

# *Installation/Operator's Manual*

## M-RK

ENHANCED VEHICULAR  
CHARGER BML 161 66/2



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## SAFETY INFORMATION

The operator of any mobile radio should be aware of certain hazards common to the operation of vehicular radio transmissions. **A list of several possible hazards is given:**

1. **Explosive Atmospheres** - Just as it is dangerous to fuel a vehicle with the motor running, similar hazards exist when operating a mobile radio, be sure to turn the radio off while fueling the vehicle. Do not carry containers of fuel in the trunk of the vehicle if the radio is mounted in the trunk.
2. **Interference to Vehicular Electronics Systems** - Electronic fuel injection systems, electronic anti-skid braking systems, electronic cruise control systems, etc., are typical electronic systems that may malfunction due to the lack of protection from radio frequency energy present when transmitting. If the vehicle contains such equipment, consult the dealer and enlist his aid in determining the expected performance of electronic circuits when the radio is transmitting.
3. **Dynamite Blasting Caps** - Dynamite blasting caps may be caused to explode by operating a radio within 500 feet of the blasting caps. Always obey the "**Turn Off Two-Way Radios**" signs posted where dynamite is being used.

When transporting blasting caps in your vehicle:

- a. Carry the blasting caps in a closed metal box with a soft lining.
  - b. Leave the radio **OFF** whenever the blasting caps are being put into or removed from the vehicle.
4. **Radio Frequency Energy** - To prevent burns or related physical injury from radio frequency energy, do not operate the transmitter when anyone outside of the vehicle is within two feet of the antenna.
  5. **Liquefied Petroleum (LP) Gas Powered Vehicles** - Mobile radio installations 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** requiring:
    - a. The space containing the radio equipment shall be isolated by a seal from the space containing the LP gas container and its fittings.

- b. Outside filling connections shall be used for the LP gas container.
- c. The LP gas container shall be vented to the outside of the vehicle.

## **SAFE DRIVING RECOMMENDATIONS FOR USERS OF MOBILE RADIOS RECOMMENDED BY AAA**

- Read the literature on the safe operation of the radio.
- Keep both hands on the steering wheel and the microphone in its hanger whenever the vehicle is in motion.
- Place calls only when vehicle is stopped.
- When talking from a moving vehicle is unavoidable, drive in the slower lane. Keep conversations brief.
- If a conversation requires taking notes or complex thought, stop the vehicle in a safe place and continue the call.
- Whenever using a mobile radio exercise caution.

## **OPERATING RULES AND REGULATIONS**

Two-way FM radio systems must be operated in accordance with the rules and regulations of the Federal Communications Commission (FCC). As an operator of two-way radio equipment, you must be thoroughly familiar with the rules that apply to your particular type of radio operation. Following these rules helps eliminate confusion, assures the most efficient use of the existing radio channels, and results in a smoothly functioning radio network.

When using your two-way radio, remember these rules:

1. It is a violation of FCC rules to interrupt any distress or emergency message. As your radio operates in much the same way as a telephone "**party line**", always listen to make sure that the channel is clear before transmitting. Emergency calls have priority over all other messages. If someone is sending an emergency message - such as reporting a fire or asking for help in an accident - **KEEP OFF THE AIR!**

2. The use of profane or obscene language is prohibited by Federal law.
3. It is against the law to send false call letters or false distress or emergency messages. The FCC requires that you keep conversations brief and confine them to business. To save time, use coded messages whenever possible.
5. Using your radio to send personal messages (except in an emergency) is a violation of FCC rules. You may send only those messages that are essential for the operation of your business.
6. It is against Federal law to repeat or otherwise make known anything you overhear on your radio. Conversations between others sharing your channel must be regarded as confidential.
7. The FCC requires that you identify yourself at certain specific times by means of your call letters. Refer to the rules that apply to your particular type of operation for the proper procedure.
8. No changes or adjustments shall be made to the equipment except by an authorized or certified electronic technician.

### **IMPORTANT**

Under U.S. law, operation of an unlicensed radio transmitter within the jurisdiction of the United States may be punishable by *a fine of up to \$10,000, imprisonment for up to two years, or both*

## OPERATING TIPS

The following conditions tend to reduce the effective range of two-way radios and should be avoided whenever possible:

- Operating the radio in areas of low terrain, or while under power lines or bridges.
- Obstructions such as mountains and buildings.

In areas where transmission or reception is poor, some improvement may be obtained by insuring that the antenna is vertical. Moving a few yards in another direction or moving to a higher elevation may also improve communication.

