



*M90 Series Portable Data Entry Unit*

***USER'S GUIDE***



**P/N: M90901**  
*Revision B*  
*September 1999*

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# ***M90 PDE Unit***



INTERMEC<sup>®</sup> hand-held terminals are used in a variety of applications throughout the world whenever data needs to be collected.

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## ***Introduction***

The M90 Portable Data Entry (PDE) Unit is one of the most versatile and flexible data collection devices available today.

Your M90 PDE unit comes with sufficient memory for most data collection applications with added features to ensure data storage integrity, barcode scanning, and communication options.

Intermec International Inc. of Intermec Technologies Corporation hopes that this manual will help you get acquainted with the M90 features and allow you maximum productivity and satisfaction from using this unit.

## ***General***

The M90 PDE unit allows you to enter data with the keyboard or integrated barcode scanner. Pen and paper are now redundant. The stored data is later transferred to your host computer either directly via a cable or over the telephone network via a modem.

## **Customized Version**

Your M90 PDE unit has more than likely been adapted to suit your specific requirements. This has been achieved by programming your unit with your special version of the M90 program. The functions described in this manual can therefore vary from your customized version. For details, refer to separate instructions supplied by your System Partner.

## **Technical Description**

<b>Keyboard</b>	25 keys
<b>Display</b>	100x65 pixel LCD mono screen Text modes 4x12 or 8x16 characters
<b>Backlighting</b>	LED
<b>Dimensions</b>	Length: 176 mm Height: 27 mm Width: 52 mm
<b>Weight</b>	245g with batteries
<b>Temperature</b>	Operate: -10 to 50° C Storage: -20 to 70° C
<b>Humidity</b>	10 to 95% RH (noncondensing)
<b>Memory</b>	256 KB Flash ROM (for O/S and application) 2 MB internal SRAM The SRAM can be setup as RAM disk, program space, or any combination thereof.
<b>Power Supply</b>	1500 mAh NiMH rechargeable removable pack Battery caddy for two AA cells ( <i>optional</i> ) CR2032 backup battery
<b>Operation Time</b>	12 to 14 hours, with one barcode scan every five seconds
<b>Data Retention Time</b>	11 weeks on main battery, two years on backup battery ( <i>normal temperature</i> )

<b>Data Transmission</b>	Asynchronous RS-232 level serial port capable of speeds up to 57600 bps. (RJ-45 socket on unit or Office dock, Kermit as standard program download) RS-485 Local Area Network via depot dock
<b>Real Time Clock</b>	Built-in real time clock with calendar.
<b>Software</b>	MS-DOS emulation operating system, subset of version 3. Supported Program Languages are Microsoft C versions 6 and up, Borland C++ versions 3 and up, Borland Turbo Pascal versions 6 and up
<b>Accessories</b>	<ul style="list-style-type: none"><li>• External Tethered scanning capability</li><li>• Serial interface cable</li><li>• Charger</li><li>• Vehicle dock</li><li>• Depot dock</li><li>• Office dock</li><li>• AA battery cell caddy</li></ul>

---

## ***Start Up of New M90 PDE Unit***

Before you can use the M90 PDE unit after unpacking it, you must do two things:

1. Insert the main batteries and wait for the prompt to appear in the “Ready” mode.
2. Start the internal program by loading an application program from a host computer.

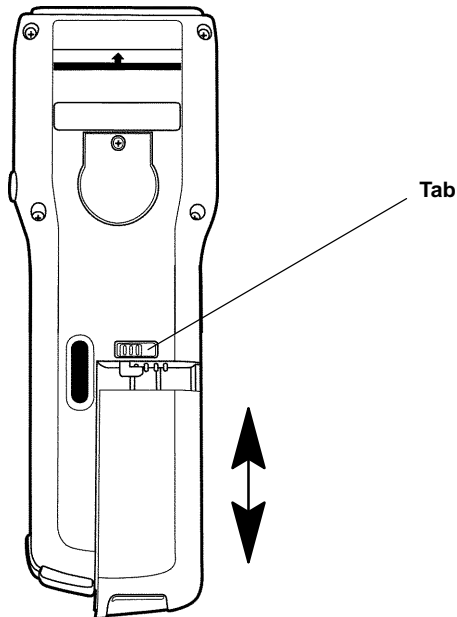
► **NOTE:**

*It is only necessary to follow these steps once after taking delivery of the M90. If your M90 is delivered with inserted batteries and application program these procedures normally do not need to be done.*

Below and on the next page are instructions for replacing either the main battery or the backup battery. Have the M90 powered off and turned over to the back before starting either procedure.

