-63 or 874-63-2) under braid as far as possible. Slip inner transition piece (874-64) over inner cable conductor until end touches cable insulation; then solder. Install snap ring (874-81). Insert inner conductor (874-61-4) in insulating bead (874-70) and screw into inner transition

piece (874-64). CAUTION: Insulator will melt if inner conductor and insulating bead are screwed on before soldering cable.



874-63 FOR 874-A2 CABLE
874-63-2 FOR RG-8/U OR RG-9/U CABLE



NOTE Minimum VSWR at high frequencies is obtained by keeping the cable braid in contact with the dielectric where the jacket has been removed. This is most easily accomplished by wrapping the exposed portion of braid tightly with tape between the end of the cable jacket and the ferrule on the outer transition piece.