MOTOROLA

Mobile Workstation 520™

Model F5203

Commercial, Government and Industrial Solutions Sector
16 Kremenetski Street, Tel Aviv 67899

Vehicle Installation Guide

Printed in Israel, March 2000

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EPS – 34440- B

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H) Freight costs to the repair depot.
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L) Normal and customary wear and tear.
M) Non-Motorola manufactured equipment unless bearing a Motorola Part Number in the form of an alpha numeric number (i.e., TDE6030B).

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FCC INTERFERENCE WARNING

The FCC requires that manuals pertaining to Class A and Class B computing devices must contain warnings about possible interference with local residential radio and TV reception. This warning reads as follows:
NOTE: This equipment has been tested and found to comply with limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial or residential environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Trademarks

Contents

Commercial, Government and Industrial Solutions Sector
1301 E. Algonquin Road, Schaumburg, IL 60196

68P02959C60-O
July, 2000

References

You may need to refer to the documents listed below for further information. These documents can be obtained from the following source:

Motorola Americas Parts Division Motorola Centralized Customer Service 1313 E. Algonquin Road Schaumburg, IL 60196 1-800-422-4210 FAX 1-847-538-8198	Motorola Literature Distribution Center 2290 Hammond Drive Schaumburg, IL 60172 1-847-576-2828 FAX 1-800-576-5891

MW-520

Document	Equip. Model No.	Document No.
Mobile Workstation 520™ Owner's Manual	F5203	68P02959C55-O
Mobile Workstation 520™ Quick Reference Card	F5203	68P02959C56-O
Mobile Workstation 520™ Application Developer's Guide	F5203	98-08901C31-O
FORTÉ RF Power Amplifier 800 MHz, 35W Owner & Installation Manual	FLN2424	68-02949C50

Using this Manual

Who Should Use this Manual

This manual is intended for trained service technicians, radio engineers, and technical operation support staff who install the Mobile Workstation 520™ (MW-520) in a vehicle.

What is in this Manual

“Introduction”, lists the features of the MW-520 vehicle mount.

“Safety Considerations”, describes the safety guidelines that should be observed when installing the MW-520.

“Installation”, describes the tools and equipment, planning requirements, and product inspections necessary for a smooth installation of the MW-520.

Safe Handling Instructions

FCC Compliance Notice

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a different circuit from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Notational Conventions

Throughout this publication, you will notice the use of warnings, cautions, and notes. These notations are used to emphasize that safety hazards exist, and care must be taken.

Do not proceed beyond a WARNING or CAUTION until the indicated conditions are fully understood and met.

Warning

Warning

Indicates a potentially hazardous situation which, if not avoided, COULD result in death or serious injury.

Caution

Caution

Indicates a potentially hazardous situation which, if not avoided, MAY result in minor or moderate injury. CAUTION may also be used to alert against unsafe practices and property-damage-only accident hazards.

Note

Note

An operational procedure, practice, condition, etc., which it is essential to emphasize.

Introduction

This section lists the features of the Mobile Workstation 520™ (MW-520) vehicle mount.

Mount Features

The MW-520 mount:

- Holds the MW-520 display within easy view of the driver.
- Permits easy access to the dashboard controls.
- Permits easy access to and removal of the keyboard.
- Enables easy access or, if preferred, prevents access with flexible placement of the CPU.

General Description

The RLN4687 MW-520 Mount Assembly is comprised of four major components: the pedestal assembly, the keyboard assembly, the CPU arm, and the display assembly. All four assemblies are shipped as a complete unit with a hardware bag for mounting to the customer's vehicle hump.

The pedestal assembly is mounted to a 7 1/2 inch plate, extends approximately 10 inches high and terminates in a double clevis that accepts the display assembly. The pedestal assembly can be rotated 120 degrees and is friction adjustable. Additionally, the pedestal assembly has a 6 inch horizontal extension pedestal attached at the lower end of the vertical assembly, to accommodate the simple attachment of the keyboard assembly and CPU arm.

The keyboard assembly allows for the quick insertion and removal of the MW-520 keyboard. The keyboard platform swivels left and right freely, with friction adjustment available. The keyboard platform can also be tilted and locked in the required position by loosening a knob on the underside of the platform. The keyboard is removed by pressing up on the spring loaded flange under the keyboard platform. The keyboard is installed by placing the back of the keyboard against the locating flanges on the back vertical wall of the platform and pressing down the front so that the spring flange engages the detente on the front of the keyboard.

The CPU arm allows for mounting of the CPU box on the pedestal. As shown in Figure 4 and Figure 5, the CPU arm can protrude forward or backward from the pedestal. The CPU box can be mounted on the CPU arm using the supplied trunnion (Figure 6 and Figure 7), or in any other suitable location.

The display assembly is designed to attach the MW-520 display directly using the provided hardware in the display kit (not SDI supplied). The display can be swiveled a total of 90 degrees, ±45 degrees in each direction. Two options are available for the display tilt limit: 10 degrees or 45 degrees. The 45 degree option allows 45 degrees backward tilt towards the dashboard and 77 degrees forward tilt. The 10 degree option limits the backward tilt to 10 degrees. The 10 degree limiting cam can be removed to allow a 45 degree tilt (see Figure 17). The swivel is friction adjustable by tightening the 10-32 nylok nuts under the display perch. The handle at the top left of the display is used to bring the display down. Grabbing the display on both sides and twisting it slightly allows the rotation of swivel to occur.

Safety Considerations

This section describes the following safety considerations to be observed when installing the Mobile Workstation 520™ (MW-520):

- High-power Radio Frequency (RF) signal exposure
- Personal safety warning
- Air bag warning
- Liquid propane (LP) gas warning
- Battery handling safety

High-Power RF Signal Exposure

English Statement

"The long-term characteristics or the possible physiological effects of Radio Frequency Electromagnetic fields have not been investigated by Underwriter's Laboratories (UL)."

