Engineer: Chris Samios	Date: 5/30/02	Raytheon JPS Communications 5800 Departure Drive, Raleigh, NC 27616			
Drawn: Jack Curtis	Date: 5/30/02				
Approved: CTS	Date: 5/30/02	Title: ACU RADIO APPLICATION NOTES			
Issued/ Revised	Date: 2/11/05	Size: **A**	Dwg. #: **5961-271132-APP**	Rev: **B2**	Sheet: **1 Of 5**

APPLIES TO: Motorola Spectra Mobile (Dash-mount)
Motorola Spectra Plus Mobile (Dash-mount)

RADIO MODIFICATIONS:

Some models of Motorola Spectra mobile radios are shipped from the factory with internal jumpers set disabling PTT and external MIC audio to the rear panel DB-15 connector. The internal jumpers are surface mount zero ohm resistors that may need to be moved for proper function when connecting the radio to the ACU-1000. If Squelch Type COR functionality is needed additional radio modifications will be required and are listed below as optional modifications. All of these modifications will require proper surface mount soldering/de-soldering tools. The optional modification will require the addition of a surface mount diode in an SOT-23 package. Fairchild Semiconductor MMBD914 (JPS P/N 6420-009140) has been verified although other equivalent diodes are available. Listed below are steps required for these modifications with figures to locate changes required. A Service Manual for the exact model and revision of Command Board may also be required.

1) Remove the top cover of the radio.

2) Remove the four corner screws from the large cover plate / VOCON board and carefully remove it by pulling straight up on the strap. This will unplug the P501 connector from the command board.

3) Remove the two screw in the front of the Control Head and pull the Control Head straight out.

4) The Command Board has four connectors; P502 on front of the board, P503 on the rear of board, P501 is near center of the board and was connected to the previously removed Cover Plate / VOCON board, also in the center part of the board is the J500 thru board connector. The board also has a large IC (U450) located on the left side. The U450's heat sink is screwed to the metal case of the radio.

5) Remove the interface connector board that connected the Control Head to P502 by pulling it straight out of the front of the radio case.

6) Remove the screw in the middle of the board as well as the screw holding the U450 heat sink to the radio case. There may be silicone compound around the screw and between the heat sink and the radio chassis.

7) Using two small flat-blade screwdrivers, disconnect P503 by pushing back on the receptacle. Be careful not to push the receptacle too far or it may be difficult to reattach the connector when reinserting the board.

8) Carefully lift the Command Board by grasping the P501 connector and pulling straight up unplugging the J500 thru board connector.

9) Locate the zero ohm resistor JU518 on the top of the board (See Figure 1). If present, carefully unsolder resistor JU518 and reinstall it into the unoccupied jumper position JU500 on the other side of the board (See Figure 2).

10) On the bottom side of the Command Board verify presence of jumper JU521 (See Figure 2). If present remove the zero ohm resistor JU521 and reinstall it into the unoccupied position JU513.

11) **Optional Radio Modifications required to enable the DSP settings choice of Squelch Type - COR. (the DSP default Squelch Type setting – VOX* remains available after this modification)**:
On the front side of Command Board locate and remove jumpers JU520 and JU512. Place one of the removed jumpers in the unoccupied position JU515 (See Figure 1). On the backside place the SOT-23 diode in position CR402 (See Figure 2).

12) Carefully place the board back into position by first slipping the connector P503 on the rear edge onto the mating pins, and then lowering the front edge of the board into place.

13) Replace the screw in the center of the board, and the screw fastening the U450 heat sink to the metal case.

14) Using two small screwdrivers, one on each side, carefully work the connector P503 onto the pins on the rear of the board.

15) Replace the interface connector board to P502, then replace the Control Head and re-insert the two screws.

16) Replace the cover plate / VOCON board into P501 and re-insert the four corner screws.

17) Re-attach the top cover and re-insert the two screws.

