

EXTECH DATA SYSTEMS

COMPACT PORTABLE PRINTER

USER'S MANUAL

VERSION: 5.1

DATE: January, 2000

Extech Data Systems
(A Division of Extech Instruments Corporation)
285 Bear Hill Road
Waltham MA 02154
(781 890 7440)

Part Number: 7A060023

NOTE:

FCC Part 15 Class B

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 too 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 circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Warranty

This printer is warranted by Extech Data Systems to be free of defects in parts and workmanship for a period of one year from date of shipment. (The customer is responsible for ensuring proper packing to prevent damage in transit.) This warranty does not apply to defects resulting from action of the user such as misuse, improper wiring, operation outside of specification, improper maintenance or repair, or unauthorized modification. Extech specifically disclaims any implied warranties of merchantability or fitness for a specific purpose and will not be liable for any direct, indirect, special, incidental or consequential damages. Extech's total liability is limited to the repair or replacement of the product. The warranty set forth above is inclusive and no other warranty, whether written or oral is expressed or implied.

Warranty Service (Call 617 890 7440)

A Return Authorization number must be issued before a unit is returned to Extech for repair. Once a unit has been properly returned to Extech, it will be repaired (estimates are provided first if the repair cost is estimated above \$100.00) and returned via UPS ground. The customer may elect a faster mode of transport at their cost.

1.0 INSTALLATION AND INITIAL POWER-UP

Thank you for selecting the Extech compact portable printer. The MPP/MSP/MST printer series feature compact reliable, plain paper dot matrix and direct Thermal printers capable of printing 24 through 42 columns and dot addressable graphics. Packaged in rugged Cyclac enclosure, it is designed for use as a table top or portable battery operated printer.

These printers are available in two types of interfaces, either serial RS232C or 8 bit parallel. All models feature 2048 character print buffer to free the host computer during the printing process. The serial RS232C printers (models MSP II, MSP III or MST IV) support all standard serial communication handshakes, the communication rate and the protocol are set via dip switches. The 8 bit parallel printers (models MPP II or MPP III) support Centronics compatible communication handshakes.

1.1 MODEL NUMBER

To best meet OEM requirements, the Extech compact portable printers are manufactured in a variety of configurations. The Model number of your printer is shown on the front panel label (Figure 1.0).

The model number of the printer is comprised of three fields. The first field specifies the type of communication interface installed, the second field specifies print speed and the third field specifies the number of the print columns. The model number convention summarizing the features of the printer are listed below.

MSP -II-24
(1) (2) (3)

(1) Printer interface type:

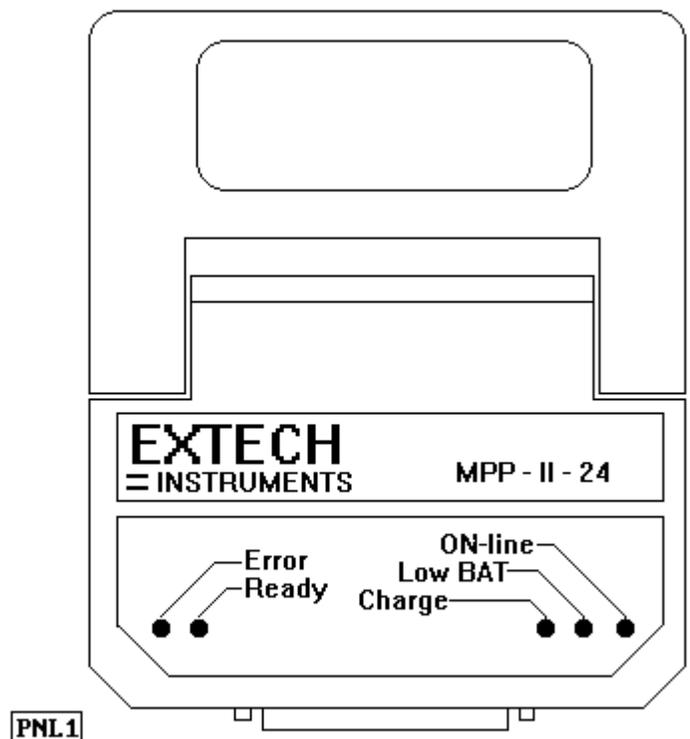
- MSP Serial RS232C interface
- MPP 8 bit parallel interface
- MST Serial RS232C interface (Thermal print head)

(2) Print speed:

- II 40 Characters per second (CPS)
- III 60 Characters per second (CPS)
- IV up to 1" per second

(3) Print columns:

- For II 24 or 42 columns
- For III 24 or 40 columns
- For IV definable in software



The instructions in this manual apply to the following Extech compact printers.

