LBI-38901B

ERICSSON

Mobile Communications

ORION MOBILE RADIO

Installation Manual

TABLE OF CONTENTS

INTRODUCTION

This manual contains installation instructions for the Orion Mobile Radio Unit and associated accessories. These instructions cover the mounting and cabling of the radio; interconnection and wiring diagrams are provided for reference. Before installation the radio should be programmed using an IBM compatible personal computer and the following items:

Serial/Flash Programming Interface Module	TQ3370
Programming Cable	TQ3377
EDACS Programming Software	TQ3374
	or
Conventional Programming Software	TQ3367

IMPORTANT NOTICE

ORION UHF MOBILES

The PC programmer automatically defaults the receiver oscillator shift to position No. 2. When field programming the receive frequencies for ORION UHF mobiles, the oscillator shift must be programmed to position No. 1 or No. 3. Enter the CONVENTIONAL and/or TRUNKED FREQUENCY SET screen of the PC programmer and set the values in the "OS" column to "1" or "3".

UNPACKING AND CHECKING EQUIPMENT

Carefully unpack the radio and identify each item in the shipping container as listed below. If damage has occurred to the equipment during shipment, file a claim with the carrier immediately. The available options for the Orion Mobile Radio are covered in Table 1.

- Orion Mobile Radio Unit
- Microphone D2MC3W or D2MC3Z
- Speaker D2LS1F or D2LS1H
- Power Cable D2CE1V
- Fuse Kit D2PD1J
- Control Cable D2CE1Y

- Front Mount Bracket Kit D2MA3N

  or

- Remote Mount Kit D2MA3R

  with

- Control Unit Mount Kit D2MA3J
- Operator's Manual LBI-38888
- Installation Manual LBI-38901

Figure 1 - Orion Mobile Radio Components And Mounting Hardware

Figure 2 - Rear View Of Radios

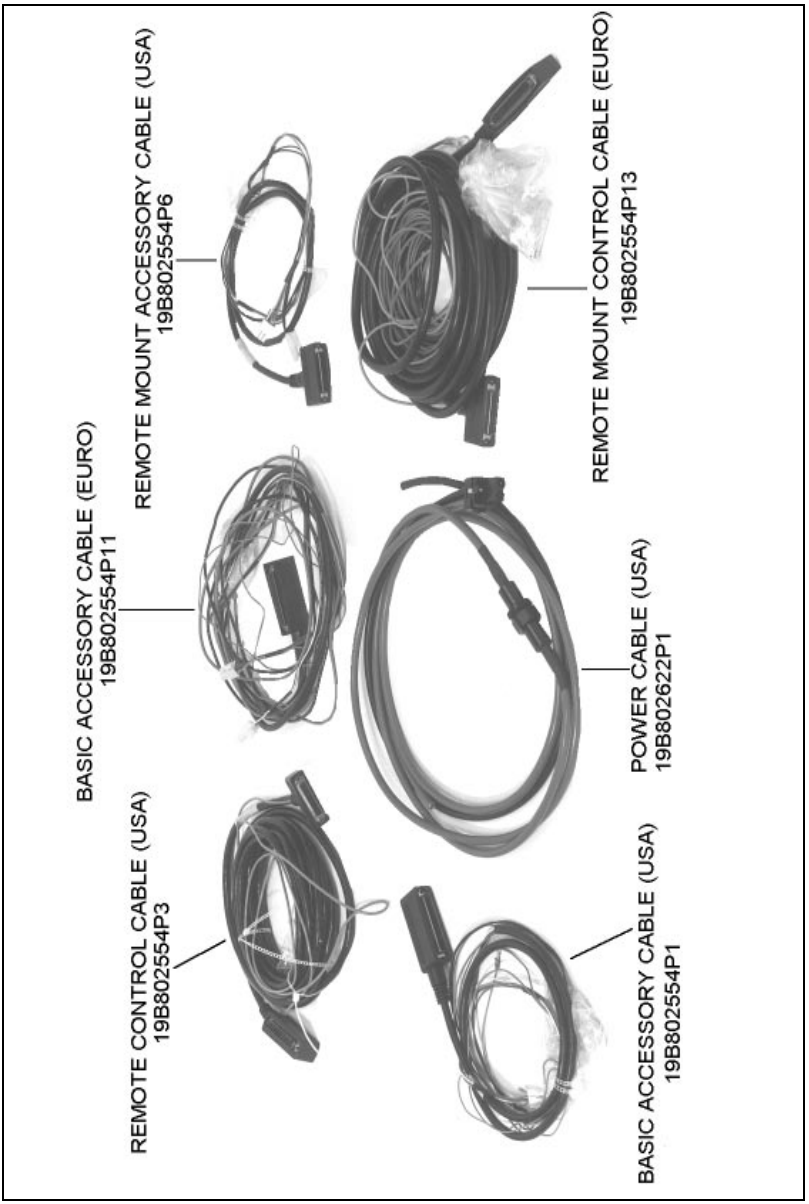


Figure 3 - Cables

Table 1 - Orion Mobile Radio Optional Accessories

Option	Description	Part Number
D2AN1M	900 MHz, 1/4 Wave Whip Antenna	19B801182P3
D2AN1L	800 MHz 1/4 Wave Whip Antenna	19B209568P5
D2AN1R	VHF/UHF, 1/4 Wave Whip Antenna	19B209568P6
D2CE1V	Power Cable, 7.5 M	19B802622P1
D2CE1W	Accessory Cable, Front Mount	19B802554P1
D2CE1X	Accessory Cable, Rear Mount	19B802554P6
D2CE1Y	Control Cable, Remote Mount, 5.5 M	19B802554P3
D2CE1Z	Accessory Cable, Front Mount EURO	19B802554P11
D2CE5R	Extended Option Accessory Cable Front Mount	19B802554P2
D2CE5S	EXT Option Control Cable, Remote Mount, 5.5 M	19B802554P4
D2CE5T	EXT Option Accessory Cable, Remote Mount	19B802554P7
D2CE5U	EXT Option Accessory Cable, Front Mount, EURO	19B802554P12
D2CE5V	Control Cable, Remote Mount, EURO, 5.5 M	19B802554P13
D2CE5W	EXT Option Control Cable, Remote Mount, 5.5 M	19B802554P14
D2CE5Z	Dual Control Cable, Remote Mount, 9.0 M	19B802554P9
D2CE7A	Dual Radio Cable, Remote Mount, 2.0 M	19B802554P10
D2CE7B	Dual Control Cable, Remote Mount, 9.0 M, EURO	
D2CE7C	Dual Radio Cable, Remote Mount, 2.0 M, EURO	
D2LS1F	Speaker, GE Label	19A149590P1
D2LS1H	Speaker, ERICSSON Label	19A149590P11
D2MA3J	Mounting Bracket Kit, Remote Control Unit	344A4584G2
D2MA3N	Mounting Bracket Kit, Front Mount Radio	19B802672P1
D2MA3R	Mounting Bracket Kit, Remote Mount Radio	19B802673P1
D2MA3W	Mounting Bracket Kit, Remote Mount Radio, EURO	19B802672P1
D2MA3X	Cassette Mounting Bracket Kit, Front Mount, EURO	19B852366P1
D2MC3W	Microphone, GE Label	
D2MC3Z	Microphone, Ericsson Label	
D2MK3E	Keycap Kit, SCAN Control Unit	19C852359P101
D2MK3F	Keycap Kit, SYSTEM Control Unit	19C852359P102
D2MN1A	Microphone Hanger	7141414G2
D2PD1J	Transmit Fuse Holder Kit, 20/30A (USA Only)	19A149701G2

PLANNING THE INSTALLATION

Figure 4 provides an example of a typical mobile radio installation. Before starting, plan the radio installation carefully so that it will be:

- safe for the operator and passengers
- convenient for the operator to use
- neat
- protected from water damage
- easy to service
- out of the way of auto mechanics
- out of the way of passengers

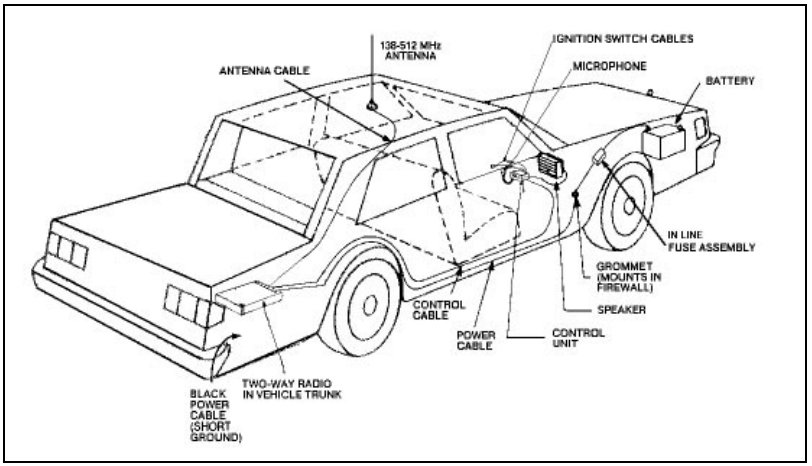


Figure 4 - Typical Installation (Remote Mount Shown)

It is suggested that the radio be installed by one of the many authorized General Electric Service Stations located throughout the United States. These experienced service stations can provide a proper radio installation and make any final adjustments that may be needed.

WARNING

- Vehicular Electronics-Electronic fuel injection systems, electronic anti-skid braking systems, electronic cruise control systems, etc., are typical of the types of electronic devices which may be prone to malfunction due to the lack of protection from radio frequency energy present when a radio is transmitting. If the vehicle contains such equipment, consult the dealer to determine if such electronic equipment will perform normally when the radio is transmitting.
- For passenger safety, mount the radio securely so that the unit will not break loose in the event of a collision. This is especially important in station wagons, vans and similar type installations where a loose radio could be extremely dangerous to the vehicle occupants.

