

# Printer series

## MCP7850B

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**REPLACED**

**MCP7850B Infra-Red THERMAL PRINTER**

*Applications Datasheet*



**Features**

- Easy-Load paper feature
- Infra-red interface, HP82240B format
- Powered by Akaline Batteries
- High speed, high resolution printing capability
- Quiet, non-impact system
- Maintenance-free
- Ultra-Compact and light weight
- High reliability line head mechanism
- Versatile for use with text or graphics
- 24, 32 or 48 characters per line
- Barcode capability
- Protective boot available

**Introduction**

The MCP7850B is an ultra-compact, lightweight portable thermal printer with an “easy-load” paper feature. Housed in a new innovative enclosure this printer has an Infra-red interface compatible with HP82240B format.

Designed for maximum versatility, the MCP7850B is compatible with existing systems whilst allowing many upgrades in terms of printing speed and functionality.

Power is provided bt easy to obtain alkaline batteries or an external power supply unit can be used.

Many different modes of operation are possible, including numerous character sets, all selectable by software commands.

The MCP7850B is from a family of thermal printers designed and manufactured in the UK by Martel Instruments. All units are built into robust ABS housings, with a choice of colours. We would be pleased to discuss the possibility of customising any aspect of the printer to specific requirements.

## 1.1 Overall Specification

Printing system	Thermal line head system
Max Characters per line	48 (Default 24)
Character matrix	24x16, 24x12 or 24x8
Character size	3mm x 2mm, 3mm x 1.5mm or 3mm x 1mm (Approx. 13, 17 or 25cpi)
Horizontal dot pitch	0.125mm (Approx. 200dpi)
Vertical dot pitch	0.125mm
Text line composition	24x384 dots
Printing width	48mm
Average printing speed	5 lines per sec
Dimensions	85.5mm x 150mm x 55mm (45mm low profile printer)
Weight	400g approx (inc batteries and paper roll)
<b>Power Supply</b>	
MCP7850B	internal 4 x 1.5V alkaline, AA cells
Paper width	58mm
Paper capacity	45mm dia, 25m
Recommended paper	TF50-KS-E2D
Character set	ASCII
Country codes	USA, France, Germany, UK, Denmark I/II, Sweden, Italy, Spain & Japan
Interface	
Data format	8 bit (1 start bit, 4 error detection), Infra-red 940nm, 33KHz modulated
Buffer size	5 Kbytes
Environmental Conditions	
Operating range	0°C to +50°C
Storage range	-20°C to +60°C
Charging range	+10°C to +45°C
MTBF	Approx. 10 Million lines (20°C, print ratio = 25%)

## 1.2 Infra-red Interface

The transmit/receive requirements for interfacing with the MCP7850B are compatible with existing systems, however higher transmission speeds and printing speeds are possible due to the incorporation of a large 5Kbyte buffer and a high speed thermal fixed head printer mechanism.

Higher print speed can be achieved by minimising the inter-frame delays in the transmission software, previously required when using a slower printer mechanism.

Maximum distance for reliable infra-red communication between printer and host equipment is 45cm (18in). The infra-red port at the front of the printer should be pointed directly at, and horizontal to, the port on the host equipment and the beam should not be obstructed.

## 2. PRINTER CONFIGURATION

### 2.1 Software Selectable Functions

Underline	Horizontal tab, plus setting	Inverse printing
Double height	Form feed, plus setting	Reset
Double width	11 selectable international character sets	Barcodes
Graphics	Reverse printing	

