FILE COPY

ACCESSORY Kit

AK-U-17-3B
DECEMBER 3, 1968

Title SUNAIR T-10-D INSTALLATION KIT.

Cessna®

1. SERIALS AFFECTED:

USAF SERIALS	CESSNA SERIALS	USAF SERIALS	CESSNA SERIALS
67-14542	185-1251	67-22521	185-1279
67-14543	185-1252	67-22522	185-1280
67-22519	185-1277	67-22523	185-1282
67-22520	185-1278	67-22524	185-1283

2. PURPOSE:

This kit modifies 1967 U-17B aircraft to include the Sunair T-10-D radio system. All parts and materials are supplied in this kit to make the installation. One man may accomplish the installation, however, two men are required to accomplish antenna adjustment procedures at the end of this kit.

3. SPECIAL TOOLS REQUIRED:

R. F. Ammeter, 0-1 Amp full scale, equipped to connect into a coaxial transmission line at a junction consisting of UG-88 C/U and UG-89 C/U connectors.

4. PARTS SUPPLIED:

QUANTITY	PART NUMBER	NOMENCLATURE
1	S382-1	Switch
2	S1360-10	Circuit Breaker
2 ft.	S1460-22-6-10	Wire, Blu/Tan
6 ft.	S1460-22-9-6	Wire, Wht/Blu
3 ft.	S1460-22-8-10	Wire, Gry/Tan
6 ft.	S1460-22-10-2	Wire, Tan/Red
6 ft.	S1461-22-6-0	Wire, Blu/Blk, Shielded
6 ft.	S1461-22-6-2	Wire, Blu/Red, Shielded
6 ft.	S1460-22-10-4	Wire, Tan/Yel
6 ft.	S1460-22-9-6	Wire, Wht/Blu
2 ft.	S1460-22-10	Wire, Tan
2 ft.	S1460-22-6-4	Wire, Blu/Yel
8	AN515-6R12	Screw
2	0770080-3	Backing Plate
2	0770101-10	Doubler
16	NAS679A06	Nut
8	AN507-632R10	Screw
4	PRB3-1/2	Receptacle
8	S1021Z6-8	Screw
8	NAS446-2-3	Nut
1	0770400-244	Control Panel & Cable Assy
1	0770755-1	Radio Dust Cover & Cable Assy
1	0511104-19	Bracket
3	AN100-3	Thimble
3	463	Insulator
2	S1367-2-10	Terminal
2	135-40	Insulator
2	0411686	Clip
50 ft.	W106A	Wire

PARTS SUPPLIED: (Cont)

QUANTITY	PART NUMBER	NOMENCLATURE
2	S1282-4	Spring
12	AN515-8R16	Screw
12	NAS43DD3-8	Spacer
12	NAS679A08	Nut
1	0770754-1	Selector Coil Assy
1	0770753-1	Motor & Selector Coil Assy
4	AN515-4R6	Screw
4	NAS679A04	Nut
1	0712032-1	Stinger Assembly
1	S1367-2-8	Terminal
1	S1370-1	Splice
4	0770079-2	Spacer Block
2	S1367-2-6	Terminal
1	0770097-5	Placard
1		Installation Instructions

5. CHANGE IN WEIGHT AND BALANCE - Installation of this kit results in the following change to the aircraft weight and balance:

WEIGHT INCREASE	25.4 pounds
ARM	107.8 inches
MOMENT	2739 pound-inches
INDEX	2.739

6. DESCRIPTION OF INSTALLATION - Installation of this kit consists of (Refer to figure 1):

   a. Aircraft preparation.

   b. Modification of transmitter and audio selector switches.

   c. Relocation of ARC-44 control head.

   d. Installation of T-10-D receiver-transmitter.

   e. Installation of antenna control panel.

   f. Installation of fixed antennas.

   g. Installation of fixed antenna load coils.

   h. Installation of trailing wire antenna.

7. INSTALLATION INSTRUCTIONS.

   a. Aircraft preparation.

      (1) Remove seats, carpets and closure over access to tailcone area.

      (2) Remove upholstery forward of left door under the instrument panel to expose wiring.

      (3) Remove existing ARC-44 control head and its attaching hardware. Cap or bag connector for protection.

      (4) Remove existing RT-302 & R-318 radios and dust cover from instrument panel. Cap or bag connectors for protection.

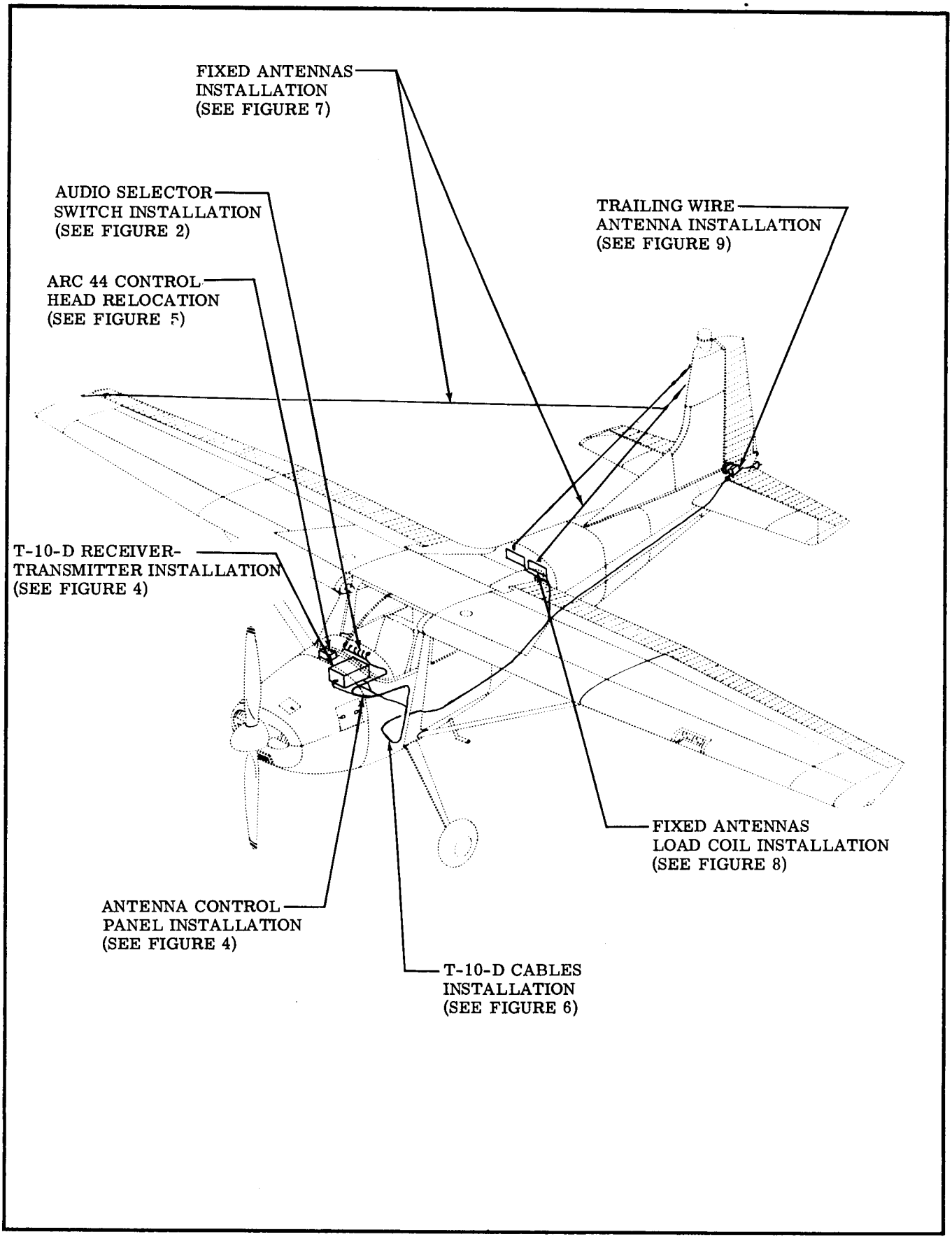


Figure 1. Sunair T-10-D H. F. Radio Installation

(5) Remove upper plastic cover over instrument panel on right hand side.