## INTRODUCTION

The M-RK and Enhanced Vehicular Charger BML 161 66/2 unit can be used with both the M-RK I and M-RK II Personal radios. The following batteries may be used with the M-RK I or M-RK II radios and these chargers

|             |                               |
|-------------|-------------------------------|
| 19A149838P1 | 1200 mAh                      |
| 19A149838P2 | 1200 mAh (Intrinsically safe) |
| 344A3278P1  | 1700 mAh                      |
| 344A3278P2  | 1700 mAh (Intrinsically safe) |

A vehicular charger enhances the operational versatility of an M-RK radio in the mobile environment. See Table 1 for feature.

The Enhanced Vehicular Charger allows the user to operate the radio while it is in the charge mode. With the Enhanced Vehicular Charger, the M-RK portable radio can be used as a mobile radio. In this configuration, the M-RK radio can be used with an external antenna, microphone, and speaker. The radio can also be operated with a remote mounted control unit.

Table 1 - Vehicular Charger Features

| FEATURE  | ENHANCED<br>BML 161 66/2 |
|--|--------------------------|
| Fast Charge  | Yes                      |
| Charge and Ready Indicator Lights                      | Yes                      |
| Transmitter Enabled Indicator Light                    | Yes                      |
| Vehicular Repeater Enabled Indicator Light             | No                       |
| 10-Watt External Speaker Amplifier with Volume Control | Yes                      |
| External Microphone Control                            | Yes                      |
| External Antenna Connector                             | Yes                      |

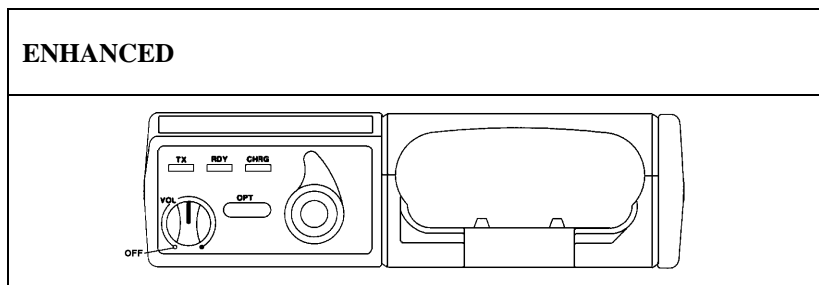


Figure 1 - Enhanced Vehicular Charger

## OPERATION

### MOBILE CHARGER OPERATION

There are two different type of mobile chargers.

- 1) Enhanced Vehicular Charger
- 2) Enhanced Vehicular Charger with Remote Control Unit

#### Enhanced Vehicular Charger

To operate the Enhanced Vehicular Charger, place the M-RK radio into the charger and turn the rotary knob clockwise until it locks into position (see Figures 2 & 3). The **CHRG** LED should light to indicate that the battery is charging. When the battery is fully charged, the **CHRG** LED will turn off and the **RDY** LED will turn on. At this time, the button in the center



of the rotary knob may be pressed to unlock the radio from the charger, and the radio may be removed.

When the radio is in the charger, it may be operated as normal, except that the separate speaker and microphone must be used.

**NOTE**

When the radio is in the charger, it may be operated as normal, except that the separate speaker and microphone must be used.

**Enhanced Vehicular Charger with Remote Control Unit**

To operate the Enhanced Vehicular Charger, place the M-RK radio into the charger and turn the rotary knob clockwise until it locks into position (see Figure 2 & 3). Turn on power to the control head and then turn on power to the radio. Microphone must be connected to Control Unit during this mode of operation.

**NOTE**

- 1) When the radio is in the charger, it may be operated as normal through the remote control unit. The separate speaker and microphone must be used.
- 2) Never insert or remove the radio from the charger unit by pulling on the antenna, or using it as a handle, as this may damage the antenna.
- 3) Volume on charger must be set to 1/4 turn. Audio volume is controlled by remote control head.



Figure 2 - Charger With M-RK II Personal Radio Inserted  
(Antenna Removed For Photo Only).

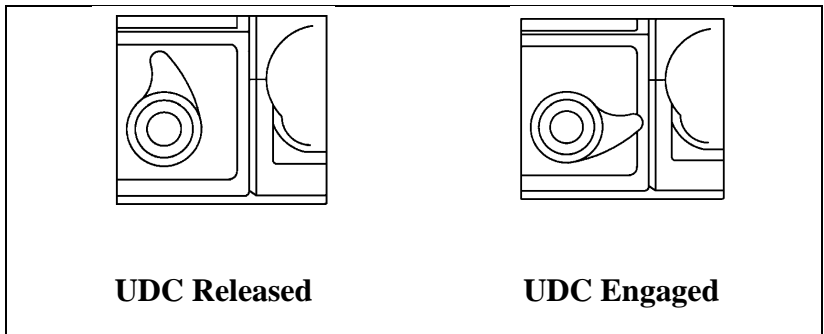


Figure 3 - Universal Device Connector (UDC) Rotary Latch Knob

# FRONT PANEL SWITCHES AND INDICATORS

## Enhanced Vehicular Charger

This front panel contains three indicator lights; **TX**, **RDY**, and **CHRG**, an **ON/OFF** volume control switch for operation of the M-RK radio as a mobile radio, an Option push-button, and the UDC Rotary Latch Knob.