### 2.2 Control Codes and Escape Sequences

Function	Code	Decimal	Hex
Horizontal tab	HT	9	09
Line feed	LF	10	0A
Form feed	FF	12	0C
Carriage return	CR	13	0D
Cancel	CAN	24	18
Double width on	SO	14	0E
Double width off	Si	15	0F
Set print mode	ESC NULL ! <i>n</i>	27 0 33 <i>n</i>	1B 00 21 <i>n</i>
Set barcode start position	ESC NULL \$ <i>n1 n2</i>	27 0 36 <i>n1 n2</i>	1B 00 24 <i>n1 n2</i>
Set bit image (8 pin single density)	ESC NULL * 0 <i>n1 n2 [d]</i>	27 0 42 0 <i>n1 n2 [d]</i>	1B 00 2A 00 <i>n1 n2 [d]</i>
Set bit image (8 pin double density)	ESC NULL * 1 <i>n1 n2 [d]</i>	27 0 42 1 <i>n1 n2 [d]</i>	1B 00 2A 01 <i>n1 n2 [d]</i>
Set bit image (24 pin single density)	ESC NULL * 32 <i>n1 n2 [d]</i>	27 0 42 32 <i>n1 n2 [d]</i>	1B 00 2A 20 <i>n1 n2 [d]</i>
Set bit image (24 pin double density)	ESC NULL * 33 <i>n1 n2 [d]</i>	27 0 42 33 <i>n1 n2 [d]</i>	1B 00 2A 21 <i>n1 n2 [d]</i>
Underline on	ESC NULL – 1	27 0 45 1	1B 00 2D 01
Underline off	ESC NULL – 0	27 0 45 0	1B 00 2D 00
Reset	ESC NULL @	27 0 64	1B 00 40
Set page length	ESC NULL C <i>n</i>	27 0 67 <i>n</i>	1B 00 43 <i>n</i>
Set horizontal tabs	ESC NULL D <i>n</i>	27 0 68 <i>n</i>	1B 00 44 <i>n</i>
Set bit image	ESC NULL K <i>n1 n2 [d]</i>	27 0 75 <i>n1 n2 [d]</i>	1B 00 4B <i>n1 n2 [d]</i>
Country select	ESC NULL R <i>n</i>	27 0 82 <i>n</i>	1B 00 52 <i>n</i>
Double width on	ESC NULL W 1	27 0 87 1	1B 00 57 01
Double width off	ESC NULL W 0	27 0 87 0	1B 00 57 00
Compressed bit image graphics	ESC NULL Z <i>n1 [d1] ... n24 [d24]</i>	27 0 90 <i>n1 [d1] ... n24 [d24]</i>	1B 00 5A <i>n1 [d1] ... n24 [d24]</i>
Print & feed paper	ESC NULL d <i>n</i>	27 0 100 <i>n</i>	1B 00 64 <i>n</i>
Label advance	ESC NULL f	27 0 102	1B 00 66
Reversed on	ESC NULL i 1	27 0 105 1	1B 00 69 01
Reversed off	ESC NULL i 0	27 0 105 0	1B 00 69 00
Double height on	ESC NULL w 1	27 0 119 1	1B 00 77 01
Double height off	ESC NULL w 0	27 0 119 0	1B 00 77 00
Inverse on	ESC NULL { 1	27 0 123 1	1B 00 7B 01
Inverse off	ESC NULL { 0	27 0 123 0	1B 00 7B 00
Graphics	ESC <i>n [d]</i>	27 <i>n [d]</i>	1B <i>n [d]</i>
Roman 8 character set	ESC <248>	27 248	1B F8
ECMA 94 character set	ESC <249>	27 249	1B F9
Underline off	ESC <250>	27 250	1B FA
Underline on	ESC <251>	27 251	1B FB
Normal width on	ESC <252>	27 252	1B FC
Double width on	ESC <253>	27 253	1B FD
Self test	ESC <254>	27 254	1B FE
Reset	ESC <255>	27 255	1B FF
Set barcode height ( $1 \leq n \leq 255$ )	GS h <i>n</i>	29 104 <i>n</i>	1D 68 <i>n</i>
Print UPC-A barcode	GS k 0 [ <i>d</i> ] NULL	29 107 0 [ <i>d</i> ] 0	1D 6B 00 [ <i>d</i> ] 00
Print UCP-E barcode	GS k 1 [ <i>d</i> ] NULL	29 107 1 [ <i>d</i> ] 0	1D 6B 01 [ <i>d</i> ] 00
Print EAN13 barcode	GS k 2 [ <i>d</i> ] NULL	29 107 2 [ <i>d</i> ] 0	1D 6B 02 [ <i>d</i> ] 00
Print EAN8 barcode	GS k 3 [ <i>d</i> ] NULL	29 107 3 [ <i>d</i> ] 0	1D 6B 02 [ <i>d</i> ] 00
Print Code 39 barcode	GS k 4 [ <i>d</i> ] NULL	29 107 4 [ <i>d</i> ] 0	1D 6B 04 [ <i>d</i> ] 00
Print 2 of 5 barcode	GS k 5 [ <i>d</i> ] NULL	29 107 5 [ <i>d</i> ] 0	1D 6B 05 [ <i>d</i> ] 00
Print Codabar barcode	GS k 6 [ <i>d</i> ] NULL	29 107 6 [ <i>d</i> ] 0	1D 6B 06 [ <i>d</i> ] 00
Print CODE128 barcode	GS k 7 <i>n [d]</i>	29 107 7 <i>n [d]</i>	1D 6B 07 <i>n [d]</i>
Set barcode magnification ( $2 \leq n \leq 4$ )	GS w <i>n</i>	29 119 <i>n</i>	1D 77 <i>n</i>

## 2.3 International Character Sets

Country	Code	Decimal	Hex
USA	ESC NULL R 0	27 0 82 0	1B 00 52 00
France	ESC NULL R 1	27 0 82 1	1B 00 52 01
Germany	ESC NULL R 2	27 0 82 2	1B 00 52 02
UK	ESC NULL R 3	27 0 82 3	1B 00 52 03
Denmark I	ESC NULL R 4	27 0 82 4	1B 00 52 04
Sweden	ESC NULL R 5	27 0 82 5	1B 00 52 05
Italy	ESC NULL R 6	27 0 82 6	1B 00 52 06
Spain	ESC NULL R 7	27 0 82 7	1B 00 52 07
Japan	ESC NULL R 8	27 0 82 8	1B 00 52 08
Norway	ESC NULL R 9	27 0 82 9	1B 00 52 09
Denmark II	ESC NULL R 10	27 0 82 10	1B 00 52 0A

## 2.5 Character Font

		Bit 1	Bit 0
Roman 8	24 chars/line	0	0
Arial	48 chars/line	0	1
Arial	32 chars/line	1	0
ECMA 94	24 chars/line	1	1