EQUIPMENT REQUIRED

The equipment required for installing the Orion Mobile Radio is listed below:

- Crimping Tool for fuse holder
- Electric drill for drilling mounting holes
- Drills and circle cutters as follows:

  No. 31 (1/8-inch) drill

  No. 27 (9/64-inch) drill

  5/8-inch drill or circle cutter

  3/4-inch circle cutter, hole saw or socket punch
- Phillips and flat-blade screwdrivers
- POZIDRIV driver
- No. 20 Torx driver

Torx is a registered trademark of CAMCAR Division TEXTRON, Inc.
POZIDRIV is a registered trademark of Phillips International Company.

CAUTION

- Be careful to avoid damaging some vital part (fuel tank, transmission housing, etc.) of the vehicle when drilling mounting holes. Always check to see how far the mounting screws will extend below the mounting surface before installing.
- If pilot holes must be drilled, remove all metal shavings from drilling holes before installing screws.

INSTALLATION IN VEHICLES POWERED BY LIQUEFIED (LP) GAS

Radio installation in vehicles powered by liquefied petroleum gas with the LP gas container in the trunk or other sealed-off space within the interior of the vehicle must conform to the National Fire Protection Association Standard NFPA 58 which requires that:

- Space containing radio equipment shall be isolated by a seal from the space containing the LP gas container and its fittings.
- Outside filling connections shall be used for the LP gas container.
- The LP gas container space shall be vented to the outside of the vehicle.

INSTALLATION

RUNNING CABLES

To assure the feasibility of the planned cable routings, it is suggested that the cables be run before mounting the radio. The Orion mobile radio may be installed as a Front Mount, Remote Mount or Cassette Mount. The type of mount, the application and the options to be installed should be considered when planning the cable runs. Figures 5-12 provide Interconnection Diagrams for typical installations. Figures 5-12 should be referenced throughout this manual and throughout the installation.

Be sure to leave some slack in each cable going to the radio so that the radio may be pulled out for servicing with the power applied and antenna attached. Coil any surplus cables and secure them out of the way. Try to route the cables away from locations where they will be exposed to heat (exhaust pipes, mufflers, tailpipes, etc.), battery acid, sharp edges or mechanical damage or where they will be a nuisance to automobile mechanics, the driver or passengers. Keep wiring away from electronic computer modules, other electronic modules and ignition circuits to help prevent interference to these components and radio equipment.

In addition, try to utilize existing holes in the firewall, trunk wall and the channels above or beneath doors. Channels through door and window columns that are convenient for running cables may also be used, unless rigid or flexible conduit is to be installed for cable runs.

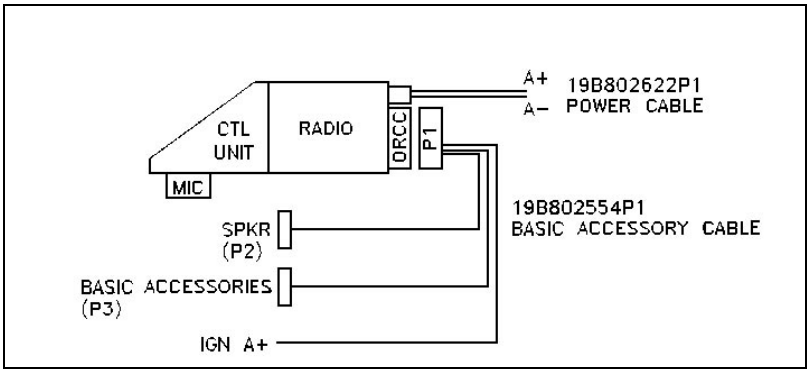


Figure 5 - Front Mount Basic Accessory Interconnections (USA Models Only)

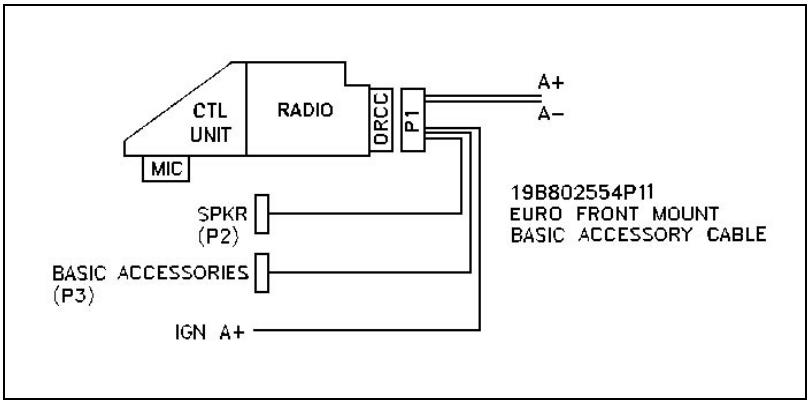


Figure 6 - Front Mount Basic Accessory Interconnections (EURO Models Only)

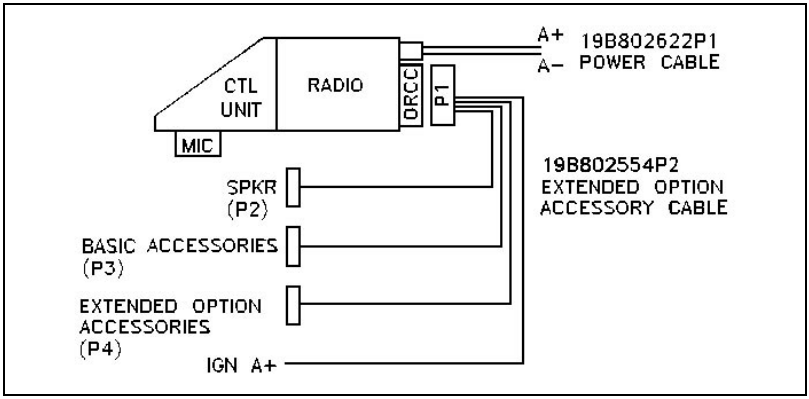


Figure 7 - Front Mount Extended Option Accessory Interconnections (USA Models Only)

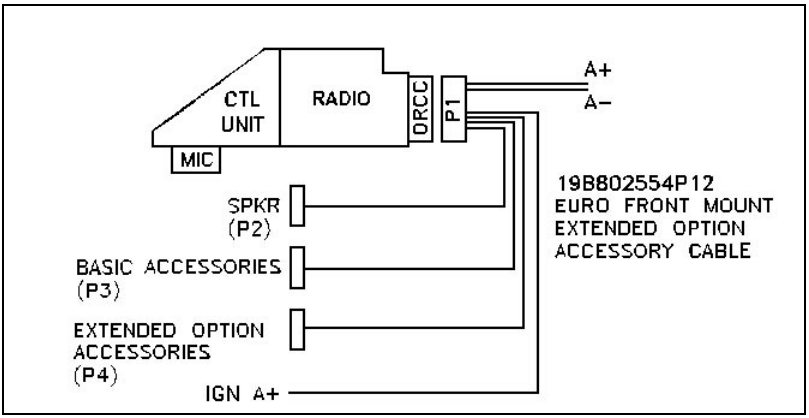


Figure 8 - Front Mount Extended Option Accessory Interconnections (EURO Models Only)

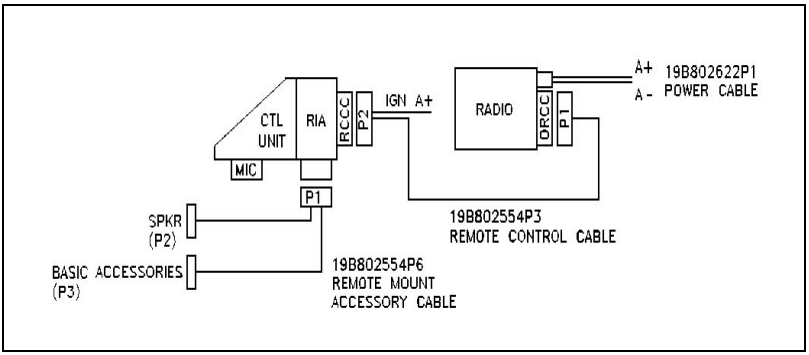


Figure 9 - Remote Mount Basic Accessory Interconnections (USA Models Only)

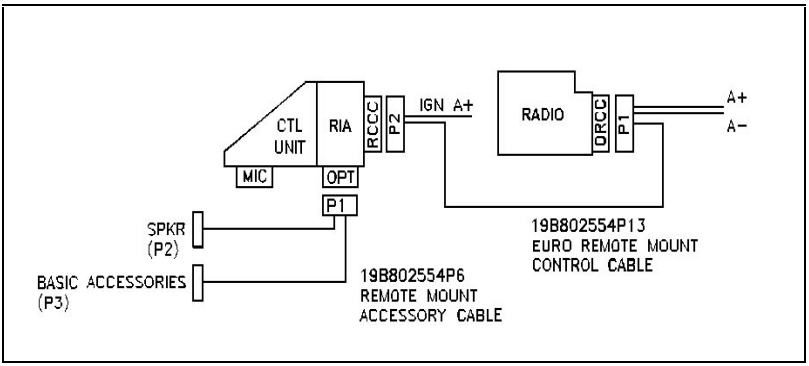


Figure 10 - Remote Mount Basic Accessory Interconnections (EURO Models Only)

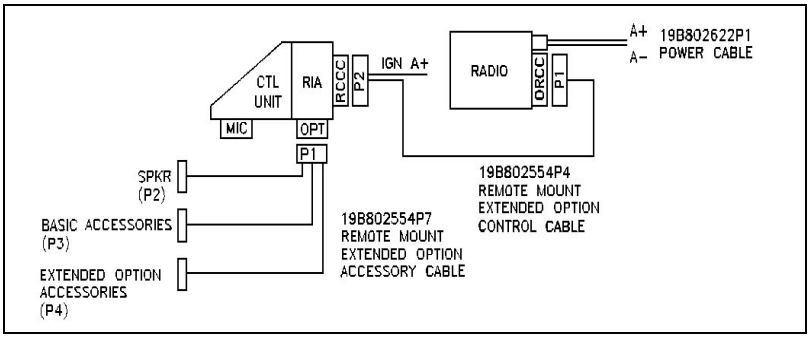


Figure 11 - Remote Mount Extended Option Accessory Interconnections (USA Models Only)