## ***Main Battery Replacement***

1. Slide tab from right to left (see Figure 1-1).
2. Slide the main battery pack down and out from the battery compartment.
3. Insert the new main battery pack up into the battery compartment.
4. Slide the tab from left to right to secure the battery.



*Figure 1-1*  
**Sliding the Main Battery in the M90**

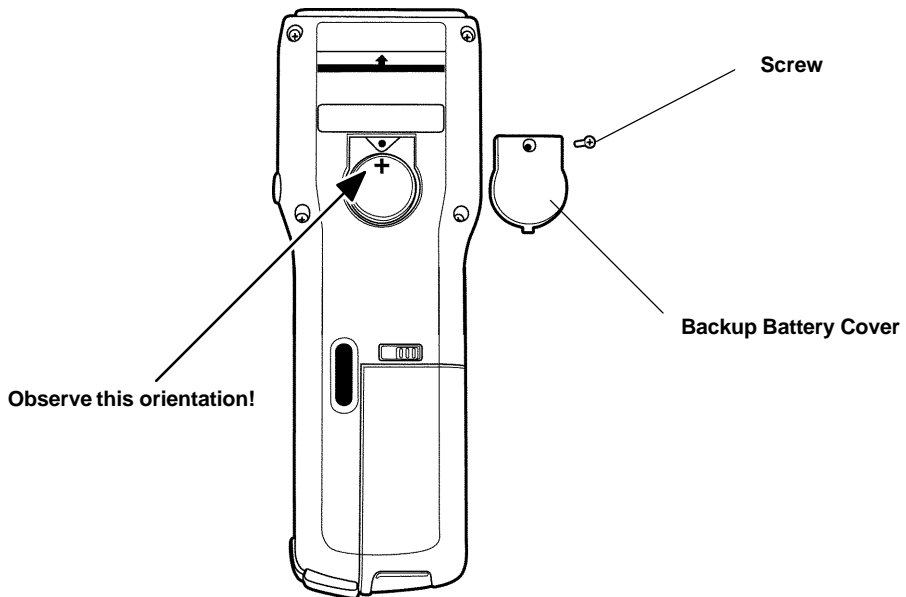


## Backup Battery Replacement

► **NOTE:**

*The main battery must be inserted during replacement of the backup battery, otherwise the data in the RAM will be lost.*

1. Unscrew and remove the backup battery cover with a Phillips screwdriver, then carefully remove the old lithium battery.
2. Insert a new lithium battery into the holder. Be sure to align the “+” symbol on the lithium battery with the screw hole in the M90 (see Figure 1-2).
3. Securely tighten the backup battery cover back onto the M90.



*Figure 1-2*  
**Backup Battery in M90 Without Cover**

## ***Downloading from Host Computer***

Connect the host personal computer (PC) to the M90 PDE unit with a serial cable null modem. Select “COM” in the “User mode” and the M90 enters the “Kermit server” mode with default communication parameters 19200 bps, 8 bit, 1 stop, no parity, and no flow control. Table 1-1 lists commands understood by the M90.

*Table 1-1*  
***Kermit Server Program Commands***

<b>Command</b>	<b>Description</b>
SEND program (download)	Send a program from the PC to the M90 PDE unit.
GET data	Send a collected data file from the M90 to the PC.
REMOTE DIR	Display the directory of files stored in the M90 RAM disc.
REMOTE DEL filename	Delete a program or data file in the M90.

### ***Kermit Communications Program***

To set up the PC to talk to the M90 PDE unit using a Kermit communications program, consult your manual for the Kermit communications program

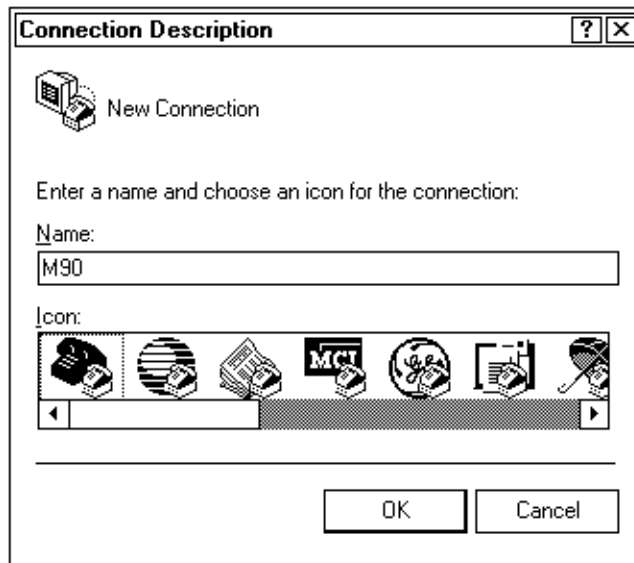
### ***Windows Hyper Terminal Method***

If you are using “Hyper Terminal” on a Windows 95 or 98 PC, do as follows to download a file to the M90. “Hyper Terminal” is not optimized for large files or for daily use in an application, but is an easier method of downloading files to the M90.