French Statement

"Les caractéristiques à long terme ou les effets physiologiques éventuels des champs électromagnétiques des Fréquences Radio n'ont pas été examinés par UL."

When transmitting, every radio radiates energy into the atmosphere which may, under certain conditions, cause the generation of a spark.

All users of vehicles fitted with radios should be aware of the following warning:

Do not operate the radio near flammable liquids or in the vicinity of explosive devices.

During normal use, the radio will subject you to radio energy substantially below the level where any kind of harm has been reported.

Personal Safety Warning

To ensure personal safety, please observe the following warning:

Do not transmit when the antenna is very close to, or touching, exposed parts of the body, especially the face and eyes.

Check and obey the laws and regulations on the use of two-way mobile radios in the areas where you drive.

Give full attention to driving. Pull off the road and park before using the MW-520. Do not monitor the MW-520 display or type on the keyboard while driving.

To assure optimal radio performance and to ensure that your exposure to radio frequency electromagnetic energy is within the guidelines referenced in this document, always adhere to the following procedure:

- Transmit only when people inside and outside the vehicle are at least the minimum distance away from a properly installed, externally mounted antenna.

Table 1 below lists the minimum distance for several different ranges of rated radio power.

Table 1
Rated Power Versus Distance Air Bag Warning

Rated Power of Vehicle-Installed Mobile Two-Way Radio	Minimum Distance from Transmitting Antenna
7 - 15 Watts	1 foot (30.5 centimeters)
16 - 50 Watts	2 feet (61 centimeters)
More than 50 Watts	3 feet (91.5 centimeters)

Air Bag Warning

To ensure personal safety in vehicles equipped with air bags, please observe the following warning:

An air bag inflates with great force. Do not place objects, including communication equipment, in the area over the air bag or in the air bag deployment area. If the communication equipment is not installed properly and the air bag inflates, serious injury could result.

Installation of vehicle equipment should be performed by a professional installer/technician qualified to perform such installations.

An air bag's size, shape and deployment area can vary by vehicle make, model and front compartment configuration (for example, bench seats vs. bucket seats). Contact the vehicle manufacturer's corporate headquarters, if necessary, for specific air bag information for the vehicle make, model, and front compartment configuration involved in your communication equipment installation.

Mobile Antenna Installation

A vehicle antenna must be installed external to the vehicle and in accordance with:

- The requirements of the antenna manufacturer/supplier.
- Instructions in the Radio Installation Manual.

Liquid Propane Gas Warning

To ensure personal safety, please observe the following warning:

It is mandatory that radios installed in vehicles fueled by liquefied petroleum gas conform to the National Fire Protection Association (NFPA) standard NFPA 58. This standard applies to vehicles with a liquid propane (LP) gas container in the trunk or other sealed off space within the interior of the vehicle.

The NFPA 58 requires the following:

- Any space containing radio equipment shall be isolated by a seal from the space in which the LP gas container and its fittings are located.
- Removable (outside) filling connections shall be used.
- The container space shall be vented to the outside.

Battery Handling Safety

To ensure equipment and personal safety, please observe the following battery replacement and disposal statements:

English Statement

Danger of explosion exists if batteries are replaced incorrectly. Replace only with the same or equivalent type recommended by the manufacturer.

Do not replace or recharge batteries in a hazardous atmosphere. Contact sparking can occur during installation or removal of batteries from chargers and can trigger an explosion in a hazardous environment.

Do not dispose of batteries in fire. This creates an explosion hazard. Dispose of used batteries according to the manufacturer's instructions.

French Statement

ATTENTION

Il y a danger d'explosion s'il y a remplacement incorrect de la batterie. Remplacer uniquement avec une batterie du même type ou d'un type équivalent recommandé par le constructeur. Mettre au rebut les batteries usagées conformément aux instructions du fabricant.

Installation

This section describes the tools and equipment, planning requirements, and product inspections necessary for a smooth installation of the Mobile Workstation 520™ (MW-520). Proper planning will help to ensure that the installation is completed without difficulty and that no damage occurs to the units or the vehicle.

The MW-520 is a reliable product when installed correctly. However, performance can be seriously impaired if it is not installed correctly. Thoughtful planning can make the difference.

Unpacking

Carefully unpack each item from the shipping carton. Check all items for shipping damage, and make sure you have received all items ordered.

If there is damage or missing items, retain the shipping carton for inspection.

The following parts are used to mount the CPU:

- Mount assembly RLN4687
- Trunnion for the MW-520 CPU HLN5488
- *Mobile Workstation 520 Vehicle Installation Guide,* 68P02959C60-O

The foam cover, Motorola part no. 7586540F01, is placed on the protruding Power connector to protect it from incidental hits. Keep the connector covered until the CPU is secured in its place.

Use this cover whenever the CPU is disassembled.

Preparing to Install the MW-520 Inside the Vehicle

Tools

The following tools and service aids are required for installation:

- 3/8” nut driver
- 1/2”, 3/8” or 7/16” wrench
- No. 2 Phillips screwdriver
- Drill with 3/16” drill bit

Planning

Be sure to consider the following issues when planning the installation:

- Keyboard and display location relative to air bag deployment zones
- Environmental considerations

- Electrical guidelines
- LP gas warning
- Usability by driver/operator

MW-520 Mounting Location

The MW-520 is typically installed on a pedestal (included in the kit) which affixes directly to the vehicle transmission hump or to the hump plate (preferred and not included in the kit).

Using an optional tall pedestal under the MW-520 is recommended only for use in vehicles where air bag compliance is not required. An example of this is a utility van which does not currently have passenger-side air bags in the given model year.