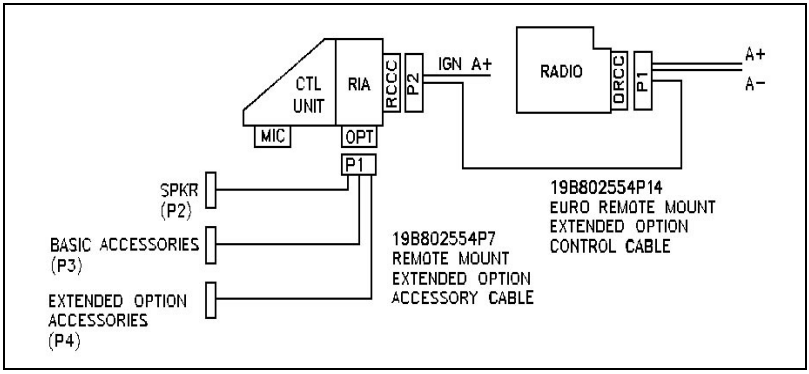


Figure 12 - Remote Mount Extended Option Accessory Interconnections (EURO Models Only)

Power Cable

The USA power cable (19B802622P1) consists of a red lead A+ and a black lead A- connected to a molded 2-pin power connector and supplied with ring terminals. The EURO power cable also consists of a red lead A+, a black lead A- and is terminated with ring terminals, but it is connected to P1 of the Accessory Cable or P1 of the Control Cable (in remote applications). To install the power cable:

1. Drill a 5/8-inch hole in the firewall for the cable run and insert the rubber grommet. Run the cable through this grommet to the battery location. Secure the cable at several locations within the engine compartment to prevent possible damage to cable.

2. Strip back the insulation approximately 3/8 of an inch from the end of the black lead. Slide one of the large heat shrink sleeves onto the wire and crimp a battery ring terminal onto this lead. Heat shrink

the sleeve over the crimp connection. Connect the black lead directly to the battery negative (-) or ground frame member.

3. Cut off 12-18 inches from the red lead. Strip back the insulation approximately 3/8 of an inch on each end of the wires. Insert the wire ends into the small openings at the end of each fuse holder section and crimp a fuse connector to each wire. Prepare the other end of the short wire in the same manner as in Step 2 and connect to the positive (+) terminal of the battery.

NOTE

Do not install fuse into fuse holder until installation is completed and all connections have been checked.

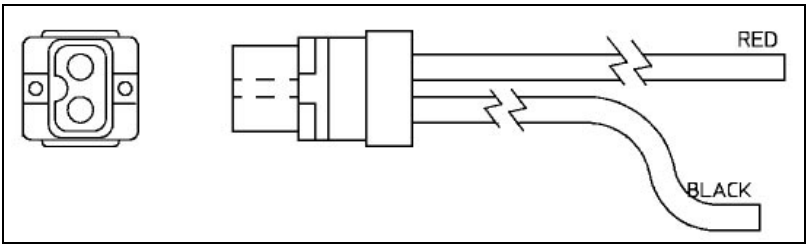


Figure 13 - Power Cable 19B802622P1 (USA Only)

Accessory Cable

Front Mount

The Basic Accessory Cable, at one end, consists of the basic accessories connector (P3), the speaker connector (P2) and the ignition sense lead. At the other end is plug P1. P1 connects to the Option/Remote Control Connector (ORCC) which is mounted on the back of the radio. The EURO Accessory Cable also contains the red and black leads of the Power Cable.

NOTE: The EURO ORCC is the opposite gender from the USA ORCC. The Extended Option Accessory Cable is the same as the Basic Cable but with the addition of the Extended Option Plug (P4). See Figures 14-17.