<u>MODEL #</u>	<u>DESCRIPTION</u>	<u>PART #</u>
MSP-II -24	Mini Serial Printer40CPS - 24 columns	76716F-
MSP-II -42	Mini Serial Printer40CPS - 42 columns	76718F-
MPP-II -24	Mini Parallel Printer40CPS - 24 columns	76916F-
MPP-II -42	Mini Parallel Printer40CPS - 42 columns	76918F-
MSP-III-24	Mini Serial Printer60CPS - 24 columns	76816F-
MSP-III-40	Mini Serial Printer60CPS - 40 columns	76818F-
MPP-III-24	Mini Parallel Printer60CPS - 24 columns	77016F-
MPP-III-40	Mini Parallel Printer60CPS - 40 columns	77018F-
MST-IV	Mini Serial Thermal	77818F-

1.2 UNPACKING YOUR PRINTER

When you remove the printer from its shipping box, make sure it is in good condition. The package also includes an AC power adapter and rechargeable battery pack. If any of the components are missing, contact Extech or your distributor for assistance.

Keep the packing material so you can repack the printer for storage or shipment. If there is any visible damage to the printer, record it on the freight bill, have the freight carrier acknowledge it and submit your claim to the carrier.

Caution: Do not install or operate damaged equipment as safety and performance may be affected.

1.3 FRONT PANEL LED INDICATORS

Five LED lights are used for various printer function indications. These LEDs are located on the front panel of the MSP/MPP/MST Printer series. The functions assigned to these lights are as follows:

ON-Line indicator

The green LED, labeled <ON-Line>, illuminates if the printer is selected.

Low BAT indicator

The Yellow LED, labeled <Low BAT>, illuminates if the battery pack is depleted. Recharge battery pack if LED is on.

Charge indicator

The Yellow LED, labeled <Charge>, illuminates if battery is accepting charge. It turns off automatically at the end of the charge cycle.

Ready indicator

The green LED, labeled <Ready> is used for the following:

- The <Ready> LED illuminates if the printer senses the presence of the AC power.
- The <Ready> LED illuminates if a command to enable Magnetic card reader is received.

Error indicator

The red LED, labeled <Error>, is used for the following indication:

- The <Error> LED flashing:

The <Error> LED flashes at a rate of once per second for 5 seconds, before auto-shutoff of the printer.

- The <Error> LED stays lit:

The <Error> LED stays lit if the printer control card fails to turn on the printer mechanism, due to low battery or paper jam or if an error is detected while reading the magnetic card.

1.4 MEMBRANE SWITCH PANEL

Four membrane switches are provided on the left side of the MSP/MPP printers for various operator controls. The switches are labeled <SLCT>, <FEED>, <SET> and <ADV N>. The functions performed by these switches are summarized below.

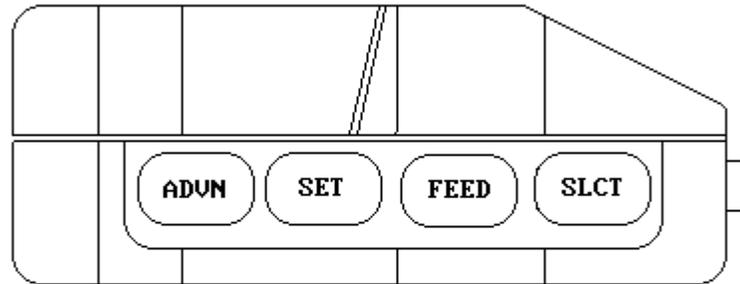
<SLCT> or <ON>The <SLCT> or <ON> switch is used to turn printer power on. The green <ON-Line> LED is illuminated, if printer is selected.