(6) Remove map case and map case door.

(7) Remove radio remote units from shockmounts in tailcone. Cap or bag connectors for protection.

(8) Disconnect negative (-) lead from battery terminal to prevent short circuits and subsiquent damage to aircraft.

(9) Remove fairings from both sides of vertical fin root.

b. Modification of transmitter and audio selector switches (Refer to figure 2).

(1) Remove knobs and retention nuts from the transmitter and audio selector switches as required to gain access to the wiring on the back side of the switches. Discard old placard.

(2) Cut hole (4) through the plastic cover over the existing hole which will accommodate the H. F. audio selector switch (1) to be added.

NOTE

Each radio has an audio selector toggle switch to select either "phones" or "speaker" operation of the individual receiver. In addition, a rotary transmitter selector switch is provided for both the pilot and copilot to select the transmitter they desire to use. The aircraft serials applicable to this kit are presently equipped with audio switches for three receivers; and the transmitter switches for two transmitters. It is necessary to add a third position to the transmitter selector switches and add an audio selector switch to accommodate the T-10-D.

In the following steps the phrase "insure that" is intended to imply that if a wire is not connected as described, it should be reconnected to comply. An assortment of wires of appropriate color and size are provided with this kit in case the existing wire is too short to be properly reconnected or is the wrong color. Numbers and letters in parenthesis ( ) refer to the numbers on the rotary switch waffers shown on figure 3. The physical location of the waffers may be determined by comparing the switches with the wiring diagram, figure 3.

(3) Remove the hoods from the larger two connectors on the audio junction box on the firewall. Inspect the wiring on the male connector and insure that a tan/red wire, connects to pin 3; a blu/blk shielded wire, connects to pin 20; and a blu/red shielded wire, connects to pin 19.

(4) Inspect the wiring on the female connector and insure that a tan/yel wire, connects to pin 3; and a wht/blu wire connects to pin 9.

(5) Route any added wires to the audio selector switches location on instrument panel with existing wires. Wht/blu wire routes to H. F. audio selector switch location (to be added later).

(6) On both transmitter selector switches, remove one stop in the clockwise limit to add a third position to the switch.

(7) On waffer (A), of the pilot's selector switch, insure that two tan/yel wires connect to position 2; one wire routes to audio junction box, other wire connects to waffer (1), position 2, of copilot's selector switch.

(8) On waffer (A), insure that two tan/red wires connect to position 3; one wire routes to audio junction box, other wire connects to waffer (1), position 3.

(9) On waffer (B), insure that two blu/red, shielded, wires connect to position 2; one wire routes to the audio junction box, other wire connects to waffer (2), position 2.

(10) On waffer (B), insure that two blu/blk, shielded, wires connect to position 3; one wire routes to audio junction box, other wire connects to waffer (2) position 3.