Correct positioning of the pedestal will ensure that the MW-520 meets the following requirements:

- There is proper equipment ventilation.
- It is within easy reach of the driver/operator (more difficult due to air bag constraints).
- It will not injure the operator or passenger in case of an accident.
- It does not interfere with the operator's driving vision.

Provided for your reference are several air bag deployment zone templates from automobiles used in public safety roles (Figures 1-3). Please obtain the official documents for the automobile in which you are installing the MW-520 to ensure the safety of the operator.

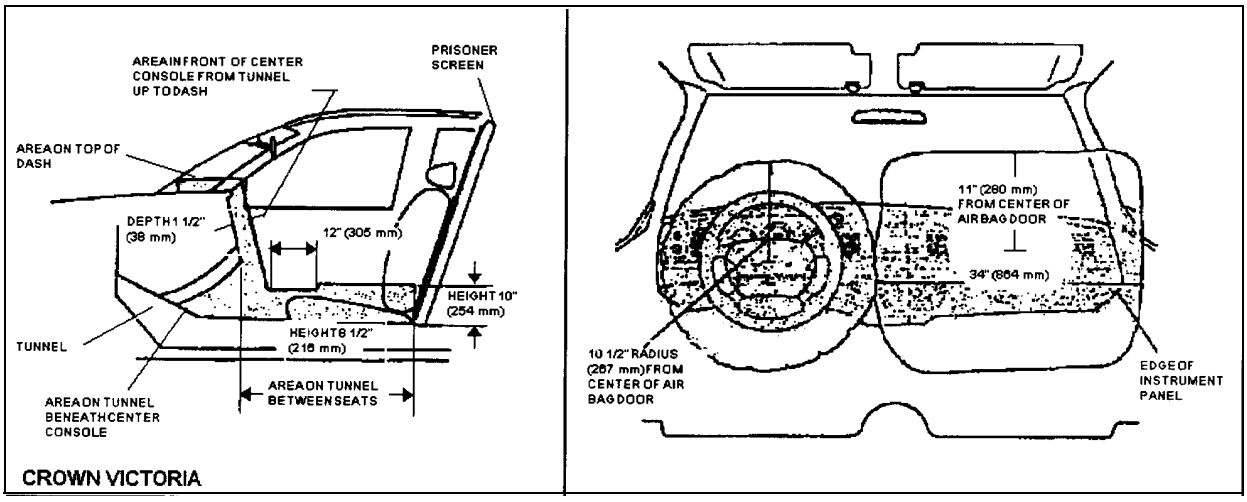


Figure 1
Air Bag Deployment Zones - Crown Victoria

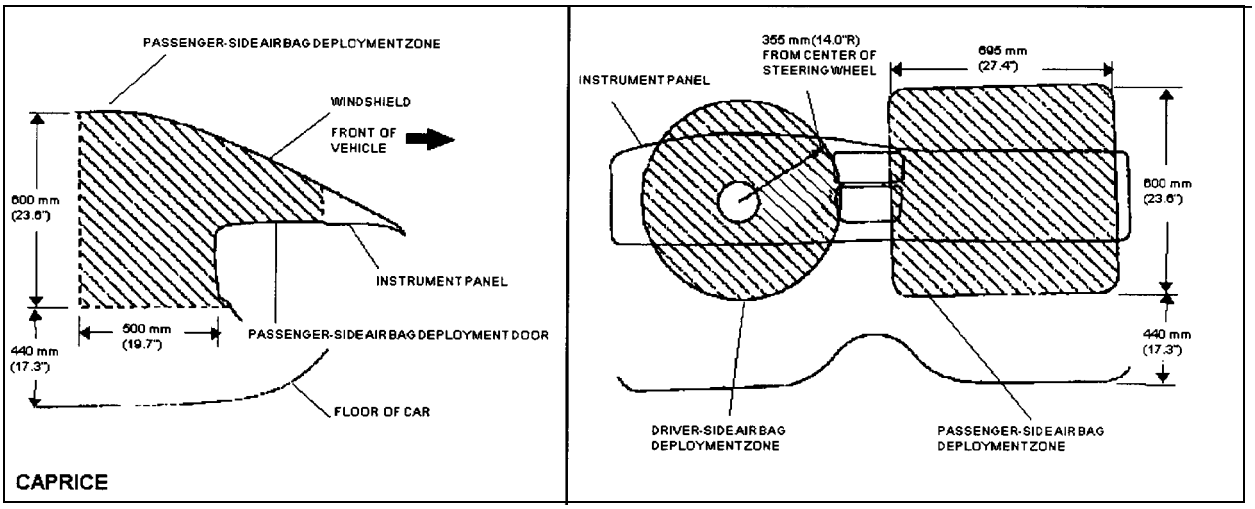


Figure 2
Air Bag Deployment Zones - Caprice

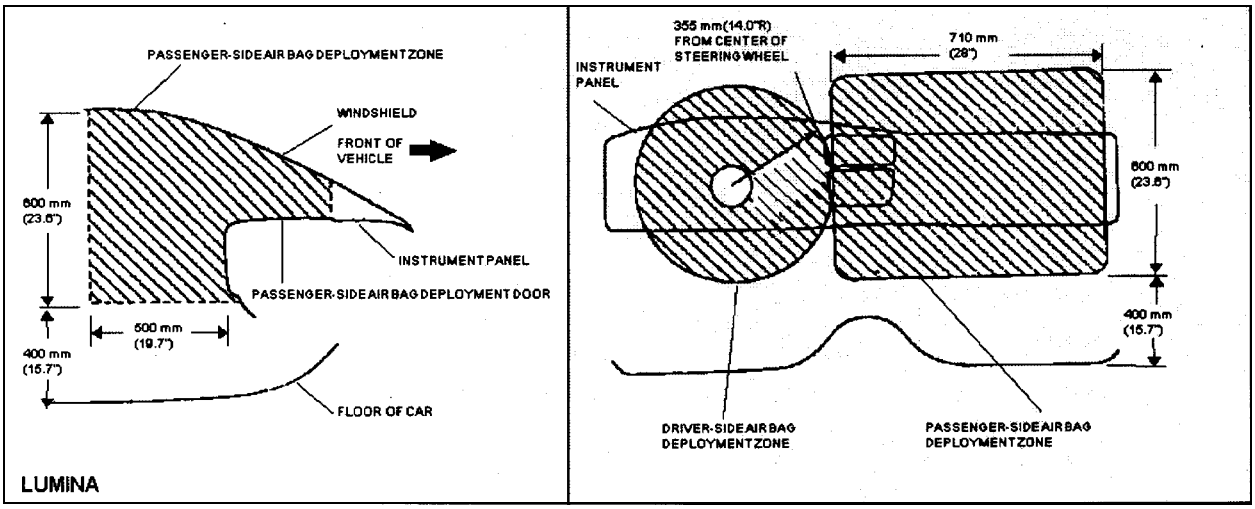


Figure 3
Air Bag Deployment Zones - Lumina

Environmental Considerations

Consider the environmental parameters listed in the *MW-520 Owner's Manual* before installing the MW-520.

For operation in hot climates, the vehicle must be adequately ventilated.

Electrical Guidelines

Be sure that the vehicle's electrical system is in good condition. Faults in the alternator and ignition system can be a source of severe Radio Frequency Interference (RFI) and can result in MW-520 operating problems. Correct any problems in the alternator output, ignition system, and battery condition before beginning the installation.

The minimum voltage requirement for operating the MW-520 is 11 to 16V DC, 8A. The vehicle must have an alternator that can produce a high-current output at low speed (below 18 m.p.h. or 29 km/h) and in an idle state. It also needs the highest rated heavy-duty battery available for the vehicle.

DO NOT install the workstation in a vehicle with a positive-ground electrical system.

Installation Procedure

Installation Time

A qualified and experienced service technician requires between one and three hours to install and configure the MW-520 in a vehicle.

Mounting the MW-520

Perform the following steps to install the MW-520:

Step 1. Determine the proper mounting location.

Step 2. Remove the hardware bag from the shipping container.

Step 3. Ensure that the pedestal is securely bolted together.

Step 4. The pedestal can be mounted directly on the vehicle transmission hump or on a hump plate secured rigidly to the vehicle transmission hump. (Commercial hump plates are available, such as the SDI 7200 system or equivalent.)

Figure 4
Mount General View (CPU arm at rear)

Figure 5
Mount General View (CPU arm at front)

Figure 6
MW-520 System on Pedestal (CPU at rear)

Figure 7
MW-520 System on Pedestal (CPU at front)

Step 5. Place the pedestal with the keyboard, the display mount and the CPU arm (if desired) in the vehicle and use it for marking the location of the base plate on the vehicle transmission hump or on the hump plate.

Step 6. At the optimum location, drill four 1/4” holes into the transmission hump or the hump plate in order to achieve proper functionality and use of the MW-520.