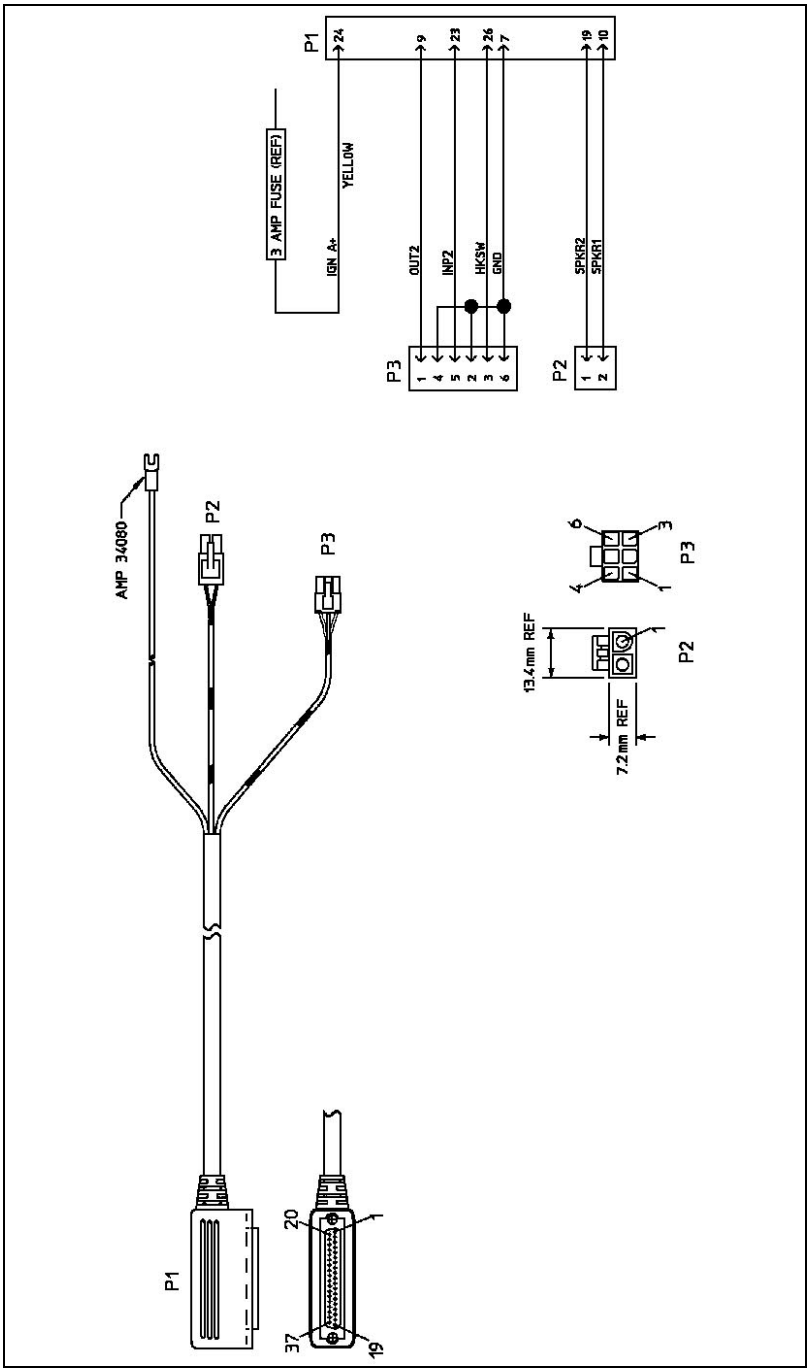


Figure 14 - USA Front Mount Standard Accessory Cable 19B802554P1

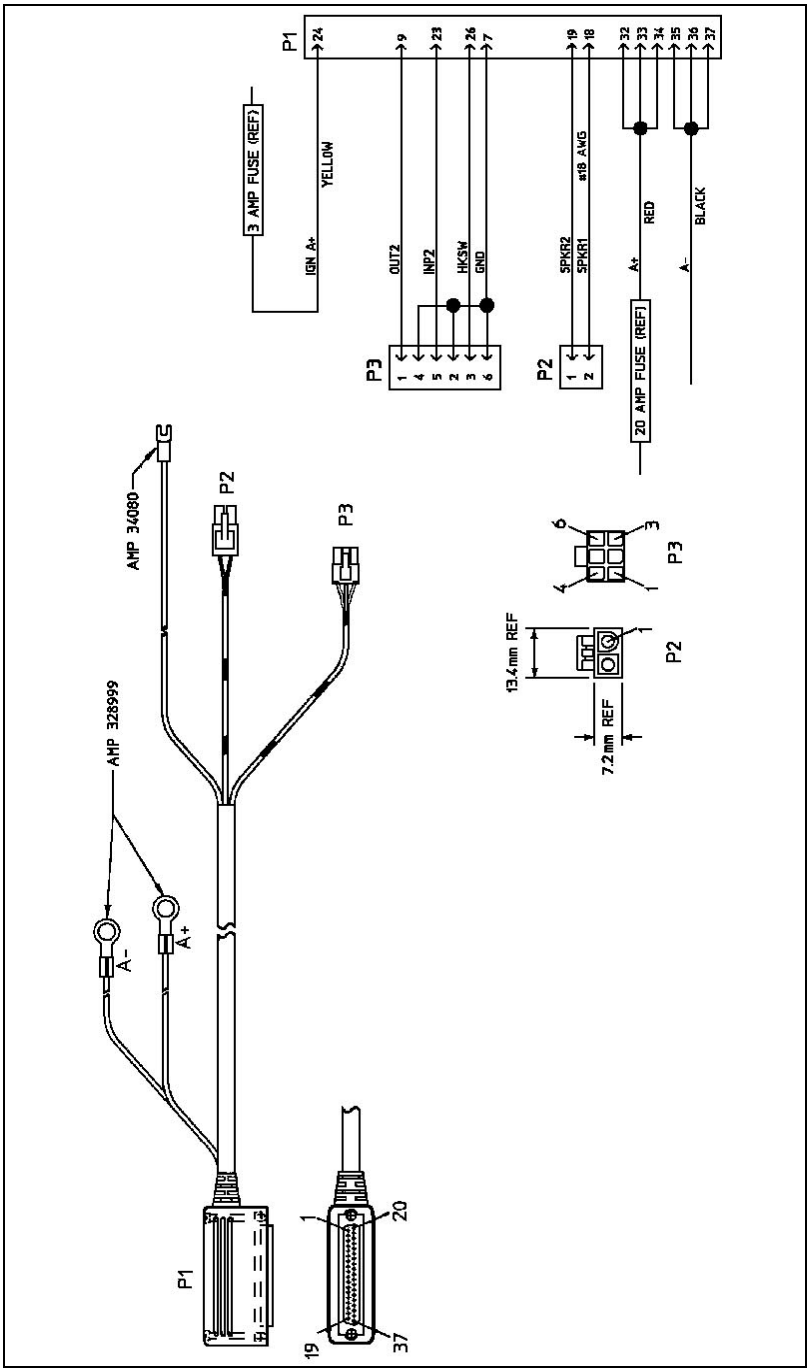


Figure 15 - EURO Front Mount Standard Accessory Cable 19B802554P11

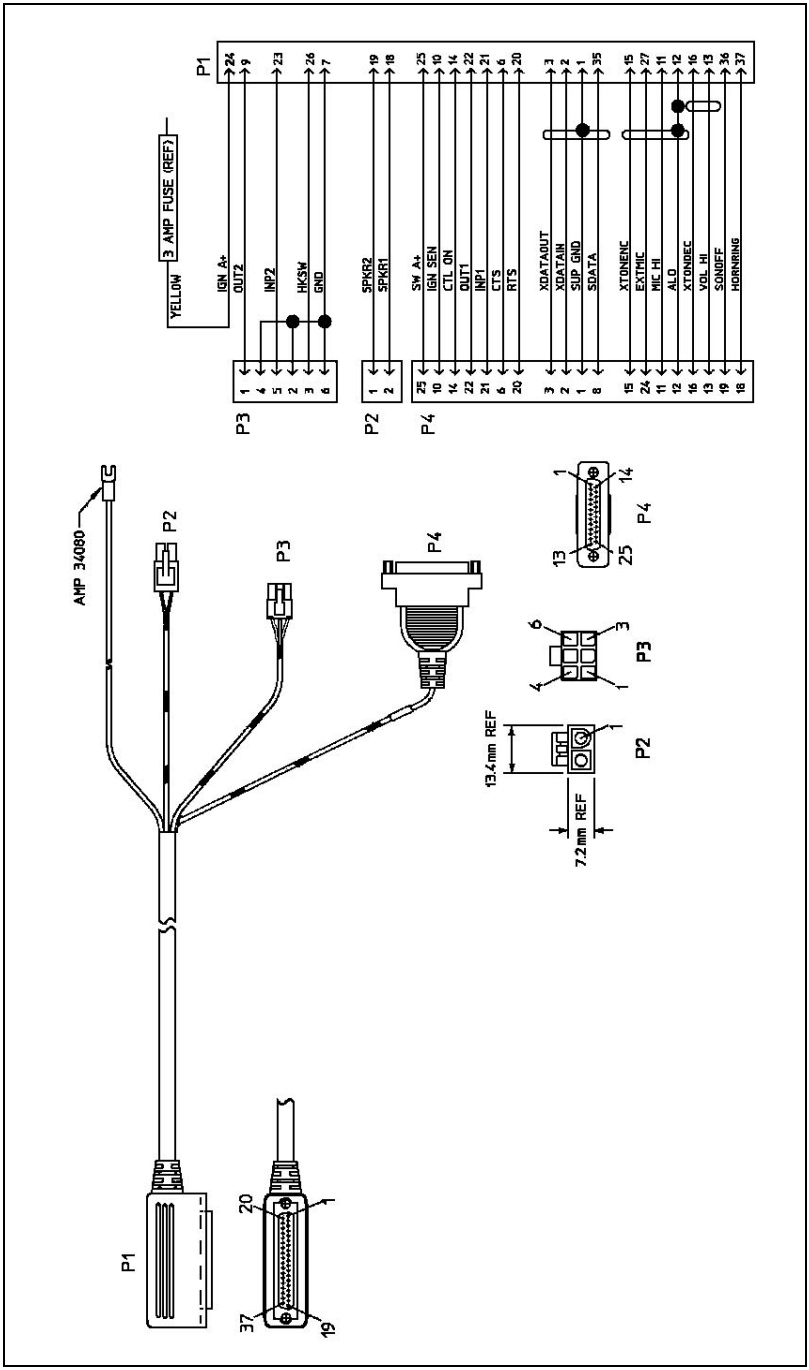


Figure 16 - USA Front Mount Extended Option Accessory Cable 19B802554P2

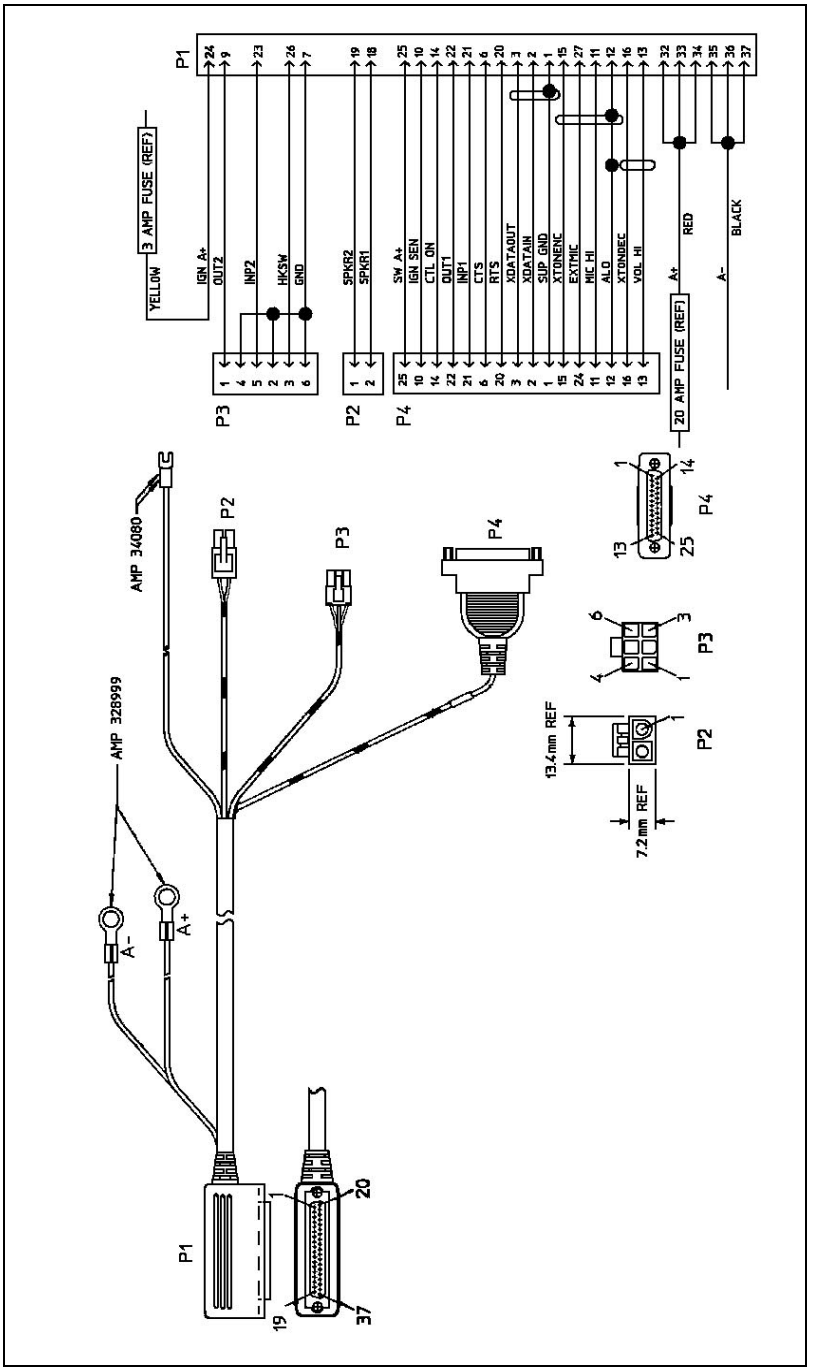


Figure 17 - EURO Front Mount Extended Option Accessory Cable 19B802554P12

Remote Mount

The Basic Accessory Cable, at one end, consists of the basic accessories connector (P3) and the speaker connector (P2). At the other end is the plug P1. P1 will connect to the Option Connector (OPT) which is mounted on the back of the Radio Interface Adapter (RIA). The Extended Option Accessory Cable is the same as the Basic Cable but with the addition of the Extended Option Plug (P4). See Figures 18 and 19.