### Set up Host Computer

Do the following to set up the host computer:

1. From the Windows desktop, select **Start** → **Programs** → **Accessories** → **Hyper Terminal** to access the contents of the “Hyper Terminal” directory.
2. Double-click the **Hypertrm.exe** icon (shown left) to access the “Connection Description” window to create a new connection icon.



3. Enter a descriptive title for this connection in the **Name** field, such as “M90,” and select an icon from the **Icon** field to illustrate this connection.

4. Click the **OK** button to continue to the “Phone Number” window. Select the applicable “Direct to Com” option from the **Connect using** drop-down list, then click the **OK** button to continue.

**Phone Number** [?] [X]

 M90

Enter details for the phone number that you want to dial:

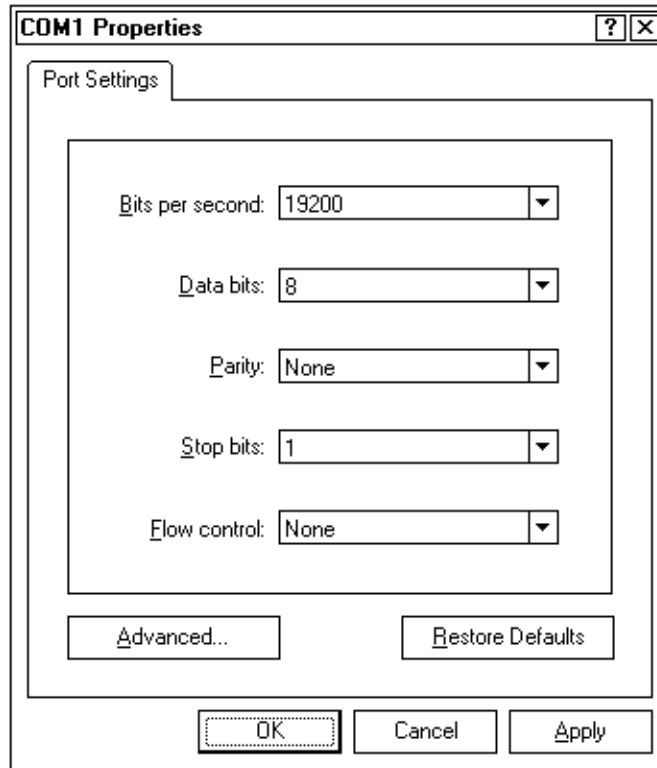
Country code:

Area code:

Phone number:

Connect using:

5. Use the applicable “COM Properties” window to set up the proper port settings.



- ▶ Set the **Bits per second** field to “19200.”
- ▶ Set the **Flow control** field to “None.”

Click the **Apply** button, then the **OK** button. A communications icon (like the one shown left) appears for this connection within the “Hyper Terminal” directory.

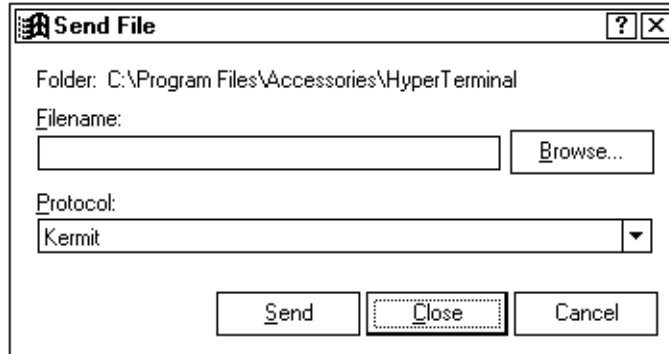


M90.ht

### **Set up Protocol via Hyper Terminal**

Double-click the communications icon to access the “Hyper Terminal” window.