RADIO PROGRAMMING:

1. Mobile radios should normally be programmed for low transmit power.
2. For proper PL & DPL function the selection box HUB Defeats PL must be unchecked. This option is found under Conventional Configuration – General Tab.

RADIO CONTROLS:

1. Adjust the Volume Control until the yellow "SIGNAL" indicator on the associated DSP Module flashes with receive audio. This is approximately level 7 or 8.

CABLING:

Standard ACU-1000 and ACU-T Interface cables are made up of a 2 foot TRP Radio Tray Interface cable and the appropriate 13-foot extension cable.

		Dash-Mount
ACU-1000 Interface Cable	JPS P/N 5961-291132	(P/N 5961-271132 + 5961-261002-00)
ACU-T Interface Cable	JPS P/N 5961-281132	(P/N 5961-271132 + 5961-281013-00)
TRP-1000 Shelf Interface Cable	JPS P/N 5961-271132	
RF Connector Type	Mini UHF	

DSP-1 JUMPERS:

JP1	Low Impedance *
JP2	Balanced *

DSP PROGRAMMING:

RX Level	3*	0 dBm*	
TX Level	6*	0 dBm*	
Squelch Type	COR		See notes below
COR Polarity	Active High		See notes below
High Frequency Equalizer	6	+3.5 dB	
RX Audio Delay	2*	100 ms*	
TX Audio Delay (Radio type)	0*	No Delay*	See note below
Noise Reduction Value	0*	Off*	
VOX/VMR Threshold	1*	Med1*	
VOX/VMR Hang Time	3*	775*	
COR Inhibit After PTT	1*	100 ms*	See note below
All Others	As needed		

(* Indicates Default Value)

NOTES:

The modification instructions given above are based on Rev. F printed circuit boards. The modifications required for other revisions are likely to be similar.
The Squelch Type COR is recommended if it has been made available through the Optional Radio Modifications. Otherwise the Default setting VOX is recommended.

For trunked radios:

1. It is recommended to make the Optional Modifications to radio and select Squelch Type as COR and COR Polarity as Active High.

2. COR Inhibit After PTT time may need to be increased to prevent "ping-pong" effect. If this does not resolve the problem, Squelch Type may need to be changed to VMR.