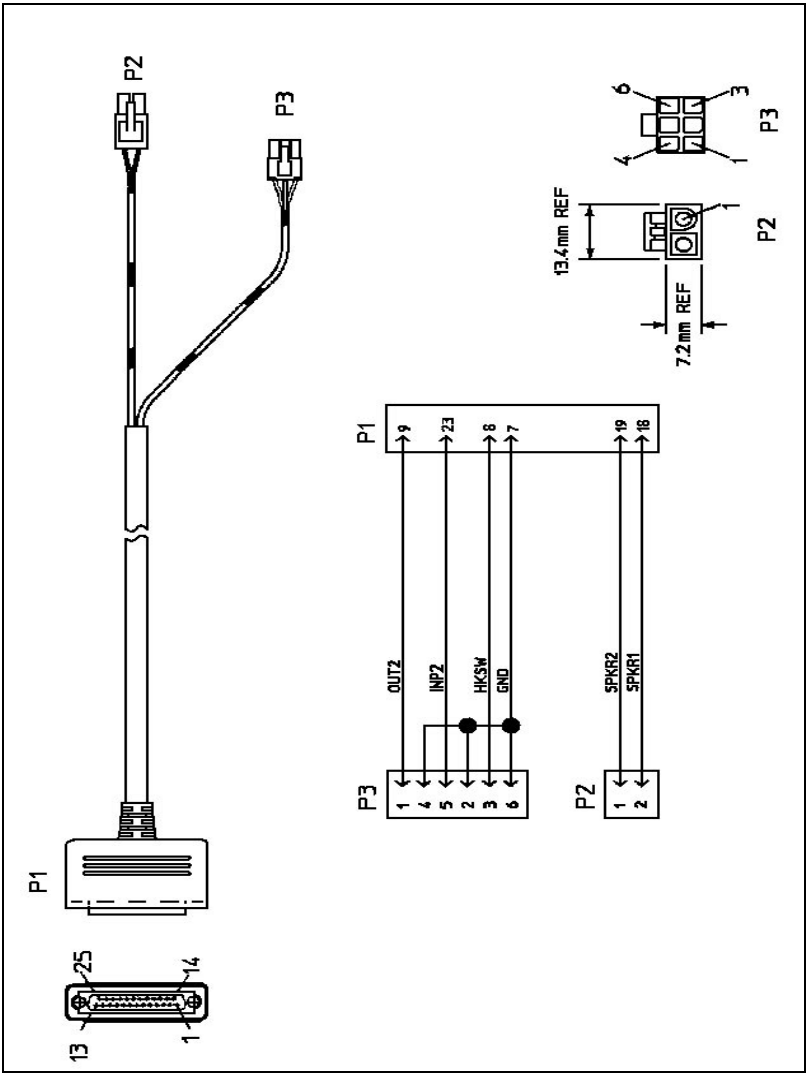


Figure 18 - Remote Mount Standard Accessory Cable 19B802554P6

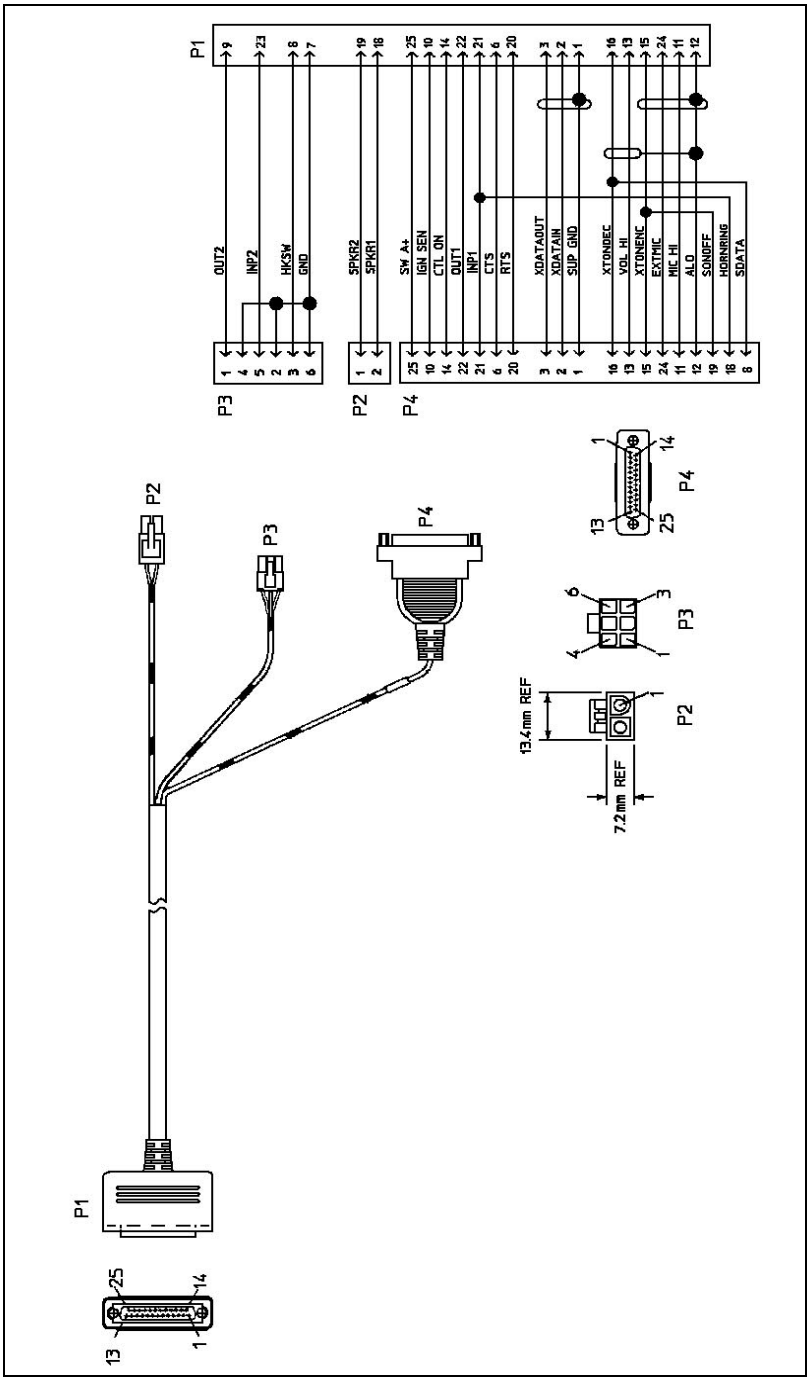


Figure 19 - Remote Mount Extended Option Accessory Cable 19B802554P7

Ignition Sense (All Applications)

NOTE

- The radio as shipped from the factory has the "ignition sense" feature disabled. As such the radio will be powered ON or OFF as determined by the front panel ON/OFF/VOLUME control only (assuming A+ and A- are connected). If it is desired to enable the "ignition sense" feature, open top cover of radio and remove shield from logic PWB. Slide switch SW601 from position 3-2 to 1-2. Replace shield and top cover. Be sure to apply correct torque to screws holding top cover in place. See Maintenance Manual.
- The "Accessory" point should drop to ZERO volts when cranking the engine and return to +12 volts after the engine is started. If a point is chosen that drops to a voltage between zero and +12 volts, the radio may execute a power-up cycle several times during start up. It is recommended that the terminal be measured with a voltmeter to be sure it shuts off (goes to zero volts) during the cranking of the engine.

The fuse holder must be attached to the yellow sense lead along with the ring terminal as follows:

1. Cut the yellow sense lead approximately 6-12" from the end that will be connected to the power source.
2. Strip the insulation from each end of the short lead and from the end of the long lead at least 3/8".
3. Insert the stripped end of the long lead and one end of the short lead into the narrow end of each fuse holder half.
4. Crimp the leads in the fuse holder halves with a crimping tool.
5. Insert the 3 amp fuse into one end of the fuse holder and join the two fuse holder halves firmly together.
6. Attach the ring terminal to the end of the short lead and connect this lead to the ignition "ON" sense point [preferably an "Accessory" point (in the vehicle fuse panel) that is switched on when the vehicle ignition switch is in the ACCESSORY and RUN positions].

CAUTION

Certain problems may be encountered when accessory equipment is connected to the ignition or accessory lines of the vehicle, where these lines may have large filter capacitors and a leakage path present. If the radio does not turn off within a reasonable amount of time after the ignition is turned off, first try a different accessory or ignition sense pick up point in the vehicle. Many vehicles have more than one circuit that is switched by the ignition switch, and one may be available that does not have large filter capacitors or a leakage path present.

If a different pickup point cannot be found, then add a 470-ohm, 1-watt resistor from the ignition sense pick point to ground. This will discharge the capacitor(s) or reduce the leakage voltage to a low value. Current drain through this resistor will be minimal (less than 0.03A) when the ignition is switched on.

Control Cable (Remote Mount Only)

The Control Cable is used to connect the Control Unit (through the RIA) to the Radio Transceiver in remote applications. Plug P2, at one end, connects to the Remote Control Cable Connector (RCCC) which is mounted on the back of the RIA. The Ignition Sense wire is also part of P2. The other end of the Control Cable (P1) connects to the ORCC which is mounted on the back of the radio. P1 of the EURO Control Cable also contains the Power Cable leads. See Figures 20-23.

CONTROL UNIT MOUNTING (REMOTE APPLICATIONS ONLY)

1. Using the bracket as a template, mark and drill the mounting holes. Be sure to leave enough room at the rear of the control unit for the cable connector. Refer to Figure 24 for control unit mounting bracket installation.
2. Secure the mounting bracket using the four No. 10 x 3/4 self-tapping screws supplied (use No. 10 x 1-1/2 if needed.).
3. Secure the control unit to the bracket with the two 1/4-20 x 5/8 hex head screws and lock washers provided.

