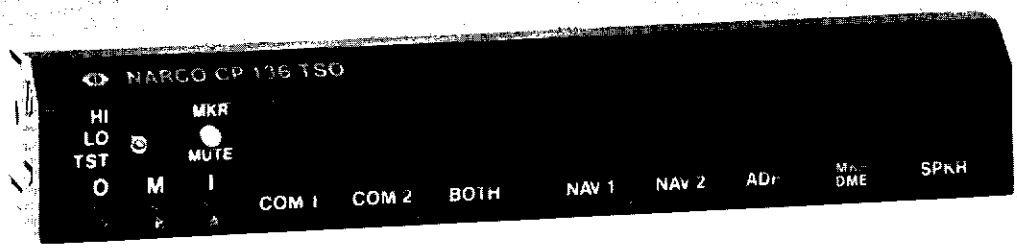
NARCO AVIONICS

CP 135 TSO
AND
CP 136 TSO
AUDIO PANELS



INSTALLATION MANUAL

NARCO AVIONICS

FORT WASHINGTON, PENNSYLVANIA, 19034 U.S.A.

Printed in U.S.A.

Jan. 1977

Reprint 8/81

NARCO AVIONICS INC.

270 COMMERCE DRIVE, FORT WASHINGTON, PA 19034 (215) 643-2900 TELEX 846395

February 7, 1986

TP #28

TO: ALL NARCO AVIONICS CENTERS

SUBJECT: CP135/136 MAINTENANCE MANUAL UPDATE "S-10" DATED 1/86

TOPIC: TRAY CONNECTOR P101

The CP 135/136 50 pin tray connector P101 has been changed to a 50 pin MOLEX type. All CP 136 trays currently being manufactured will have the new type connector installed. This change to a new connector warrants a new connector cover design which features an additional hole to ease wire routing, and an overall length increase of 0.40 inches to provide for jumper wire clearance under the cover.

The new connector will directly interchange on the tray with no modifications required. Should it ever become necessary to replace the older original tray connector with the new type connector, the old original connector cover must be replaced with the new connector cover.

Update "S-10" comprises the following pages:

- A page (with bar S-10): Remove the Manual's existing "A" page and replace with the new one
- Page 1-i : Remove the Manual's existing page 1-i and replace with the new one
- Page 1-6A: Add this Addendum page to the Manual between pages 1-6 and 1-7
- Page 2-ii: Remove the Manual's existing page 2-i /2-ii and replace with the new one
- Page 2-8A: Add this Addendum page to the Manual between pages 2-8 and 2-9

Addendum page 1-6A updates Table 1-2 "Installation Kits" of page 1-7 to a new Table 1-2A.

Addendum page 2-8A updates Figure 2-3 "Installation Diagram" of page 2-8, to a new Figure 2-3A.

Very truly yours,

Allan S. Cox

Allan S. Cox
Technical Publications

ASC:dmc

CP 135 and CP 136
Manual issue date 1/77
Reprint issue date 8/81

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Service Bulletins

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3.	"	12/13/77	"
4.	"	12/29/77	"
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1.6 UNITS AND ACCESSORIES SUPPLIED

The following tables may be used to:

1. Check the contents of your order and,
2. To order additional components

Table 1.1A is used for ordering Units, refer to the Unit's Part Number and its Unit Description.

Table 1.2A may be used for ordering additional kits or specific parts of the kit.

TABLE 1.1A UNITS AVAILABLE

Unit Part Number	Unit And Description	Supplied With Installation Kit Part Number
03740-0302	CP 136 TSO with Marker Beacon Receiver Built-in	03740-0500
03740-0303	CP 136 TSO without Marker Beacon Receiver	03740-0501

TABLE 1.2A INSTALLATION KITS 03740-500/501

	ITEM	PART NUMBER	DESCRIPTION	500 QTY	501 QTY
	1	54731-0102	Tray assembly	1	1
	2	41406-0017	Connector, 50 pin	1	1
NEW	3	82814-0007	Screw, Mach, Bind Hd, #4-40x7/16	1	1
	4	41407-0002	Contacts, crimp type	50	50
	5	82017-0001	Miniature cable clamp	2	2
	6	04831-0002	Label, CP-136 push button	1	1
	7	81324-0004	Lockwasher, split #4	2	2
	8	82815-0007	Screw, Mach, Bind Hd #6-32x7/16	1	1
	9	82802-0005	Lockwasher, Int. tooth #6	3	3
	10	82900-0008	Nut, Hex #6	3	3
	11	99090-0002	Pad, Spacer	2	2
	12	82977-0007	Screw, Mach F. Hd #6-32x1/2	2	2
	13	04831-0001	Label, CP 136 push button	1	1
NEW	14	54763-0101	Cover, Connector	1	1
	15	04827-0001	Label, CP 136	1	1
	16	54572-0101	Connector, Marker Ant.	1	-

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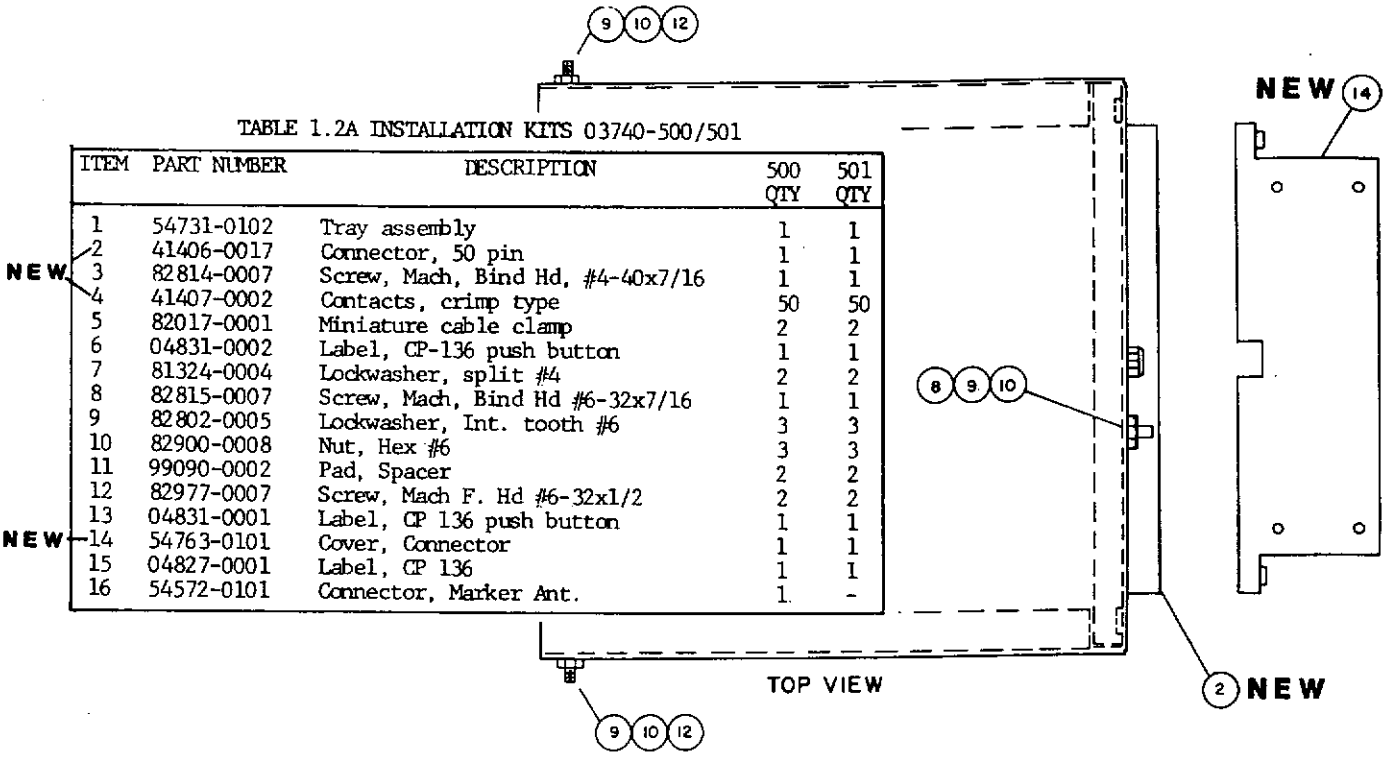

FIGURE 2-3A INSTALLATION DIAGRAM

CP 135 and CP 136
Manual issue date 1/77
Reprint issue date 8/81

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1.1 GENERAL

In support of the Narco Avionics TSO'd CP 135 and CP 136 Audio Panels, this manual provides detailed installation, operation, and maintenance procedures.

"This manual is intended for use only by persons qualified to service equipment described in this manual pursuant to current regulatory requirements."

1.1.1 Manual Organization

Organized into six major sections, the manual provides the following:

Section 1,	Introduction	- general information required in planning the installation.
Section 2,	Installation	- detailed procedures for performing the mechanical and electrical installation.
Section 3,	Circuit Description	- technical description of all mechanical and electrical circuits.
Section 4,	Maintenance	- provides test procedures and troubleshooting methods.
Section 5,	Replacements Parts List	- provides exploded views of the Unit depicting the mechanical parts and certain electrical components. This Section also provides an alphanumerical listing of all the electrical components of the Unit.
Section 6,	Schematics	- circuit schematics with voltages, test points, and component drawings.

1.2 PRODUCT DESCRIPTION

The CP 135 and CP 136 Audio Panels provide central pushbutton control for all aircraft communications and navigation audio signals. As many as seven audio inputs may be combined for routing to the cabin speaker. The CP 136 contains a 10 watt cabin speaker amplifier while the CP 135 utilizes the COM transceiver audio power amplifier to drive the speaker. Both units contain fail-safe circuitry in that the speaker and phones have separate A+ power so one failure will not disable both channels. Both units may be ordered with an optional Marker Beacon Receiver or with only the switches and lights for a Remote Marker Beacon Receiver.

1.3 DESIGN FEATURES

- LED annunciated pushbutton control provides instant transmitter, microphone, and receive audio selection at busy airports.
- Simultaneous listening to both COM receivers, if desired by depressing the BOTH pushbutton.
- Four intercom inputs connected to an integral 50 mW audio amplifier that provides headphone audio output for those inputs selected.
- Headphone audio is totally independent of Speaker Off pushbutton.

1.3 Continued

- No descernable audio level change in Speaker or Headphone as audio inputs are switched in and out.
- Speaker and phones have separate A+ power.
- Unswitched audio to headphones for such things as helicopter engine out warning.
- Provides transmitter sidetone from selected transmitter during transmit.

1.4 PRODUCT SPECIFICATIONS

Mechanical			
Physical Dimensions and Mounting	Refer to appropriate mechanical installation Diagram in Section 2		
Weights: CP 135 without Marker	0.8 lbs (363 gr)		
CP 135M with Marker	0.9 lbs (408 gr)		
CP 136 without Marker	1.0 lbs (454 gr)		
CP 136M with Marker	1.1 lbs (499 gr)		
Electrical			
Voltage	13.75 or 27.5 Vdc		
Current (not including Pilot Lamps)	P101-F	P101-1	MKR A+
CP 135 at 13.75 Vdc	0.25 amp	0.05 amp	0.20 amp
CP 135 at 27.5 Vdc	0.25 amp	0.05 amp	0.23 amp
CP 136 at 13.75 Vdc	0.25 amp	2.0 amp	0.20 amp
CP 136 at 27.5 Vdc	0.25 amp	1.5 amp	0.23 amp
Circuit Breaker			
CP 135	1A	1A	1A
CP 136	1A	5A	1A
Pilot Lamps			
13.75 Vdc	0.26 amp		
27.5 Vdc	0.13 amp		
Audio Input Levels			
Unswitched audio to Headphones	3.5V for 50 mW		
Intercom (Four Inputs)	0.5V for 50 mW		
Sidetone (COM 1 and COM 2)	3.5V rms across 470 ohms for 50 mW of headphone audio.		
Switched Audio	Factory-set for 3.5V rms across 470 ohms		
Audio Output Levels			
Low Level Audio	350 mV across 600 ohms		
Speaker Audio	10W across 4 ohms		
Headphone Audio	50 mW across 600 ohms (Output Low Z - 150 ohms)		
Isolation/Combining Network			
Isolation between input ports	40 dB		
Optional Marker Beacon Receiver			
Antenna Input Impedance	50 ohms		
Sensitivity			
HI	200 uV for lamp threshold		
LO	1000 uV for lamp threshold		
Selectivity			
6 dB	$\pm$ 10 kHz minimum		
40 dB	$\pm$ 180 kHz minimum		
60 dB	$\pm$ 310 kHz minimum		
AVC Characteristics	Audio output held to within 10 dB for input level changes from 200 uV to 50,000 uV		

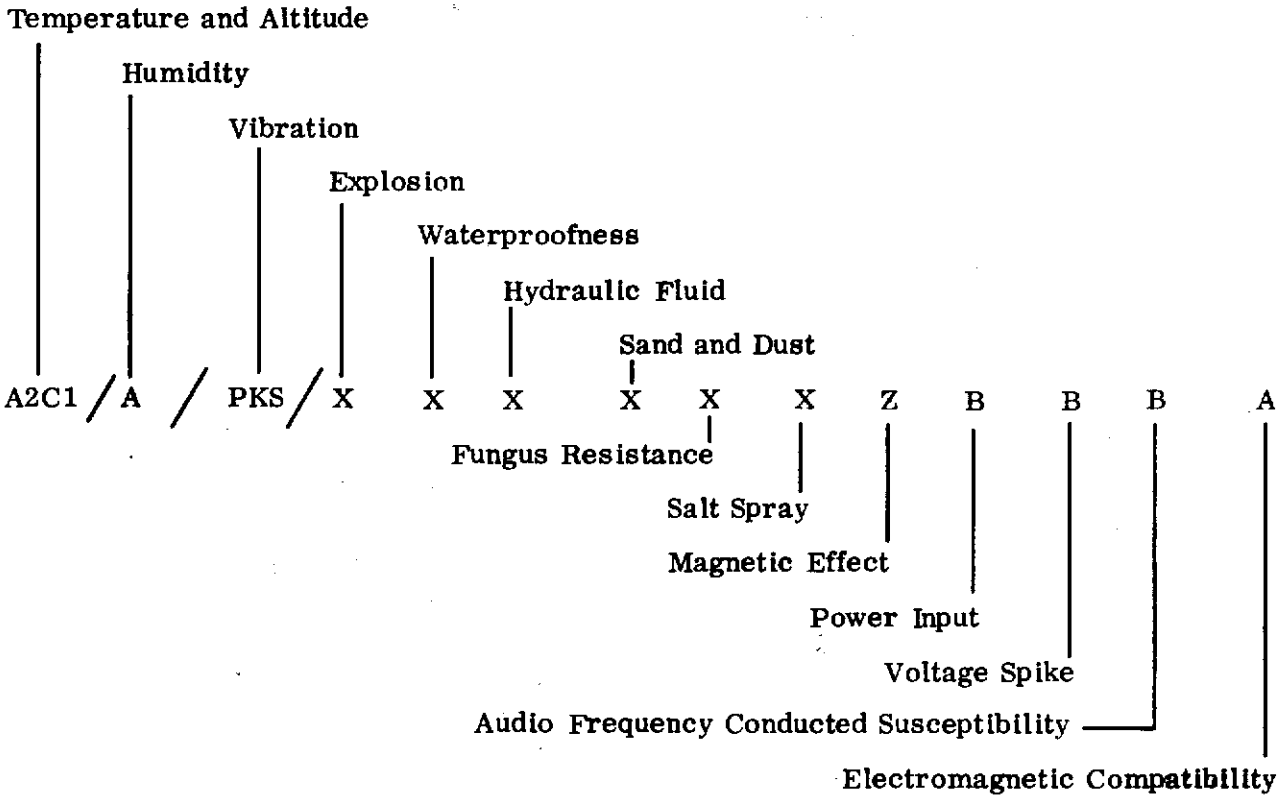
1.5 TSO EXPLANATION

The CP 135 and CP 136 are designed to be instrument panel mounted within the cabin environment of fixed and rotary wing aircraft using piston or turbine, single and multi-engines. They are designed for non-pressurized aircraft operating up to 35,000 feet as well as for pressurized aircraft. This equipment requires direct current power but may be installed in aircraft having additional on-board alternating current sources.