Be careful not to drill into the transmission. Some commercially available hump plates, such as the SDI 7200 system, may have the hole pattern already pre-drilled.

Step 7. Attach the pedestal to the desired anchor point on the transmission hump or on the hump plate, using studs and nuts, screws and nuts or self-tapping screws, as required.

Steps 8 and 9 are optional for adjusting the tilt tension.

Step 8. Remove the two end caps as shown in Figure 17.

Step 9. Fold down tension should be adjusted by tightening the two 5/16” nuts at the edges of the folding mechanism. This can also be done when the MW-520 display is installed in the vehicle.

Step 10. Attach the display to the mount and route the display cable down the pedestal. Ensure that the display cable has enough slack to move when the display is tilted down.

Step 11. Rotate the keyboard left and right to determine the range of swivel. Some hump plates are attached to the anchor points of the seats. These hump plates allow adjustment front to back, thus allowing for fine-tuning of the installation.

Step 12. Fold the display up and down to determine the available range for the given vehicle and application. When mounting the keyboard, care must be exercised to ensure sufficient space for proper installation of the device. This will restrict the amount of tilt/swivel available. The 10 degree display tilt limiting cam is supplied as standard; it must be removed to allow a 45 degree tilt of the display.

MW-520 Keyboard

The MW-520 keyboard is located between the seats of the vehicle. Position it to allow some tilt and swivel of the keyboard tray.

The keyboard tray is attached to the MW-520 mount with an extension arm. This arm may be removed if desired and the tilt/swivel modified until attached to the adjustable “U” brackets.

If required, the keyboard mounting can be placed elsewhere in the vehicle to allow for use of other installed equipment. Please ensure that all safety guidelines and air-bag deployment requirements are met.

The keyboard is provided with a quick release holder to allow operation of the keyboard when out of the holder. Care must be used to ensure ample space for extracting and reinserting the keyboard into the holder. Ensure that the cable is

routed in a manner that allows the operator to remove the keyboard from the mounting tray and operate the keyboard in their lap.

MW-520 Display

The MW-520 display is attached to the display mount on top of the pedestal using a Phillips screwdriver and screws supplied in the display shipping carton. The cable from the CPU box is routed through the mount and connected to the back of the display. Use caution when assembling the cable to the display to prevent damage to the display or the cable.

Note

The display cable may be secured to the display using the supplied bracket (kit FHN6144).

Note

For the 1000NIT display option, an additional power cable must be used to supply power to the display.