1. From the “Hyper Terminal” title bar, select **Transfer** → **Send File** to access the “Send File” window.



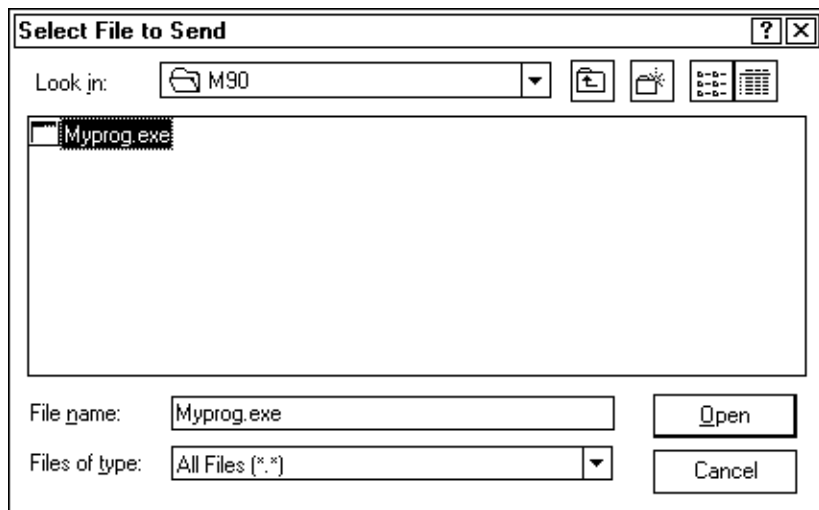
2. Select “Kermit” from the **Protocol** drop-down list, then click the **Close** button to return to the “Hyper Terminal” window.
3. From the “Hyper Terminal” window, select **File** → **Save** to exit.

The host computer is now ready to send and receive files. Your connection is saved, for later use, under the name and icon created.

**Download the Program MYPROG.EXE to the M90 PDE Unit**

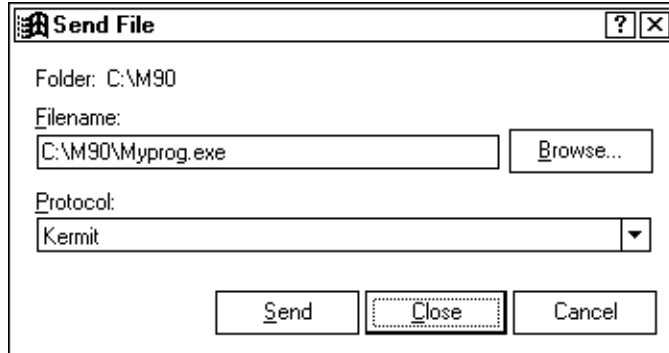
Do the following to download files from the host computer to the M90 PDE unit. Repeat these steps for each file to be downloaded:

1. From the “Hyper Terminal” window, select **Transfer** → **Send File** to access the “Send File” window (shown on page 10).
2. Use the **Browse** button to access the “Select File to Send” window and locate the directory that contains files for the M90.



3. Select the **MYPROG.EXE** file, then click the **Open** button to access the “Send File” window.

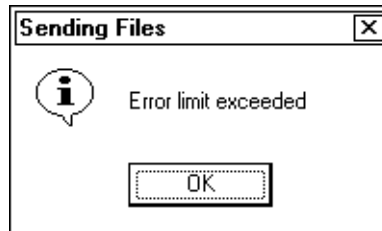
4. **MYPROG.EXE** should appear in the **Filename** field in the “Send File” window. If not, go back to the “Select File to Send” window and select MYPROG.EXE again.



5. Click the **Send** button to download MYPROG.EXE to the M90 PDE unit. The “Kermit file send to M90” window appears with the progress of the file transmission.



- ▶ If the file is sent successfully, the status screen disappears.
- ▶ If the transmission fails, the following “Sending Files” message appears. Click the **OK** button to exit, then try to send MYPROG.EXE again. Likely problems could include faulty baud rate settings or cable connections.



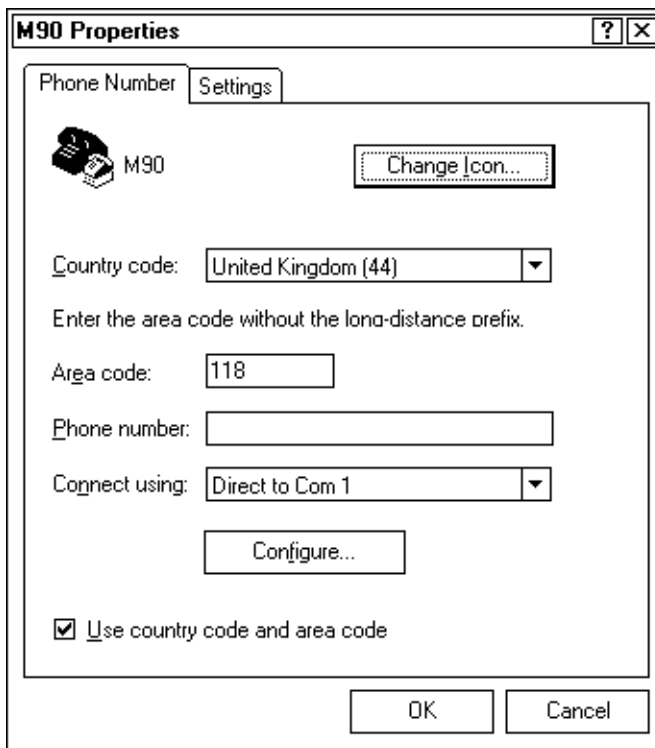
6. Press and release **[FN]** and press ▶ to exit “Server Mode” and return to “Ready Mode.”
7. Type “DIR” at the “Ready Mode” prompt, then press **[ENT SCAN]** for a list of files. Ensure that MYPROG.EXE is listed. If listed, go to the next page. If not, go to page 11 to download the program again.