There are fourteen Environmental Test Procedures established in RTCA Document DO 160. These are identified on the TSO Nameplate(s). Following are the Environmental Categories to which the Units are designed and an explanation of each category.

Audio Panel TSO-C50b, Environmental Category A2C1/A/PKS/XXXXXXZBBBA

Marker Beacon TSO-C35d, Class A, Environmental Category A2C1/A/PKS/XXXXXXZBBBA



1.5 Continued

Temperature And Altitude - Category A2C1		
Temperature, Operating:		
Low Operating Temperature	-20°C	(-4°F)
High Operating Temperature	+70°C	(+158°F)
Short Time Operating Temperature, High	+70°C	(+158°F)
Temperature, Non-Operating		
Ground Survival Temperature, Low	-55°C	(-67°F)
Ground Survival Temperature, High	+85°C	(+185°F)
Altitude, Non-Pressurized:		
Maximum Operating Altitude	+35,000 ft.	
Altitude, Pressurized:		
Not affected by decompression to	+40,000 ft.	
Not affected by overpressurization to	-15,000 ft.	

Humidity - Category A

These units have been tested under the Standard Humidity Environment of: +50°C (+122°F) at 95% relative humidity, reduced to +38°C (+100°F) with relative humidity maintained in excess of 85%.

This cycle was repeated twice for a total of 48 hours of exposure. Within 15 minutes* after exposure, the units were operated and met all specifications.

*TSO requires that all specifications be met within 4 hours after exposure.

Vibration - Categories PKS

Maximum vibration limits are: 0.08" double amplitude from 5 Hz to 22 Hz
2.0G constant acceleration from 22 Hz to 200 Hz
1.5G constant acceleration from 200 Hz to 500 Hz
0.25G constant acceleration from 500 Hz to 2000 Hz

Not Applicable - Category X

The following six Environmental Conditions do not normally exist in Civil Aircraft, when recognized installation practices are adhered to, and are therefore not tested.

Explosion - Category X
Waterproofness - Category X
Hydraulic Fluid - Category X
Sand And Dust - Category X
Fungus Resistance - Category X
Salt Spray - Category X

1.5 Continued

Magnetic Effect - Category Z

With this equipment operating, it may be placed at a distance less than 0.3 meter from a free magnet with a 1^{o}, or less, deflection of the magnet.

Power Input - Category B

This equipment is designed for use in aircraft electrical systems supplied by an engine driven alternator/rectifiers or DC generator with a battery of significant capacity floating on the DC bus at all times.

		28V System	14V System
Normal Operating Conditions (Vdc) are:	Maximum	30.3	15.1
	Nominal	27.5	13.8
	Minimum	24.8	12.4
	Emergency Operation	20.0	10.0

Voltage Spike - Category B

This equipment has been designed to withstand the transient voltage characteristics specified by RTCA Document DO 160.

Audio Frequency Conducted Susceptibility - Category B

This equipment has been designed and tested to assure compliance with the requirements of RTCA Document DO 160.

Electromagnetic Compatibility - Category A

Note: For this series of tests, equipment Interconnecting Cables and RF transmission lines were constructed in accordance with Section 2 of this manual.

1. Induced Signal Susceptibility - This equipment has been designed to withstand the effects of audio frequency electric and magnetic fields and induced voltage spikes as specified by Category A.
2. Radio Frequency Susceptibility - This equipment has been tested and is not affected by interference from other on board electronic equipment which meet Category A, Emission of Radio Frequency Energy Test of RTCA Document DO 160.
3. Emission of Radio Frequency Energy - This equipment has been tested and does not emit radio frequency energy in excess of that specified.

1.6 UNITS AND ACCESSORIES SUPPLIED

The following tables may be used to:

1. Check the contents of your order and,
2. To order additional components

Table 1.1 is used for ordering Units, refer to the Unit's Part Number and its Unit Description. There is no need to order an Installation Kit as it is automatically included with its associated Unit.

Table 1.2 may be used for ordering additional kits or detail parts of the kit. The quantity column lists the quantity of each part contained in the kit.

TABLE 1.1 UNITS AVAILABLE

Unit Part Number	Unit And Description	Supplied With Installation Kit Part Number
03740-0300	CP 135M TSO with Marker Beacon Receiver Built-IN	03740-0500
03740-0301	CP 135 TSO for Remote Marker Beacon Receiver	03740-0501
03740-0302	CP 136M TSO with Marker Beacon Receiver Built-In	03740-0500
03740-0303	CP 136 TSO for Remote Marker Beacon Receiver	03740-0501

TABLE 1.2 INSTALLATION KITS

Item	Part Number	Description	Qty per Kit 03740- 500	501
1	54731-0102	TRAY	1	1
2	54733-0001	CONNECTOR, 50 pin, PC, with Key item 17	1	1
3	82814-0007	SCREW, Mach, Bind Hd, Sl, 4-40 x 7/16	2	2
4	04831-0002	LABEL, Pushbutton	1	1
5	82017-0001	CLAMP, Cable, Miniature, Tie wrap	2	2
6	54572-0101	RF CABLE ASS'Y, MKR Antenna	1	0
7	81324-0004	WASHER, Lock, Split, No. 4	2	2
8	82815-0007	SCREW, Mach, Bind Hd, Sl, 6-32 x 7/16	1	1
9	82802-0005	WASHER, Lock, Int. Tooth, No. 6	3	3
10	82900-0008	NUT, Hex, 6-32	3	3
11	99090-0002	PAD, Spacer, 9/16 square x 3/32 thick	2	2
12	82977-0007	SCREW, Mach, 100° Flat Hd, Sl, 6-32 x 1/2	2	2
13	04831-0001	LABEL, Switch Identification	1	1
14	54730-0101	COVER, Connector	1	1
15	04827-0001	LABEL SET, Switch Identification	1	1
17		KEY, Connector Polorization (comes with item 2)	1	1

1.7 ACCESSORIES REQUIRED BUT NOT SUPPLIED

For proper operation of the CP 135 and CP 136 TSO, the following accessories are required.

a. Antenna - Narco Avionics VMA-15 or equivalent (Int. MKR only)
b. Loudspeaker/Headphones
   1. Loudspeaker - voice coil impedance, 4 ohms
   2. Headphones - high impedance type, 300 or 600 ohms
c. Microphone - Narco Avionics M700B or equivalent
d. Narco Avionics NAV 124, NAV 124A, or MKR 101R when Internal MKR is not installed

1.7.1 Miscellanious Items Required But Not Supplied

Refer to Installation Section for additional details.

a. Sufficient length of 22 AWG stranded hookup wire.
b. Sufficient length of RG-58 A/U coaxial cable (Int. MKR only).

1.8 OPERATOR LICENSE REQUIREMENTS

There are no operator license requirements.

1.9 OPERATION

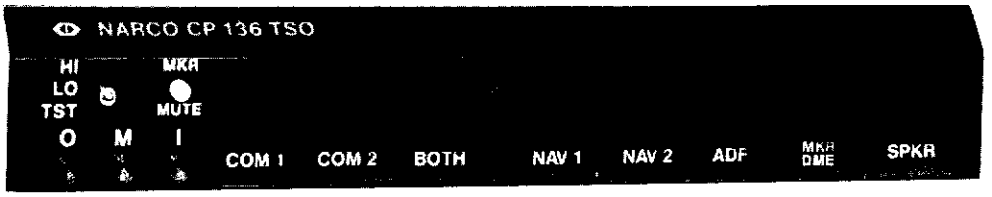


FIGURE 1-1. CP 136 TSO FRONT PANEL

1.9.1 HI-LO-TST Switch

The Marker Beacon Receiver sensitivity is selected by HI or LO sensitivity settings. The momentary TST position lights the OMI lamps for test purposes. When the optional Marker Beacon Receiver is installed and the DME/MKR and SPKR pushbuttons are selected, a steady tone will be heard on the speaker and headphones.

1.9.2 OMI Lamps

These lamps are the Marker Beacon identifiers. The appropriate OMI lamp will light upon receipt of a signal from the Marker Beacon Receiver.

1.9.3 MKR Mute Switch

The MKR MUTE switch allows the pilot to mute or disable the MKR audio output for a period of 10 to 14 seconds. This time duration is long enough to allow the MKR audio to remain muted as the aircraft passes over a marker beacon transmitter, yet short enough to permit reactivation of the MKR audio before the next Marker Beacon is reached. The MKR MUTE switch is spring loaded and requires only momentary contact.

1.9.4 Pushbutton Operation

Pushing a button IN closes that circuit and lights that button. The button is held in the IN position by a lock. A second push releases the lock and allows the button to pop out and open the circuit.

1.9.5 COM 1 and COM 2 Pushbuttons

The COM 1 and COM 2 pushbuttons are the only two pushbuttons that are interlocked. Depressing one button causes the other to release or vice versa. Depressing either the COM 1 or COM 2 button allows that particular COM transceiver to be used for transmit and receive modes of operation. Thus received audio, transmitter keying, microphone audio, and sidetone are all simultaneously selected via one pushbutton.

1.9.6 BOTH Pushbutton

Depressing the BOTH pushbutton permits the audio from both COM receivers to be heard on the speaker and/or headphones simultaneously. It does not void the selection of the COM transmitter selected by the COM 1 or COM 2 pushbutton.

1.9.7 Navigation Receiver Selection Pushbuttons

Four pushbuttons are provided for navigation receiver selection. Depressing one or more of these pushbuttons permits the low level audio signal from the selected unit(s) (NAV 1, NAV 2, ADF and DME/MKR) to be routed to the isolation combining circuits of the audio panel.

1.9.8 SPKR Pushbutton CP 135 Only

Depressing the SPKR pushbutton connects the combined audio signals from all the selected units to an output terminal on the rear panel connector. This output is designed to feed the AUX AUDIO input of a COM unit which is used as a cabin speaker amplifier. When a transmitter is keyed, all the receive audios at this terminal will be automatically muted except UNSWITCHED AUDIO. The SPKR pushbutton has no effect on headphone output which is available from another terminal on the rear panel connector. The headphone audio output is automatically switched to sidetone audio whenever a COM transmitter is keyed.

1.9.9 SPKR Pushbutton CP 136 Only

Depressing the SPKR pushbutton connects the combined audio signals from all the selected units to the input of the internal cabin speaker amplifier. The output of this amplifier is 10 watts across a 4 ohm speaker.

1.10 COMPATIBILITY

The CP 135 and CP 136 are not interchangeable with other Narco Audio Panels. The CP 135 and CP 136 are interchangeable in that they use the same rear panel connector and all the wired system functions, intercom, and headphones will operate. However, if a CP 136 is inserted into a system that has been wired for a CP 135, the internal speaker amplifier of the CP 136 will not operate. If a CP 135 is inserted into a system that has been wired for a CP 136 there will be no speaker audio.