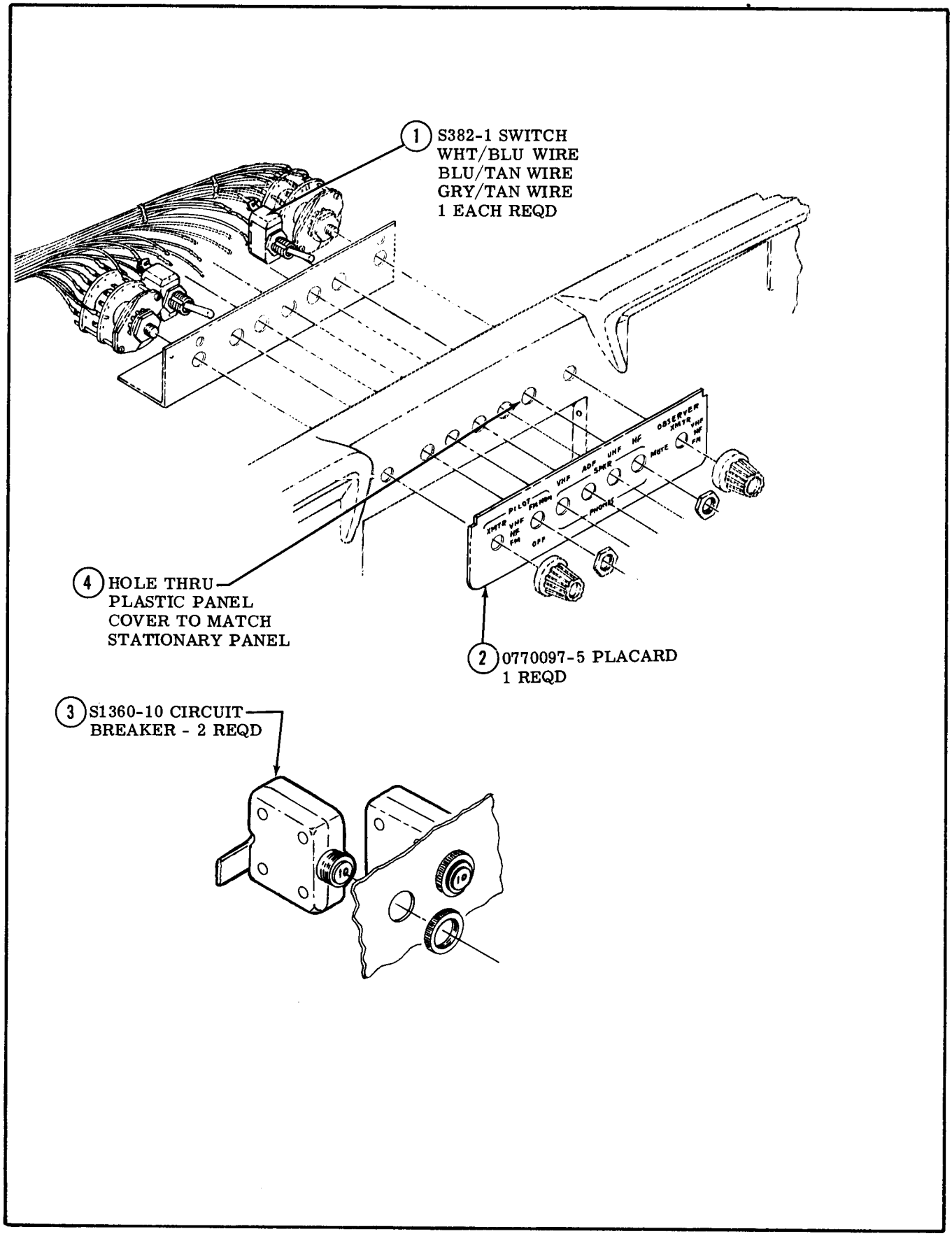


Figure 2. Transmitter and Audio Selector Switch System Modifications

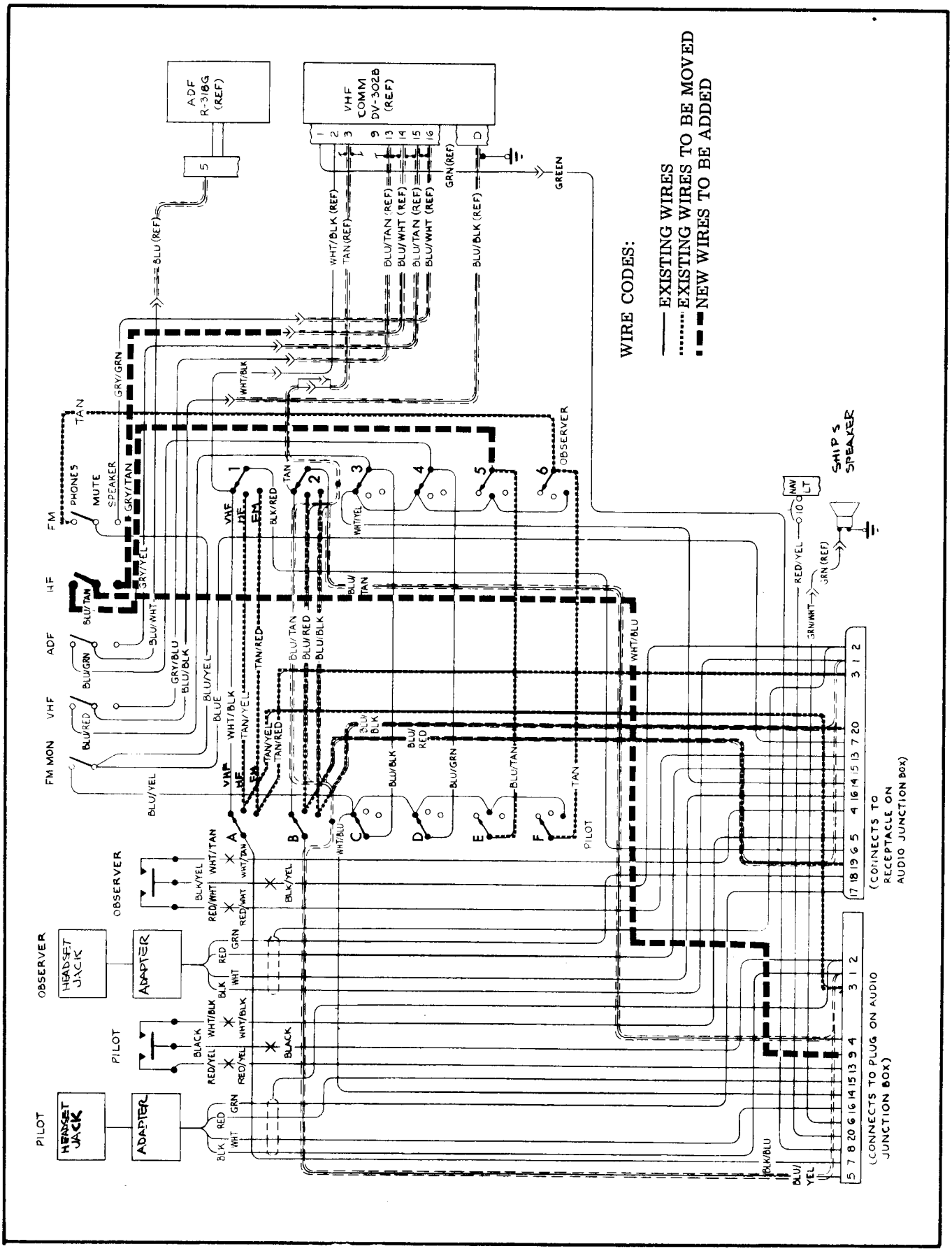


Figure 3. Wiring Diagram, Transmitter and Audio Selector Switch System

(11) On waffer (5), insure that two blu/tan wires connect to the wiper contact; one wire connects to waffer (E) wiper, other wire routes to H. F. audio selector switch location (to be added later).

(12) On waffer (6), insure that two tan wires connect to the wiper contact; one wire routes to the F. M. audio selector switch, other wire connects to waffer (F) wiper.

(13) Insure that a blu/yel and a wht/blu wire connect to waffer (C), position 1, along with a jumper which connects to waffer (D) position 1; waffer (E), position 2; and waffer (F), position 3.

(14) Insure that a wht/yel wire connects to waffer (3), position 1, along with a jumper which connects to waffer (4), position 1; waffer (5), position 2; and waffer (6), position 3.

(15) The audio isolation amplifier for speaker operation is a part of the ARC 302 transceiver. The amplifier input wires are brought out of the 302 harness near the R-T unit in the panel. Locate a capped blu/tan wire emerging from this harness and splice a length of gry/tan wire to it with an S1370-1 splice. Route wire to H. F. audio selector switch location (to be added later).

(16) Locate loose wires: wht/blu, from step 5; blu/tan, from step 11; and the gry/tan from step 15; and connect to the H. F. audio selector switch (1, figure 2) as shown in the wiring diagram.

(17) Reinstall transmitter and audio selector switches in panel using new placard (2, figure 2) in place of old one.

NOTE

When properly installed, the top terminal of each audio selector switch will have a wire of the following color connected to it:

FM MON	BLUE & BLUE/YELLOW
VHF	BLUE/RED
ADF	BLUE/GREEN
HF	BLUE/TAN
FM	TAN

(18) Replace connector hoods removed in step 3. Tie all loose wiring into existing wire bundles.

(19) Replace RT-302 & R-318 dust covers removed in step a. (4).

(20) Install two circuit breakers (3) in empty radio circuit breaker spaces. Wiring to be added later.

c. Relocation of ARC-44 control head (Refer to figure 4).

(1) An existing radio cutout will be found in the aircraft's stationary panel on the right hand side, under the engine instrument cluster. Using backing plates (2) for patterns, locate and drill holes (3).

NOTE

Backing plates are centered vertically on mounting flanges. The forward (acft fwd) edge of the backing plate is to be flush with the forward edge of the mounting flange.

(2) Attach receptacles (9) to blocks (8) with screws (6) and nuts (10).

(3) Attach blocks, backing plates (2) and doublers (4) to flanges with screws (1) and nuts (5).

(4) Replace plastic cover over instrument panel and using a sharp knife, start in center of opening, and cut through plastic, out to both edges being careful not to over-cut the height. Trim plastic to allow receptacles to stick through. Use tops of upper receptacles and bottoms of lower receptacles to scribe horizontal reference lines on plastic cover between sides of cutout. Extend height of cutout <u>equally</u> up and down from these reference lines so that the neight of the opening is 2.96".

(5) Route ARC-44 control head cable to new location and reinstall control head.

(6) Reinstall map case and map case door removed in step a. (6).