### Review Hyper Terminal Settings



Do the following to change or view Hyper Terminal settings:

1. Double-click the communications icon (like the one shown left) to access the “Hyper Terminal” window.
2. From the “Hyper Terminal” window, select **File** → **Properties** to access the “Properties” window.



3. Change the COM port in the **Connect using** field and the icon with the **Change Icon** button. Click the **Configure** button to access the “COMx Properties” window and change the communication port settings.

Click the **OK** button to save your changes or click the **Cancel** button to exit this screen without saving your changes.

---

## Operation, General

Your M90 PDE unit has more than likely been adapted to suit your specific requirements by programming the M90 PDE unit with an adapted application program. Thus, you have to follow the instructions supplied by your local dealer.

### On/Off

The M90 PDE unit has no ON/OFF switch. Just press the [S1] and [FN] keys simultaneously to turn the M90 PDE unit on. To turn the M90 PDE unit off, press the [S1] and the [FN] keys simultaneously again.

The M90 PDE unit has an automatic “auto off” feature to reduce power drain from the internal main batteries. This function will turn off the unit if no key has been pressed for one to nine minutes (five minutes is default). The automatic “Auto Off” feature can be disabled.

► **NOTE:**

*Your terminal might be equipped with a customized keyboard and the keys may not correspond to this manual.*

### Keyboard

The keyboard consists of alphanumeric keys. Each key has several functions. By pressing [S1], [S2], or [S3] before pressing a key, the left character, the center character, or the right character above the keys are entered.

### Ready Mode

After a warm or cold start, the Liquid Crystal Display (LCD) will indicate the following.

M90 VerX.XX	; Model code and version number
MEM XXXX KB	; Size of total installed RAM
>	; Prompt, shows M90 is in “Ready” mode

## User Mode

Press and release the [FN] key, then press and release the ► key in “Ready” mode to invoke the “User” mode with the following screen displayed:

- |        |        |
|--------|--------|
| 1. RUN | 2. TER |
| 3. COM | 4. DIR |
| 5. ERA | 6. TYP |
| 7. CPY | 8. SET |

► **NOTE:** For the “RUN,” “ERA,” and “TYP” commands, use ◀ and ▶ keys to scroll and select another file.

You can use the corresponding number, 1–8, or use the ▲, ▼, ◀, or ▶ keys to move the cursor, and then press the [ENT SCAN] key to select a function.

**RUN** Runs the highlighted executable program  
**TER** Terminal mode operation  
**COM** Communication function  
**DIR** Display M90 disc directory  
**ERA** Erase the highlighted file  
**TYP** Type the highlighted file  
**CPY** Allows you to make a copy of data from a source and transfer to a destination, valid combinations are as follows:

<u>Source</u>	<u>Destination</u>	<u>Description</u>
file1	file2	Copy file1 to file2
file1	COM	Output content of file1 to serial port
file1	CON	Output content of file1 to LCD
COM	file1	Input data from serial port to file1
CON	file1	Input data from keyboard to file1, press the [FN] key, release it, then press and release the ► key to end the data input.

**SET** Set the parameters of the M90 PDE unit

To return to the “Ready” mode, you have to press the [FN] key, release it, then press and release the ► key.

## Special Keys

### S1, S2 and S3

The SHIFT keys which allow you to reach the alternate functions above each key. [S1] enables the left function above the keys, [S2] the center, and [S3] the right function.

### F1, F2, F3, F4, F5, F6, F7 and F8

These keys are application specific keys. Refer to the instructions supplied by your local dealer.



Move to the previous field.



Move to the previous record.



Move to the next record.

[S1] + ▲

Moves the cursor to the first record.

[S1] + ▼

Moves the cursor to the last record.