MW-520 CPU

The MW-520 CPU must be mounted so that the cables from the keyboard, display, power and options can be attached. The limiting factor is the 9.6 foot length of the display interface cable. When attached to the display, this cable is routed down through the pedestal to the CPU box. The CPU can be mounted anywhere in the passenger compartment of the vehicle that provides adequate ventilation.

It is recommended that the CPU unit be mounted in a place where the PC Card slots can be easily accessed. For the secured door option, consider that easy access should be assured when using the special tool for locking/unlocking the PC Card door.

In addition, attach the adhesive tapes provided in the shipping carton (Motorola part no. 556665F01) to the PC Cards to facilitate easy removal.

Suggested locations, in order of preference, are: on the pedestal's CPU arm, on the prisoner cage, under the dashboard, in the console, or under the seat (not in the direct path of the heater air flow).

If the CPU box is mounted on the pedestal, it must be mounted to the CPU arm using the trunnion. The CPU arm can be affixed to the pedestal in two possible orientations (see Figure 4 and Figure 5):

1. Directly under the keyboard tray (see Figure 5).
2. Using the same mounting holes as in option one, but protruding from the pedestal in the opposite direction to the keyboard tray (see Figure 4).

Note

The CPU box must be mounted so that it is within ±5 degrees of the primary axes, as illustrated below (see Figures 8-13).

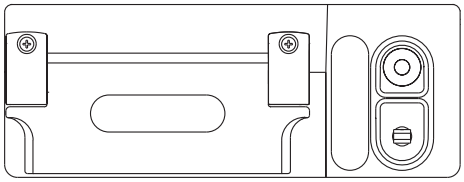


Figure 8
CPU front unit view

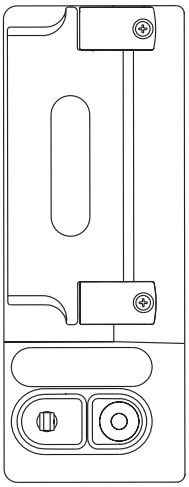


Figure 9
CPU unit front view - rotated 90 degrees

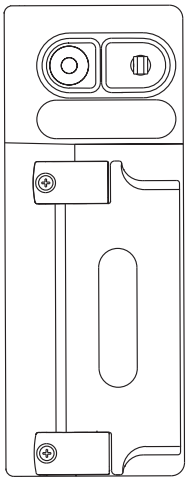
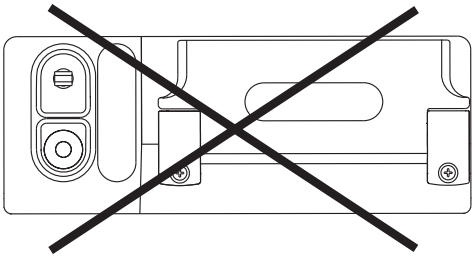
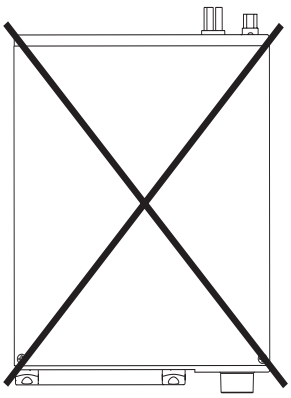


Figure 10
CPU unit front view - rotated 270 degrees



DO NOT MOUNT CPU BOX INVERTED

Figure 11
CPU unit front view - rotated 180 degrees



DO NOT MOUNT CPU IN THIS ORIENTATION

Figure 12
CPU unit side view

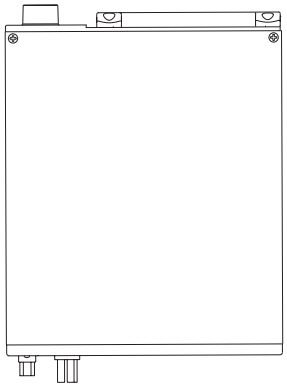


Figure 13
CPU unit side view - rotated 180 degrees

MW-520 GPS Antenna

To install the GPS antenna, perform the following steps:

Step 1. Drill a 12 mm hole into the mounting surface for the antenna post.

Step 2. Release the M18 nut and the flat washer from the antenna post and insert the post into the hole.

Step 3. Secure the post with the flat washer and the nut.

Interconnection of the MW-520

With the mechanical installation complete, hook up the optional antenna and other required options to the MW-520 CPU box.

Connect the DC cable at the end of the connection procedure.

RF Antenna Connection

If there is an internal radio and no Power Amplifier (PA), connect the vehicle antenna to the RF connector (mini UHF). If the optional RF PA is used, this connection is made to the RF-in connection on the RF PA and the vehicle antenna is connected to the antenna connector on the RF PA.

Parallel Port Connection

The MW-520 has one built in, PC-style DB-25 parallel port. You may use an off-the-shelf shielded parallel printer cable.

Keyboard Connection

Connect the keyboard to the bottom DB-9 female connector on the MW-520 CPU.

RS-232 Connection

There is one RS-232 port on the rear of the MW-520, an IBM® PC standard DB-9 male connector. To attach a radio modem, such as the VRM 600, use the FKN4369 cable or equivalent. To attach a Trimble Placer™ GPS 400, use the FKN4369 or FKN4367 cable or equivalent.

Ensure that the cables are properly routed to prevent damage to the cables and any operator hazards due to loose cables from the vehicle.

DC Connection

The MW-520 comes with a Motorola DC cable (FKN4567) and fuse.

Step 1. Route the power cable from the power connector on the MW-520 CPU box to the vehicle battery using accepted industry methods and standards.

Step 2. Plug the cable tightly into the DC connector.

Step 3. Be sure to grommet the vehicle fire wall to protect the cable. Connect the red wire to the positive (+) terminal of the battery, and the black wire to the negative (-) terminal.

The black wire should be connected directly to the battery and not to the chassis of the vehicle.