<FEED>

The <FEED> switch is used to advance the paper by one line.

<SET> or <OFF>The <SET> or <OFF> switch is used to turn the printer OFF. The <Error> LED starts flashing when set switch is pressed.

<ADV N> or < >The <ADV N> or < > switch is used to advance paper by one line.



1.5 DATA CONNECTOR

PNL2

The Data Connector of the MSP/MPP/MST printer is located at the front of the printer. Figure 1.0 shows the front panel of the MSP/MPP/MST Printer series. The serial and parallel input/output signals of the printers are terminated on a 25 pin, DB25S female connector. The MST and some MSP models terminate in an RJ type connector.

1.6 POWER INPUT

The compact printers receive DC power via Exttech rechargeable battery pack or through a two (2) conductor Power Input Connector located on the right side of the printer.

NOTE: The printer must be operated with the battery installed when the Power Adapter is used. Failure to do so will invalidate the warranty.

1.6.1 AC POWER ADAPTER

A wall mount UL listed power adapter is provided to operate the printer. The AC Power Adapter plugs directly into an AC power outlet while it's mating DC plug, on a 6 ft extension, connects to the printer. The center pin is the positive DC input, while the body of the connector is logic common or DC negative input.

The AC Power Adapter is internally fused and it's output is rated at 9 VDC/1.0A. The Power adapter AC input is available for either 110 VAC, 220 VAC OR 240 VAC.

PART #DESCRIPTION

152120MSP/MPP 110 VAC IN / 9VDC 1A Out
 152320 MSP/MPP 220 VAC IN / 9VDC 1A Out
 152340 MSP/MPP 240 VAC IN / 9VDC 1A Out
 151129DC CAR ADAPTER

1.6.2DC POWER CONNECTION (OPTIONAL)

For DC powered units, a two conductor power plug is available (Part # 151129DC CAR ADAPTER. Refer to Table 1.0 to connect power to your DC unit. No internal fuse is provided with DC units. It is strongly recommended you install external fuses with the values shown in the table 1.0.

Table 1.0 below summarizes Voltage, Current and Fuse requirements for AC and DC configurations.

MODEL #	VOLTAGE	+/-	CURRENT	FUSE
MSP/MPP	110VAC	10%	.1A	INTERNALLY FUSED
MSP/MPP	220VAC	10%	.06A	INTERNALLY FUSED
MSP/MPP	7.5-13.6VDC	--	4 WATTS	1.0A SLB

**Table 1.0
 Voltages, Currents and Fuses**

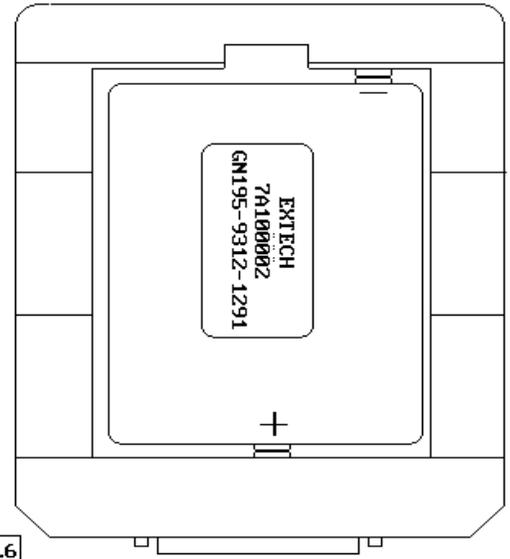
1.6.3 INSTALLING BATTERY

Install the battery pack provided into the battery compartment at the bottom of the printer.

The battery pack provided must be charged over night prior to its first use.