[DEL]

Moves the cursor one position left and clears that position.

[ENT SCAN]

Enters what you have just written to the M90 PDE unit. Or, if in review mode, it moves to the next field, when in a bar code reading field it will activate the laser scanner.

## Enter Data

Enter data into the M90 PDE unit via any of the following:

- ▶ Pressing keys on the keyboard.
- ▶ Using the built-in bar code scanner or a bar code wand or scanner.
- ▶ Combining keyboard entry with bar code inputs.
- ▶ Downloading data from a host computer.

## **Key Entry**

Enter data in response to the display prompts by pressing the appropriate keys. Conclude each data record by pressing the [ENT SCAN] key.

## **Bar Code Reader Entry**

Enter the data in response to the display prompts by pressing the [ENT SCAN] key and point the scanner beam to the label.

- ▶ The LED above the display is *red* as long as the scanner beam is reading the bar code.
- ▶ When data is accepted, the LED turns *green* and the M90 PDE unit emits a short beep.

## **Downloading Data from Host Computer**

See *Downloading from Host Computer* on page 6.

## **Start Application Program**

To start the application program, you can enter the filename in the “Ready” mode or use the **RUN** command in the “User” mode. The executable program has the extension **EXE**.

---

# Battery Replacement

## Replacing Main Battery

*Alkaline* batteries have to be replaced when the M90 PDE unit displays:

**! WARNING !**  
**MAIN BATTERY**  
**VOLTAGE LOW**

or if you see small battery icons to the right of the display. These indicate that the main battery should be replaced in approximately one hour, otherwise, the keyboard will be set in the “Off” position (see page 15). These warning will be periodically repeated until the battery is replaced.

If the main battery is not replaced, the M90 will be Off and if the backup battery is fully-charged, the data will be safe for two years. If, however, the backup battery is low on power, the data will remain safe for three weeks.

If you are using a rechargeable battery, the M90 will have to be charged for approximately for a half hour after the battery low warning occurs. See page 4 for details.



**WARNING:**

*Data will be lost if the main battery is exhausted and the backup battery is too low.*

## Replacing Backup Battery

If the M90 displays the following message, the lithium backup battery has to be replaced. See page 5 for details.

**! WARNING !**  
**BACKUP BATT.**  
**VOLTAGE LOW**

**► NOTE:**

*The main battery must be inserted during replacement of the backup battery.*

## Battery Life

► **NOTE:**

*These approximate time periods are estimated for general usage. Your machine and configuration may differ.*

**Continuous Operation:**

When data is continuously entered and the display remains on (not communicating).

- Alkaline batteries            Five hours
- Rechargeable batteries    Five hours

**Normal Daily Use:**

When data is entered at a normal rate one barcode scan every five seconds.

- Alkaline batteries            14 hours
- Rechargeable batteries    14 hours

**No Active Use:**

When the M90 PDE unit is not used or turned off.

- Main batteries:
  - Alkaline batteries            Two months
  - Rechargeable batteries    Two months
- Backup battery                Two years

When the main battery is removed, the backup battery will preserve the program and data for two years.



## **Peripherals**

### **Modem Cable**

Connects the M90 PDE unit directly to a MODEM or via Null Modem to a PC.

### **PC Cable**

(P/N: M90402) Connects the M90 directly to a PC.

### **Bar Code Wands**

Different tethered bar code wands and scanners can be adapted to the M90. Ask your System Partner.

### **Dock**

A connection box that charges the M90 while connected to a modem or a host computer. Each dock holds one M90. The docks are powered by an external wall charger supplied with the unit. Each dock has a spare battery charger.

#### **Using the Dock**

To use the dock, connect the charger and the wall socket. Then, slide the M90 into the dock. The LED marked “Charge” should turn solid *RED*, if rechargeable batteries are being used. The Charge LED will turn solid *GREEN* when the batteries are over 80 percent full. The unit is now ready for use.

The spare battery will start charging only when the unit battery is fully-charged, or there is no unit in the dock. It will take four hours to fully charge the battery in the M90, and then an additional four hours to charge the spare battery.

## **Vehicle Dock**

A connection box, in a vehicle, that charges the M90 PDE unit while connected to a modem or a host computer. Each vehicle dock holds one M90. The vehicle docks can be powered by the vehicle battery via a power cable.