### 1) Indicator Lights

- |                       |   |
|-----------------------|---|
| <b>TX</b> (Red)       | Lights if the M-RK radio is transmitting  |
| <b>RDY</b> ( Green)   | Lights if battery is 90 to 100 percent charged and the charger is in trickle charge mode.       |
| <b>CHRG</b> ( Yellow) | Lights when radio is first inserted in the charger. Indicates that the radio is in charge mode. |

### 2) ON/OFF Volume Control Switch

This switch powers the radio for operation as a mobile radio.

### 3) Option Push-button

This button can be programmed for many functions, but factory programming causes the same action as the M-RK "**clear**" function. This option is not available during remote control operation.

### 4) UDC Rotary Latch Knob

This knob latches the M-RK radio in the charger and connects the UDC connector to all circuits within the charger to allow the M-RK radio to operate as a mobile radio. It should always be latched when the radio is in the charger.

## BATTERY CHARGER DETAILS

### NOTE

To maximize nickel cadmium battery life, the M-RK vehicular chargers are designed with automatic controls which limit the rapid charging of M-RK batteries if the internal battery temperature is below 0° C (+32° F) or above +45° C (+113° F). The charger indicates this high or low internal temperature condition by a yellow LED which blinks at a slow rate.

If a slow blinking, yellow LED is observed, the operator must wait until the internal battery temperature stabilizes within the allowable range before restarting the charging procedure by removing and re-inserting the radio into the charger.

In a vehicular application, with either high ambient temperature inside or outside of the vehicle, the automatic charging control will often prevent rapid charging or limit the time of rapid charging.

In other situations, where the operator inserts and removes the radio many times during a short period of time, the automatic control will sense a high internal battery temperature (due to start-up rapid charging of the battery) and will prevent further rapid charging of the battery until the internal temperature of the battery stabilizes within the acceptable range.

When the M-RK radio is placed in the charger, the radio's battery pack is charged. The fast or "rapid" charge feature, normally is applied immediately, and is controlled by the microprocessor circuits within the charger. The following details apply to the battery charge feature:

- Normally, when initially placed in the charger, the battery pack is fast charged and the yellow charge indicator glows continuously until it is near a full charge (between 90% and 100% full charge). At this time the charger switches to a slow or "trickle" charge rate and completes the charge. During the "trickle" charge the green ready indicator is illuminated.
- If the CHARGE INDICATOR flashes, the battery is not being fast charged. Several factors may cause this to occur. These include,

dirty battery pack contacts, an extremely hot or cold battery pack, or a defective battery pack.

- Engagement of the UDC is not necessary for battery charge operation, but is required to operate an M-RK Personal in the enhanced vehicular charger. The UDC should also be in the engaged position whenever the vehicle is moving, for both the standard and enhanced models, to firmly hold the radio in the charger in case of an accident.

#### **NOTE**

If the Battery is deeply discharged, the radio must be turned off when inserted into the charger.

## **INSTALLATION**

### **UNPACKING AND CHECKING THE EQUIPMENT**

Before starting the installation, carefully unpack the equipment and inspect the equipment for damage. If there is any damage, file a claim with the carrier immediately.

#### **Enhanced Charger**

The following equipment is included with the Enhanced Charger

- M-RK Vehicular Charger BML 161 62/2
- Mounting Bracket and Mounting Hardware 344A4616P11 (mounting hardware includes four machine screws, four lock washers, six self-tapping screws and one cable tie)

#### **Enhanced Charger with Remote Control Unit**

The following equipment is included with the Enhanced Charger

- M-RK Vehicular Charger BML 161 62/2
- Remote Control Unit
- Mounting Bracket and Mounting Hardware 344A4616P11 (mounting hardware includes four machine screws, four lock washers, six self-tapping screws and one cable tie)

- Power Cable 19B802554P2
- Power Cable 19B801358P2

## **TOOLS REQUIRED**

- 1) Electric Drill
- 2) No. 28 Drill Bit
- 3) Hole Saw
- 4) Phillips and Flat-Blade Screwdrivers

## **PLANNING THE INSTALLATION**

The installation of the Vehicular Charger should be carefully planned, before work actually begins.

Mechanical installation guidelines include mounting the unit:

- in a location that is safe for the operator and any passengers in the vehicle.
- in a location that is convenient for the operator to use.
- in a location that allows proper clearance for cables.
- so that it can be easily removed for servicing.