1.11 SYSTEMS

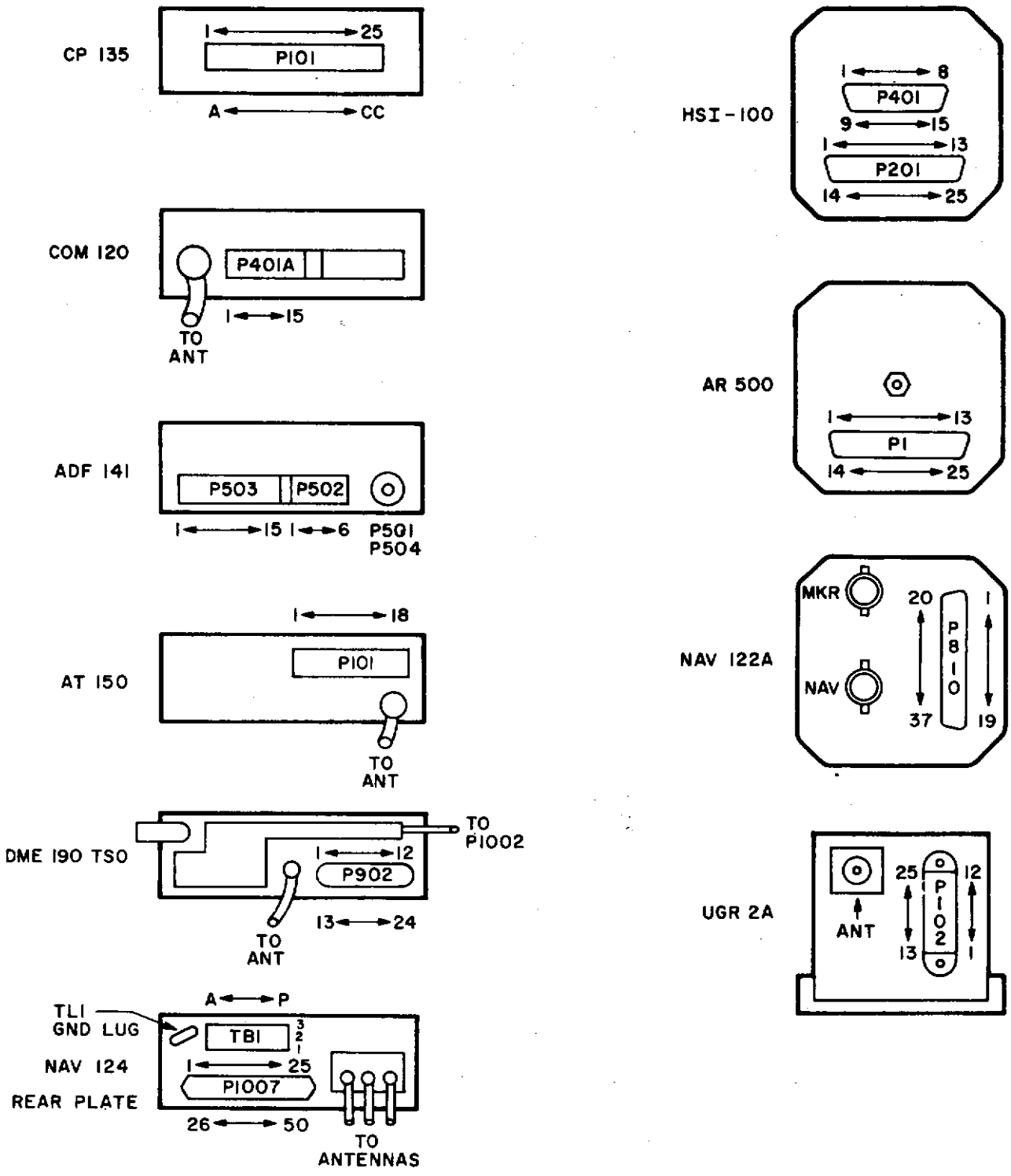
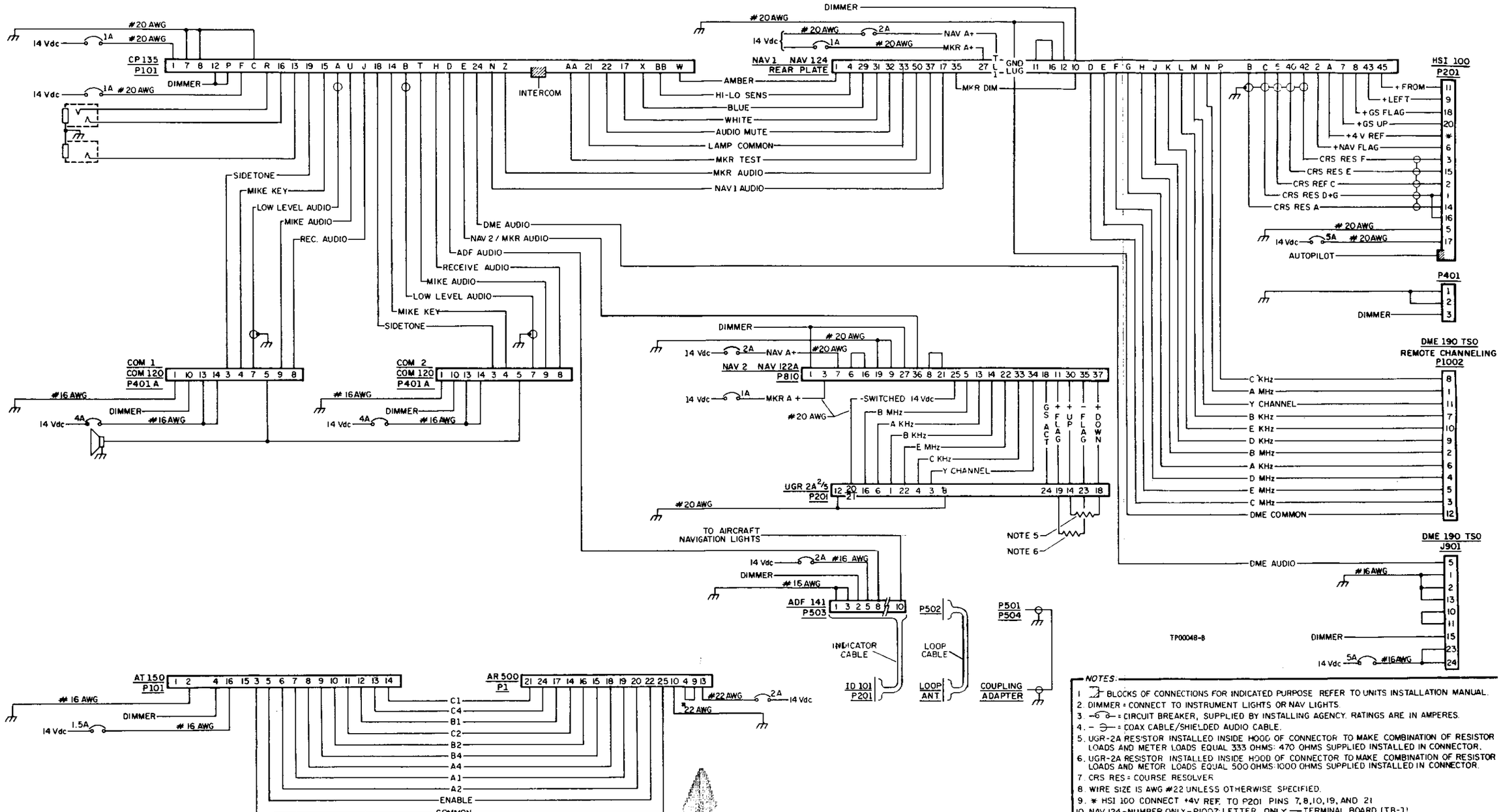


FIGURE 1-2. AVIONICS CONNECTOR IDENTIFICATION AND PIN SEQUENCE



NOTES:
1. ⊐ BLOCKS OF CONNECTIONS FOR INDICATED PURPOSE REFER TO UNITS INSTALLATION MANUAL.
2. DIMMER = CONNECT TO INSTRUMENT LIGHTS OR NAV LIGHTS.
3. —o o— = CIRCUIT BREAKER, SUPPLIED BY INSTALLING AGENCY. RATINGS ARE IN AMPERES.
4. — ∋ = COAX CABLE/SHIELDED AUDIO CABLE.
5. UGR-2A RESISTOR INSTALLED INSIDE HOOD OF CONNECTOR TO MAKE COMBINATION OF RESISTOR LOADS AND METER LOADS EQUAL 333 OHMS: 470 OHMS SUPPLIED INSTALLED IN CONNECTOR.
6. UGR-2A RESISTOR INSTALLED INSIDE HOOD OF CONNECTOR TO MAKE COMBINATION OF RESISTOR LOADS AND METOR LOADS EQUAL 500 OHMS: 1000 OHMS SUPPLIED INSTALLED IN CONNECTOR.
7. CRS RES = COURSE RESOLVER
8. WIRE SIZE IS AWG #22 UNLESS OTHERWISE SPECIFIED.
9. * HSI 100 CONNECT +4V REF TO P201 PINS 7, 8, 10, 19, AND 21
10. NAV 124 - NUMBER ONLY - P1007; LETTER ONLY — TERMINAL BOARD (TB-1)