3. Set TX Audio Delay at 4 (800 ms).

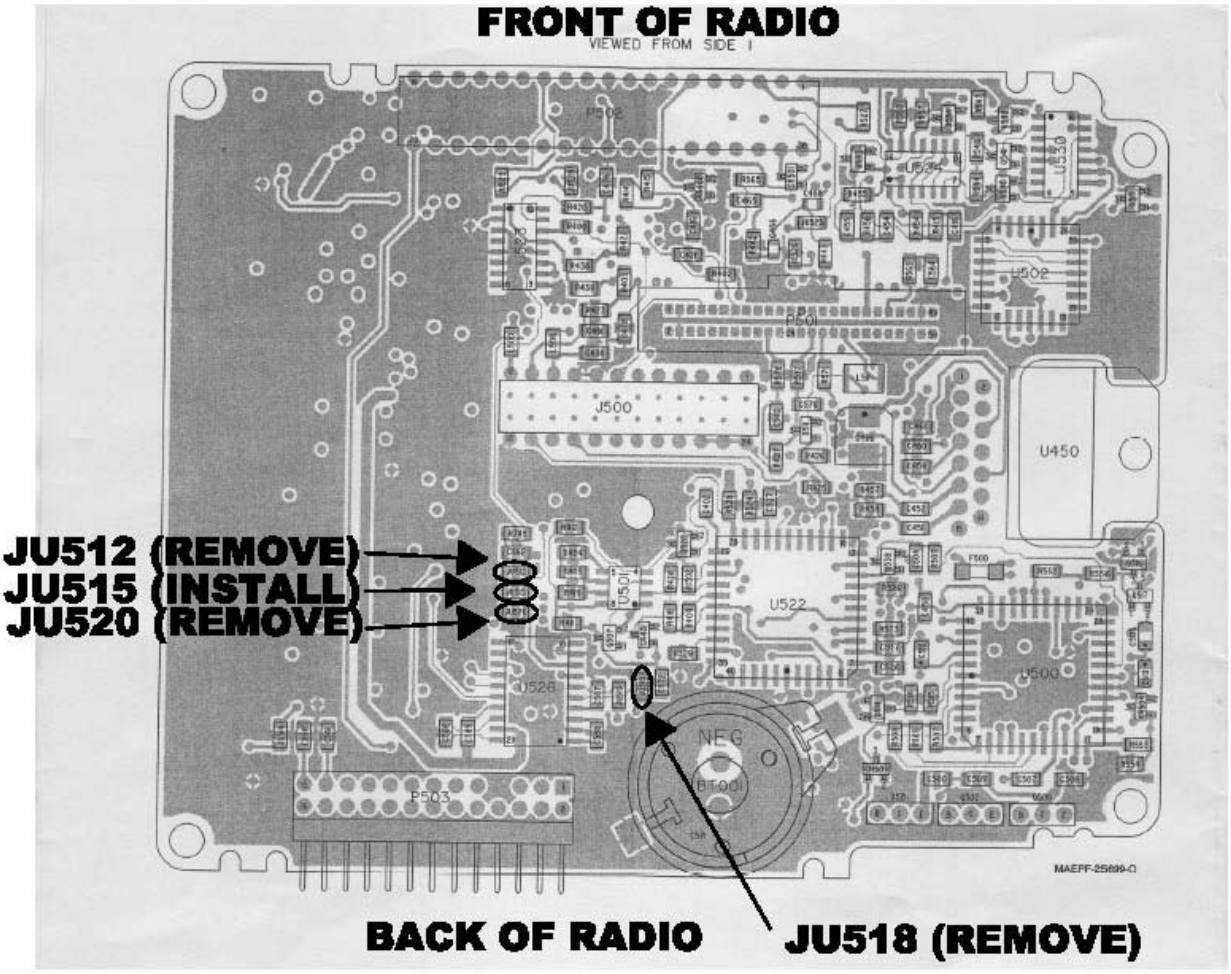


FIGURE 1. COMMAND BOARD – TOP VIEW