It is recommended that the unit be installed by one of the many Authorized Service Centers located throughout the United States. Personnel at these centers are experienced in installations of this type of equipment and can provide a safe, neat and functional installation.

## **MOUNTING THE UNIT**

- 1) Select a mounting location.
- 2) Using the mounting bracket as a template, mark six mounting screw hole locations on the mounting surface.
- 3) Using the No. 28 drill bit, drill holes into the mounting surface at the marked locations.
- 4) Using the six self tapping screws, secure the mounting bracket to the mounting surface.

- 5) Using the four machine screws and lock washers, secure the unit to the mounting bracket. The charger can be fastened in any of three different positions: parallel to the mounting surface or tilted  $\pm 20$  degrees from the parallel position. See figure 4.

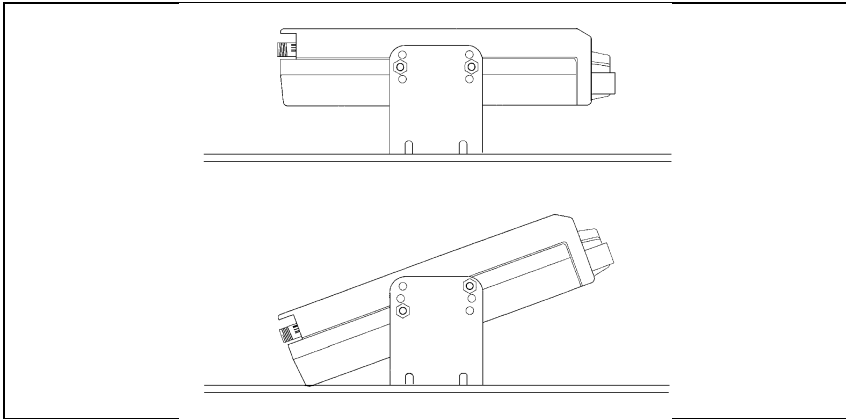


Figure 4 - Mounting the Charger

## SYSTEM CONFIGURATION

The Enhanced Vehicular charger has a DIP switch bank inside the unit. The Factory settings for the DIP switches are as follows:

| SW3                 | 1  | 2   | 3  | 4  | 5  | 6   | 7   |
|---------------------|----|-----|----|----|----|-----|-----|
| Enhanced Charger P2 | ON | OFF | ON | ON | ON | OFF | OFF |

|     |     |
|-----|-----|
| SW5 | 1   |
|     | OFF |

### Accessing The Dip Switches

To access the DIP switches:

- 1) Remove the three Phillips head screws from the bottom of the charger case near the back edge.
- 2) Remove the radio cover off of the top cover. This cover slides down toward the back of the charger after the bottom edge is raised to escape small locking ridges in the mating plastic piece. Free the sliding cover by inserting the tip of a flat blade screwdriver in the small notch at the back center of the cover and gently pry to lift the cover over the ridges and slip it back approximately 3/8 inches. From this position the sliding portion of the cover can be lifted straight up and off.

- 3) The remainder of the cover can be lifted up from the back edge, rotating around the front lower edge of the charger, until it is approximately 45° from horizontal, and then slipped forward and off. The front panel with all switches and indicators remains attached to the base casting.
- 4) Remove the four Phillips head screws from the RF protective shield covering the circuit components.
- 5) Remove the RF shield.

### **Setting The DIP Switches**

#### **Ignition A+ Control:**

To control the power to the charger by the ignition switch, a control wire must be connected from the rear DB-25 connector, Pin 10 to the ignition switch .

Connect this wire to the ignition "ON" sense point (preferably an ACCESSORY point on the fuse panel that is switched on when the ignition switch is in the accessory position and in the "RUN" position).

DIP switch SW-3 must be configured as follows:

| <b>SW3</b>       | <b>1</b> | <b>2</b> | <b>3</b> | <b>4</b> | <b>5</b> | <b>6</b> | <b>7</b> |
|------------------|----------|----------|----------|----------|----------|----------|----------|
| Enhanced Charger | OFF      | ON       | X        | X        | X        | X        | X        |

X = DON'T CARE

DIP switch 5 (SW5-1) must also be set to OFF.

|            |     |
|------------|-----|
| <b>SW5</b> | OFF |
|------------|-----|

#### **Display Invert Control:**

The M-RK display may be inverted by setting the SW-3 DIP switch as follows:

| <b>SW3</b>       | <b>1</b> | <b>2</b> | <b>3</b> | <b>4</b> | <b>5</b> | <b>6</b> | <b>7</b> |
|------------------|----------|----------|----------|----------|----------|----------|----------|
| Enhanced Charger | X        | X        | X        | X        | OFF      | ON       | X        |

X = DON'T CARE

DIP switch 5 (SW5-1) must also be set to OFF.

|            |     |
|------------|-----|
| <b>SW5</b> | OFF |
|------------|-----|



## Remote Control Operation

The Enhanced Charger can be operated with a Remote Control Unit. For this configuration, the DIP switches must be set as follows:

| SW3              | 1 | 2 | 3   | 4   | 5   | 6   | 7  |
|------------------|---|---|-----|-----|-----|-----|----|
| Enhanced Charger | X | X | OFF | OFF | OFF | OFF | ON |

X = DON'T CARE

DIP switch 5 (SW5-1) must also be set to ON.

|     |    |
|-----|----|
| SW5 | ON |
|-----|----|

## Radio Configuration

All radios must be a ROM 8 or higher version.