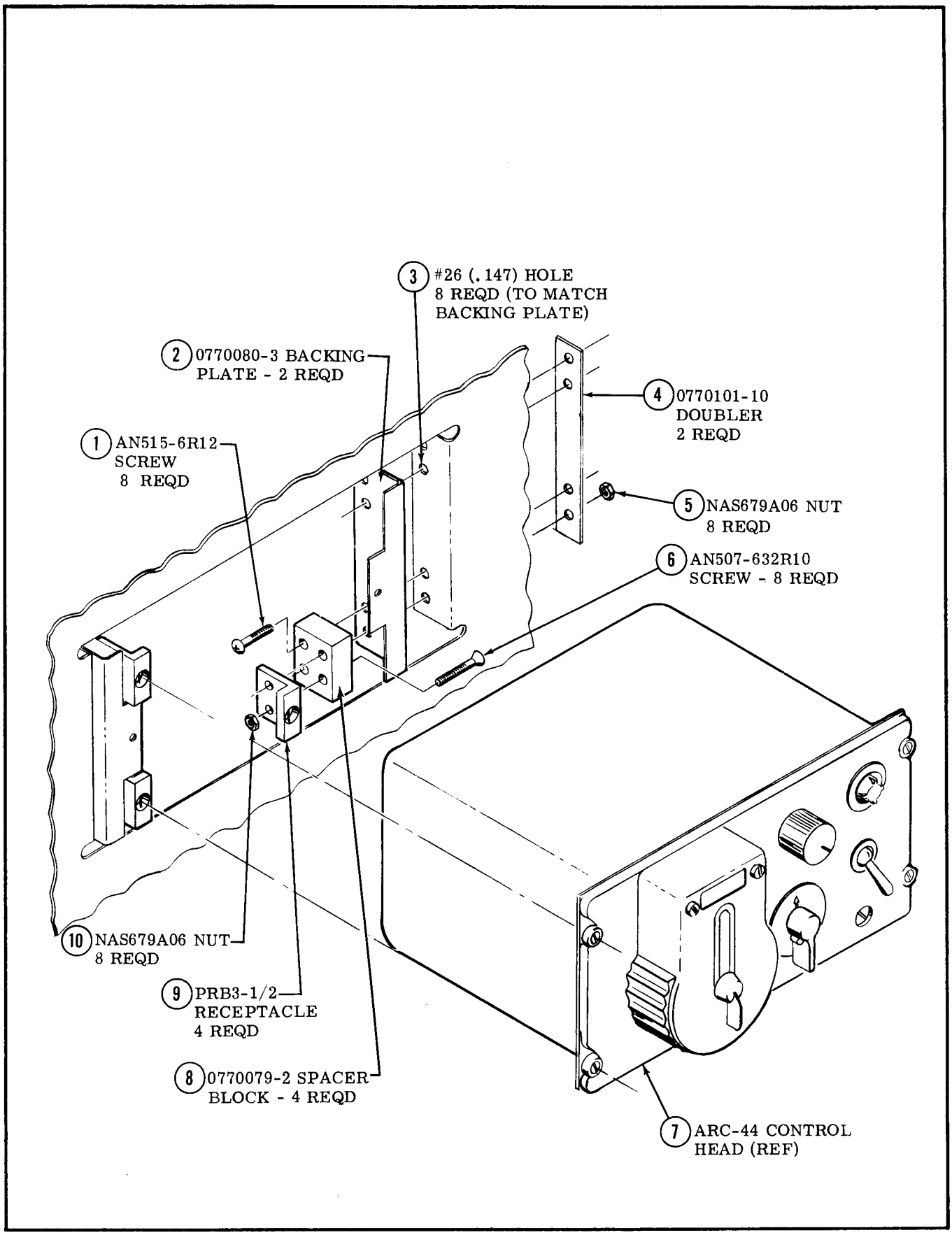


Figure 4. ARC-44 Control Head Relocation

d. Installation of T-10-D receiver-transmitter (Refer to figure 5).

(1) Locate radio dust cover and cable assembly (11) from kit parts, lay out four holes (1), two on each side, 1.00" up from bottom and down from the top of the dust cover; and .37 away from that part of the radio face plate which would be flush with the instrument panel.

(2) Remove radio from dust cover and drill holes in dust cover.

(3) Use a marking guage to scribe vertical lines on the radio side mounting angles, .35" forward of instrument panel face.

(4) Hold dust cover in place in radio stack cutout and align holes in cover to match lines previously scribed. Dust cover is to be mounted as far down as possible in the radio stack. Mark hole locations on side mounting angles to match dust cover.

(5) Remove dust cover and drill holes (1) in angles.

(6) Install dust cover in radio stack cutout with screws and nuts (2).

(7) Locate two loose white wires emerging from radio cable assembly. The heavier wire connects to one of the circuit breakers installed in step b. (20) with S1367-2-6 terminal (provided). The smaller wire will be connected later.

(8) Locate loose black wire emerging from radio cable assembly. Terminate with S1367-2-8 terminal (provided) and attach to existing ground stud on lower lip of stationary instrument panel.

e. Installation of antenna control panel (Refer to figure 5).

NOTE

The radio side mounting angles, which attach the radio dust covers to the instrument panel extend below the radio cutout to within approximately 1/2" of the bottom of the panel. The antenna control panel will also use these angles for attachment to the instrument panel.

(1) Make cutout (3) as shown in canted instrument panel just below the engine controls.

(2) Remove bulb holders (4) and plastic panel (5) from antenna control panel as shown.

(3) Remove two screws (7) from each end of the plate (6) to detach mounting angles (8).

(4) Use angles (8) as a pattern to drill holes (9). Center angles vertically in cutout & adjust so that plate will be flush with instrument panel.

(5) Attach angles (8) with screws and nuts (9).

(6) Attach plate (6) to angles with screws (7).

(7) Replace plastic panel (5) and bulb holders (4).

(8) Locate loose wire, D-RH39, emerging from antenna control panel cable assembly. Solder this wire, along with remaining white wire from step d. (7), to radio dial lights dimming rheostat.

(9) Locate loose wire, D-RH35, emerging from antenna control panel cable assembly. Terminate with S1367-2-6 terminal (provided) and attach to second circuit breaker installed in step b. (20).

(10) (Refer to figure 6). Remove access plates on cabin floorboards to gain access to wire route illustrated.

(11) String cable assemblies from receiver-transmitter and antenna control panel to the tailcone area following standard wire route. Replace existing clamps with larger sizes as required.

f. Installation of fixed antennas (Refer to figure 7).

(1) Lay out and cut holes (8) in tailcone skin.