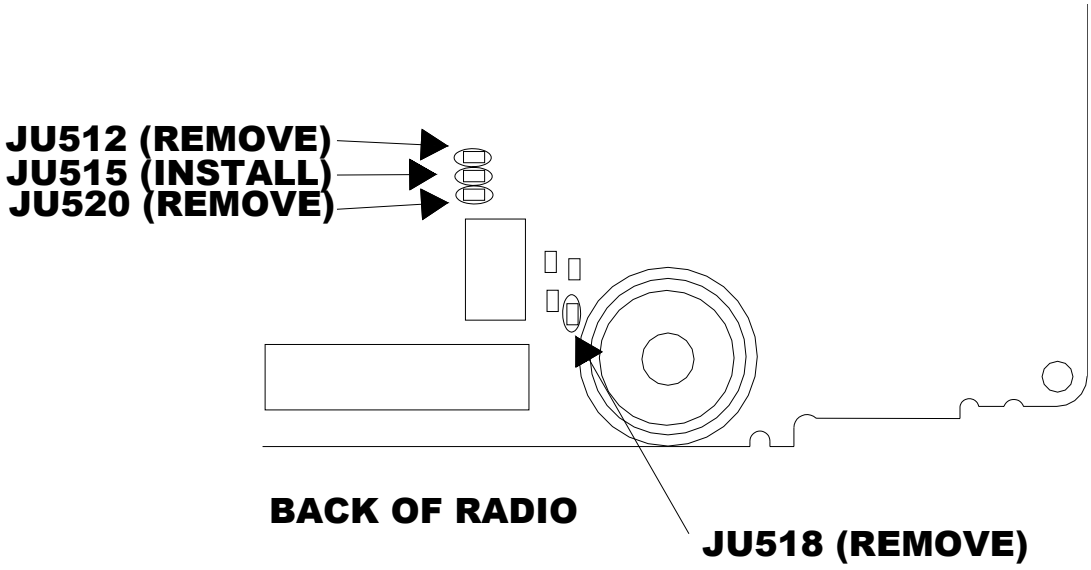


FIGURE 1A. COMMAND BOARD – TOP VIEW (EARLIER VERSIONS)