Flash Code:

|                      |                    |
|----------------------|--------------------|
| M-RK II<br>M-RK SCAN | Group 13 or higher |
| M-RK I               | Group 22 or higher |

## **INTERCONNECT CABLE**

### Power Leads

The standard power cable (not used on the Remote Control Unit chargers) supplied with the charger must be connected to the vehicle's battery. The vehicle must have a negative-ground electrical system. Power leads are approximately 8 feet in length. The YELLOW (positive) lead includes a fuse holder and 5-ampere fuse located near the battery end.

If the charger is wired directly to the vehicle's battery it will be necessary to route the power leads through the vehicle's firewall. If an existing hole is not conveniently located in the firewall, drill a small hole and install an appropriately sized rubber grommet before routing the leads through the firewall. This grommet is required to prevent lead chaffing. Additional grommets may be required if the leads must pass through shields or guards in the engine compartment between the firewall and battery. Route the leads away from high heat sources in the engine compartment that may cause lead damage and introduce a fire hazard. In addition, the leads ***should not*** be routed near noise sources such as electronic ignition modules or cruise control modules.

Connect the BLACK lead to the negative power source ("NEG" or "-" battery post) and connect the YELLOW lead to the positive power source ("POS" or "+" battery post).

This connection wires the charger to an unswitched power source so the charger can operate when the vehicle ignition switch is turned off. However, if desired, the charger can be controlled by a switched power supply.

### **Connecting To A Switched Power Source**

If it is desired to control the charger by a switched power source by running a lead to the ignition switch power, make the connection as follows:

1. Using a small phillips head screwdriver, disassemble the DB-25 Power Cable connector.
2. Solder one end of a #18 AGW wire to Pin 10 of the DB-25 connector. Make sure enough lead is provided to make the connection.
3. Reassemble the connector and plug it in the charger.
4. Route this new wire and connect the other end behind the vehicle fuse box so that the vehicle fuse protection is used.
5. Change the charger DIP switch settings as shown under, **SETTING THE DIP SWITCHES** to Enable Ignition A+.

#### **NOTE**

The power source must have adequate current supply capability.

### **Speaker Options**

The external speaker normally supplied with the charger is option H2LS1F (19A149590P1).

### **Antenna Connection**

The TNC connector at the back of the Vehicular Charger must be connected to an external antenna. For optimum performance, the antenna should be installed in accordance with the installation instructions provided with the antenna package.

### **Other Connections**

See the Interconnection Diagrams in the following pages for specific details on other connections that may be required.