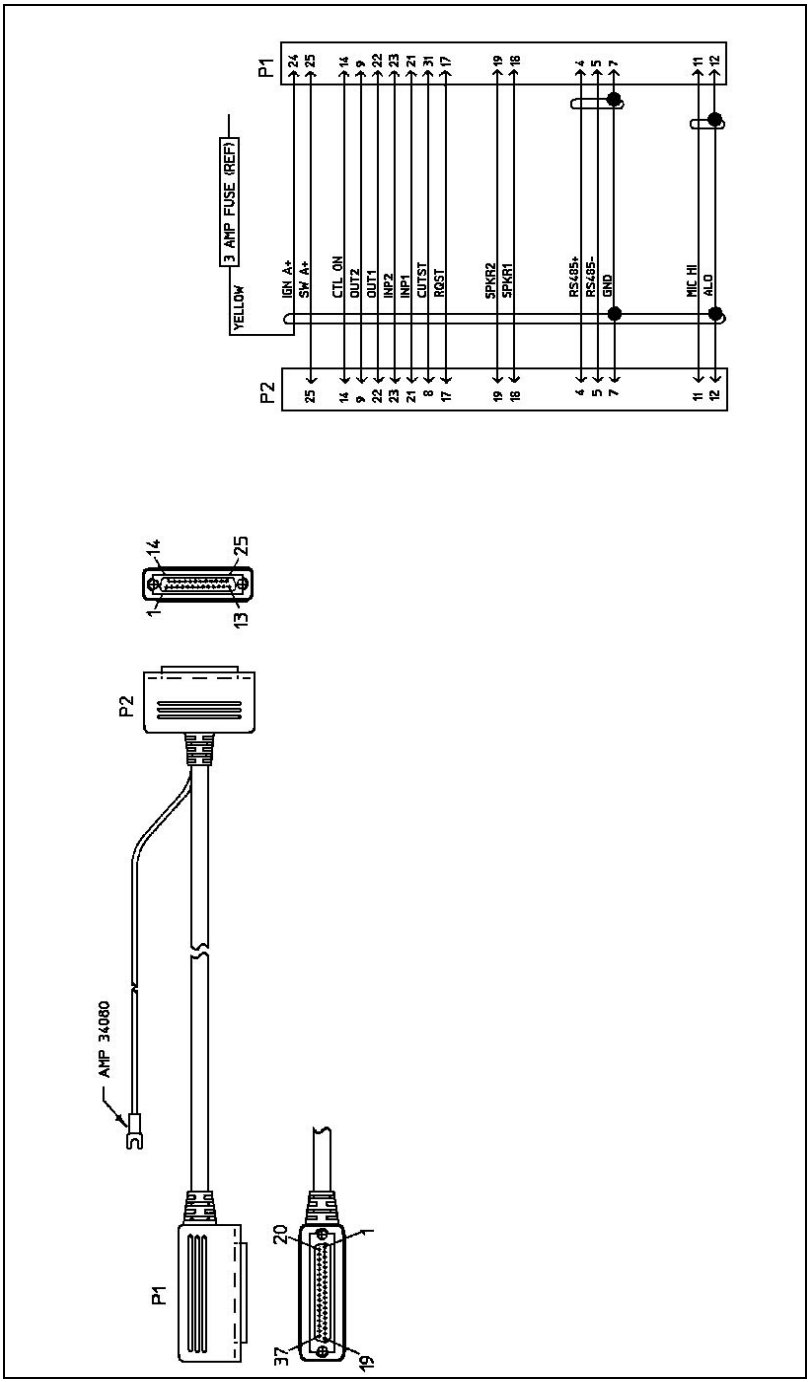


Figure 20 - USA Remote Control Cable 19B802554P3

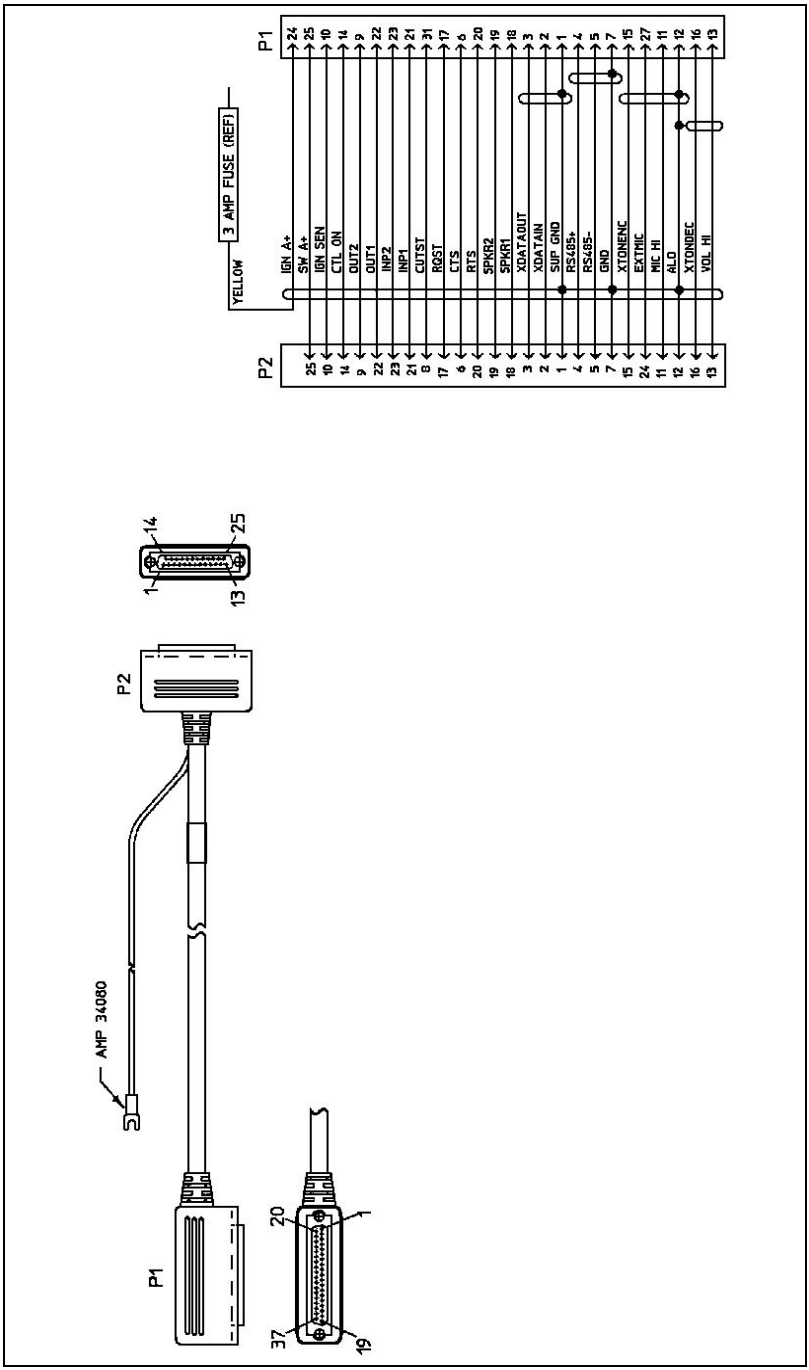


Figure 21 - USA Remote Extended Option Control Cable 19B802554P4

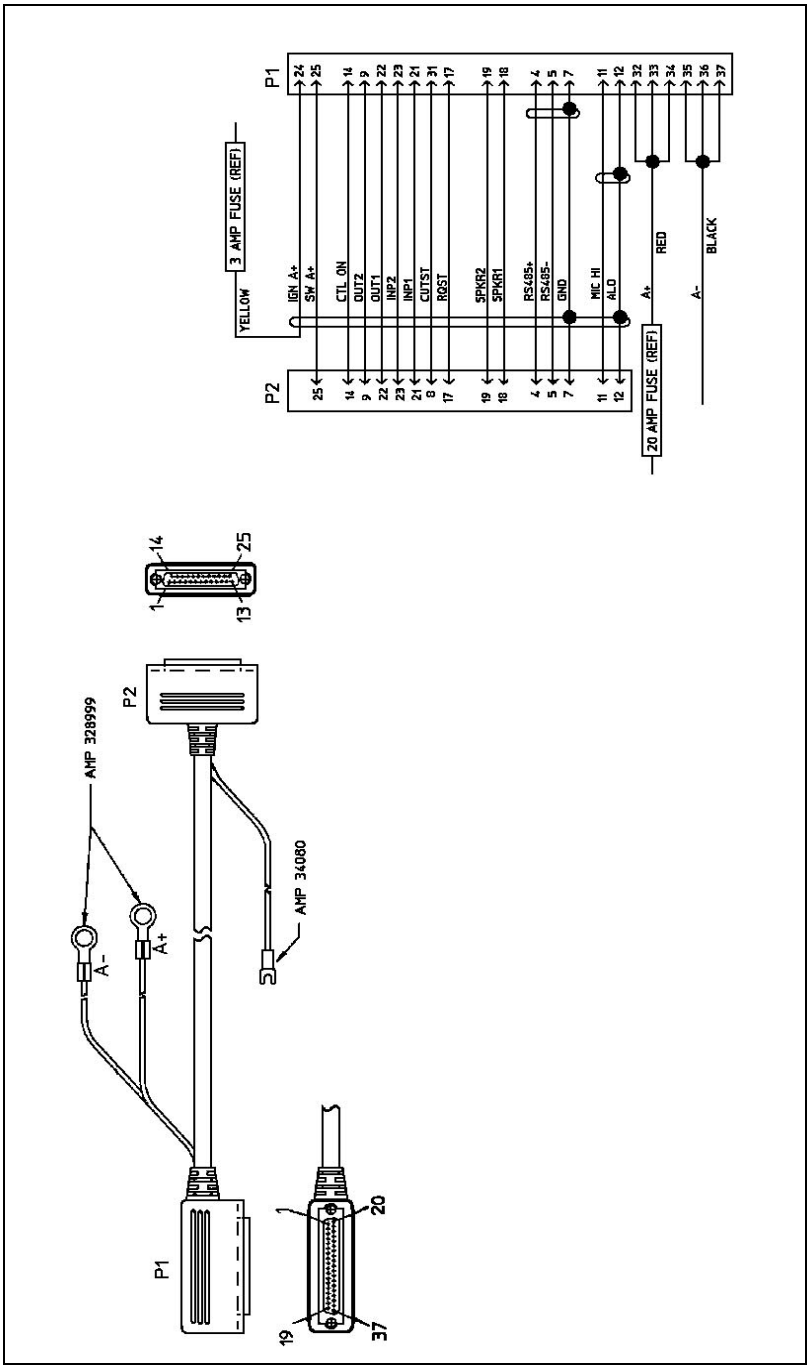


Figure 22 - USA Extended Options Remote Control Cable 19B802554P13

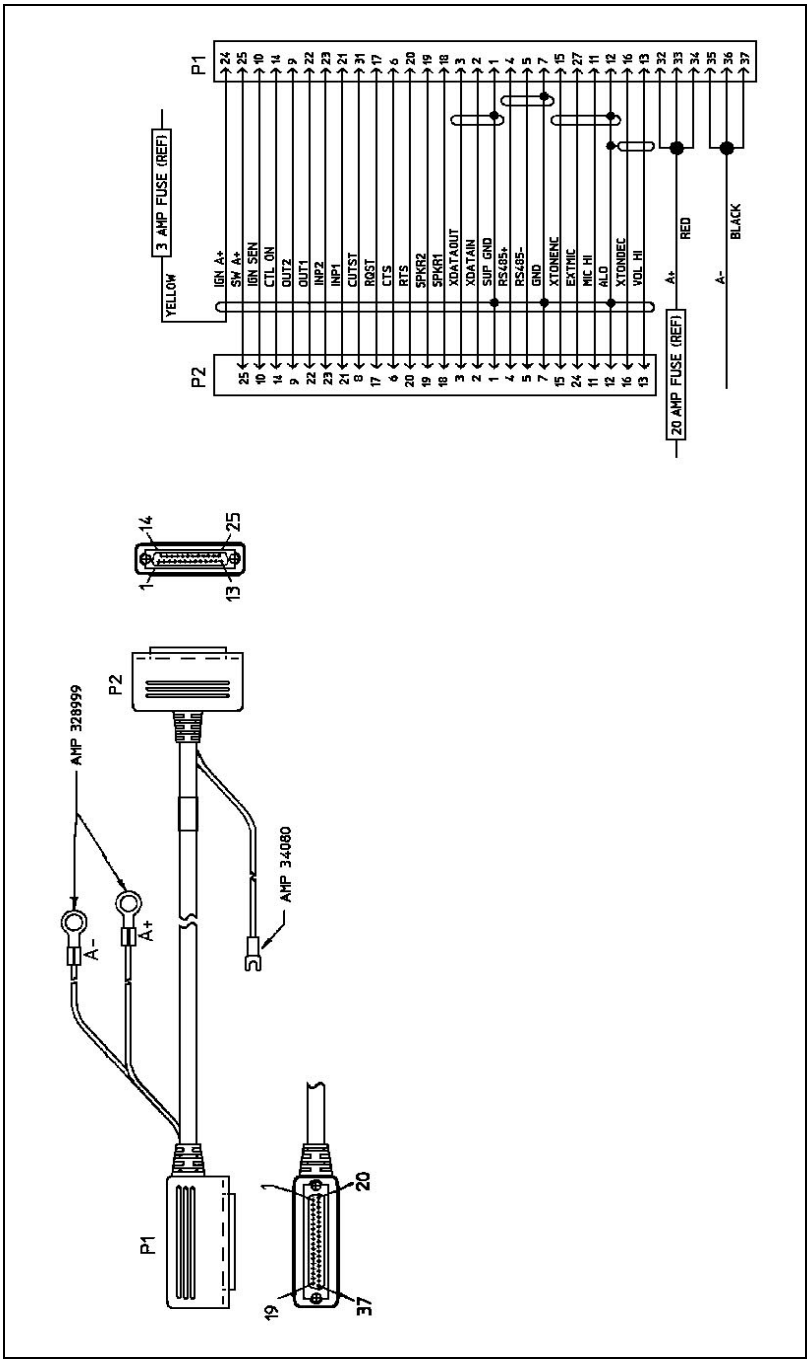
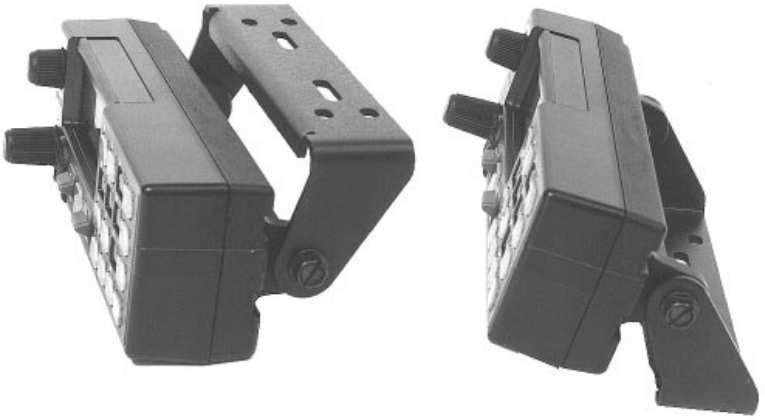


Figure 23 - EURO Extended Options Remote Control Cable 19B802554P14



Top Mount Bottom Mount

Figure 24 - Control Unit Mounting Bracket Installation

SPEAKER D2LS1F

The speaker kit includes the speaker, mounting bracket and connecting cable. Mount the speaker so it is directed to the operator but does not present a hazard in the event of an accident. The speaker may be mounted on the lower edge of the instrument panel, the firewall or above the windshield in some trucks.

1. Use the mounting bracket as a template for locating the mounting holes and mount the speaker as shown in Figure 25.
2. Refer to the applicable installation procedures for connection of the speaker to the accessory cable.

MICROPHONE HANGER AND/OR HOOKSWITCH MOUNTING

The microphone hanger or hookswitch should be mounted in a location convenient to the operator where it will not interfere with the safe operation of the vehicle or be a hazard to the vehicle passengers. The hanger or hookswitch is designed to be mounted with the open end of the mounting button slot pointed upward. Use the hanger or hookswitch as a template to mark and drill the mounting holes. Mount the hanger or hookswitch with the self-tapping screws provided.

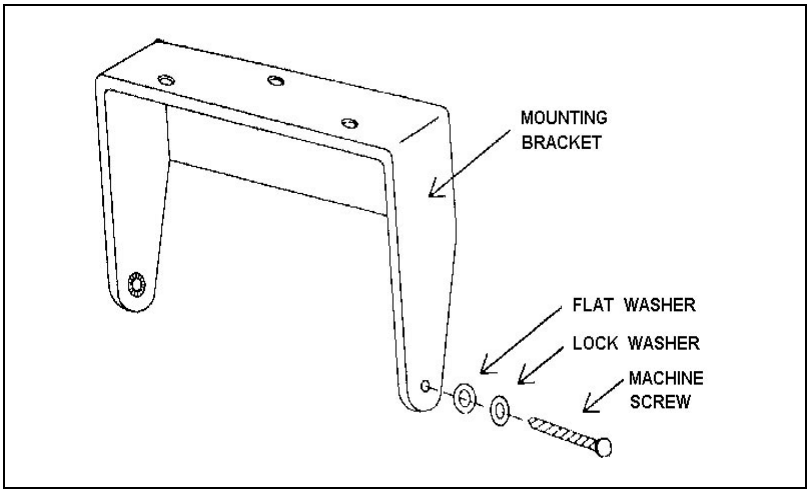


Figure 25 - Speaker Mounting

RADIO MOUNTING AND FINAL HOOK-UP

Front Mount

Typically the bracket shown in Figure 26 is used for Front Mount applications. The bracket can be mounted so that it is either above or below the radio for the user's convenience. The bracket pictured in Figure 24 can also be used for Remote Mount application but is **not recommended for 110 watt VHF radios or 100 watt UHF radios**. The following instructions are for a Front Mount installation using the bracket shown in Figure 26.

1. Use the supplied mounting bracket as a template to locate the position for each of the drill holes. Be sure to leave enough room at the front and rear of the radio for cable connections. Drill No. 27 (9/64) pilot holes.
2. Mount bracket with four 1/4"-14 x 3/4" sheet metal screws (use 1/4"-14 x 1-1/2" screws if needed).
3. Place radio into mounting bracket and secure with the four M4 x 10 mm hex head screws, M4 flat washers and M4 lock washers supplied. No. 20 Torx.