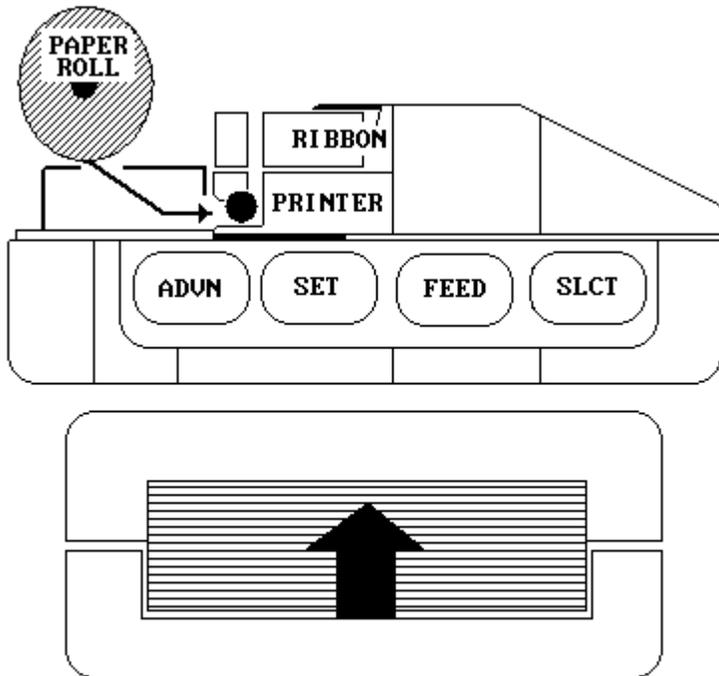
To charge the battery pack use the AC adaptor provided. 8-10 hours are required to recharge the battery pack.

The MSP/MPP/MST printers are capable of delivering from one to two hours continuous printing on a full charge.



1.7 INSTALLING PAPER AND RIBBON

The printer is shipped from the factory with paper and ribbon installed, refer to this section to install new supply of paper and ribbon. The paper tray and ribbon cartridge of the compact printers are located inside the printer enclosure. To access the paper tray and the ribbon cartridge the back cover must be removed. To remove the back cover, press in at the arrow mark while pulling the back cover up.



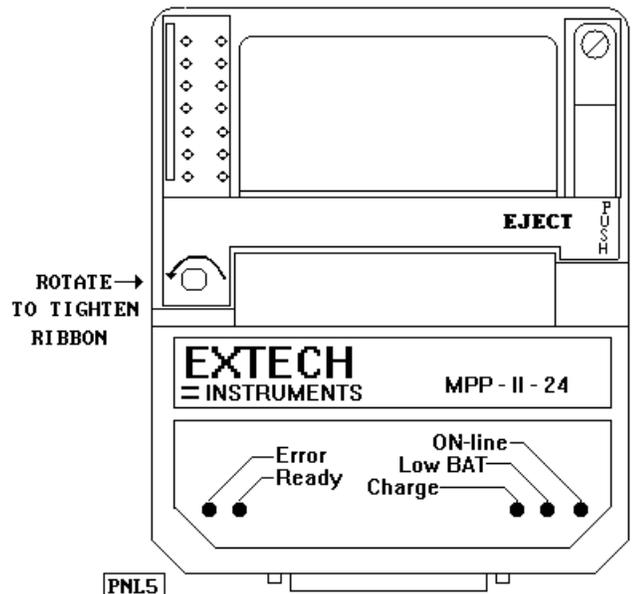
PUSH AT ARROW
TO REMOVE COVER

1.7.1 INSTALLING PAPER

1. Remove the back cover (section 1.7 and figures 1.1 and 1.3).
2. Turn on the printer by pressing the <SLCT> or <ON> switch.
3. Tear and discard any paper remaining in the printer tray.
4. Remove any paper remaining in the printer mechanism, using the <FEED> switch.
5. **Do not REVERSE pull paper out of the printer mechanism - this will damage the printer mechanism**
6. Feed the new roll of paper into the printer paper slot using the <FEED> switch.