### **Using the Dock**

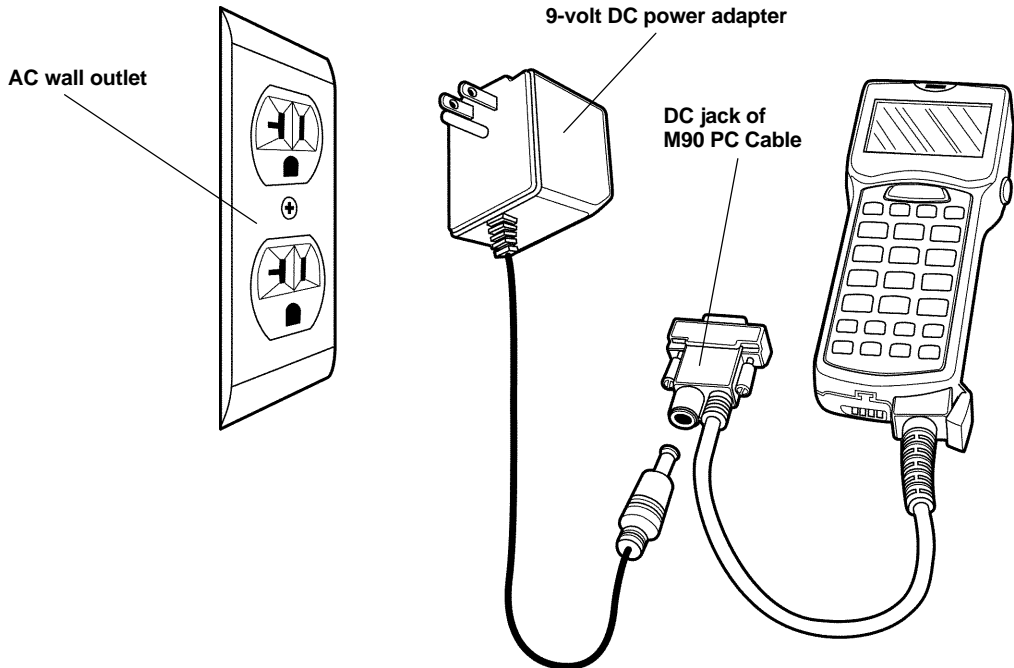
To put the M90 in the vehicle dock, enter it with the top section first so that the hooks of the vehicle dock grip around the rubber grommet at the top of the M90. Then, push the bottom end of the M90 forward so that it will slide into the vehicle dock. The dock provides power and regular charging.

## **Battery Pack Charging**

When the M90 shows the “Main battery low” message or icons, the battery pack in the M90 needs to be recharged. There are two ways to charge the battery: regular and quick charging.

## Regular Battery Charging

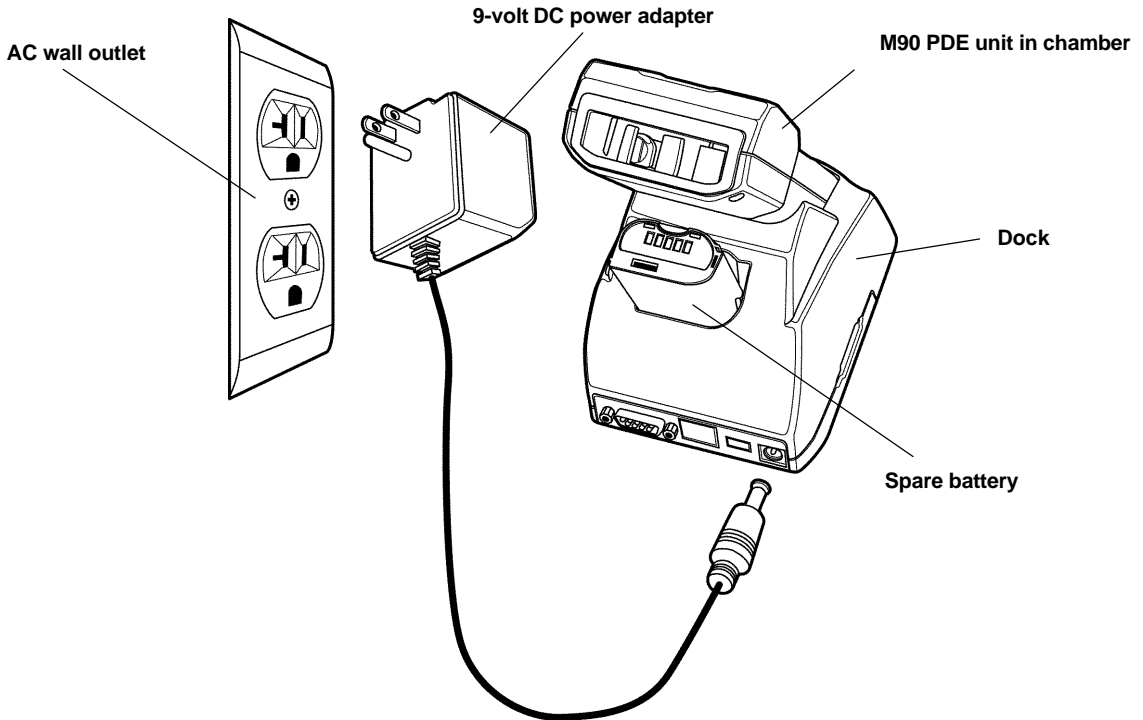
Plug one end of a 9-volt DC power adapter into the DC-jack of the M90 PC Cable (P/N: M90402) and the other end into an ac wall outlet. The battery pack will be fully recharged after 14–16 hours.