FIGURE 1-3. SYSTEM INTERCONNECT WIRING FOR 14V AIRCRAFT

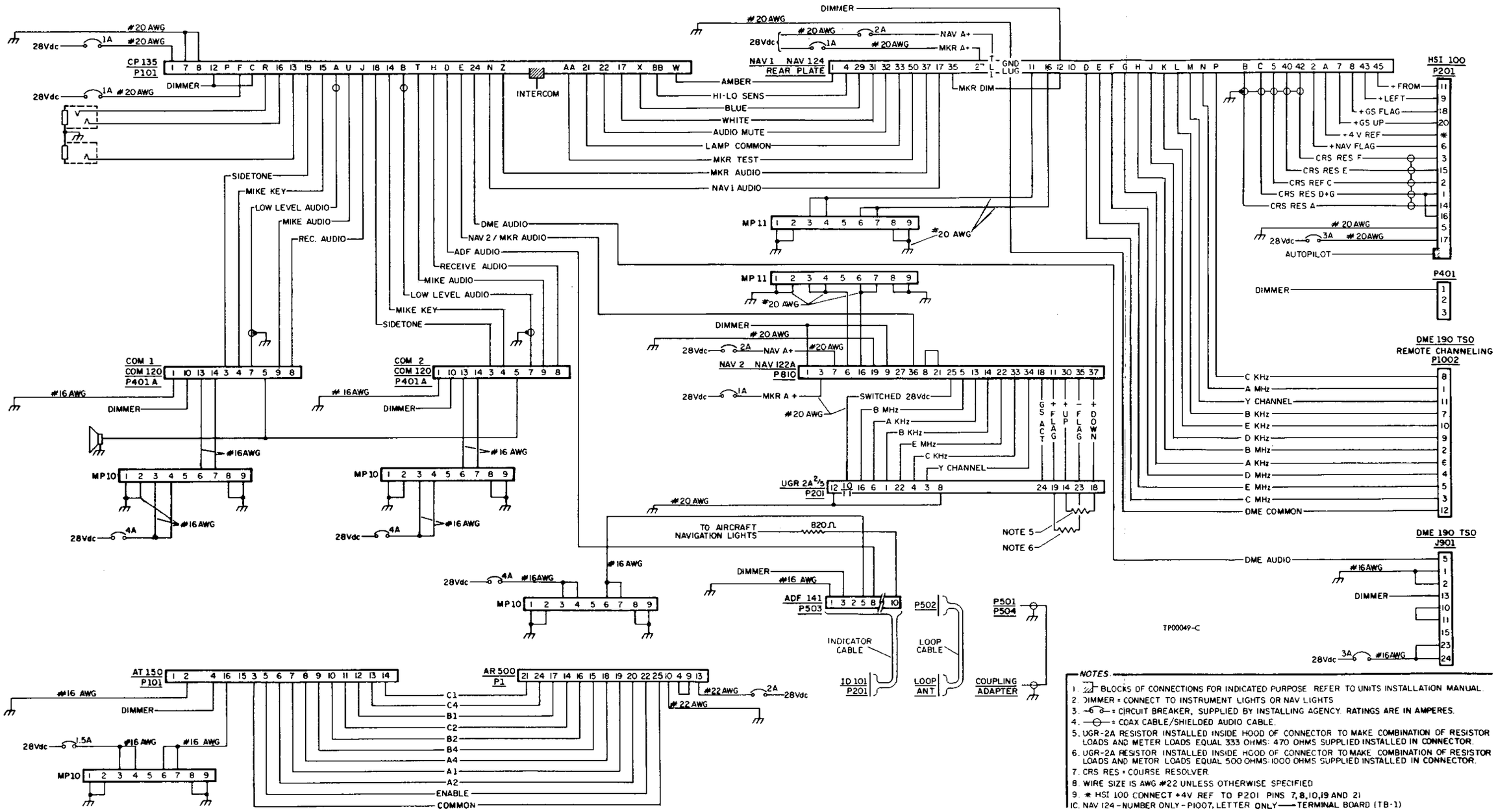


FIGURE 1-4. SYSTEM INTERCONNECT WIRING FOR 28V AIRCRAFT

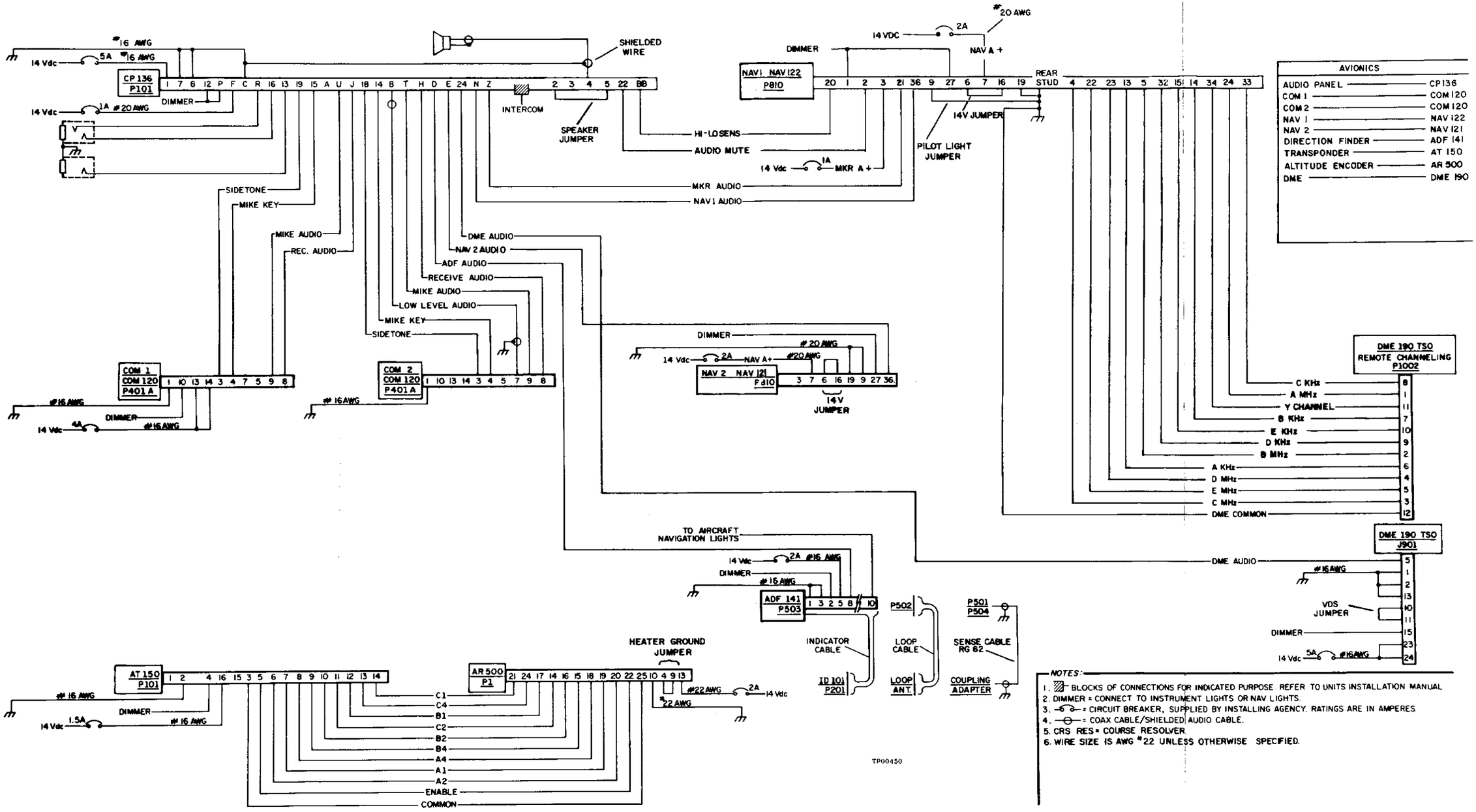


FIGURE 1-5. CENTERLINE WIRING DIAGRAM, 14V AIRCRAFT

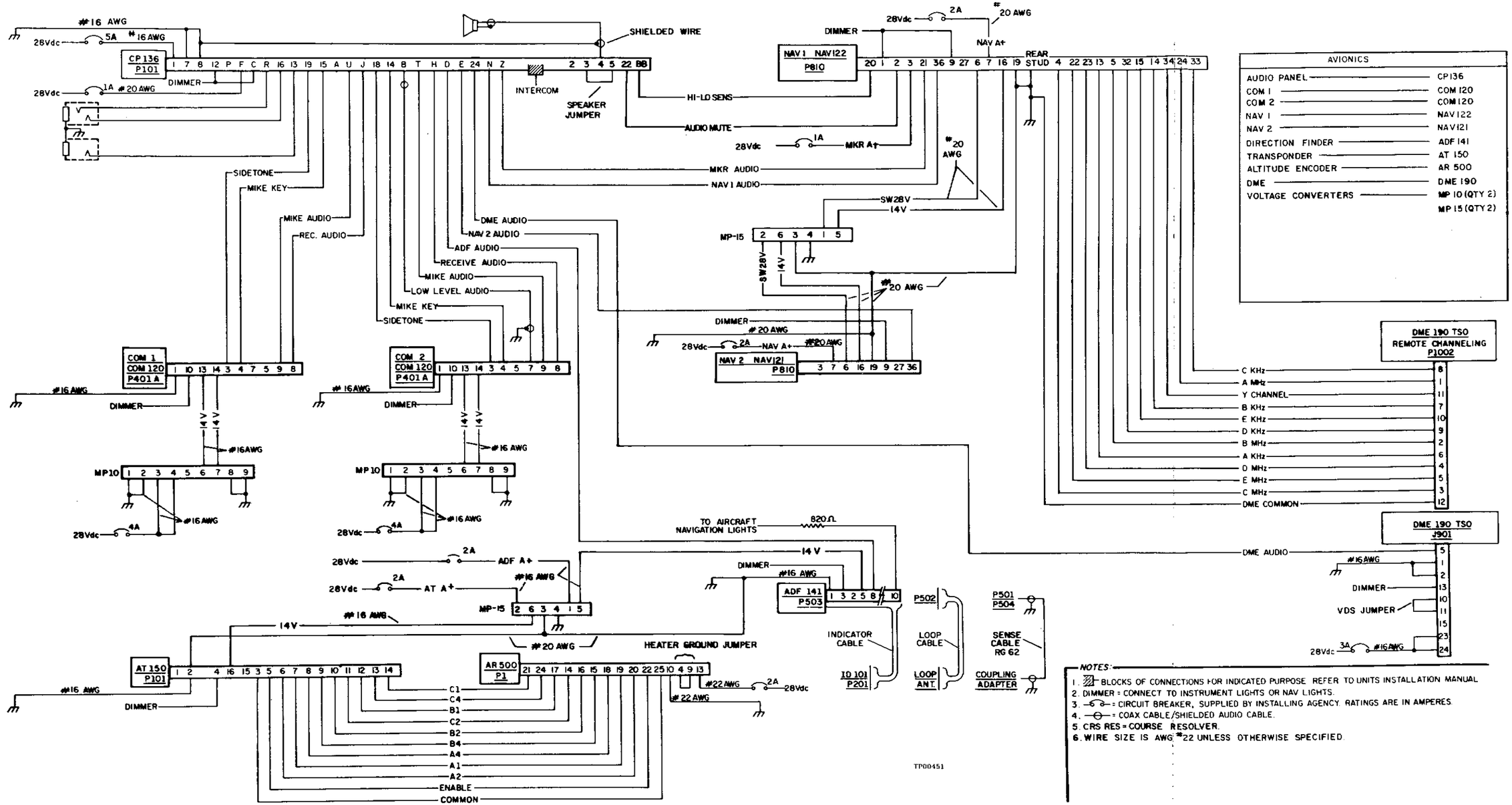


FIGURE 1-6. CENTERLINE WIRING DIAGRAM, 28V AIRCRAFT

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

LIST OF TABLES

2.1 INTRODUCTION

This section provides the necessary information for the installation of the CP 135 TSO and CP 136 TSO and, where required, optional accessories. The mechanical and electrical sections are self-supporting and may be removed from the manual to permit the mechanical and electrical installation efforts to proceed simultaneously.

2.2 PRELIMINARY INSPECTION

2.2.1 Unpacking

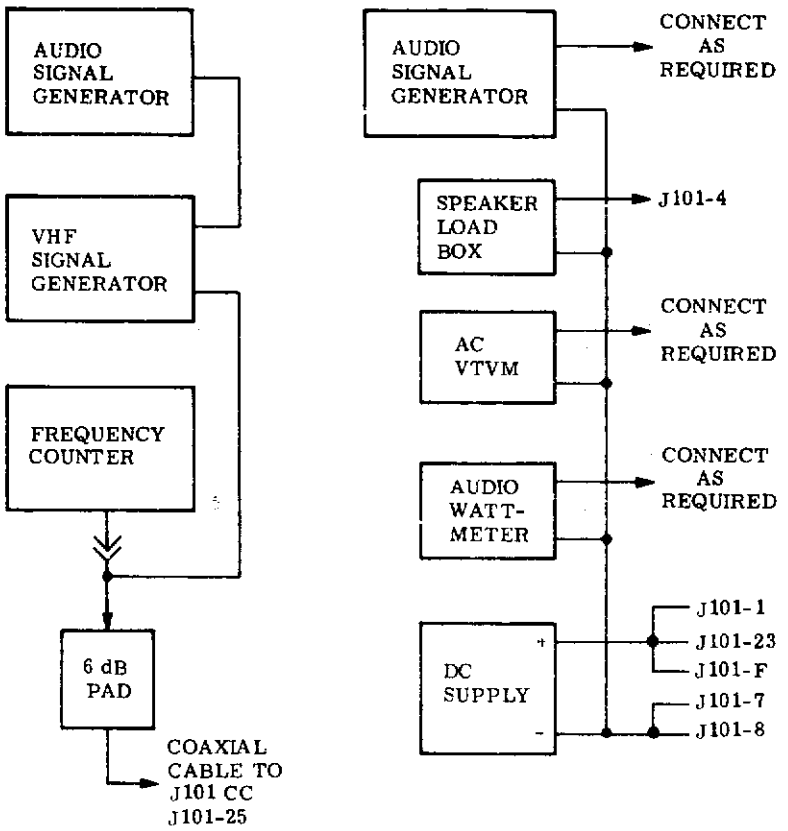
Carefully unpack the unit and inspect it for any damage that may have occured during shipment. Refer to Section 1.6, Units and Accessories Supplied, and inventory the contents of the Installation Kit. Refer to Section 1.7, Accessories Required but NOT Supplied for a listing of items required for proper installation.

2.2.2 Electrical Bench Test

2.2.2.1 Test Equipment Required

a. VHF Signal Generator: HP Model 608D or equivalent.
b. Audio Signal Generator: HP Model 200CD or equivalent.
c. Frequency Counter: HP Model 5246L equipped with Prescaler Plug-In Model 5252A or equivalent.
d. Regulated DC supply with 0 to 30 Vdc at 2 ampere capability: Power Design Model 3650 or equivalent.
e. AC VTVM.
f. Speaker Load Box with 15 watt capability.
g. 6 dB pad.
h. Audio Wattmeter: General Radio Model 583A.
i. Field fabricated test cable.

A versatile test cable for use between the CP 135 or CP 136 and the test equipment may be fabricated by hand wiring. Only the DC power, speaker, and phones outputs need to be part of the cable. The remaining inputs and outputs may be made by soldering a length of number 16 bus wire to a contact and forming a loop at the free end. Thus connections can be quickly made to the loop by use of miniature alligator clips or similar test clips. An additional connector may be purchased from NARCO. The part number is listed in Section 1, Table 1.2 Installations Kits.



P101

MKR GROUND	25 CC	MKR ANTENNA
DME IN	24 BB	MKR SENSITIVITY
MKR 14/28V	23 AA	MKR TEST
MKR MUTE	22 Z	MKR AUDIO IN
MKR LAMP COMMON	21 Y	MKR DIM
SPARE	20 X	MKR LAMP-BLUE
COM 1 SIDETONE	19 W	MKR LAMP-AMBER
COM 2 SIDETONE	18 V	SPARE
MKR LAMP-WHITE	17 U	COM 1 MIKE AUDIO OUT
MIKE JACK KEY	16 T	COM 2 MIKE AUDIO OUT
COM 1 KEYOUT	15 S	SPARE
COM 2 KEYOUT	14 R	MIKE JACK AUDIO
PHONES OUT	13 P	14V DIM
PUSHBUTTON DIM	12 N	NAV 1 IN
INTERCOM 2	11 M	INTERCOM 4
INTERCOM 1	10 L	INTERCOM 3
EXT. SPKR	9 K	SPARE
GROUND	8 J	COM 1 IN
GROUND	7 H	COM 2 IN
UNSWITCHED AUDIO	6 F	14/28VA
*SPKR IN	5 E	NAV 2 IN
CABIN SPKR	4 D	ADF IN
*28V SPKR OUT	3 C	28V DIM
*14V SPKR OUT	2 B	LOW LEVEL OUT
14/28VB	1 A	LOW LEVEL OUT - CP 135 only

*JUMPER J101-2 TO J101-5
IN 14V INSTALLATIONS
JUMPER J101-3 TO J101-5
IN 28V INSTALLATIONS
CP 136 ONLY

FIGURE 2-1. BENCH TEST SET-UP

2.2.2.2 Test Procedure

This procedure assumes that the internal audio input level controls have not been changed from the factory settings and the pushbuttons are labeled as in Figure 1-1.

a. Connect the unit into the test set-up diagramed in Figure 2-1. When testing a CP 136 the eventual aircraft bus voltage must be considered with regard to connection of the internal speaker amplifier output. The speaker load box is always connected between CABIN SPKR J101-4 and ground. If the CP 136 is to be installed in an aircraft with a 14 Vdc electrical system, an external jumper must be provided between 14V SPKR OUT J101-2 and SPKR IN J101-5. If the CP 136 is to be installed in an aircraft with a 28 Vdc electrical system, an external jumper must be provided between 28 V SPKR OUT J101-3 and J101-5. Set the DC supply to match the anticipated aircraft bus voltage (14 or 28 Vdc).
b. Intercom and Unswitched Audio
   1. Connect the audio generator through a DC blocking capacitor to J101-10 (INTERCOM 1) set to 0.5V at 1 kHz. Connect the audio wattmeter to J101-3 (PHONES OUT). Monitor 50 mW on the wattmeter.
   2. Disconnect the audio generator and capacitor from J101-10 (INTERCOM 1) and in succession, connect them to J101-11 (INTERCOM 2), J101-L (INTERCOM 3), and J101-M (INTERCOM 4). Monitor 50 mW on the wattmeter for each intercom input tested.
   3. Connect the audio generator to J101-6 (UNSWITCHED AUDIO) and set it for 1 kHz at 3.5V. Monitor 50 mW on the wattmeter.
c. COM 1 and COM 2 Sidetone
   1. Connect the audio generator to J101-19 (COM 1 SIDETONE) and set it for 1 kHz at 3.5V. Depress the COM 1 pushbutton. Ground J101-16 (MIKE KEY). Monitor 50 mW on the wattmeter.
   2. Repeat Step 1 with the audio generator connected to J101-18 (COM 2 SIDETONE) and the COM 2 pushbutton depressed. Monitor 50 mW on the wattmeter.
d. Switched Audio - COM 1, COM 2, BOTH, NAV 1, NAV 2, ADF, and DME/MKR
   1. Connect the audio generator to J101-J (COM 1 IN) set to 3.5V at 1 kHz. Depress the COM 1 pushbutton and the SPKR pushbutton. Connect the AC VTVM to J101-A or J101-B (LOW LEVEL OUT). Monitor 0.35V rms on the VTVM; Monitor 10W on the Speaker Load Box (CP 136).
   2. Repeat Step 1 with the audio generator connected to J101-H (COM 2 IN) and the COM 2 pushbutton depressed. Monitor 0.35V rms on the VTVM. Monitor 10W on the Speaker Load Box (CP 136).
   3. Repeat Steps 1 and 2 with COM 1 and COM 2 pushbuttons out and the BOTH pushbutton depressed.
   4. Connect the audio generator to J101-N (NAV 1) set to 3.5V at 1 kHz. Depress the NAV 1 pushbutton. Monitor 0.35V rms on the VTVM. Monitor 10W on the Speaker Load Box (CP 136).
   5. Connect the audio generator to J101-E (NAV 2). Depress the NAV 2 pushbutton. Monitor 0.35V rms on the VTVM. Monitor 10W on the Speaker Load Box (CP 136).

2.2.2.2 Continued

6. Connect the audio generator to J101-D (ADF IN). Depress the ADF pushbutton. Monitor 0.35V rms on the VTVM. Monitor 10W on the Speaker Load Box (CP 136).
7. Connect the audio generator to J101-24 (DME AUDIO). Depress the DME/MKR pushbutton. Monitor 0.35V rms on the VTVM. Monitor 10W on the Speaker Load Box (CP 136).
8. Connect the audio generator to J101-Z (MKR AUDIO IN). Monitor 0.35V rms on the VTVM. Monitor 10W on the Speaker Load Box (CP 136).
9. Alternately disconnect, then reconnect J101-F, 14/28A and J101-1 14/28VB. Monitor 0.35V rms on the meter even though one of the A+ voltages is disconnected.

a. Optional Marker Beacon Receiver

1. Interconnect the Audio Signal Generator, VHF Signal Generator, Frequency Counter, and 6 dB pad as illustrated in Figure 2-1.
2. Tune the VHF Generator to 75 MHz $\pm$ 1.0 kHz; modulate the generator 95% at 1300 Hz. Set the VHF generator output level to 400 uV.
3. Set the HI-LO-TST switch to the HI position. Connect the test equipment to J101-CC (MKR ANT) and J101-25 (MKR GND). The amber light should come on.
4. Set the HI-LO-TST switch to the LO position. Increase the VHF generator output level to 2000 uV. The amber light should come on.
5. Repeat Step 4 with VHF generator modulated at 400 Hz to light the blue lamp and 3000 Hz to light the white lamp.
6. Connect and set the test equipment as described on Steps 1 and 2. Connect the AC VTVM to J101-A or J101-B (LOW LEVEL OUT). Monitor 0.35V rms on the VTVM. Monitor 10W on the Speaker Load Box (CP 136).
7. Momentarily depress the MKR MUTE button. The VTVM or the Speaker Load Box should read zero then gradually increase to full output in approximately 10 to 14 seconds.
8. Disconnect the Audio Signal Generator, VHF Signal Generator, Frequency Counter, and 6 dB pad. Hold the HI-LO-TST switch in the TST position. Monitor 0.1V rms on the VTVM.

2.2.3 System Audio Levels

The CP 135 and CP 136 internal audio input level controls are factory-set to accept audio input levels produced by the current line of Narco Communications and Navigation Equipment. In the event that a unit contained in the aircraft communication and navigation system produces an audio output level less than 3.0V rms or greater than 4.0V rms, the audio input level control associated with that particular input should be adjusted accordingly, until the CP 135 and CP 136 audio output levels meet specified values. For input levels less than 3.0V rms the control should be turned clockwise; for input levels greater than 4.0V rms, the control should be turned counterclockwise.

2.2.3 Continued

This adjustment may be accomplished by using the particular unit or an audio signal generator set to match the unit's audio output level. Refer to paragraph 2.2.2.2 for set-up procedure and Figure 2-2 for location of the audio input level controls.