4. Connect antenna coaxial cable to antenna connector (TNC).
5. Connect front mount accessory cable connector P1 to the Option/Remote Control Connector (ORCC) and secure with the two captive screws in the connector to the radio.

Top Mount

Bottom Mount

Figure 26 - Mounting Bracket Installation

6. Connect front mount accessory cable connector P2 to speaker cable connector.
7. Connect power cable to power connector on rear of radio unit and secure with the two captive screws to the radio unit.
8. Connect microphone connector to connector on front panel and secure with captive screw.

NOTE

Do not torque microphone connector screw greater than 2 in-lb. Alternatively, finger tight plus 1/4 turn is acceptable.

9. If there are no other accessory connections, tie back plug P3 to main cable.
10. Recheck all connections before inserting fuse into transmit fuse assembly.

Remote Mount Installation

The bracket shown in Figure 27 is used for Remote Mounting (USA Only). In some applications the bracket shown in Figure 26 can also be used for Remote Mounting. The following instructions are for a Remote Mount installation using the bracket shown in Figure 27.

1. Using the bracket as a template, mark and drill the mounting holes using a No. 27 drill. Be sure to leave enough room at the rear of the radio unit for the cable connections.
2. Secure the Mounting bracket using four 1/4"-14 x 3/4" sheet metal screws (use 1/4"-14 x 1" if needed.) The bracket can be used mounted so that it is either above or below the radio for the user's convenience.
3. Slide the radio unit into the bracket by aligning bracket guides with grooves on each side of radio (rear of radio should be inserted first). Slide radio back until screw holes in front of bracket align with screw holes in side of radio. See Figure 27.
4. Secure radio to the bracket with two M4 x 10 mm socket head screws provided.
5. Connect antenna coaxial cable to antenna connector (TNC).
6. Connect remote control cable connector P1 to the ORCC connector on the radio unit and secure with the two captive screws.
7. Connect other end of remote control cable to the remote control cable connector (RCCC) on the remote control unit.
8. Connect remote mount accessory cable connector P1 to the option connector (OPT) on control unit. Then connect the speaker to connector P2 and accessory connector P3 to any options (hookswitch, etc.). If connector P3 is not used, insulate and tie back to main cable.
9. Recheck all connections and cables. Insert fuse into transmit fuse assembly.