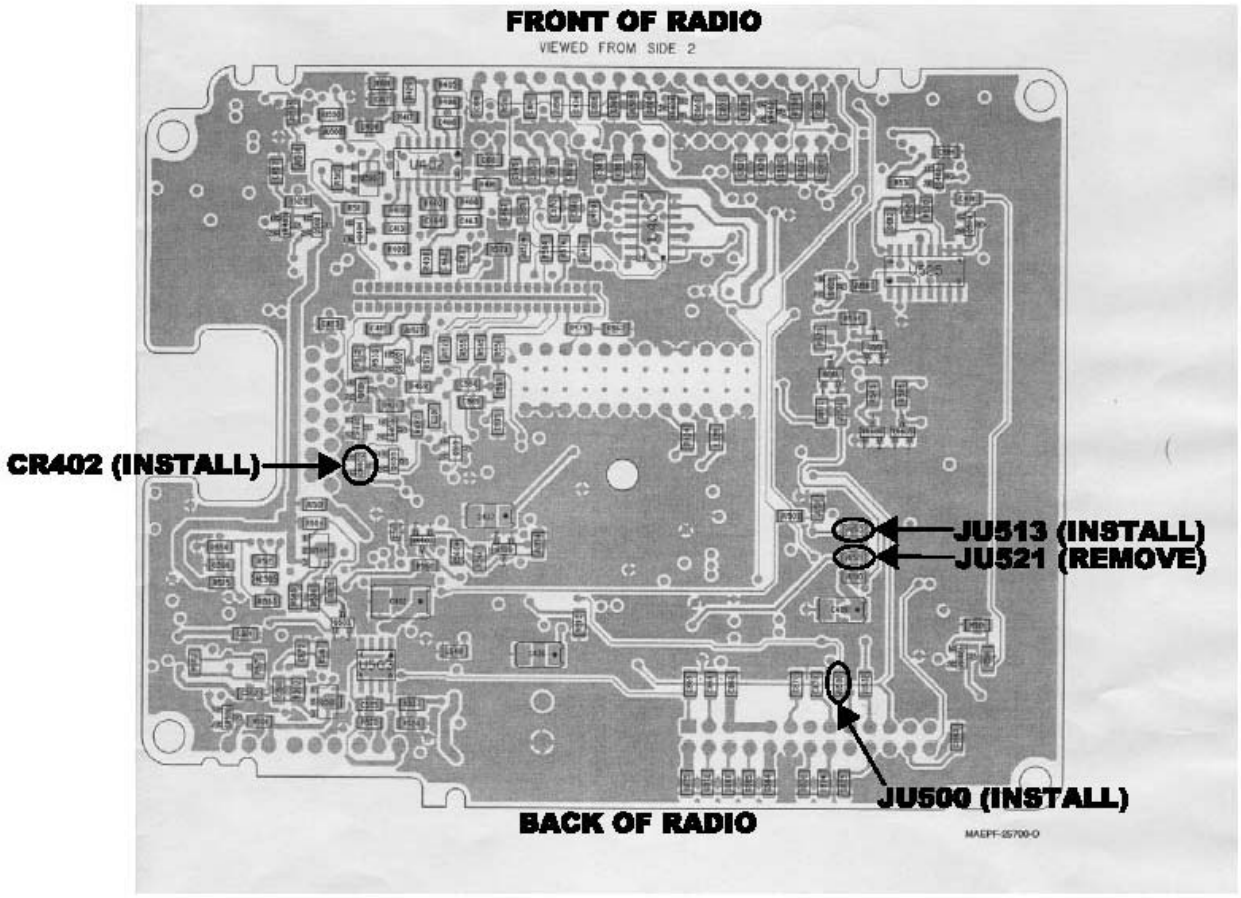


FIGURE 2. COMMAND BOARD – BOTTOM VIEW