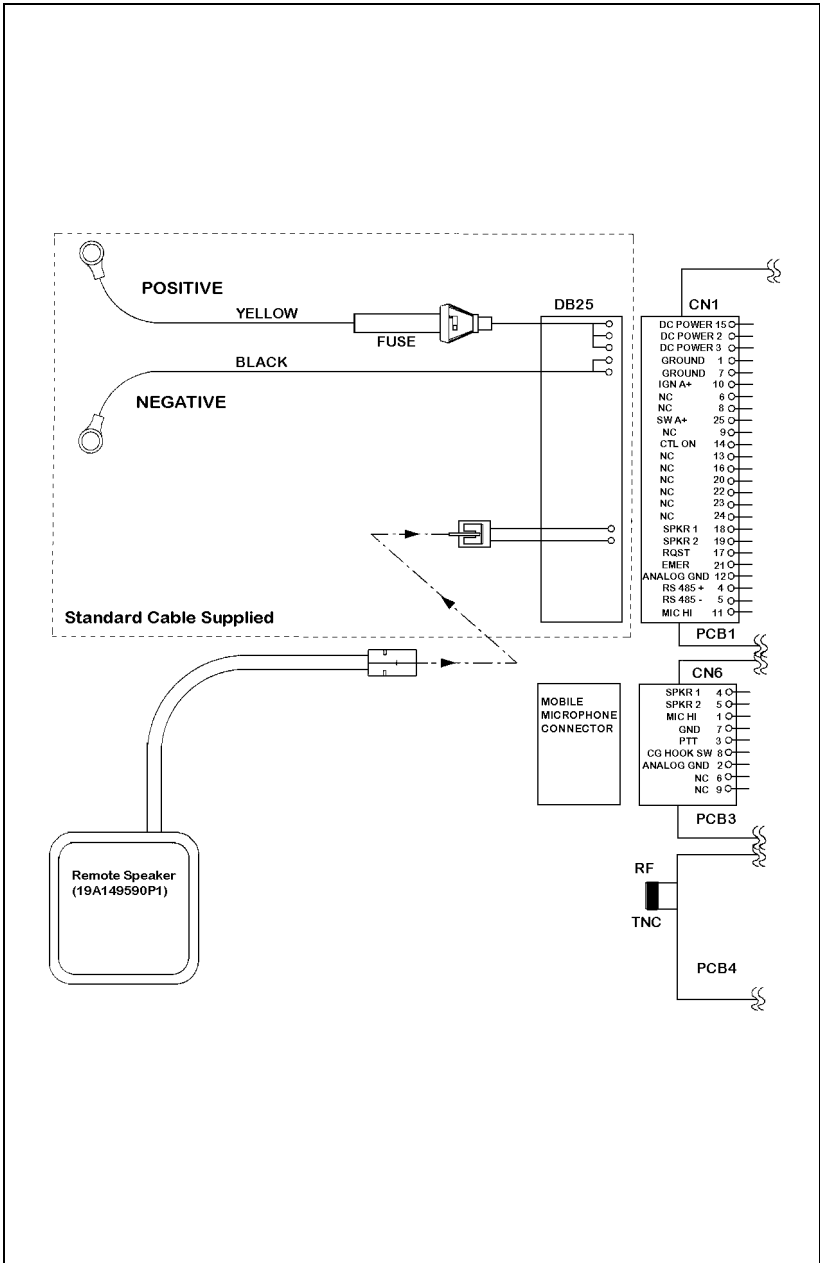


Figure 5 - Interconnection Diagram For Charger  