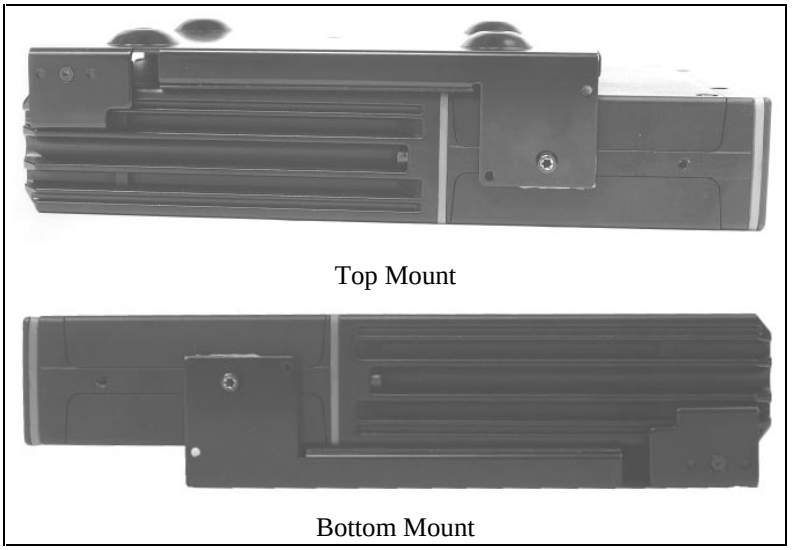


Figure 27 - Remote Mounting Bracket Installation

Cassette Mounting (EURO ONLY)

The cassette mounting assembly is designed to mount in a standard DIN space in the instrument panel or console. This mounting permits rapid insertion and removal of the radio unit from the vehicle. All connections are made through a quick disconnect connector at the rear of the cassette mounting assembly to the radio unit. This connector is part of the cassette assembly. The cassette assembly is shown in Figure 28.

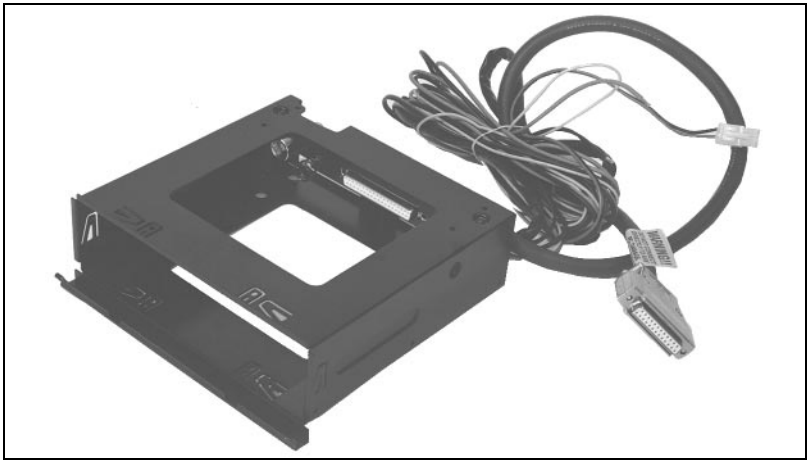


Figure 28 - Cassette Assembly

Cassette Assembly Mounting

1. Insert the cassette assembly in the mounting location. Secure the cables with the sheet metal screws and retaining straps provided.

2. Secure the back of the cassette assembly using the mounting stud (located at the back of the cassette assembly), No. 6 flat washer, No. 6 split lock washer and No. 6 wing nut.

3. Several tabs are located on the top, bottom and sides of the cassette assembly. These tabs are conveniently located near the front of the assembly and may be bent out as needed to further secure the cassette assembly to the vehicle.

4. Next install the Handle Assembly:

   a. Turn the radio upside down. Remove the two small machine screws on the bottom of the radio, near the front. Use upward pressure on screws to engage captivated threads for removal.

   b. Using the machine screws and flat washers provided with the handle assembly, attach the handle to the bottom of the radio. The two holes on the handle should align with the two holes on the radio created by step (a). Once installed, the rubber handle should rotate freely from over top of the radio to just out in front of the control unit (approximately 90 degrees). Be sure to torque the two mounting screws within 6.5 to 8.25 in/lb limits.

5. Connect the antenna coaxial cable to the cassette mounting assembly rear connector.

6. Connect the Power leads and the Ignition Sense leads as described in previous sections. See Figure 29.

7. Connect the speaker cable connector P2 to the speaker and the basic accessory connector P3 to the following options (if used, see Figure 29):

Option	Plug & Pin
Ext. Hookswitch	P3-3 (HOT)
	P3-6 (GND)
Foot Switch	P3-5 (HOT)
	P3-2 (GND)
Horn Relay	P3-1 (HOT)
	P3-4 (GND)

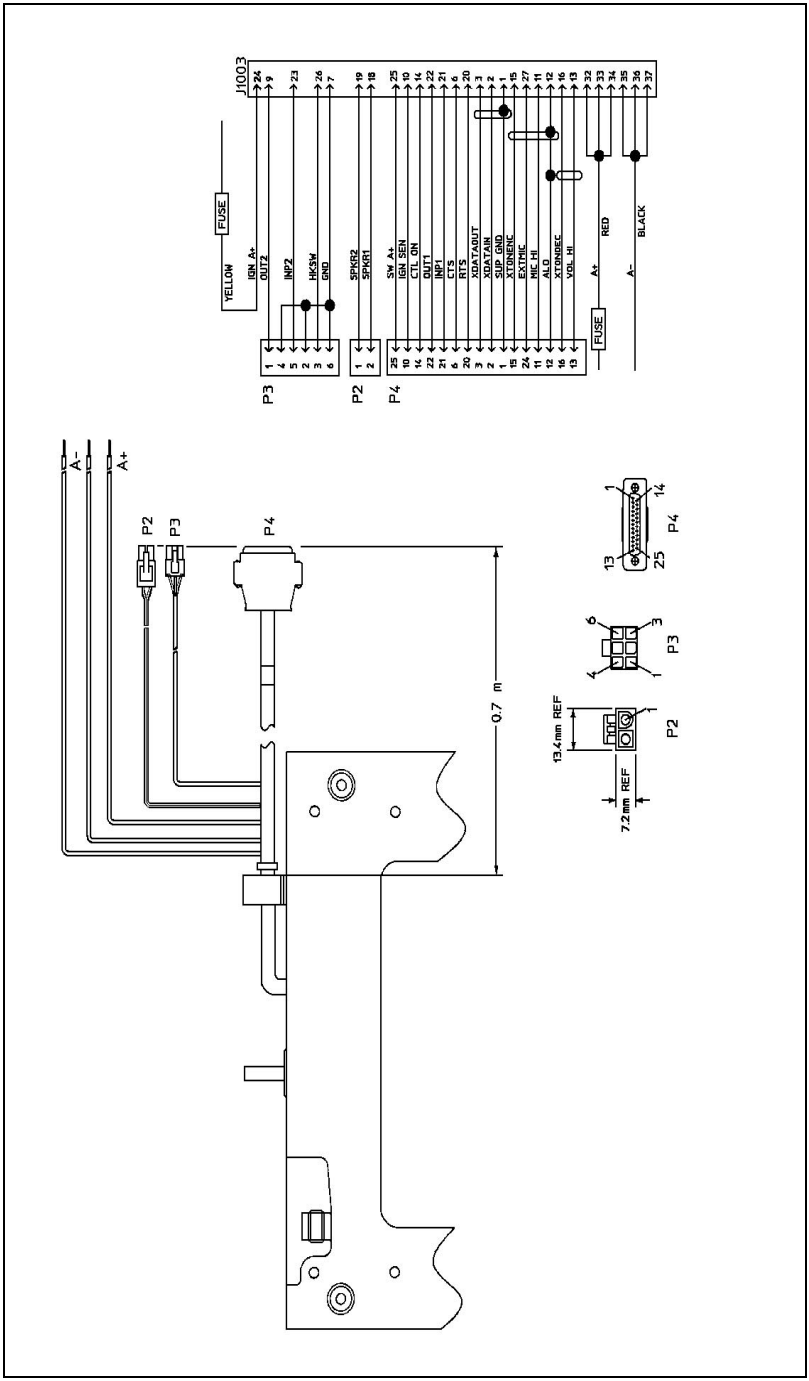


Figure 29 - Cassette Assembly Schematic Diagram

8. Connect the extended option accessory plug P4 to the following options (if used, see Figure 29):

- Mobile Data Terminal
- Public Address (External Amplifier)
- External Microphone
- External Tone Encoder
- External Tone Decoder
- Output (User Defined)
- Input (User Defined)

CAUTION

Refer to accessory manual supplement for details regarding the extended options listed above. DO NOT CONNECT DIRECTLY TO A PC OR DATA TERMINAL. DAMAGE COULD RESULT!!!

9. With the handle assembly in the UNLOCKED position (out in front of the control unit), insert the radio into the cassette assembly. Slide the radio into the cassette assembly until the back of the radio meets the back of the cassette assembly.

NOTE

Caution should be used while engaging the radio in the cassette the first few times until the cabling in the cassette mount assembly has had an opportunity to work into its permanent location. To insure proper first time engagement, the following procedure should be used:

Insert radio into cassette mount opening and slide in until you feel some spring resistance. Holding the handle, jiggle the radio a bit to give it a chance to find the connectors. Then engage the radio handle in the sheet metal hooks which protrude from the lower corners of the cassette mount casing. Rotate the handle upward to fully engage the radio. See Figure 30. DO NOT FORCE THE CONNECTOR ENGAGEMENT portion of the travel.

If the radio does not go in using this procedure, a large flat blade screwdriver may be used to re-position the 37 pin connector slightly to assist the first time engagement.

10. Recheck all connections and cables. Insert fuse into transmit fuse assembly.

Figure 30 - Handle Assembly In LOCKED Position

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