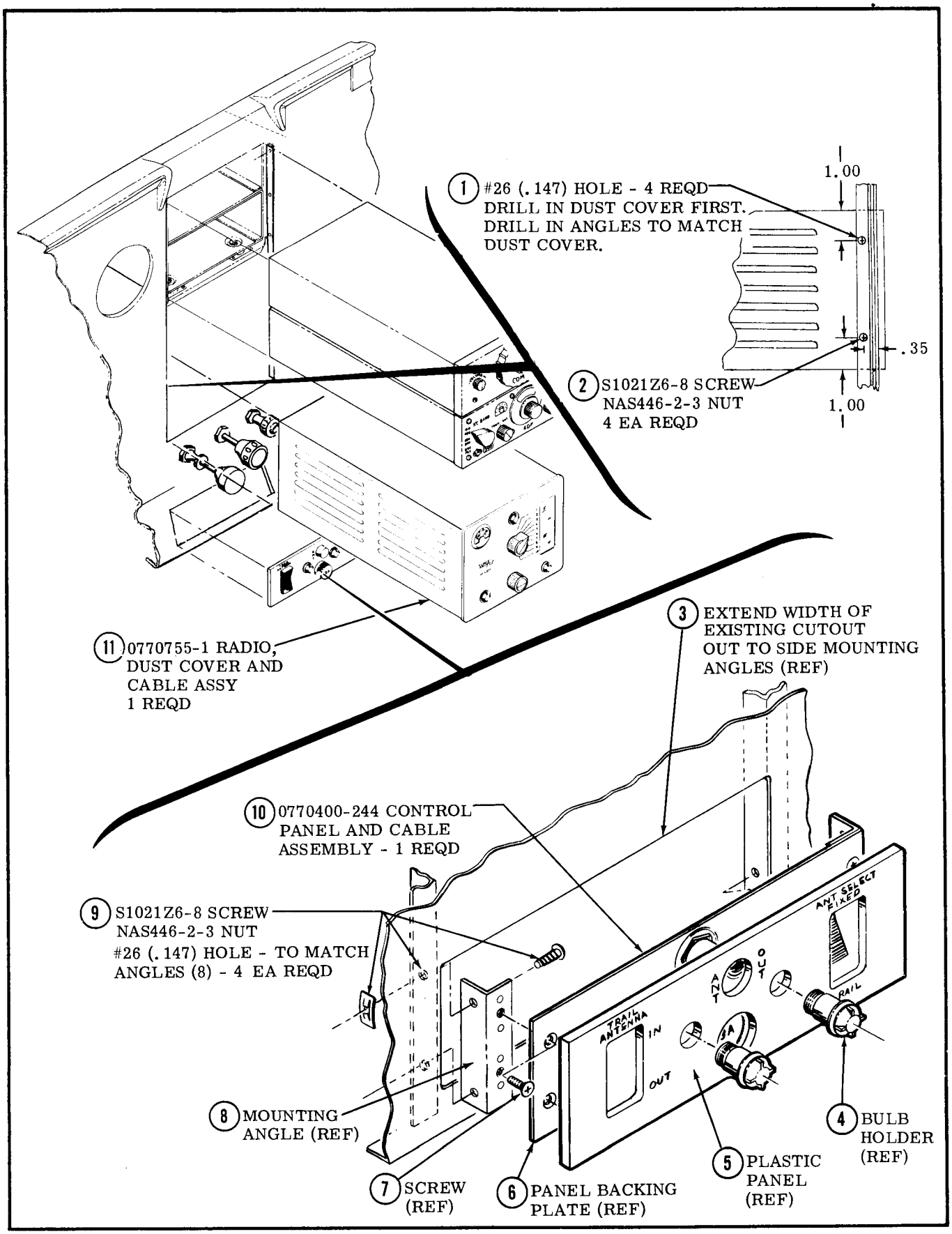
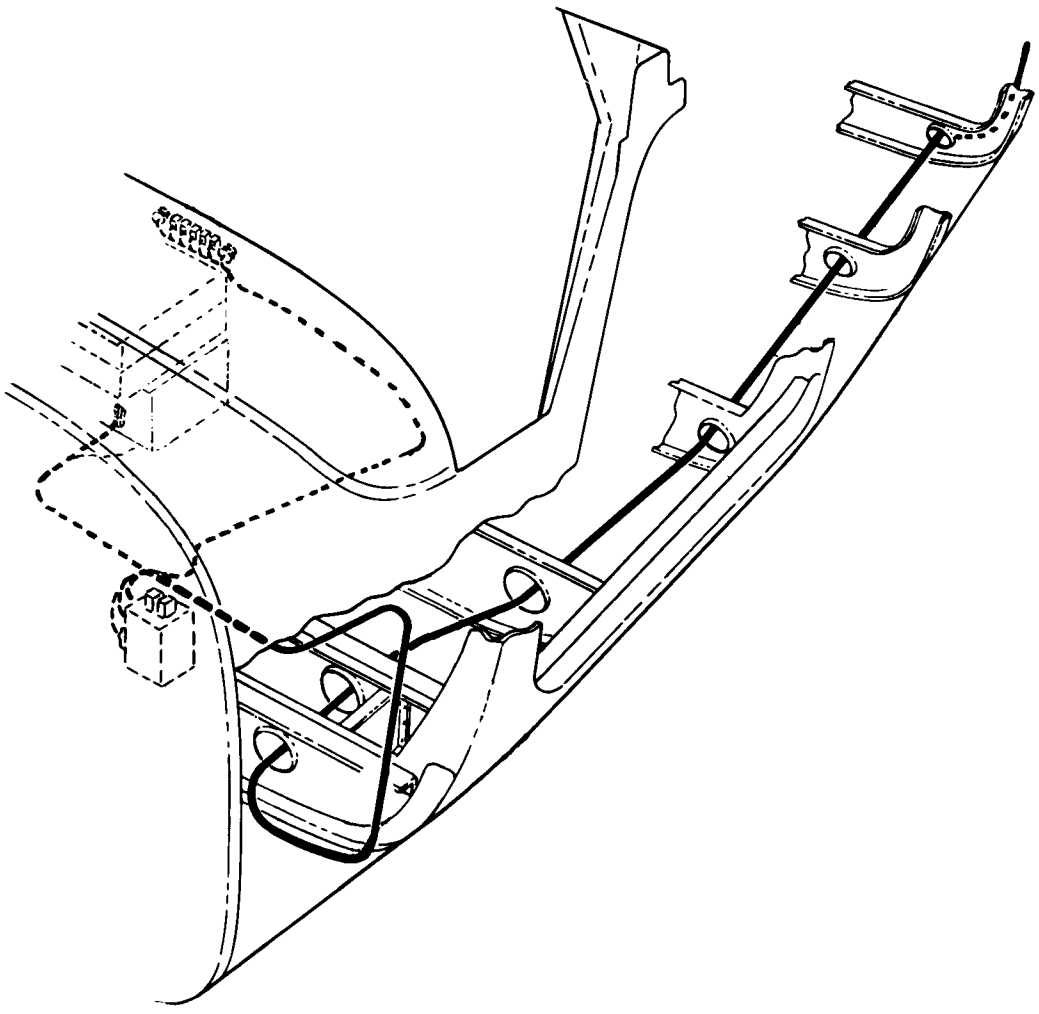


Figure 5. T-10-D Receiver-Transmitter and Antenna Control Panel Installation



WIRING FROM THE T-10-D RECEIVER TRANSMITTER AND THE ANTENNA CONTROL PANEL FOLLOW EXISTING WIRE BUNDLES DOWN THE LEFT SIDE OF THE COWL, UNDER THE FLOORBOARDS, AND THROUGH LIGHTENING HOLES AS SHOWN. REPLACE EXISTING CLAMPS WITH LARGER SIZES AS REQUIRED.