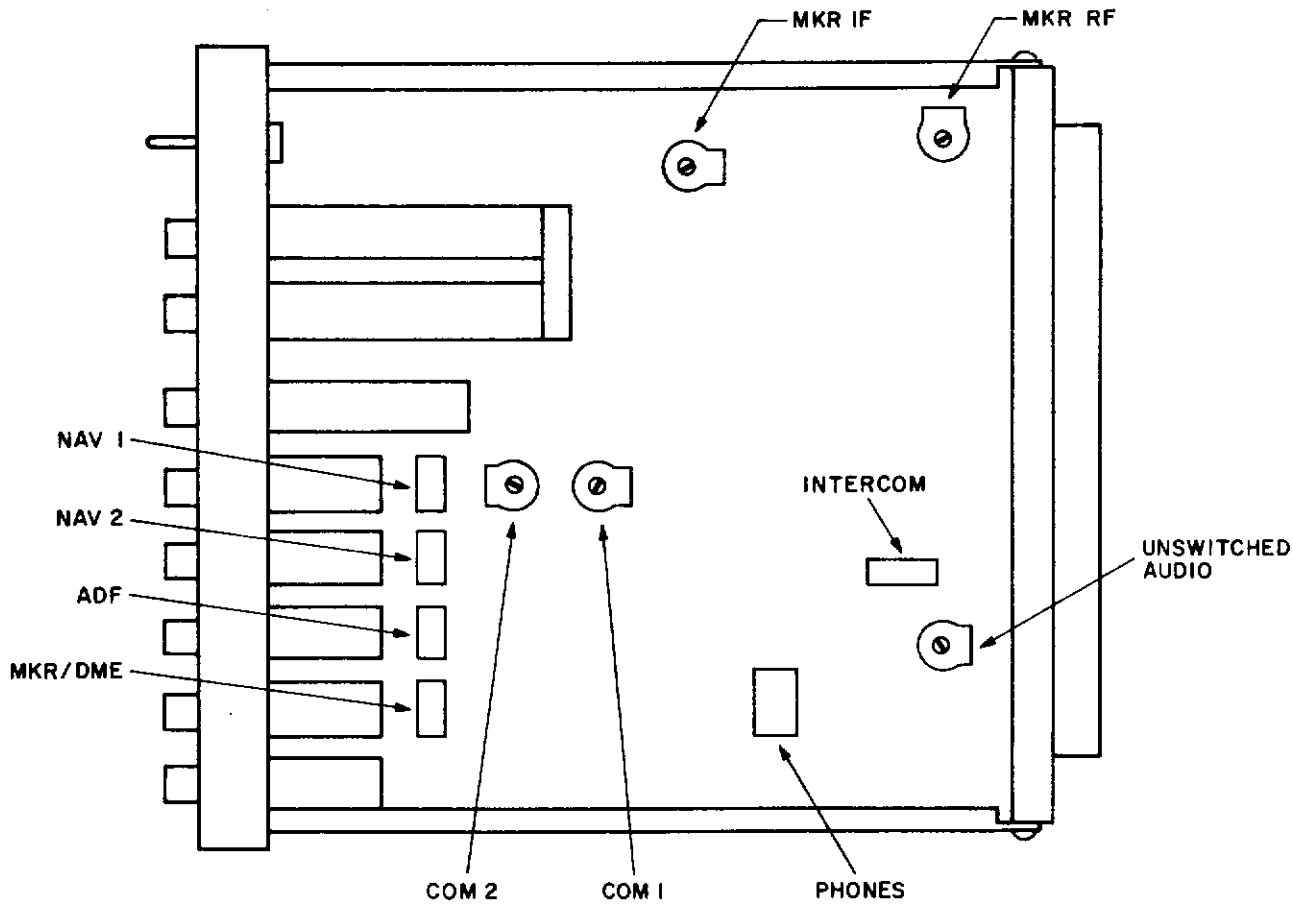


FIGURE 2-2. AUDIO INPUT LEVEL AND MKR SENSITIVITY CONTROLS

2.3 MECHANICAL INSTALLATION

2.3.1 Mounting Tray

The CP 135 and CP 136 are supplied with a mounting tray which is designed to mount behind the aircraft instrument panel using three number 6 screws. Figure 2-3 provides a detailed drawing of the tray and the parts of the Installation Kit. This figure also provides all the necessary dimensions for the panel cutout as well as dimensions for mounting bracket locations. A full scale panel cutout template is also provided.

Mounting brackets (3) are not supplied due to the wide range in mounting requirements. Suitable mounting brackets may be fabricated from ordinary sheet metal or angle stock.

To ensure a sturdy mount, rear support for the unit should be provided.

The tray must be provided with a good electrical ground to the airframe.

2.3.2 Insertion And Removal Of The CP 135 And CP 136

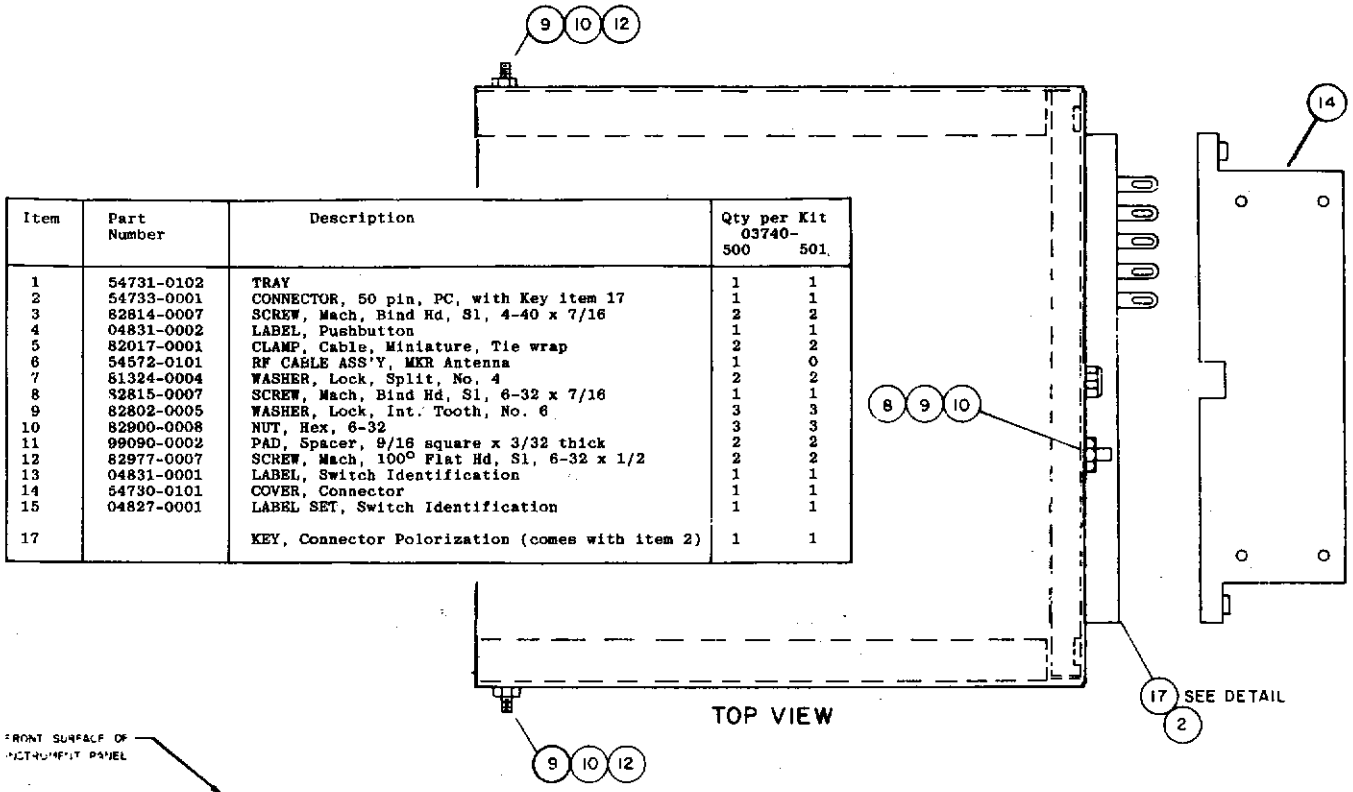
The CP 135 and CP 136 are secured to the mounting tray by a allen head ramping screw running from the front panel to the rear of the unit and a self-locking nut attached to the tray rear panel. The access hole for the ramping screw is located on the front panel between the BOTH and NAV 1 pushbuttons (see Figure 1-1).

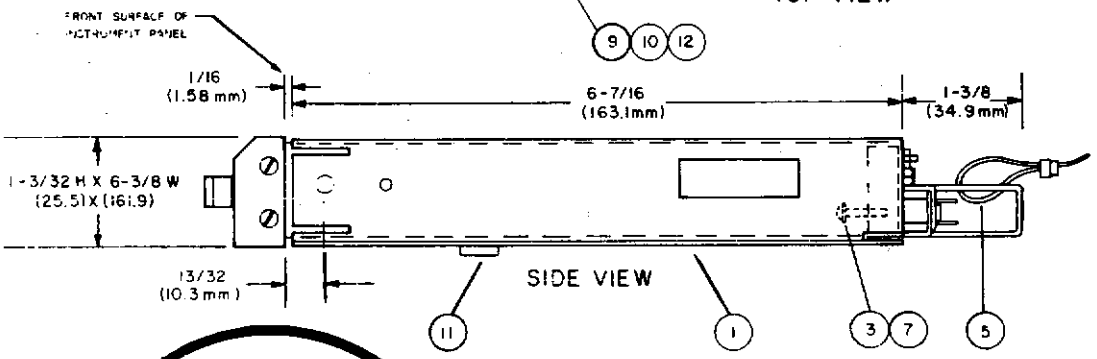
Slide the unit straight into the tray until the ramping screw contacts the self-locking nut. Using a 5/64" Allen wrench, turn the screw clockwise until the mating connector is engaged and the unit is firmly secured in the tray.

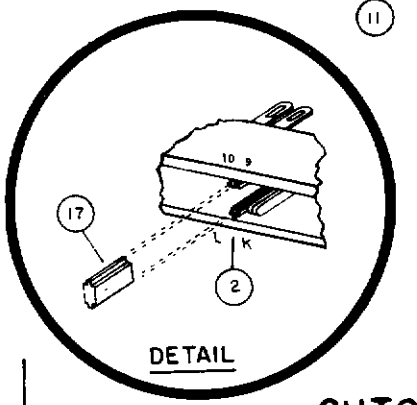
DO NOT RAM THE UNIT INTO THE TRAY OR OVER TIGHTEN THE RAMPING SCREW.

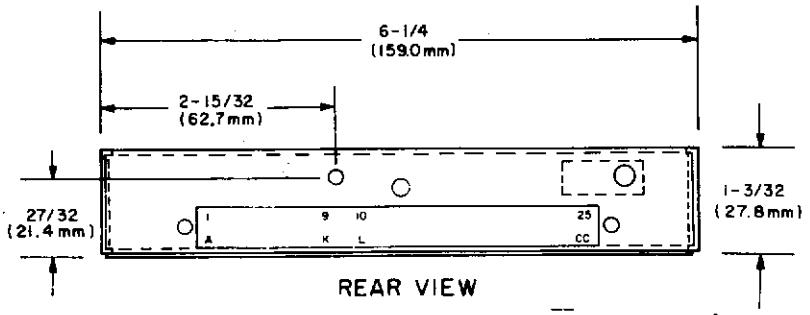
To remove the unit, turn the ramping screw counterclockwise until it is clear of the self-locking nut and then pull the unit straight out.

Item	Part Number	Description	Qty per Kit 03740-500	Qty per Kit 03740-501
1	54731-0102	TRAY	1	1
2	54733-0001	CONNECTOR, 50 pin, PC, with Key item 17	1	1
3	82814-0007	SCREW, Mach, Bind Hd, Sl, 4-40 x 7/16	2	2
4	04831-0002	LABEL, Pushbutton	1	1
5	82017-0001	CLAMP, Cable, Miniature, Tie wrap	2	2
6	54572-0101	RF CABLE ASS'Y, MKR Antenna	1	0
7	81324-0004	WASHER, Lock, Split, No. 4	2	2
8	82815-0007	SCREW, Mach, Bind Hd, Sl, 6-32 x 7/16	1	1
9	82802-0005	WASHER, Lock, Int. Tooth, No. 6	3	3
10	82800-0008	NUT, Hex, 6-32	3	3
11	99090-0002	PAD, Spacer, 9/16 square x 3/32 thick	2	2
12	82977-0007	SCREW, Mach, 100° Flat Hd, Sl, 6-32 x 1/2	2	2
13	04831-0001	LABEL, Switch Identification	1	1
14	54730-0101	COVER, Connector	1	1
15	04827-0001	LABEL SET, Switch Identification	1	1
17		KEY, Connector Polorization (comes with item 2)	1	1









CUTOUT TEMPLATE (1:1)

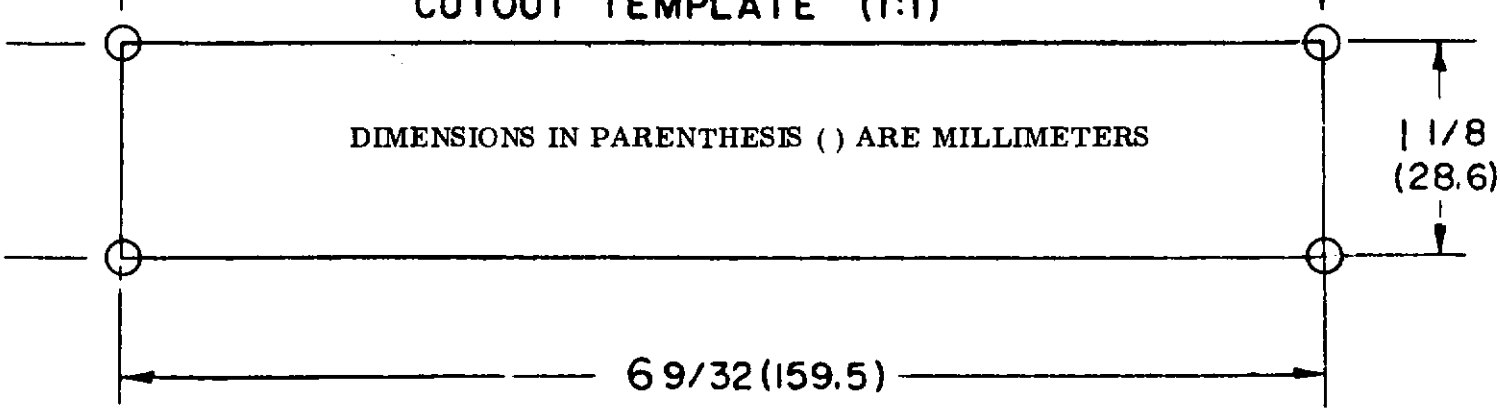


FIGURE 2-3. INSTALLATION DIAGRAM

2.4 ANTENNA INSTALLATION

If the CP 135 or CP 136 is equipped with an optional Marker Beacon Receiver, an antenna is required. Marker Beacon antennas vary widely in form and gain. Narco Avionics markets the VMA-15 Marker Beacon Antenna shown in Figure 2-4. This non-TSO'd, 50 ohm antenna provides 10 dB of gain with a single lobed, downward directed pattern. Rugged enough for use on all sub-sonic aircraft, the electrical elements are sealed by foamed-in-place resin, within a plastic housing. Additional information is presented in the VMA-15 Installation Manual.

Alternate antennas may be the Marker Beacon only type, as shown in Figure 2-5, or a combination ADF Sense/Marker Beacon Antenna. A recommended combination antenna is the Model AD92 marketed by Antenna Developments of Cleveland, Ohio.

Figure 2-5 shows a non-TSO'd off center fed antenna. This antenna should be located under, and spaced about six inches away from the fuselage by a pair of support masts. Note that the point where the lead-in is connected is displaced five inches from the center of the antenna wire. This dimension is important for proper impedance matching.