1.7.2 INSTALLING RIBBON

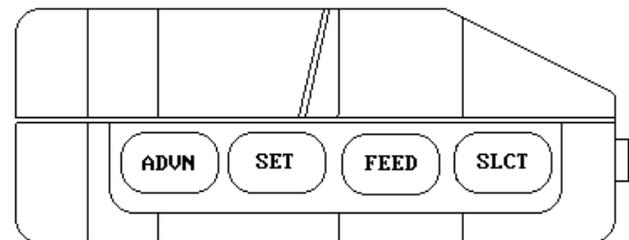
1. Remove the back cover (section 1.1 and figure 1.3).
2. Remove the worn ribbon by pressing with one finger at the location labeled "EJECT" on the ribbon cartridge.
3. Insert the new ribbon in place and press at the extreme ends of the ribbon cartridge to secure it in place.
4. With your thumb, tighten the ribbon by rotating clockwise the ribbed wheel located on the front of the ribbon cartridge.
5. Feed paper to insure that the paper passes through exposed ribbon and ribbon cartridge case.



1.8 INITIAL POWER-UP AND SELF-TEST

A self-test feature is built into your MSP/MPP compact printer series. To start the self-test, press the <FEED> switch during initial power-up of the printer (see below).

Once the battery is installed and all the front panel LED indicators are turned off (press the <OFF> or <SET> switch to turn off) press and hold down the <FEED> switch, then press the <SLCT> or <ON> switch, this will automatically start the self test. The self-test program checks the integrity of the operating program installed, the 2048 character print buffer, the processor watchdog, and the power supervision circuits. The printer performs an internal self-test and prints the self-test findings, current printer settings, and starts continuous print of the built-in printer character fonts. To stop the self-test process, press the <FEED> switch.



TO START PRINTER SELF TEST:
PRESS AND HOLD FEED
THEN PRESS SLCT

If no problems are found, the following messages are printed:

TEST PRINT DESCRIPTION

2K BUFFER EXTECH V2.2 (C) 1994 This line shows the version of the installed Eprom and the size of print buffer.

INTERFACE: SERIAL Type of interface selected SERIAL or PARALLEL.

MODE:2400,8,N,1 Baud=2400, number of Data bits=8, Parity= None, Stop bits = 1

Note:

The red <Error> LED will turned on if any error is encountered during self test.

If any problem is encountered during self test. Refer to the trouble shooting guide.

1.9 PRINTER PAPER SPECIFICATION

The MSP/MPP printers use 2.25" wide, .0027" thick and 1.12" diameter rolls of common calculator paper. Two types of paper may be used in the printer, Single ply roll and Two ply pressure sensitive roll. Below is the specification for each type of the paper.

<u>PAPER TYPE</u>	<u>PART #</u>	<u>WIDTH</u>	<u>THICKNESS</u>	<u>LENGTH</u>
Single Ply	757058 (5 rolls)	2.25"/57.5 mm	.0027" / .08 mm	25' / 6.3 m
Two Ply	757135 (5 rolls)	2.25"/57.5 mm	.0035" / .124 mm	16' / 4.0 m

2.0 PRINTER POWER

Printer power, battery locations and characteristics were described in section 1.6. This section reviews the printer power and battery operation and specification.

Like any battery-power device, the battery pack supplied with the printers have finite life. The maximum usage between recharge will be obtained when the following simple rules are followed.

- Turn off printer when not in use.
- Recharge until the **<charge>** LED turns off, indicating full charge.
- Use Extech power adapter to recharge the battery pack.
- Use "Logic Switching" capacity in your software to facilitate the auto turn on or turn off of the printer.

2.0.1 MANUAL POWER-UP AND POWER-DOWN

The **<SLCT>** or **<ON>** membrane switch is used to turn the printer ON manually. The **<ON-Line>** LED indicator is turned ON when **<SLCT>** or **<ON>** switch is pressed.

Press the **<SET>** or **<OFF>** switch to turn off the printer power. The red **<Error>** LED starts flashing momentarily, to indicate the start of the power down process. This process will last about 5 seconds.

2.0.2 AUTO POWER DOWN TIMER

The printers have a built-in 30 second Power-Down-Timer. The timer is automatically restarted under any one of the following conditions.

- If any of **<SLCT>** or **<ON>**, **<FEED>** or **<ADV>** or **<OFF>** switches are pressed.
- If a character is received via data interface.

Upon timeout of the Power-Down-Timer, the printer starts flashing the red **<Error>** LED to warn the operator and transmits the power down command string to the host.

The power down timer may be disabled by activating the **<RTS>** or **<SELECT>** signals on the interface connector.