Figure 6. Sub-Floorboard Wire Routing

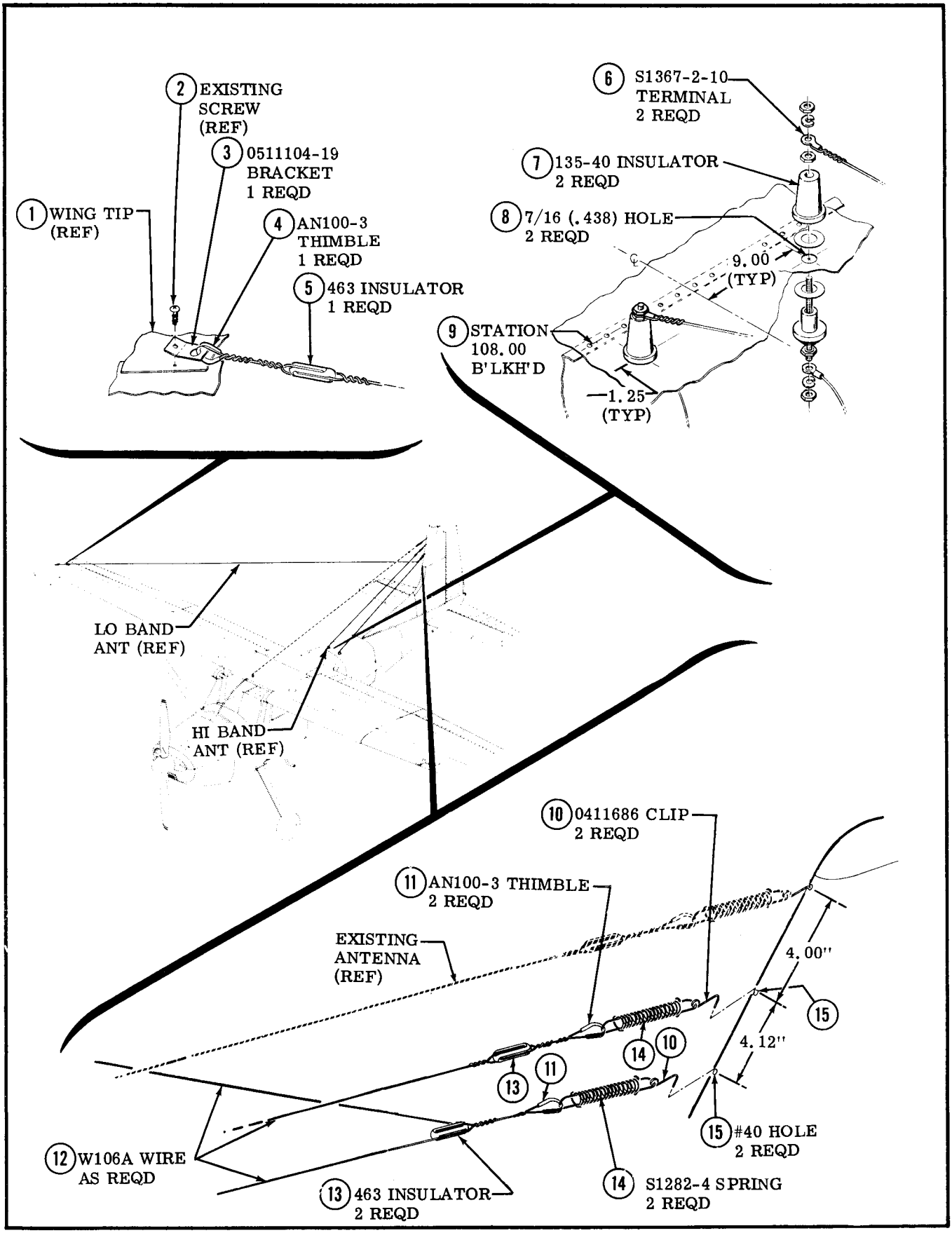


Figure 7. Fixed Antennas Installation

(2) Lay out and drill holes (15) in vertical fin leading edge.

(3) Cut a 28 foot length of wire (12) and terminate one end with terminal (6).

NOTE

Remove insulating sleeve from terminal. Slide terminal over end of wire. Bend a 3" length of the wire back on itself in a sharp "U." Slide terminal up to bend and wrap short length around wire behind the terminal a minimum of 5 turns. Solder wire to terminal with rosin core solder.

(4) Install insulators (7) in holes (8).

(5) Cut a 12" length of wire (12) and fabricate an assembly consisting of a clip (10), spring (14), thimble (11) and insulator (13) as shown using wire to attach insulator to spring. Use 5 wraps minimum at all wire joints.

(6) Remove an existing screw from the top of the right hand wing tip. Choose a screw nearest the center of the wing tip chord.

(7) Attach bracket (3) as shown with screw just removed.

(8) Attach wire assembly from step 3 to the left hand insulator installed in step 4.

(9) Thread wire through insulator on the end of assembly fabricated in step 5 and hook clip (10) in lower hole (15) on vertical fin.

(10) Install insulator (5) on end of wire and attach a length of wire long enough to extend the antenna to the wing tip anchor point.

(11) Attach antenna to bracket (3) using thimble (4) to protect wire. Apply sufficient tension to the wire to compress the spring (14) by 1 inch.

(12) Make a second insulator and spring assembly as described in step 5.

(13) Make a second antenna wire as described in step 3 using remaining length of wire.

(14) Attach wire to the right hand insulator installed in step 4.

(15) Hook insulator and spring assembly into the upper hole in vertical fin.

(16) Thread wire through insulator (13) and tighten sufficiently to compress spring by 1 inch. Wrap wire around itself and cut off excess.

g. Installation of fixed antenna load coils (Refer to figure 8).

(1) Drill holes (2) in after face of station 108.00 bulkhead to match selector coil assemblies (6 and 7).

(2) Install selector coil assemblies with screws, spacers and nuts (1 and 4).

(3) Attach terminals on ends of load coils to adjacent feed-through insulators for fixed antennas.

(4) Attach cable assemblies from load coil assembly (7) to mating cables from transceiver and antenna control panel.

(5) Secure cable assemblies to bulkhead to prevent chafing of wires or strain on connections at the coil assembly.

h. Installation of trailing wire antenna (Refer to figure 9).

(1) Remove and discard existing tailcone stinger from aircraft. Retain screws for later reuse.

(2) Route cable assembly and coax from antenna control panel back to station 230 bulkhead with tail light wiring.

(3) Cut holes (4) in station 230 bulkhead as shown.