## 2.4 Print Mode

Bit	Function	Value	
		0	1
0	Character font (see below)		
1			
2	Print density (see below)		
3			
4	Double height	Cancelled	Set
5	Double width	Cancelled	Set
6	Undefined		
7	Underline	Cancelled	Set

## 2.6 Print Density

		Bit 3	Bit 2
Light	1 (Default)	0	0
	2	0	1
	3 (Label Default)	1	0
Dark	4	1	1

## 3. Housing Colour

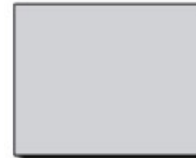
Printer housings are available in four standard colours as shown, all printers will be supplied in Black Grey colour unless specified to the contrary.

Other colours from the RAL colour chart can be supplied subject to a MOQ.

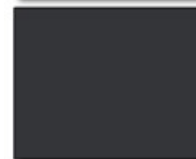
Custom colours can be moulded subject to discussion with Martel.



Cream—RAL9001



Grey White—RAL9001



Black Grey—RAL7021



Graphite Black—RAL9011

# 4. PRINTER OPERATION

## MCP7850B

### 4.2 Power On Procedure

Insert the alkaline batteries ensuring the correct polarity positioning is followed. Open the paper cup lid and ensure that the roll is present and that there are no foreign objects inside the paper cup. Close the lid, ensuring that the paper passes through the paper exit slot.

When the Status indicator is off, the printer is off. A brief press of the Mode button turns the printer on, the Status indicator will illuminate and the printer mechanism will reset. A brief press of the Mode button will turn the printer off. When the printer is asleep, pressing the Mode button will wake up the printer.

If the batteries in the printer become exhausted, printing will become faint, erratic or not possible at all

Batteries should be removed if the printer is to be left unused for long periods.

#### **External PSU (optional)**

The MCP7850B can be powered from the optional mains PSU, MPS180. The printer should be switched off when changing from battery to external power and vice-versa however the batteries do not need to be removed when using the MPS180.

### 4.3 Low Power Mode

The MCP7850B incorporates a low-power mode which minimises the printer's power consumption after approximately ten minutes of inactivity. Further data transmitted to the printer will be ignored.

The printer can be re-activated by pressing the mode button. .

### 4.4 Paper Tear Procedure

When removing the printout from the printer, pull the printout toward the front of the printer and tear from one side to the other across the serrated edge.

## 5. PRINTER MAINTENANCE

### 5.1 Power On Self Test

The self test procedure will check most of the printer functions, except for the communications Interface, i.e: Printer mechanism, Control circuitry, Firmware version, Print quality. When the printer is off, press and hold the Mode button depressed for approximately 2 seconds. Release the button, the printer will power on and print a self-test report.

### 5.2 Status LED

The printer incorporates an LED indicator to report its condition. If there is a fault, the LED will flash in sequence. The fault can be identified by counting the number of flashes.

LED Indication	Condition	Solution
On	Printer On	-
Off	Printer Off or Asleep	-
Short flash every second	Fast Charging	-
* * *	Paper out	Fit new paper
** ** *	Thermal head too hot	Allow head to cool
*** ** *	Battery cut-out (no charge remaining)	Recharge battery
**** ** *	Battery low (approx. 20% charge remaining)	Recharge battery

### 5.3 Paper Out

The printer will automatically detect when the printer paper has run out, and report this using the Status LED. Replace the paper roll as described below.

### 5.4 Head Thermal Limit

After extensive printing the print head temperature may rise to an unusable level. The Status LED will report when this occurs, and printing will be suspended until the head temperature returns to normal levels.

### 5.5 How to open Paper Reservoir Lid

Pull the lever upwards and forward until the lid is released from its locked position. To avoid damage do not use excessive force.

### 5.6 Replacing Paper Roll

If the paper roll needs replacing, open the paper reservoir lid and remove the remaining paper. Reel off a few centimetres from a new roll of paper, hold approximately 5cm of paper outside the printer as the roll is placed into the reservoir. Close the lid by applying equal amounts of pressure on each side until the lid is in the locked position. Now tear the surplus paper away.

# 6. ACCESSORIES & CONSUMABLES

MCP7850B

## 6.1 Power Adaptors

	Use with	Part Number
Universal Power Supply	MCP7850B	MPS180

## 6.2 Mains Leads

Description	Use with	Part Number
Mains Lead with US style plug	MPS120, MPS160 and MPS180	MGK50
Mains Lead with UK style plug	MPS120, MPS160 and MPS180	MGK51
Mains Lead with Euro style plug	MPS120, MPS160 and MPS180	MGK52

## 6.3 Paper / Labels

Description	Part Number
Thermal Paper Roll, 25m	MM58
Continuous Thermal Label Roll, 6m	ML58/C48

## 6.4 Replacement Battery

Description	Use with	Part Number
Battery, AA, 1.5V, Alkaline (4 required)	MCP7830B	MJ11

## 6.5 Protective Boot

Description	Part Number
Protective Boot with magnetic inserts	MPB500

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INSTRUMENTS

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