The Marker Beacon Antenna should be located as far aft as possible to reduce noise pick-up. Past experience has shown that placing the tap forward or aft of the center can make a large difference in the performance, due to capacity unbalances, etc. It is therefore recommended that the tap be moved to that side of center where the best reception occurs.

A shorter (quarter wave) bent-rod, shunt fed antenna mounted on the under surface of the aircraft has been found to be satisfactory if the feed point is adjusted for best reception.

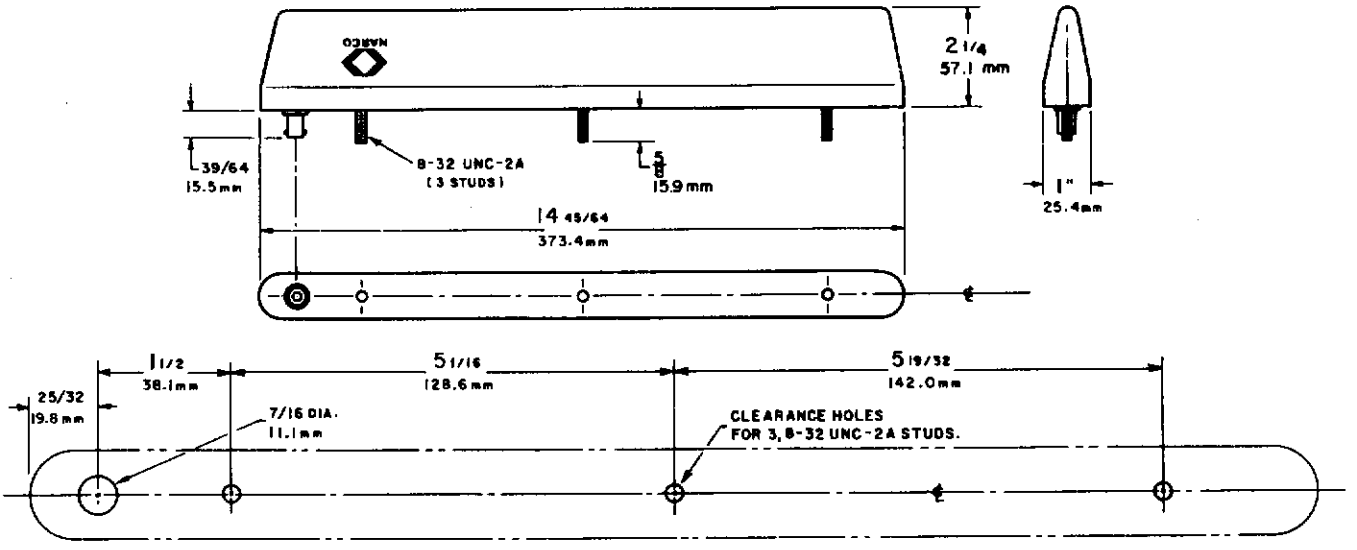


FIGURE 2-4. VMA-15 MARKER BEACON ANTENNA

2.4 Continued

The RG-58A/U antenna cable braid is connected to the metal skin or frame of the aircraft at a point opposite the connection to the antenna wire. The center conductor is connected to a feed-thru insulator, which in turn, is connected to the antenna BNC connector.

The proper method of assembling and soldering a BNC connector to the RG-58A/U cable is shown in Figure 2-6.

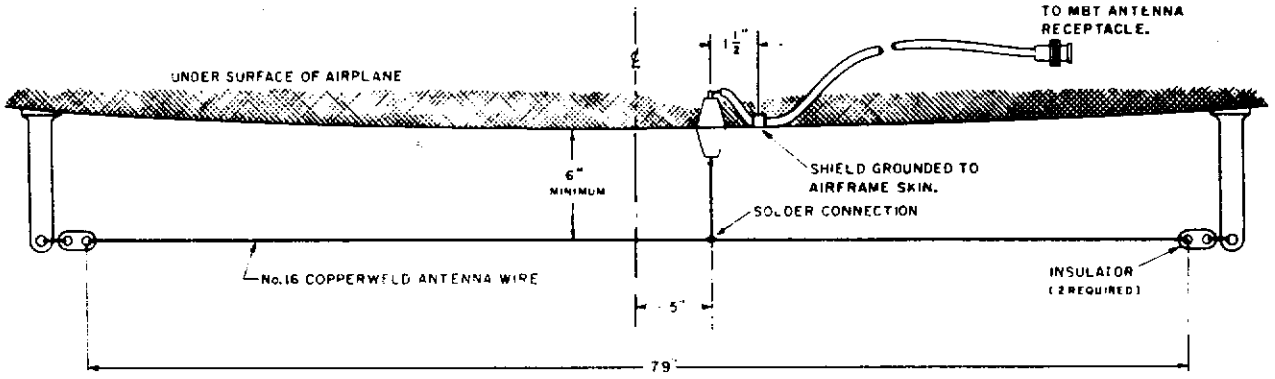
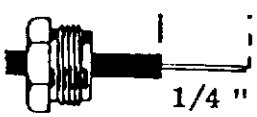
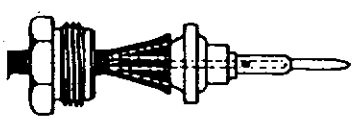


FIGURE 2-5. MARKER BEACON OFF-CENTER FED ANTENNA

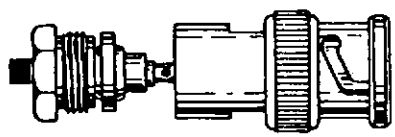


1. Take one clean square cut through cable insulation, braid and dielectric, exposing ¼" of conductor. Slip nut onto cable.

Courtesy of Bendix Corp.



2. Insert conductor into tapered, self-clamping sleeve and contact sub-assembly, force edge of sleeve between dielectric and braid until insulation rides well onto taper. Solder conductor to contact at solder hole.



3. Fit contact sub-assembly into connector body, screw nut into body, binding insulation and braid tightly against tapered sleeve . . . thus forming a strong, weatherproof connection.

All illustrations enlarged for clarity

FIGURE 2-6. RF CONNECTOR ASSEMBLY

2.5 ELECTRICAL INSTALLATION

Before proceeding with the electrical installation, refer to Table 2.1. This table relates system functions to the CP 135 and CP 136 control switches and rear panel connector J101 along with pertinent notes and references on each system function. Also included in Table 2.1 is a drawing of the audio panel front panel which identifies each control switch by number and the designation assigned on the 9/32" x 4-7/8" Switch Identification Label supplied in the Installation Kit. When planning an installation that requires switch designations in another sequence or different switch designations, the new designations should be written in the provided space to allow accurate panel labeling with the individual Switch Identification Labels provided in the Installation Kit. A check list should be compiled of J101 pin numbers that pertain to the installation. This list will aid in the initial wiring of the connector and in the final check out of the installation.

Figures 2-7 through 2-10 present separate 14 and 28 Volt general wiring diagrams for the CP 135 and CP 136. These diagrams feature the current line of Narco Communications and Navigation equipment.

2.5.1 14/28VA and 14/28VB

Both the CP 135 and CP 136 use separate A+ supplies to drive the cabin speaker and phones circuitry. Internal diode coupling provides that if either the 14/28VA (J101-F) or 14/28VB (J101-1) fails, the low level output will continue to operate.

2.5.2 Grounds

It is important that the audio panel be well grounded. The tray should be provided with a good electrical ground to the airframe. In addition, J101-7 and J101-8 are provided for ground connection. These pins should be grounded to the same point using separate 16 AWG wire.

2.5.3 Dimmer Connections

Four dimmer lead connections are provided:

1. J101-P, 14V DIM
2. J101-C, 28V DIM (connect to ground in 14V installations)
3. J101-Y, MKR DIM
4. J101-12, PUSHBUTTON DIM

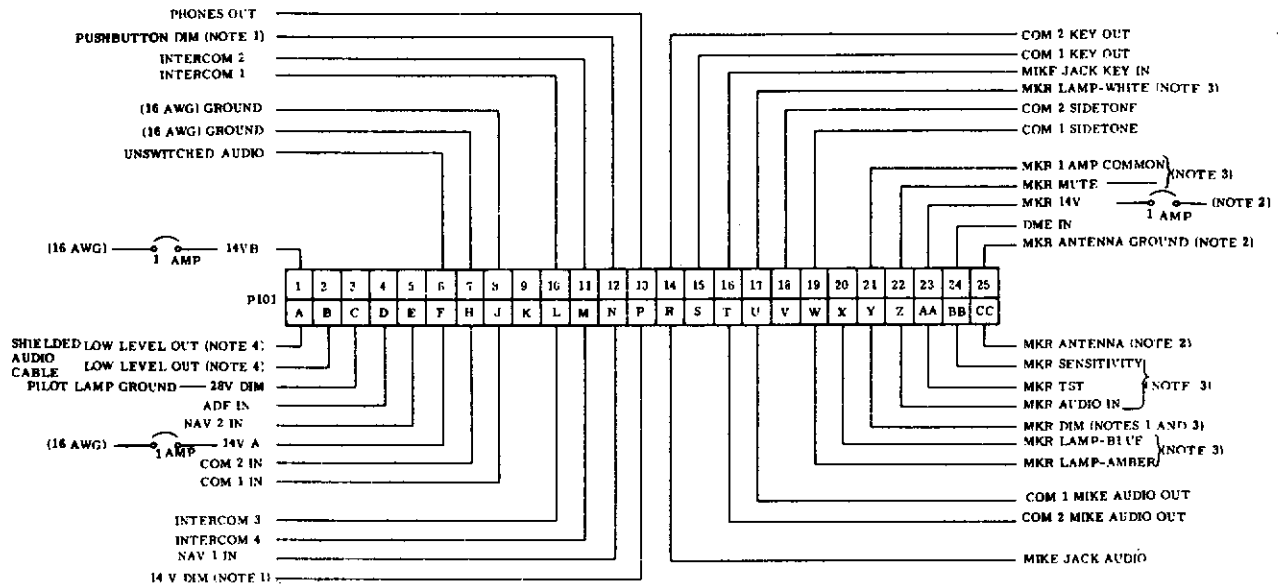
The PUSHBUTTON DIM and the MKR DIM may be connected together with either the 14V DIM(14V electrical systems) or the 28V DIM (28V electrical systems) to the aircraft dimmer bus. When connected this way, the pilot lamps will be continuously adjustable; the MKR lamps and pushbutton LED's will dim when the dimmer voltage reaches approximately 2 volts, then maintain the same intensity despite further voltage change.

Alternately, the MKR DIM and PUSHBUTTON DIM may be connected to the navigation lights. When the navigation lights are turned on the MKR lamps and pushbutton LED's will come on dimmed.

TABLE 2.1 SYSTEM FUNCTION/PIN/SWITCH RELATIONSHIP

◎ OMI	SW 1	SW 2	SW 3 Both COM	SW 4	SW 5	SW 6	SW 7	SW 8 SPKR
	COM 1	COM 2		NAV 1	NAV 2	ADF	DME/MKR	

SYSTEM FUNCTION	CONTROL SWITCH	J101 PIN NO.	NOTES
Power Connection:			
Ground	----------	J101-7	Refer to paragraph 2.5.2
Ground	----------	J101-8	
14/28VA	----------	J101-F	Refer to paragraph 2.5.1 and paragraph 1.4 specifications for circuit breaker rating
14/28VB	----------	J101-1	
14V Dim	----------	J101-P	Refer to paragraph 2.5.3
28V Dim	----------	J101-C	
Pushbutton Dim	----------	J101-12	
Rec. Audio Connections:			
COM 1 In	Switch 1	J101-J	Connect to system low level audio outputs
COM 2 In	Switch 2	J101-H	
NAV 1 In	Switch 4	J101-N	
NAV 2 In	Switch 5	J101-E	
ADF In	Switch 6	J101-D	
DME In	Switch 7	J101-24	
Intercom And Unswitched Audio Connections:			
Intercom 1 In	----------	J101-10	Refer to paragraph 2.5.7 for various intercom connection diagrams
Intercom 2 In	----------	J101-11	
Intercom 3 In	----------	J101-L	
Intercom 4 In	----------	J101-M	
Unswitched Audio In	----------	J101-6	Connect to emergency warning signals such as helicopter engine off
Audio Output Connections:			
Low Level Out	Switch 8 Speaker	J101-A, J101-B	Connect to COM aux audio input or other high level amplifier. For dual COM installations aux audio inputs may be connected in parallel. CP 135 installations only. Refer to paragraph 2.5.4.
Phones Out	----------	J101-13	50 mW 600 ohms
14V Speaker Out	Switch 8 Speaker	J101-2	Connect to J101-5 - 14V installations (CP 136 installations only)
28V Speaker Out	Switch 8 Speaker	J101-3	Connect to J101-5 - 28V installations (CP 136 installations only)
Cabin Speaker	Switch 8	J101-4	10 watts across 4 ohm speaker. CP 136 installations only
Transmit Connections:			
Mike Jack Key	----------	J101-16	Connect to Mike Jack key
COM 1 Key Out	Switch 1	J101-15	Connect to COM 1 mike key
COM 2 Key Out	Switch 2	J101-14	Connect to COM 2 mike key
Mike Jack Audio	----------	J101-R	Connect to Mike Audio
COM 1 Mike Audio Out	Switch 1	J101-U	Connect to COM 1 mike audio
COM 2 Mike Audio Out	Switch 2	J101-T	Connect to COM 2 mike audio
COM 1 Sidetone	Switch 1	J101-19	Connect to COM 1 phones
COM 2 Sidetone	Switch 2	J101-18	Connect to COM 2 phones
Remote Marker Beacon Connections:			
MKR Audio In	Switch 7	J101-Z	Connect to MKR audio out
MKR Sensitivity	HI-LO-TST	J101-BB	Connect to MKR sensitivity
MKR Test	HI-LO-TST	J101-AA	Connect to MKR test activate
White MKR Lamp	----------	J101-17	Connect to MKR white lamp
Amber MKR Lamp	----------	J101-W	Connect to MKR amber lamp
Blue MKR Lamp	----------	J101-X	Connect to MKR blue lamp
MKR Lamp Common	----------	J101-21	Connect to MKR lamp common
MKR Mute	----------	J101-22	Connect to MKR Mute
Optional Marker Beacon Connections:			
MKR Antenna	----------	J101-CC	Refer to paragraph 2.4 for antenna selection and installation
MKR Antenna Ground	----------	J101-25	
MKR 14/28V	----------	J101-23	Refer to Section 1, paragraph 1.4 specifications for circuit breaker ratings
MKR Dim	----------	J101-Y	Refer to paragraph 2.5.3