2.0.3 POWER-UP VIA DATA INTERFACE

The printer can be powered-up by transmitting a single character or activating **<RTS>** or **<SELECT>** signals on the interface connector.

To avoid the loss of data during "Logic Switching", the following software features must be implemented in the Host program.

After sending a wake up character or activating the **<RTS>** or **<SELECT>** signals.

- Pause for 1.6 seconds before sending additional characters to the printer.
- Verify the status of **<CTS>** or **<BUSY>** before sending additional characters.
- Wait for the XON character from the printer.

The printer turns off power automatically, 30 seconds after the last character received or de-activation of the **<RTS>** or **<SELECT>** signals.

2.0.4 PRINTER BATTERY PACK

The printer is designed to operate with a 5.0 VDC/ 800 mA H rechargeable Ni-Cd battery pack. Some MST models may be operated from a NiMH battery delivering 1400 mA H. This battery requires three battery terminals in the bottom case.

Two LED indicators showing the status of the battery pack are provided.

The **<Low BAT>** LED is turned on when the battery voltage drops below 4.1 volts. The **<Charge>** LED is on while the battery is accepting charge. It turns off automatically at the end of the charge cycle, when battery voltage reaches 5.56 volts.

8 to 10 hours are required to fully recharge the batteries. Up to 216,000 characters can be printed with a fully charged battery pack.

The battery pack will hold charge for 800 to 1000 hours after complete recharge. Remove the battery pack from the printer battery compartment during long storage or shipping. Additional battery packs and a 4 pack battery charger are available. The part numbers and descriptions of these accessories are:

PART #CAPACITYDESCRIPTION

7A100002800 mAh800 mAh battery pack
767500Simultaneous 4 battery pack charger

The Extech AC adapters and their respective specification are listed in section 1.6.1 of this manual.

3.0MSP SERIES: SERIAL COMMUNICATION SPEED AND PARITY

The proper Baud Rate and protocol settings are required to communicate with a host computer. The standard factory setting is 9600 BAUD, 8 DATA BITS, NO PARITY BIT, and one STOP BIT.

A six position dip switch, located to the left of the paper tray, can be used to set the baud rate and parity (Figure 3.1). The printer reads these switches once on initial power-up.

Switches 1 and 2 are used to set the communication speed/ baud rate.

SW1	SW2	BAUD RATE
ON	ON	1200
OFF	ON	2400
ON	OFF	4800
OFF	OFF	9600

Switch 3 selects number of data bits.

SW3	DATA BITS
OFF	8 DATA BITS
ON	7 DATA BITS

Switches 4 and 5 are used for parity selection

SW4	SW5	PARITY BIT
OFF	OFF	No parity
OFF	ON	No parity
ON	OFF	Odd parity
ON	ON	Even parity

The printer self-test can be used to print and verify the current serial settings. A sample test print is shown in SECTION 1.8.

3.1MPP SERIES - 8 BIT PARALLEL INTERFACE

The Parallel Interface signals for the MPP printer series are terminated on a 25 pin IBM PC parallel printer output type connector located on the front panel of the printer.

Appendix A

Serial MSP/MPP Users guide

This Guide summarizes the operating and maintenance feature of the Extech printer series.

Initial preparation

- Install the battery pack in the battery compartment located on the back of the printer.
- Recharge battery pack overnight by using the Extech power adapter provided.
- Connect the Data Connector located on the front of the printer.
- Set the communication parameters (serial printers only).
- If interfacing to PC, set MS-DOS and Windows variables.

Initial power up and self-test

- Press <SLCT> or <ON> switch to turn on printer.
- Press <SET> or <OFF> to turn off printer.
- To start self-test Hold <FEED> switch then press <SLCT> or <ON>.

Install Paper

- Remove the back cover
- Turn on the printer by pressing the <SLCT> or <ON> switch.
- Tear and discard any paper remaining in the printer tray.
- Remove any paper remaining in the printer mechanism, using the <FEED> switch.

Do not REVERSE pull paper out of the printer mechanism: this will damage printer.

- Feed the new roll of paper into the printer paper slot, press the <FEED> switch to advance the paper.