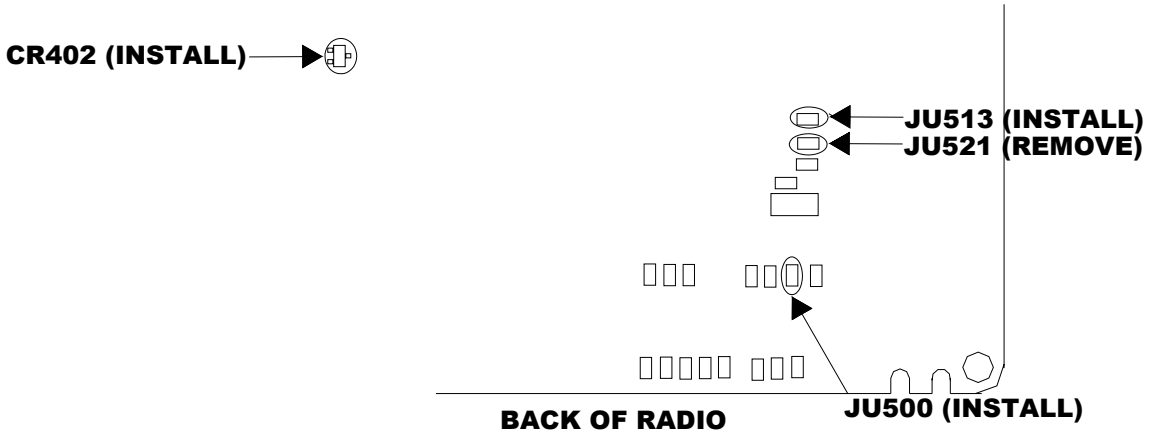
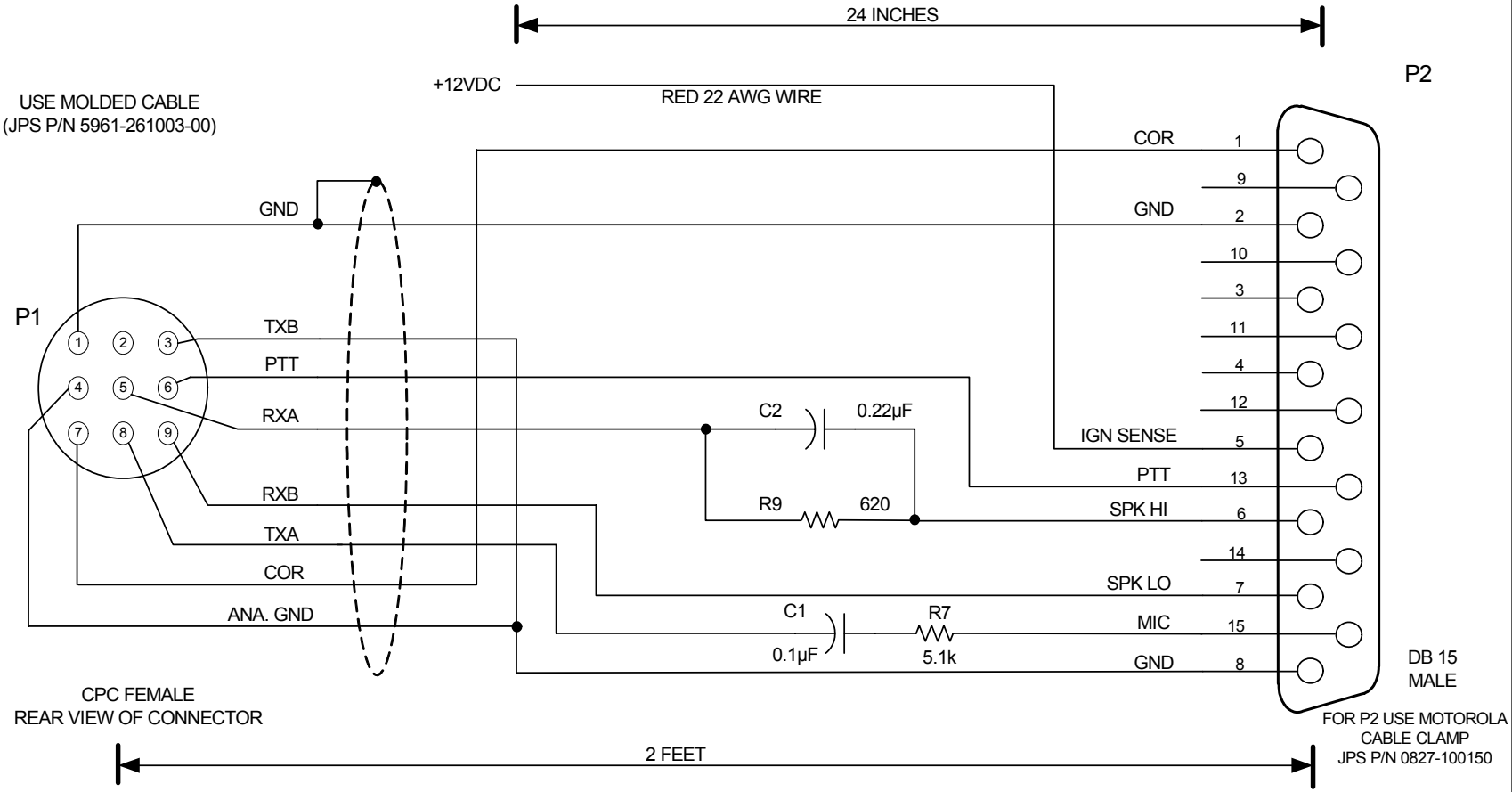