*Figure 1-3*  
**Connecting M90 to AC Wall Outlet Via DC Power Adapter**

### **Quick Charging of Battery in M90 PDE Unit**

Connect the power adapter to the dock and insert the M90 PDE unit into the chamber of the dock. The M90 battery can be fully charged in about four hours and the status of the battery charging is indicated by the LED on the front panel of the dock.

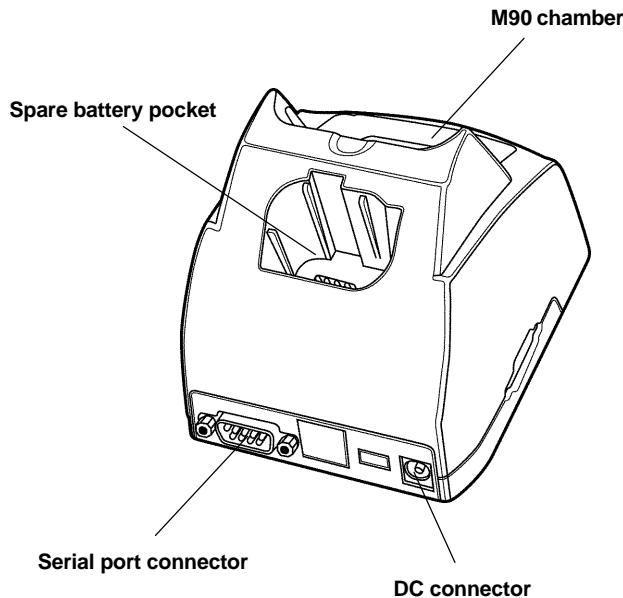


*Figure 1-4*  
**Connecting Dock to AC Wall Outlet**

## **Quick Charging of Battery Outside M90 PDE**

The dock also has a pocket for charging a spare battery pack. To charge a battery pack, put the spare battery in the battery pocket of the dock. The battery will be fully charged in four hours providing that there is no M90 PDE unit in the dock. If an M90 is in the dock, the spare battery does not start charging until the battery within the M90 is fully charged (as in Figure 1-4).

When the spare battery is waiting for the battery in the M90 to be charged, the charge LED for the spare battery flashes red. When charging starts, the LED changes to a solid red. The LED changes to a solid green when the spare battery is fully charged.



*Figure 1-5*  
**Dock Chamber and Pocket**

---

## **Maintenance**

No periodic maintenance is required, other than visual inspection and replacing the batteries. Keep the unit clean and dry with a damp cloth, but do not use solvents. Batteries are the only field-replaceable component.

---

## **Fault Finding and Error Codes**

### **No Text in Display**

1. Simultaneously press [S1] and [FN] to turn on the M90 PDE unit.
2. Replace the main battery according to page 4.
3. If the fault still remains, return the M90 to your System Partner for service.

### **M90 PDE Unit Locked in Position**

Do a system reset. Turn off the M90, then simultaneously press [S1], [FN], and ►. The display will show:

#### **START MENU**

1. *Supervisor Mode*
2. *Warm Start*
3. *Cold Start*
4. *Cancel*

► **Supervisor Mode:**

System enters “Supervisor” mode for system setup.

► **Warm Start:**

System enters “Ready” mode without destroying data.

► **Cold Start:**

Cold start will continue.



**WARNING:**

***This system reset is an emergency reset and should only be done when recommended by your System Partner.***



**Record**

A record is one complete set of entered data, it is formed from two or more fields, such as article number *and* quantity *and* date.

**Transfer**

The act of moving data records from the M90 PDE unit to a host computer or printer. During transfer, the M90 sends the entered data via a communication link to the host computer. After transfer, the entered data is retained unaltered by the M90. This is to allow a second transfer to take place if the first was unsuccessful.

**Warm Start**

The procedure which resets or restarts the M90. All data in the RAM or RAM disc are not destroyed.