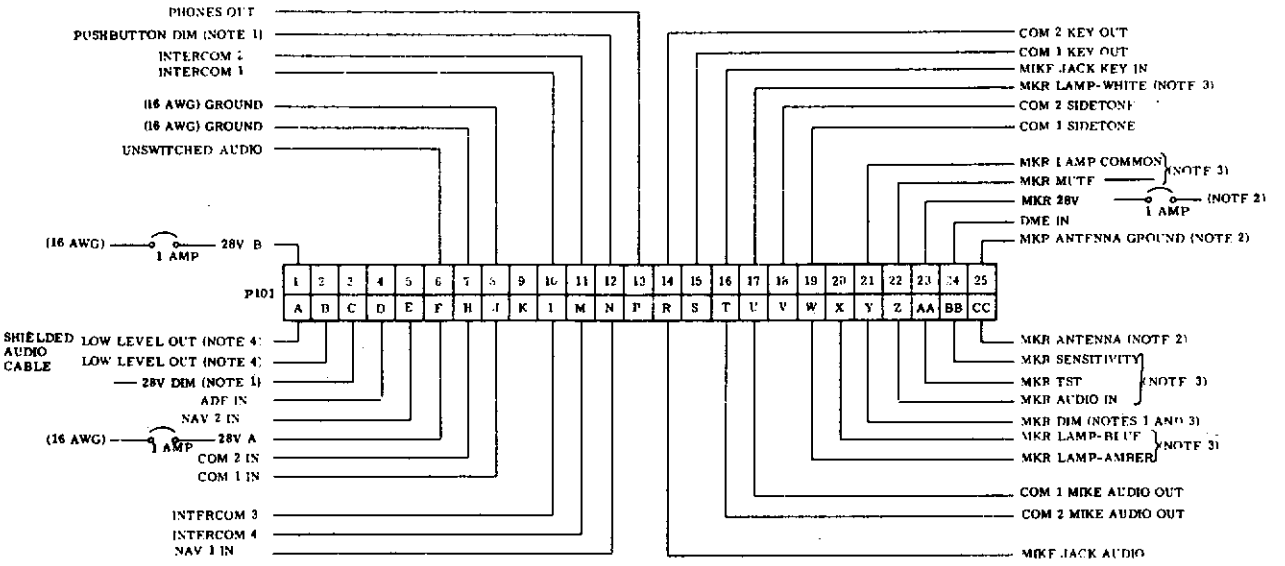


NOTES

1. REFER TO PARAGRAPH 2.5.3 FOR VARIOUS DIMMER CONNECTION METHODS.
2. CONNECTION REQUIRED ONLY WHEN OPTIONAL INTERNAL MARKER BEACON RECEIVER IS INSTALLED.
3. CONNECTION NOT REQUIRED WHEN OPTIONAL INTERNAL MARKER BEACON RECEIVER IS INSTALLED.
4. REFER TO PARAGRAPHS 2.5.4 AND 2.5.5 FOR VARIOUS LOW LEVEL OUT CONNECTION METHODS.

(ALL SIGNAL LEADS 22 AWG UNLESS OTHERWISE NOTED.)

FIGURE 2-7. CP 135 14V GENERAL WIRING DIAGRAM

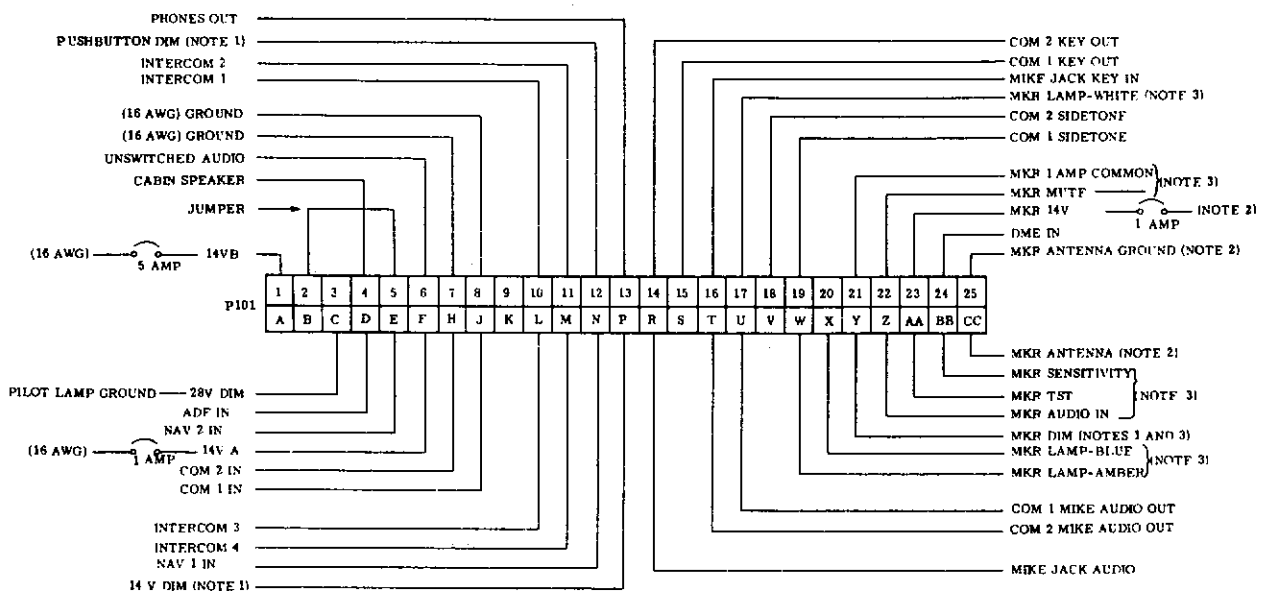


NOTES:

1. REFER TO PARAGRAPH 2.5.3 FOR VARIOUS DIMMER CONNECTION METHODS.
2. CONNECTION REQUIRED ONLY WHEN OPTIONAL INTERNAL MARKER BEACON RECEIVER IS INSTALLED.
3. CONNECTION NOT REQUIRED WHEN OPTIONAL INTERNAL MARKER BEACON RECEIVER IS INSTALLED.
4. REFER TO PARAGRAPHS 2.5.4 AND 2.5.5 FOR VARIOUS LOW LEVEL OUT CONNECTION METHODS.

(ALL SIGNALS LEADS 22 AWG UNLESS OTHERWISE NOTED.)

FIGURE 2-8. CP 135 28 V GENERAL WIRING DIAGRAM

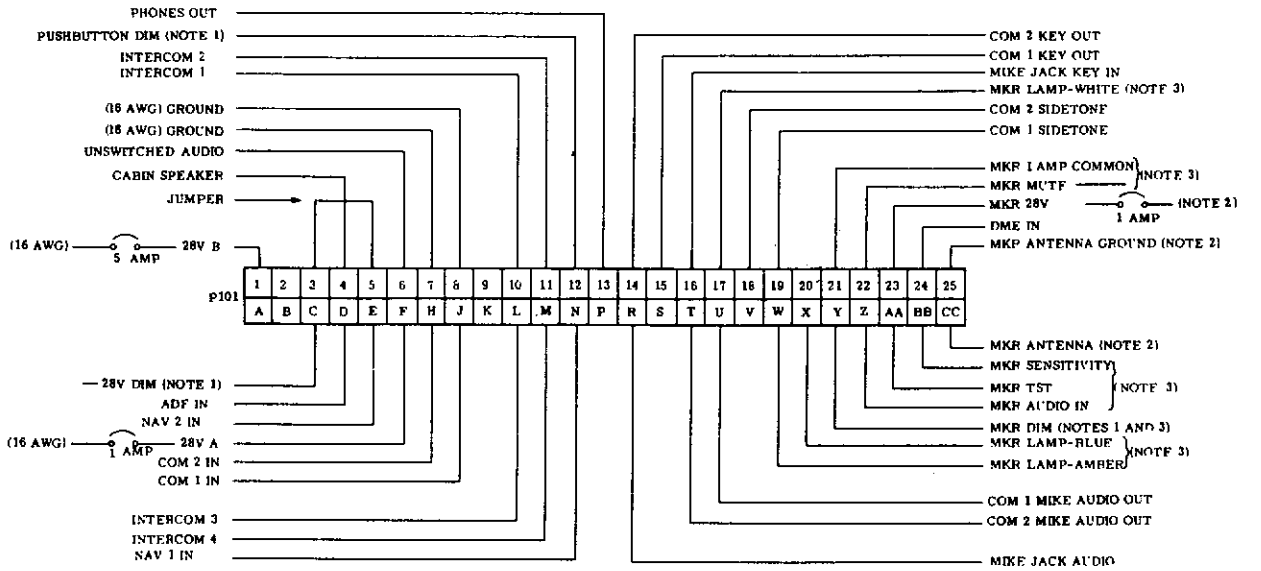


NOTES:

1. REFER TO PARAGRAPH 2.5.3 FOR VARIOUS DIMMER CONNECTION METHODS.
2. CONNECTION REQUIRED ONLY WHEN OPTIONAL INTERNAL MARKER BEACON RECEIVER IS INSTALLED.
3. CONNECTION NOT REQUIRED WHEN OPTIONAL INTERNAL MARKER BEACON RECEIVER IS INSTALLED.

(ALL SIGNAL LEADS 22 AWG UNLESS OTHERWISE NOTED.)

FIGURE 2-9. CP 136 14V GENERAL WIRING DIAGRAM



NOTES:

1. REFER TO PARAGRAPH 2.5.3 FOR VARIOUS DIMMER CONNECTION METHODS.
2. CONNECTION REQUIRED ONLY WHEN OPTIONAL INTERNAL MARKER BEACON RECEIVER IS INSTALLED.
3. CONNECTION NOT REQUIRED WHEN OPTIONAL INTERNAL MARKER BEACON RECEIVER IS INSTALLED.

(ALL SIGNALS LEADS 22 AWG UNLESS OTHERWISE NOTED.)

FIGURE 2-10. CP 136 28V GENERAL WIRING DIAGRAM

2.5.3.1 Aircraft Without Dimmer

If the audio panel is to be installed in an aircraft without a dimmer bus, the 14V DIM or 28V DIM may be connected to A+. When connected this way, the panel lamps will come on at full intensity.

If a navigation light lead is not available for the MKR DIM and PUSHBUTTON DIM, the MKR DIM should be left unconnected and the PUSHBUTTON DIM should be connected to A+. When connected this way, the MKR lamps will be at full intensity and the pushbutton LED's will be permanently dimmed.

To permanently dim the MKR lamps and pushbutton LED's, connect both the MKR DIM and PUSHBUTTON DIM to A+.

2.5.4 Low Level Out Connection To Single COM Transceiver, CP 135 Only

In CP 135 installations, the COM audio amplifier/modulator will also perform as the cabin speaker amplifier. Connect LOW LEVEL OUT J101-A or J101-B to the COM AUX AUDIO input.

The DC supply voltage of the COM audio amplifier/modulator may be connected so as to bypass the COM ON-OFF switch. Refer to the COM Installation Manual for modification procedure.

2.5.5 Low Level Out Connection To Dual COM Transceivers, CP 135 Only

Where dual COM transceivers are utilized, their AUX AUDIO inputs may be paralleled and then connected directly to the CP 135 LOW LEVEL outputs. However, early COM transceivers will require modification to prevent the microphone audio during transmit from being amplified by the unkeyed COM transceiver's audio amplifier and being faintly heard on the cabin speaker.

COM 10, COM 10A, COM 11, or COM 11A with chassis serial numbers CN (A/B) 171C10 or higher, or COM 110 TSO or COM 111 TSO with chassis serial numbers CN (A/B) 219B2 or higher will require no modification. COM transceivers with chassis numbers lower than those listed will require modification. Refer to the appropriate COM Maintenance Manual for lead and component location in the transmitter module and modify the COM Unit as follows:

1. Remove R432.
2. Remove all ground leads from K401, pin 13.
3. Remove the coaxial cable from K401, pin 12 and connect it to K401, pin 13.
4. Connect all ground leads removed in Step 2 to K401, pin 12.
5. Install a new R432, 560 ohm, 1/2 watt carbon resistor, from K401, pin 11 to the hole in the printed circuit board that R432 was inserted into which connects to P401A, pin 7 and R433 (hole nearest P401A).

2.5.6 Low Level Out Connection To High Level Amplifier, CP 135 Only

A high level amplifier may be connected to the LOW LEVEL OUT connections and used as a cabin speaker amplifier.

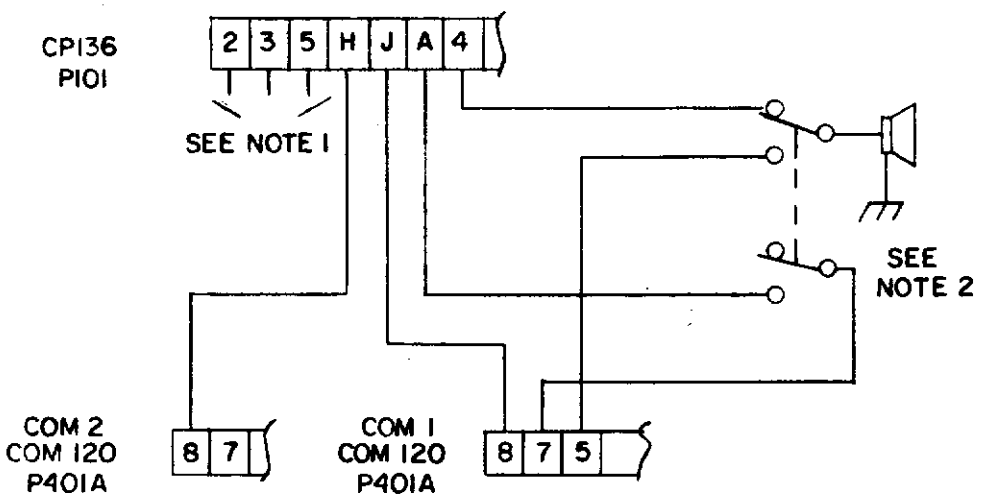
2.5.7 Cabin Speaker Connections, CP 136 Only

The CP 136 contains an integral 10 watt cabin speaker amplifier. The speaker amplifier has two output connections, one at J101-2 for 14V installations, and one at J101-3 for 28V installations.

To preserve the interchangability of pushbutton and toggle switch audio panels, the speaker is always connected to CABIN SPKR J101-4. J101-4 is internally jumpered to SPKR IN J101-5. For 14V installations, an external jumper must be provided between 14V SPKR OUT J101-2 and J101-5. For 28V installations, an external jumper must be provided between 28V SPKR OUT J101-3 and J101-5.

IT IS IMPORTANT THAT THE PROPER CONNECTIONS BE MADE! Improper connection will result in early failure and/or high audio distortion.

The CP 136 also allows for, if desired, an optional redundant cabin amplifier hookup that utilizes the COM 1 high level amplifier. Refer to Figure 2-11 for wiring.



NOTES: 1) 14V INSTALLATIONS - JUMPER P101-2 TO P101-5
28V INSTALLATIONS - JUMPER P101-3 TO P101-5
2) INSTRUMENT PANEL MOUNTED DPDT SWITCH. SHOWN IN NORMAL POSITION, AUDIO PANEL SPEAKER AMPLIFIER IN USE.

FIGURE 2-11. REDUNDANT CABIN AMPLIFIER HOOK UP

2.5.8 Intercom Connections

The CP 135 and CP 136 provide four INTERCOM connections J101-10, J101-11, J101-L, and J101-M which allow for great flexibility in the design of intercom systems.

These four inputs will supply the required microphone current and connect directly to the internal headphone amplifier. They are not muted during transmit or at any other time. An internal INTERCOM level control (see Figure 2-2) sets the input level of all four inputs simultaneously.

Figures 2-12 through 2-14 present a small number of the many types of intercom interconnections that are possible.