Install Ribbon

- Remove the back cover
- Remove the worn out ribbon by pressing with one finger at the location labeled "EJECT" on the ribbon cartridge.
- Insert the new ribbon in place and press at the extreme ends of the ribbon cartridge to secure it in place.
- With your thumb, tighten the ribbon by rotating clockwise the ribbed wheel located on the front of the ribbon cartridge.
- Feed paper to insure the that paper passes trough exposed ribbon and ribbon cartridge case.

Membrane Switch Functions

<SLCT> or <ON>

The <SLCT> switch is used to turn printer power on. The green <ON-Line> LED is turned on, if printer is selected.

<FEED>

The <FEED> switch is used to advance the paper by one line.

<SET> or <OFF>

The <SET> switch is used to turn the printer OFF. The red <Error> LED starts flashing when <SET> switch is pressed.

<ADV> or < > (May not be available)

The <ADV> switch is used to advance paper by one line.

Front Panel Indicators

<ON-Line> Green - If illuminated the printer is selected.

<Low BAT>Yellow - If illuminated the battery pack is depleted. Recharge battery pack if LED is on.

<Charge>Yellow - If illuminated the battery is accepting charge.

Turns off automatically at the end of the charge cycle.

<Ready>Green - illuminated if the printer senses the presence of the AC power.Green - illuminated if a command to Enable Magnetic card reader is received.

<Error>Red - Flashing indicates start of power down process.

Red - illuminated steady if the battery is too low to turn on the printer mechanism.

Red - illuminated steady Magnetic card reading Error.

Appendix B

Trouble Shooting Guide

PROBLEM POSSIBLE CAUSES SOLUTION

Printer will not turn on Discharged Battery Recharge battery overnight.

Charge LED not lighting when AC adapter is plugged in No AC power Check AC outlet and adapter.
Bad AC Adapter Battery pack fully charged.

Battery not Charging Battery incorrectly installed or no AC. and AC adapter. Check Battery installation

Poor print Quality Worn ribbon Replace ribbon.

Paper not feeding Obstruction in paper path or improperly installed. Check the paper path. Verify installation. Use paper with the right thickness

Error LED on SteadyPrint Mechanism Jam Press <FEED> to clear problem.
Low Battery If problem persists recharge battery or cycle power.
Low-BAT LED on Steady Low AC or Battery. Recharge Battery

Prints illegible characters Improper Baud rate Verify the printer and Host setting. and parity. Match, use test print to verify Printer setting.
In MS-DOS use write direct to port
In WINDOWS use Generic printer driver, print manger and direct write to port.

Printer will not print Improper cabling. For MSP verify that PC's pins 6,8 and 20 tied together. For MPP make proper cable is in use, all 25 pins connected straight through.

Appendix C

Magnetic Card Reader Option

Introduction

An optional Magnetic Card Reader is available for the MSP/MPP series printers. This option is designed to read Magnetic Cards conforming to ISO standards (ABA, IATA, MINTS and THRIFT), convert the encoded signals to ASCII format and transmit the information to the host computer or terminal.

Three Types of Magnetic Card Reader Heads are available. The part number, Model number and functional description of each type are summarized in Table 1. The Model number of the Magnetic Card Reader installed in the printer is shown on a label located inside the printer battery compartment.

Part #	Model #	Track #	Functional Description Track # - Max. capacity/ data bits Recording method/Recording Density
7A070007	MR-2105	1 & 2	Track 1 - 79 characters / 7 bit RecM: F2F : RecD:210BPI Track 2 - 40 characters / 5 bit RecM: FM : RecD: 75BPI
7A070005	MR-1102	2	Track 2 - 40 characters / 7 bit RecM: FM : RecD: 75BPI
7A070011	MR-2106	2 & 3	Track 2 - 40 characters / 7 bit RecM: FM RecD: 75BPI Track 3 - 107 characters / 5 bit RecM: F2F RecD:210BPI

Table 1

Note: All readers will accept odd or even Parity

Appendix D

Infrared Data Input Option

Introduction

This appendix summarizes the operating features of the Extech MSP Series printers with built in **InfraRed Data Receiver Interface (IRD)**.