Ignition-Sense Connection

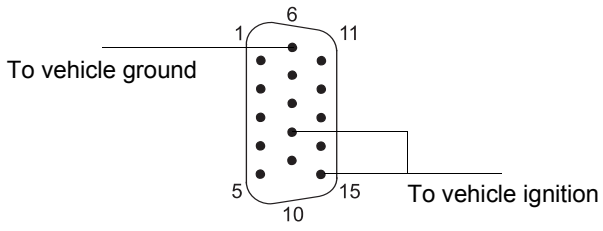
Whenever the MW-520 is not connected to the vehicle ignition, it is recommended to leave the AUX connector cover (Motorola part no. 3802219C10) in place.

To install the ignition-sense cable between the processor AUX connector and the vehicle ignition line, carry out the following steps:

Step 1. Connect a jumper wire to pins 9 and 15 of the AUX connector.

Step 2. Connect one end of the ignition-sense cable to pins 9 and 15 of the AUX connector, and the other end to the vehicle ignition.

Step 3. Connect pin 5 to the vehicle ground.



Pin #	Pin Name	Function
1 to 5	Reserved	
6	AGND	Ground
7-8	Reserved	
9	IGN_HIGH	Ignition
10-14	Reserved	
15	IGN_LOW	Ignition

Figure 14
AUX Port Pinouts

GPS Antenna Connection

The MW-520 comes with a GPS cable. Connect the GPS cable to the GPS connector on the CPU rear panel on one side and to the GPS antenna connector on the other side.

USB Connection

The MW-520 comes with one standard USB Type A receptacle connector to which any standard USB device can be connected.

Video In Connection

The MW-520 comes with a BNC Type connector to which a camera can be connected. A BNC to RCA adapter 5802810C07 is also available from Motorola, if required.

Audio In Connection

The MW-520 comes with an Audio In connector to which an external microphone can be connected.

Audio Out Connection

The MW-520 comes with an Audio Out connector to which external speakers can be connected.

Turning on the MW-520

The MW-520 main power switch must be flipped up to turn on main power. The soft power switch on the display is used for normal power cycle operations. Refer to the *Mobile Workstation 520™ Owner's Manual* for operating instructions.

Replacing the Fuse (Vehicle Power)

Remove the fuse (15 A) from the fuse holder located on the Motorola DC cable (FKN4711) and replace it with a new one of the same type and value (part no. 6580283E06).

Acronyms

A	Amperes
ACK	Positive (Acknowledgment)
CPU	Central Processing Unit
DC	Direct Current
DTE	Data Terminal Equipment
GPS	Global Positioning System
LP	Liquid Propane
MDT	Mobile Data Terminal
NFPA	National Fire Protection Association
PA	Power Amplifier
PC	Personal Computer
RF	Radio Frequency
RFI	Radio Frequency Interference
UHF	Ultra High Frequency
UL	Underwriter’s Laboratories
V	Volt
VRM	Vehicular Radio Modem

Glossary

C

Central Processing Unit (CPU): The computer in charge of fetching, processing, and storing data, generally used to refer to the entire microprocessor chip.

D

Data Terminal Equipment (DTE): User terminal equipment which creates information for transmission, for example, a user's PC.

DB-25: A 25-pin connector used for V.24 or RS-232C interfaces.

DB-9: A standard 9-pin connector used for serial interfaces.

Direct Current (DC): Current that flows through a circuit in only one direction.

G

Global Positioning System (GPS): A constellation of 24 radio navigation (not communication) satellites in six different orbits, which transmit signals used by GPS receivers to determine precise location (position, velocity, and time) solutions.

M

Mobile Data Terminal (MDT): Vehicle installed device providing a data entry and display user interface for data communication functions.

P

Personal Computer (PC): The generic term for a single user, microprocessor based computer whose architecture is derived from the original IBM® Personal Computer.

R

Radio Frequency (RF): Refers to the electromagnetic energy wavelengths between the audio and the light range (usually somewhere between 10 kHz and 300 GHz).

Radio Frequency Interference (RFI): 1) The Radio Frequency (RF) radiation which leaks from a device when it is transmitting. 2) Electrical disruption (noise) created by certain types of equipment that may be radiated through air.

RS-232: The most common, standard interface used to connect Data Terminal Equipment (DTE) to modems. It uses a DB-25 connector, although the DB-9 version has become popular on PCs which have limited space for connectors.

T

Trunnion: A pin pivot usually mounted on bearings for rotating or tilting an element.

U

Ultra High Frequency (UHF): Radio frequency, extending from 300 MHz to 600 MHz.

Underwriter's Laboratories (UL): An independent and non-profit USA testing/certification agency that was created by insurance companies to inspect electrical devices to ensure there are no shock or fire hazards present.

V

Vehicular Radio Modem (VRM): VRM 650 - External radio modem integrated with the MCS2000 mobile radio into a single unit for use with separate MDT.