FIGURE 2A. COMMAND BOARD – BOTTOM VIEW (EARLIER VERSIONS)

Rev	ECO	Date
B1		2-11-05

PURCHASED PART



COMPONENT PCB (JPS P/N 5961-271000)	
C1	JPS P/N 0327-104101
C2	JPS P/N 0327-226500
R7	JPS P/N 1820-512000
R9	JPS P/N 1820-621000
JU5	

NOTES: SHIELD DRAIN CONNECTED TO PIN 1 OF P1 ONLY.
RADIO MODIFICATIONS REQUIRED SEE APP NOTE 2961-271132-APP.

USED WITH:
MOTOROLA SPECTRA MOBILE (DASH-MOUNT)
MOTOROLA SPECTRA PLUS MOBILE (DASH-MOUNT)

Designed By: CTS	Raytheon JPS Communications Raleigh, NC USA		
Drawn By: EDV	Title CABLE, CPC TO MOTOROLA SPECTRA (DASH-MOUNT)		
Checked By: JAC	Size A	Document Number **5961-271132**	Rev B1
	Issued Date NOVEMBER 5, 2003		Sheet 1 of 1

PURCHASED PART

Rev	ECO	Date
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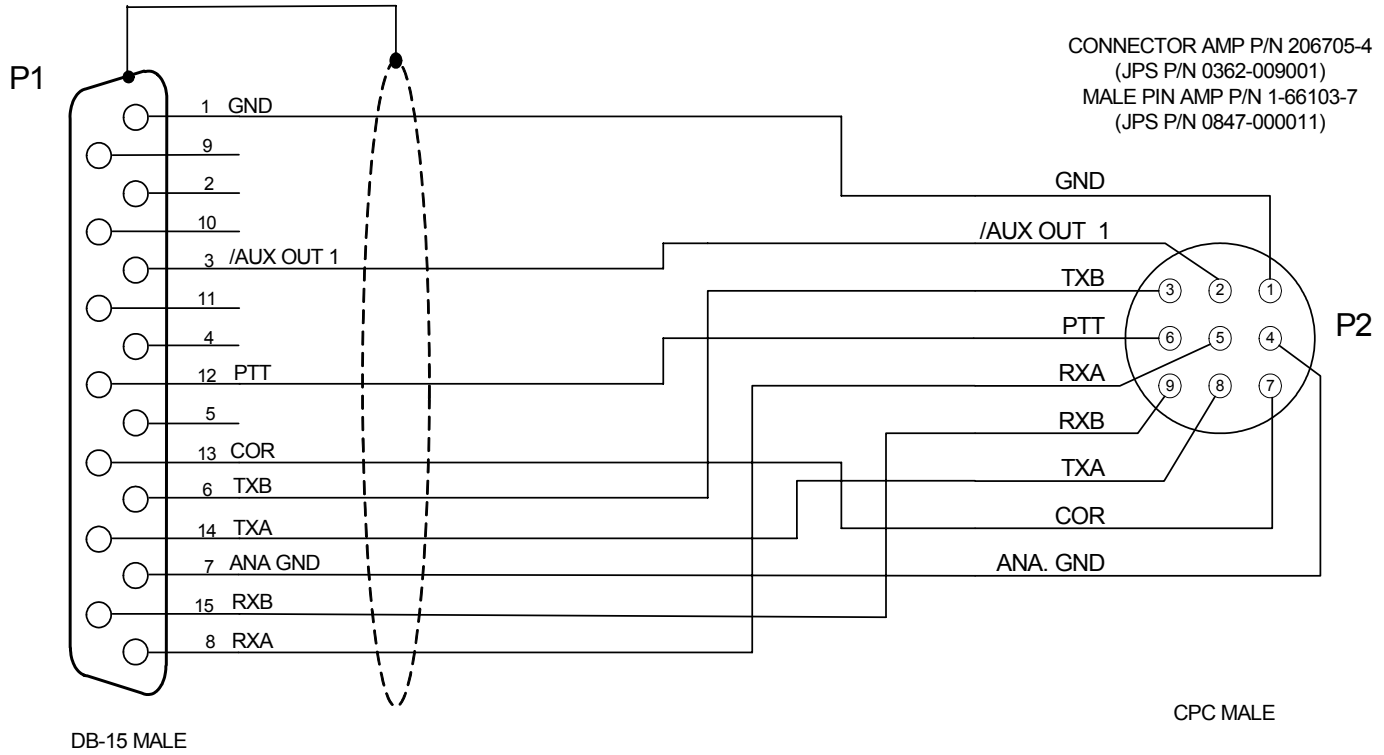


NOTES: 1) USE BELDEN 9934 SHIELDED CABLE.
2) CONNECT SHIELD DRAIN TO SHELL OF P1 ONLY.
3) CONNECTORS P1 AND P2 MUST BE MOLDED TO THE CABLE.
4) CABLE MUST BE LABELED WITH THE RAYTHEON/JPS P/N AND REV, VENDOR CODE AND DATE (MM/YY).