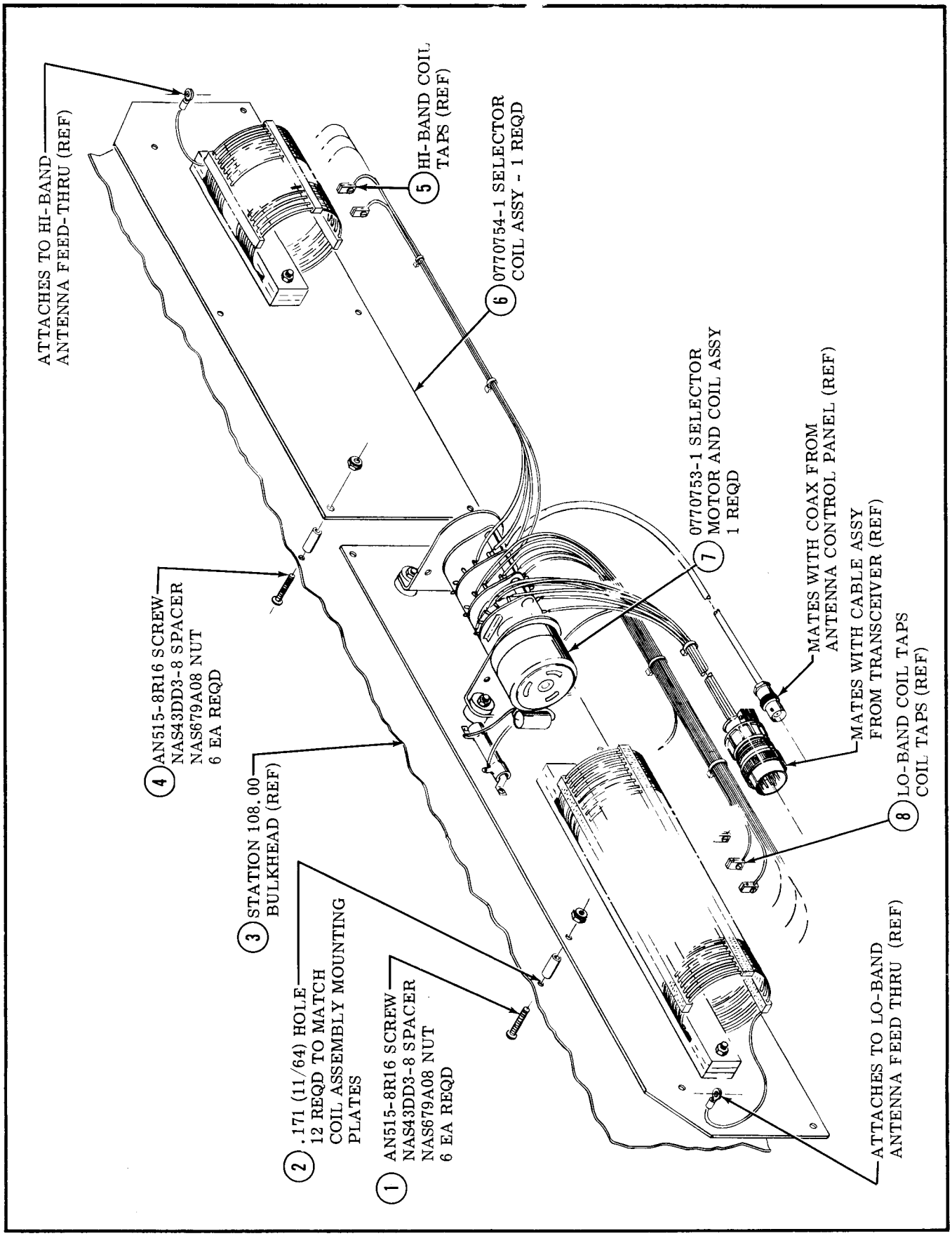


Figure 8. Fixed Antennas Load Coils Installation

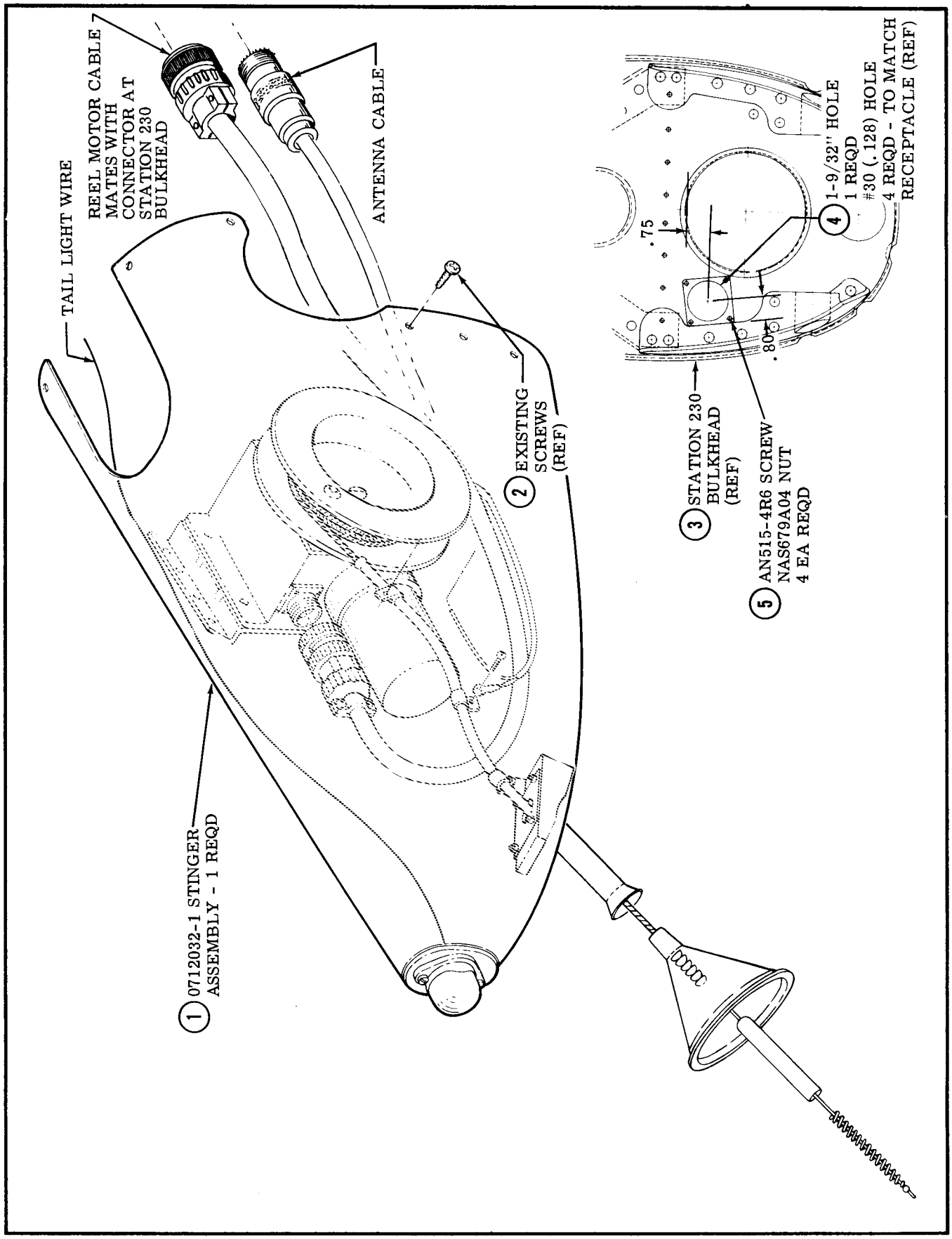


Figure 9. Trailing Wire Antenna Installation

(4) Attach receptacle to bulkhead with screws and nuts (5).

(5) Mate cable assemblies from stinger (1) to cable assemblies in tailcone. Connect tail light wire in new stinger to existing wire (disconnected in step 1) on airplane.

(6) Attach stinger to airplane with screws retained in step 1.

8. POST-INSTALLATION ADJUSTMENTS & PROCEDURES.

a. Adjustment of fixed antenna load coils.

NOTE

For efficient radiation, the fixed antennas must be resonated at each operating frequency to present an electrical 1/4-wave load to the transmitter. Since the physical lengths of the antennas is considerably shorter than 1/4-wave, they must be electrically "lengthened" by means of loading coils. The longer fixed antenna is used on the six frequencies below 9 MHz and the shorter one on the four frequencies above 9 MHz. A load coil is associated with each antenna with each coil having an adjustable tap for each frequency. The following procedure must be accomplished to set the taps on the antenna load coils.

(1) Connect the negative (-) lead on the battery. Replace the radio remote units removed during aircraft preparation.

(2) Replace radio panel units previously removed.

(3) Connect a well regulated source of 28-Volts d.c. to the ground service receptacle.

(4) Turn aircraft master switch ON and check the RT-302, R-318 and ARC-44 for proper operation. After checks, turn radios OFF.

(5) Turn the T-10-D transceiver ON and allow a few minutes for warm up.

(6) Open the fixed antenna coaxial transmission line at the junction adjacent to the load coils. Insert a 0-1 r.f. ammeter in series with the coax cable.

(7) With a man positioned up front at the pilot's position to set the transceiver frequency and key the transmitter; and a man back at the load coil position to take readings and set the taps, accomplish the following operations:

(a) Antenna selector switch - FIXED

(b) Transceiver frequency - CHANNEL 10

(c) Attach the tap lead marked "CH 10" to the last turn of the small antenna load coil (The turn nearest the antenna feed thru insulator).

(d) Momentarily key the transmitter and note the ammeter reading.

WARNING

Do not touch any part of the antenna load coil while the transmitter is keyed. Serious burns may result.

CAUTION

Key the transmitter only as long as required to take an ammeter reading. Extended transmitter operation with the tap incorrectly positioned may result in damage to the transmitter.

(e) Move the tap one turn in from the end, key the transmitter and note the ammeter reading. The ammeter reading should have increased slightly.

(f) Repeat step (e) until a position is found where moving the tap one step further results in a decrease in ammeter reading. Leave the tap on the position which gave the highest reading.

(g) Repeat steps (b) thru (f) for channels 9, 8, & 7 in that order. When all four channels are adjusted they should be in order on the coil with each successive lower channel tap using more turns of the coil to achieve resonance.

(h) Repeat steps (b) thru (g) for channels 6, 5, 4, 3, 2 & 1 in that order. The lower six channels use the longer antenna and the larger load coil.

(8) When adjustments are completed, turn T-10-D transceiver OFF and remove the r.f. ammeter from the transmission line.

b. Aircraft restoration and final operational tests.

(1) Generally check over the radio systems as they now exist in the airplane. Check for security and protection of wire bundles, security of connectors, security of radio equipments.

(2) Check areas opened for installation of this kit for debris or foreign objects.

(3) Replace all items removed to facilitate installation.

(4) Flight test aircraft and check operation of all radios.