Appendix: MW-520 Mount Assembly

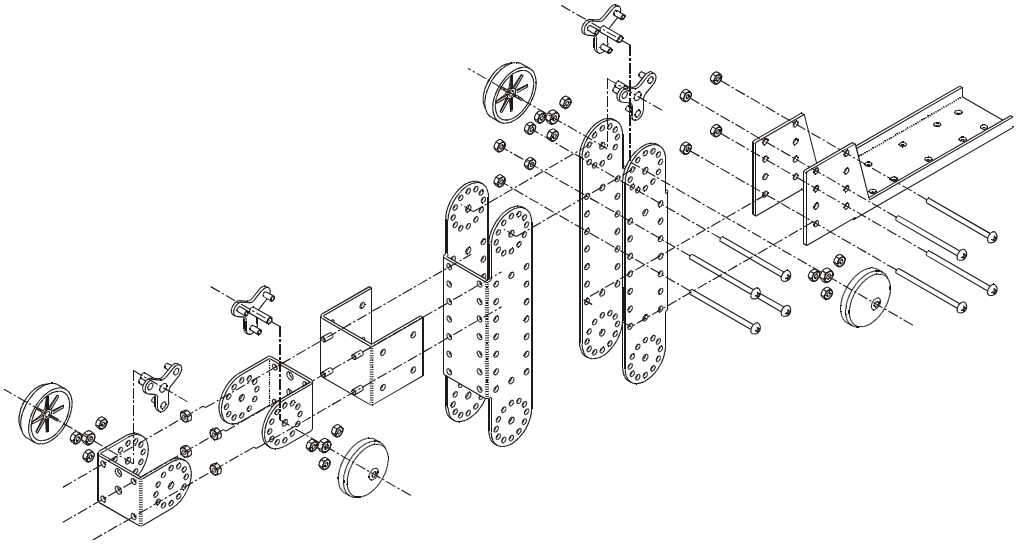


Figure 15
Pedestal Assembly - Exploded View
(CPU arm at rear)

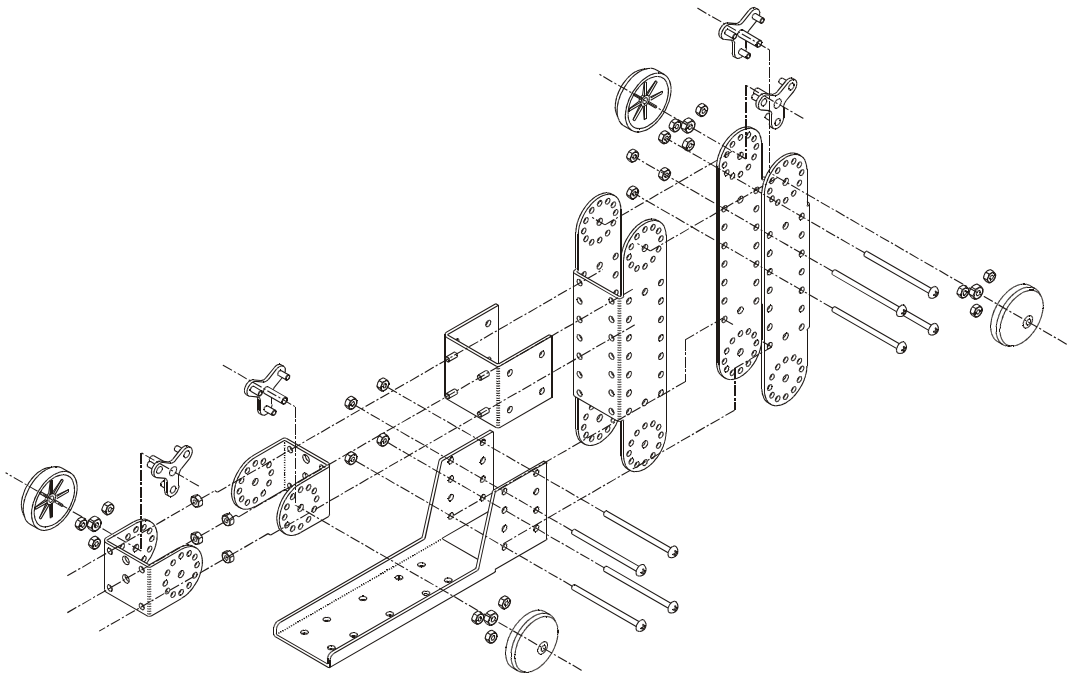


Figure 16
Pedestal Assembly - Exploded View
(CPU arm at front)