(Without Control Unit)

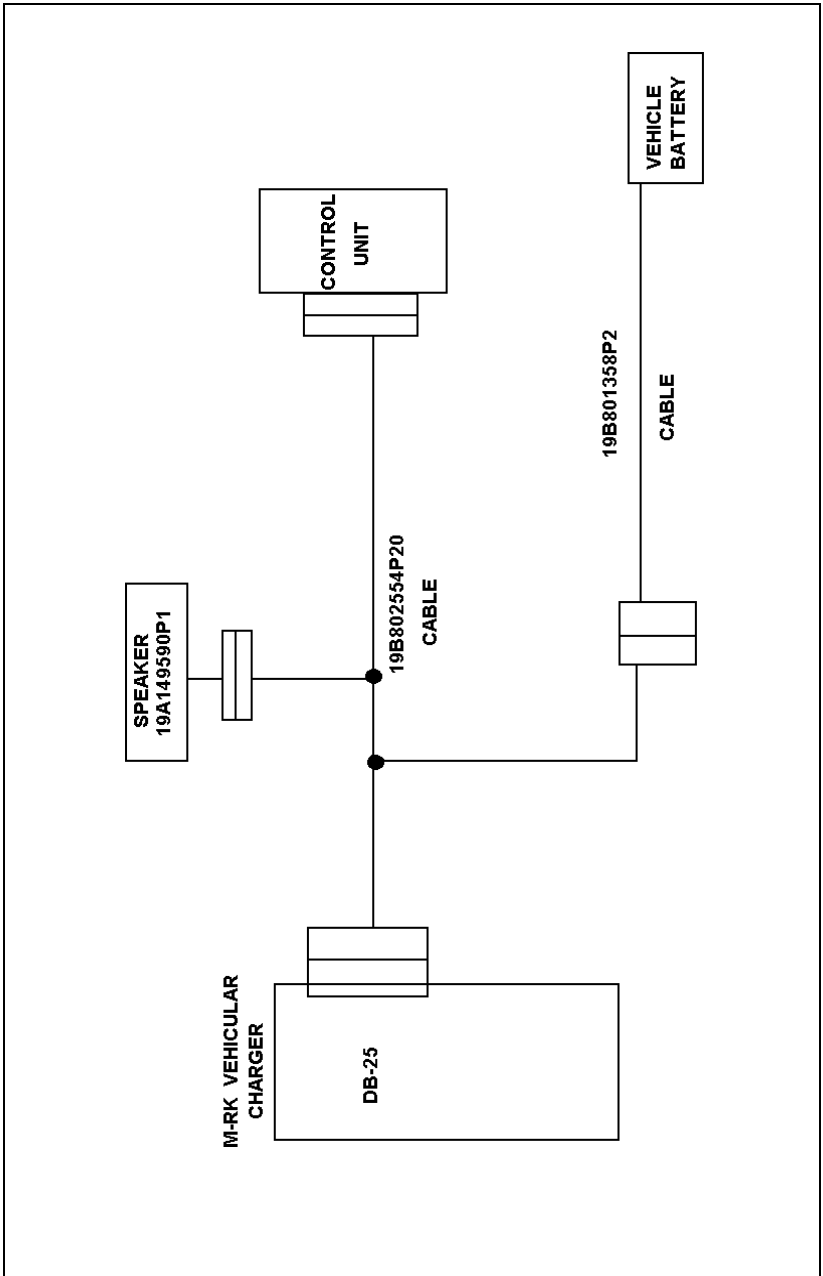
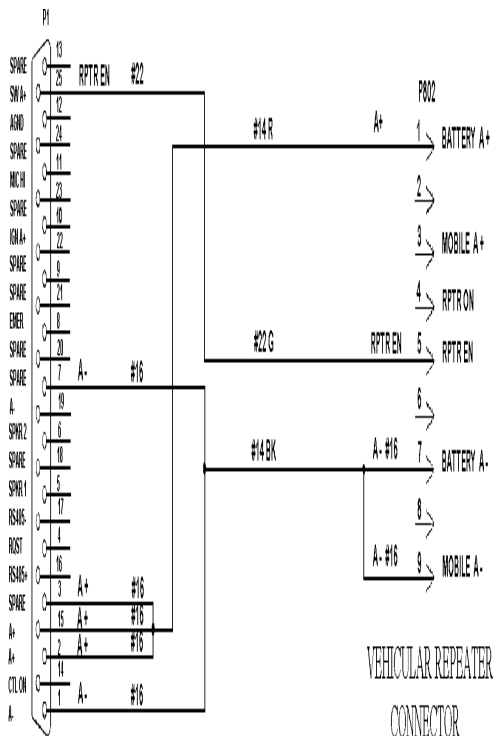