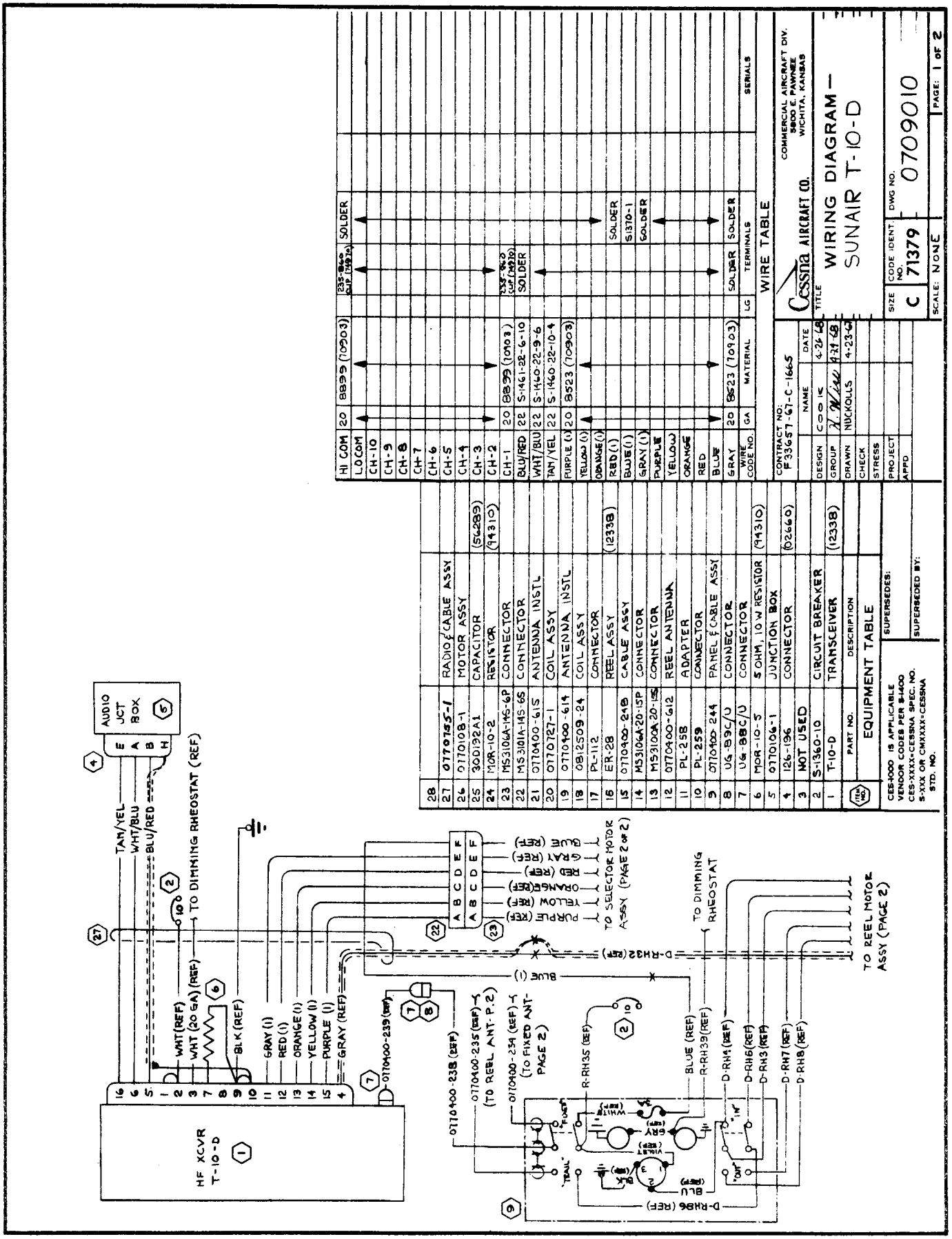


Figure 10. Wiring Diagram, Sunair T-10-D (Sheet 1 of 2)

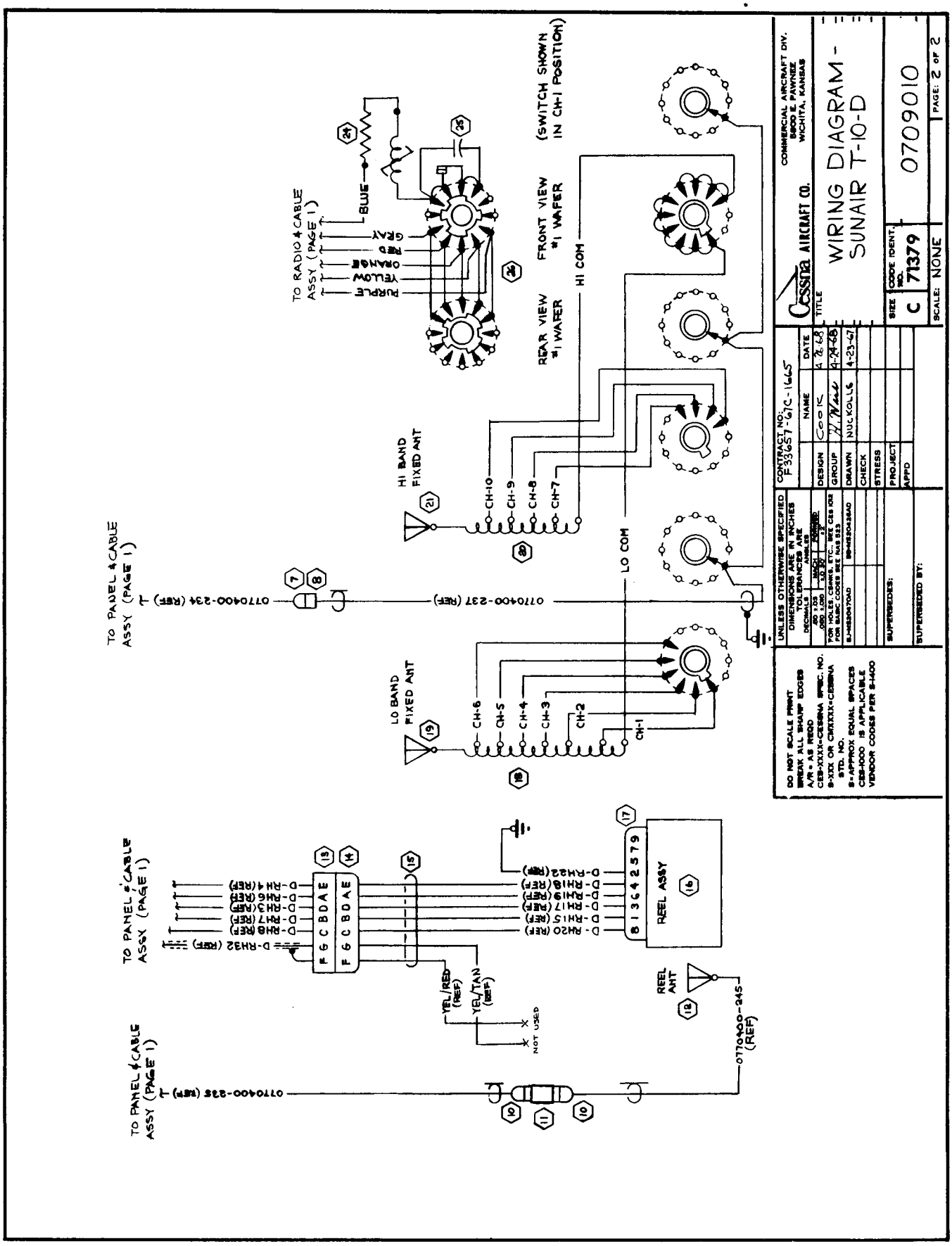


Figure 10. Wiring Diagram, Sunair T-10-D (Sheet 2 of 2)