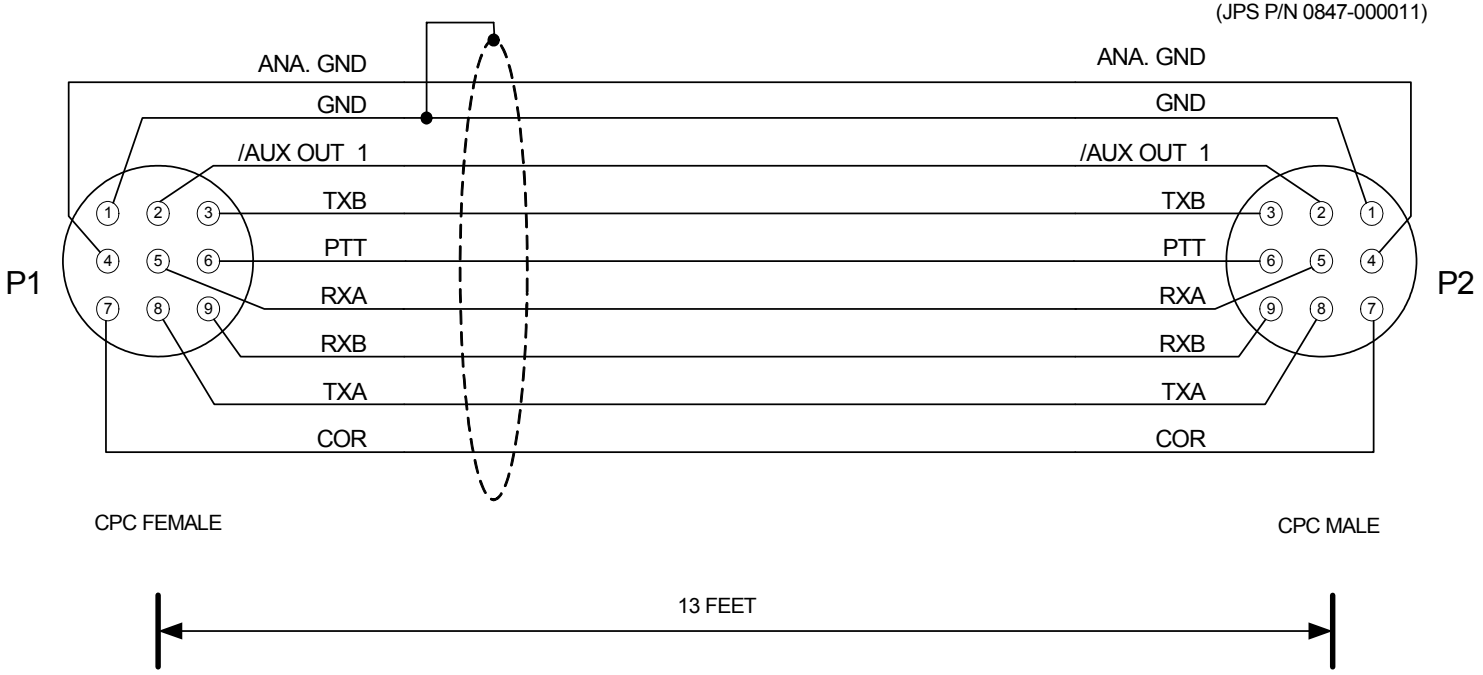
Designed By: JAC	Raytheon JPS Communications		
Drawn By: JAC	Title: CABLE, ACU-1000 RADIO EXTENSION - 13 FT		
Checked By: RBP	Size: A	Document Number: **5961-261002-00**	Rev: A
	Issued Date: JANUARY 5, 2004	Sheet 1 of 1	

Rev	ECO	Date
A		

PURCHASED PART

CONNECTOR AMP P/N 206708-1
(JPS P/N 0362-005003)
FEMALE PIN AMP P/N 1-66105-8
(JPS P/N 0362-005002)

CONNECTOR AMP P/N 206705-4
(JPS P/N 0362-009001)
MALE PIN AMP P/N 1-66103-7
(JPS P/N 0847-000011)



NOTES: 1) USE BELDEN 9934 SHIELDED CABLE.
2) CONNECT SHIELD DRAIN TO PIN 1 OF P1 ONLY.
3) CONNECTORS P1 AND P2 MUST BE MOLDED TO THE CABLE.
4) CABLE MUST BE LABELED WITH THE RAYTHEON/JPS P/N AND REV, VENDOR CODE AND DATE (MM/YY).

Designed By: JAC	Raytheon JPS Communications Raleigh, NC USA		
Drawn By: JAC	Title: CABLE, ACU-T RADIO EXTENSION - 13 FT		
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