Figure 6 - Interconnection Diagram For Charger  
(With Control Unit)



MRK VEHICULAR  
CHARGER CONNECTOR  
(MALE DBS WITH HOOD)

(198209288P21 MALE HOUSING  
WITH 198209288P1 FEMALE CONTACTS)

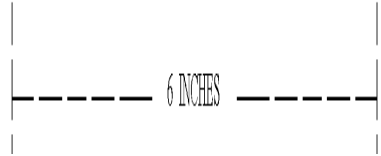


Figure 7 - Standard Power Cable

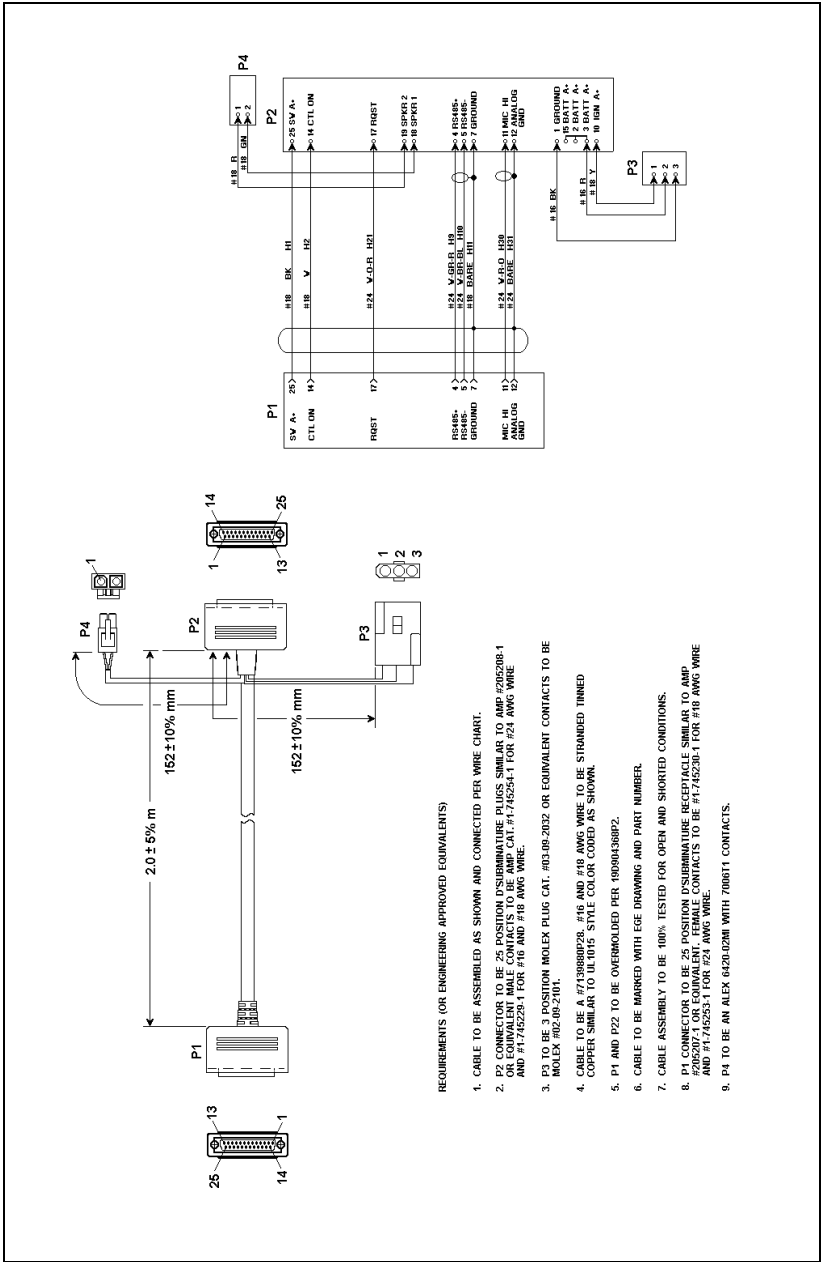


Figure 8 - Remote Control Unit Cable

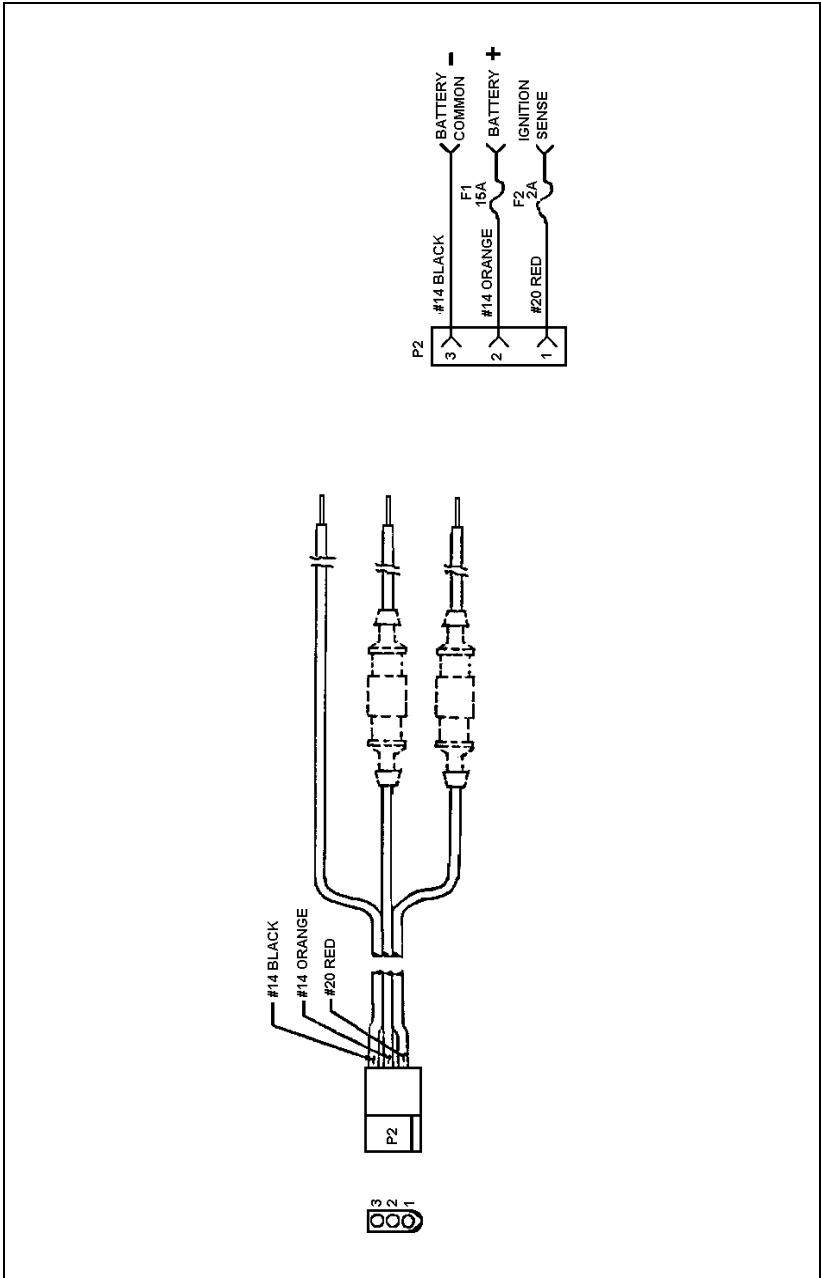


Figure 9 - Power Cable 19B801358P2

## NOTES

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