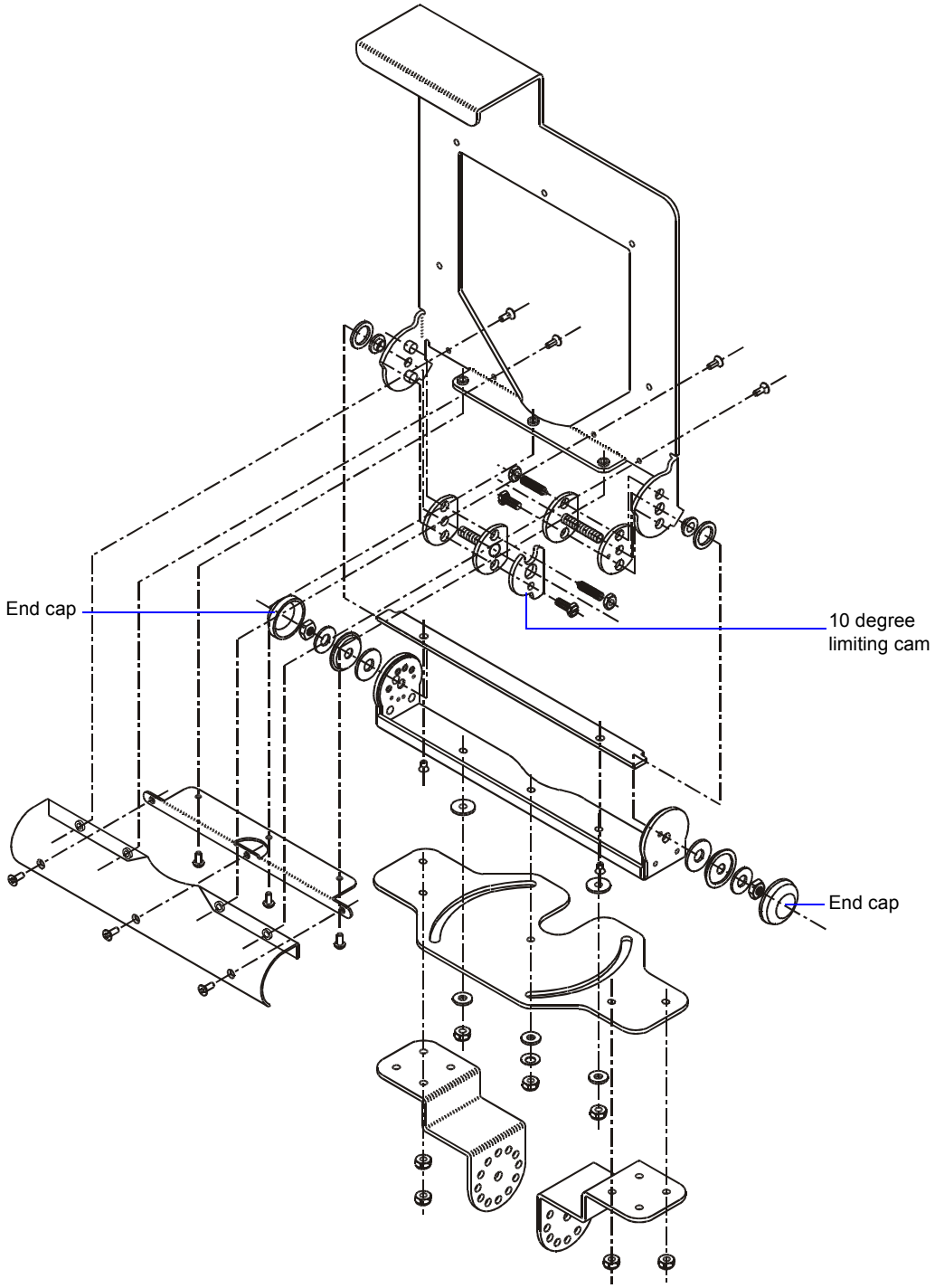


Figure 17
Display Assembly - Exploded View

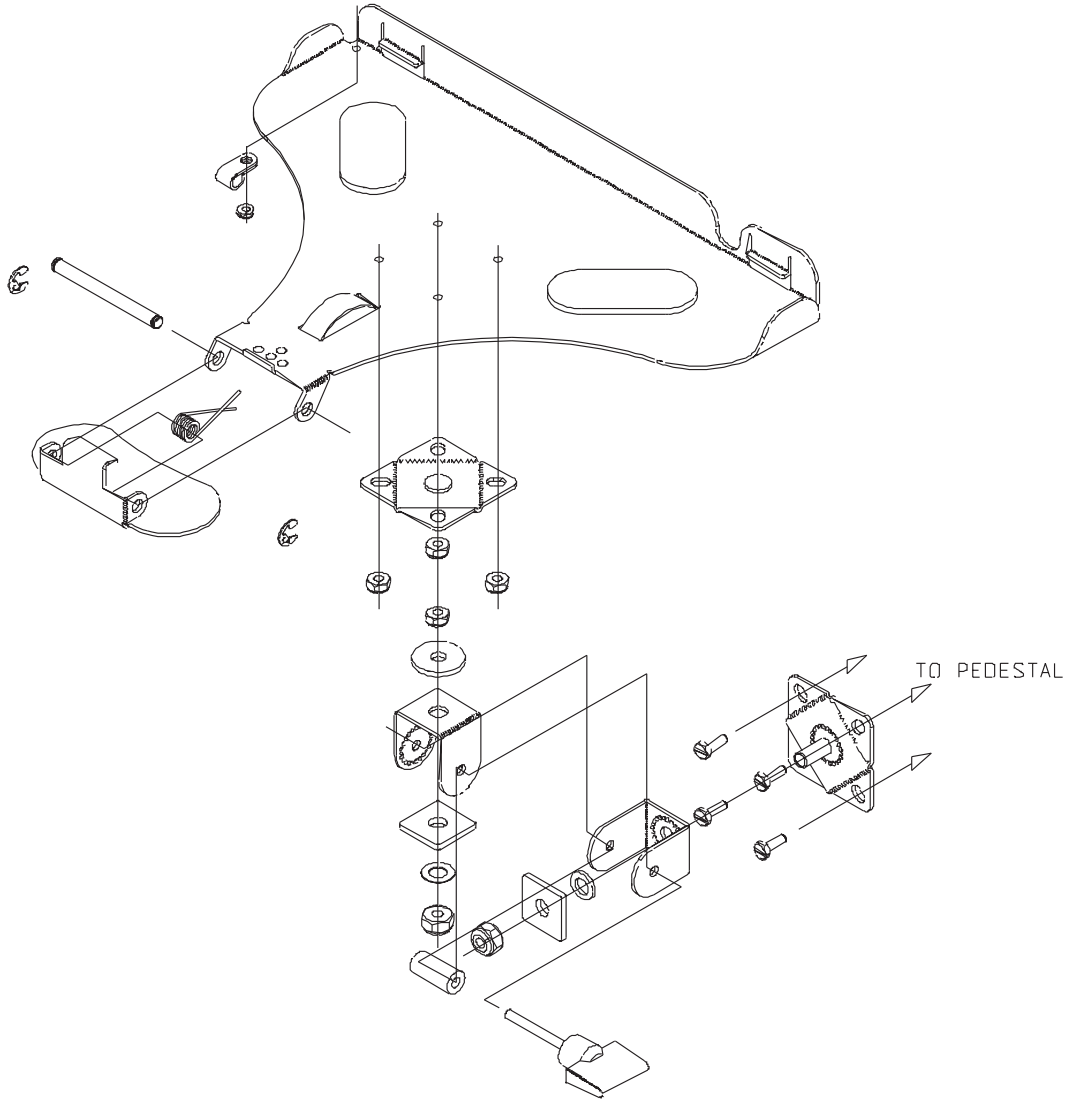


Figure 18
Keyboard Assembly - Exploded View