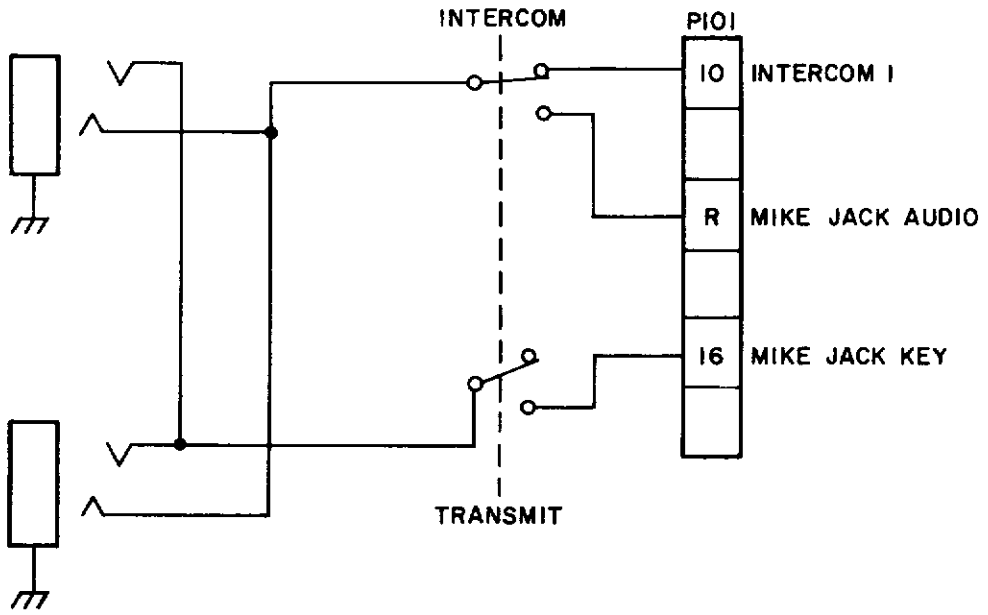
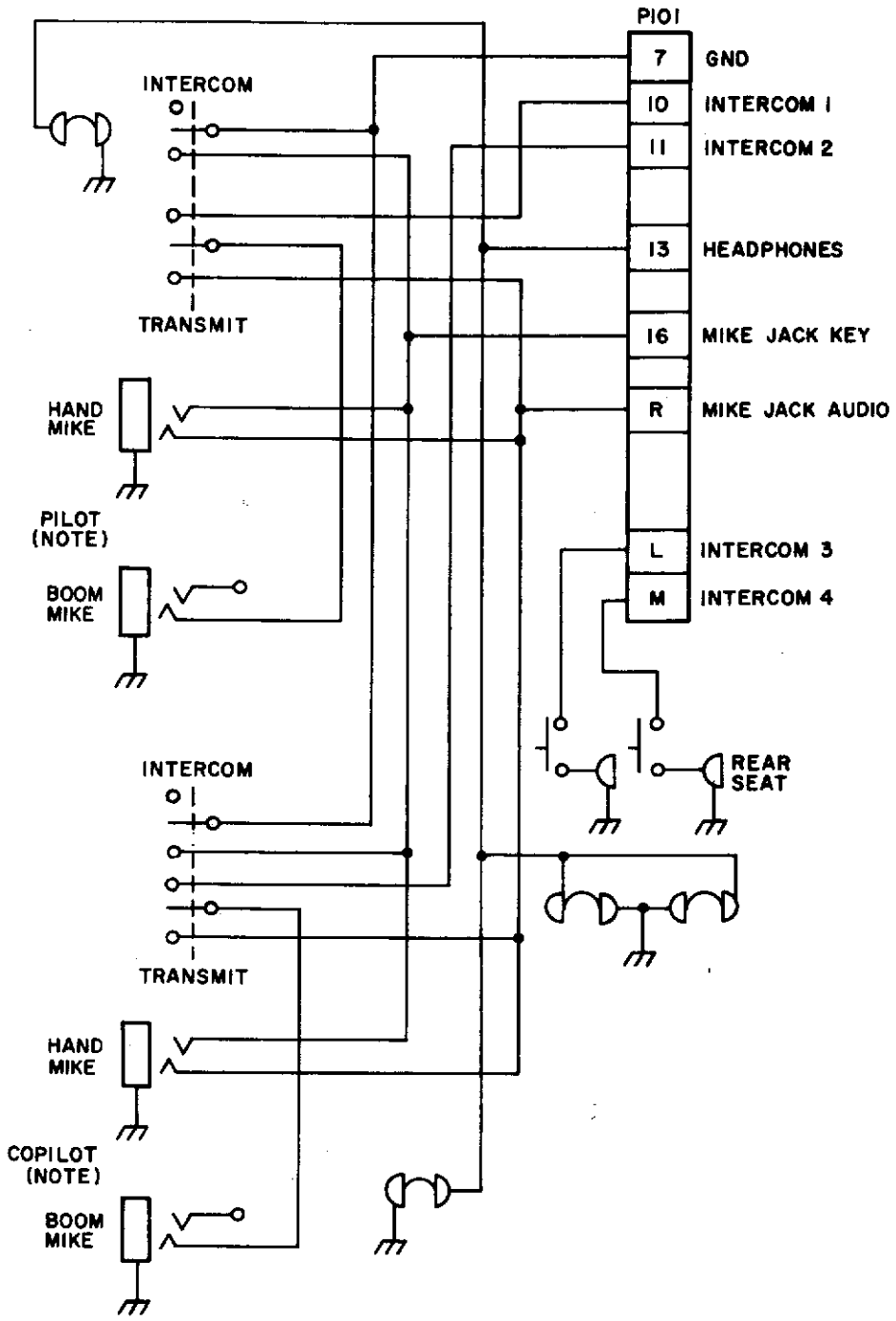


FIGURE 2-12. BASIC INTERCOM SYSTEM WHICH IS ADAPTABLE INTO AIRCRAFT THAT HAVE MICROPHONE JACKS WIRED IN PARALLEL



NOTE: BOOM MICROPHONE OR HAND MICROPHONE CAN BE USED. HOWEVER, THERE WILL BE NO INTERCOM WHEN HAND MICROPHONE IS USED.

FIGURE 2-13. WHEEL PUSH-TO-TALK INTERCOM SYSTEM-FIXED WING

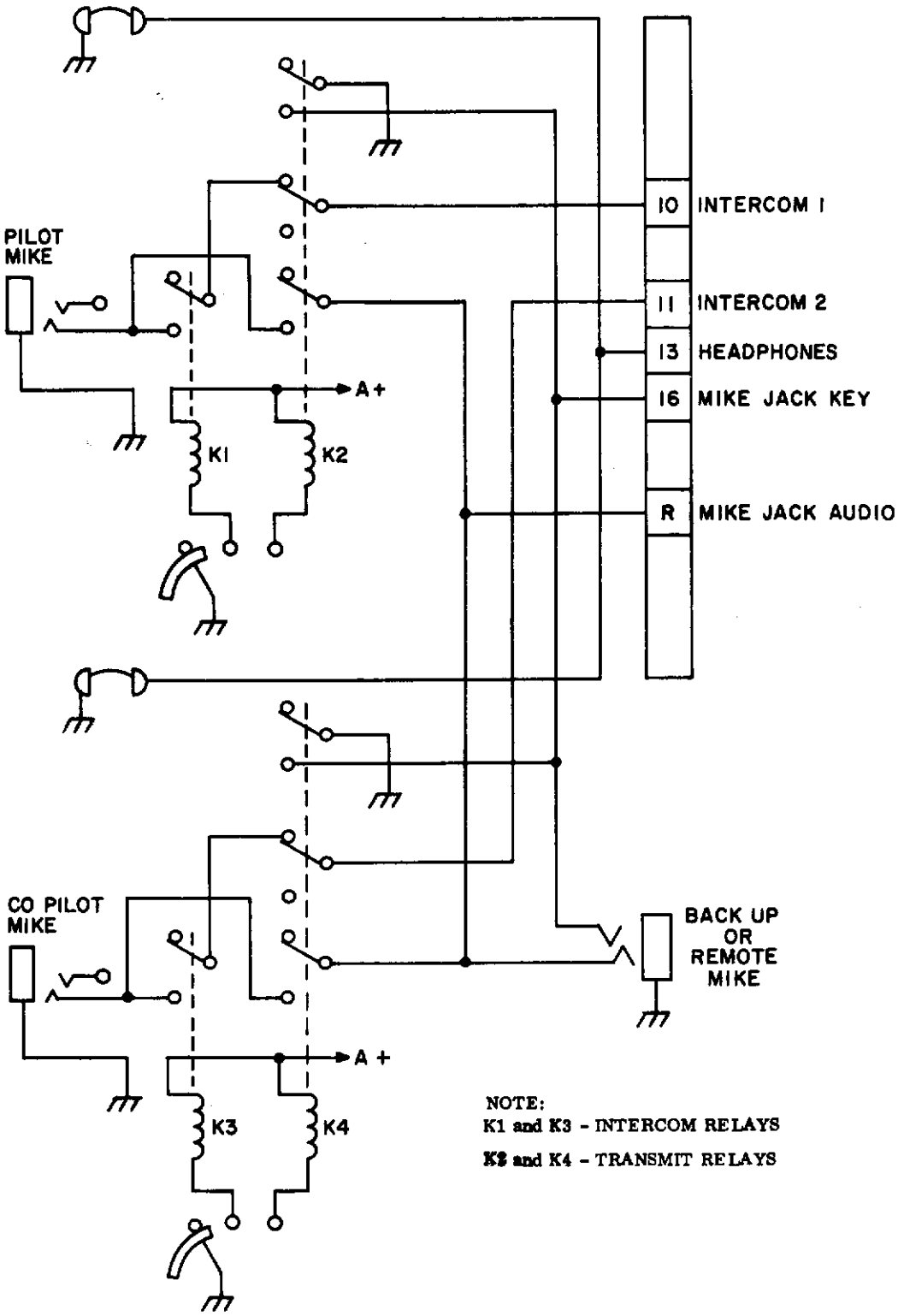


FIGURE 2-14. HELICOPTER BASIC INTERCOM SYSTEM

2.6 POST INSTALLATION TESTS

2.6.1 Pre-Flight Tests (pushbuttons labeled as in Figure 1-1)

1. Turn all system avionics OFF using each unit's ON-OFF switch.
2. Depress the SPKR pushbutton.
3. Depress the COM 1 pushbutton. Turn the COM 1 transceiver ON. Channel the transceiver to a frequency available at the airport. Transmit and receive check for sidetone audio in the headphones during transmit. Turn the COM 1 transceiver OFF.
4. Depress the COM 2 pushbutton. Turn the COM 2 transceiver ON. Channel the transceiver to a frequency available at the airport. Transmit and receive. Check for sidetone audio in the headphones during transmit.
5. With COM 2 audio or noise present on the cabin speaker, release the SPKR push-button. Speaker audio should no longer be present. Listen for COM 2 audio on the headphones.
6. Reactivate the speaker by depressing the SPKR pushbutton.
7. Depress the BOTH pushbutton. Turn COM 1 ON. Vary both COM transceivers volume controls to determine that both are audible on the speaker and headphones.
8. With the two COM units ON, check the NAV units (one at a time) by depressing the appropriate pushbutton. Turn ON that NAV unit and listen for a received signal when available or for receiver noise. Turn the COM transceiver's volume down as necessary.
9. Depress the MKR/DME pushbutton. Hold the HI-LO-TST switch in the TST position. The three marker lamps should come ON. If the CP 135 or CP 136 has a built-in Marker Beacon Receiver, a tone will be heard on the speaker and headphones. Release the HI-LO-TST switch.
10. The following procedure requires a ramp type Marker Beacon test set such as Tel-Instrument Model T18A. Place the HI-LO-TST switch in the LO position. Check that each of the three marker lamps changing the Ramp Test set modulation frequency; each lamp should glow brightly.

Blue	400 Hz modulation
Amber	1300 Hz modulation
White	3000 Hz modulation

The tone on the speaker/headphones should also change as the modulation frequency changes.

11. To check the HI sensitivity, set the HI-LO-TST switch in the LO position. Move the Ramp Test Set away from the aircraft until the marker lamp begins to dim then switch the HI-LO-TST switch to the HI position; observe the increase in lamp brillance.
12. Start the engine(s) and listen for alternator noise or any other interference. Energize all pulse equipment.
13. Check the operation of the pilot lamps.

2.6.2 Flight Test

A flight test of an audio panel without an optional Marker Beacon Receiver should not be necessary if the Post Installation Tests has been completed. When the optional Marker Beacon Receiver is installed, the following flight test is recommended to perform the following checks and adjustments.

a. Adjust receiver sensitivity in LO sensitivity mode.
b. Verify receiver performance in HI sensitivity mode.
c. Look for variations in receiver sensitivity due to various landing gear and flight control surface configurations.
d. Check for sufficient marker audio volume and lamp brillance.

Receiver sensitivity has been factory-set for satisfactory performance with a standard Marker Beacon Antenna. Should further adjustment be required, refer to Figure 2-2 for the location of the RF SENSITIVITY control. Clockwise rotation increases the sensitivity, counterclockwise rotation decreases the sensitivity.

An in-flight Marker Beacon Receiver sensitivity test procedure follows:

a. Set receiver to LO sensitivity.
b. Fly at a known ground speed, 1000 feet AGL.
c. On localizer centerline, measure the time (in seconds) that the marker lamp remained lit.
d. Refer to Table 2.2 for correlation.

TABLE 2.2 LO SENSITIVITY LIGHT TIME AT 1,000 FEET (AGL)

GROUND SPEED, In Knots	LIGHT TIME, In Seconds	
	Minimum	Maximum
90	13	20
110	11	16
130	9	14
150	8	12

To calculate flight time for ground speeds other than those tabled:

$$\text{Minimum Light Time (Seconds)} = \frac{1775}{\text{Ground Speed in Knots}}$$

$$\text{Maximum Light Time (Seconds)} = \frac{1183}{\text{Ground Speed in Knots}}$$

2.7 AIRCRAFT LICENSE REQUIREMENTS

To certify the installation FAA form 337 must be completed. In addition, weight and balance or any operating limitations must be entered into the aircraft logbook. Refer to the current Federal Aviation Regulations for any additional requirements.

Weights:

CP 135 without Marker	0.8 lbs (363 gr)
CP 135 with Marker	0.9 lbs (408 gr)
CP 136 without Marker	1.0 lbs (454 gr)
CP 136 with Marker	1.1 lbs (499 gr)

Power Requirements:

CP 135	0.30 amp at 13.75 Vdc
CP 135 (INT. MKR)	0.50 amp at 13.75 Vdc
CP 135	0.30 amp at 27.50 Vdc
CP 135 (INT. MKR)	0.53 amp at 27.50 Vdc
CP 136	2.25 amp at 13.75 Vdc
CP 136 (INT. MKR)	2.45 amp at 13.75 Vdc
CP 136	1.75 amp at 27.50 Vdc
CP 136 (INT. MKR)	1.98 amp at 27.50 Vdc
Pilot Lamps	0.26 amp at 13.75 Vdc
	0.13 amp at 27.50 Vdc