Features

- Easy-Load paper feature
- HP compatible IR interface
- IrDA and RS232 interfaces
- Rechargeable NiMH, AA batteries
- Recharge from mains or 12V vehicle supply
- 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
- Low power mode
- Supports labels and dual ply paper
- Range of configurable options
- Windows driver for XP and 2000
- Low Profile paper lid, protective boot and belt clip available

Introduction

The MCP7830 is an ultra-compact, lightweight portable thermal printer with an "easy-load" paper feature.

Housed in a new innovative enclosure and designed for maximum flexibility, the printer is compatible with existing systems using HP infra-red communications whilst allowing many upgrades in terms of printing speed and functionality. IrDA and RS232 interfaces are also incorporated.

It is powered from Ni-MH batteries and has maintenance free operation, only available with thermal printers. The standard unit may be continuously trickle charged from a mains power adapter, and a fast charge facility is incorporated. UK, Euro, US and Universal versions of the power adapter are available.

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

The MCP7830 is one of a family of thermal printers designed and manufactured in the UK by Martel. 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. PRINTER SPECIFICATIONS

1.1 Overall Specification

Printing system	Direct thermal line head
Max Characters per line	48, 32, 24(default)
Character matrix	24x8, 24x12 or 24x16
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	10 lines per second (max)
Dimensions	85.5mm x 150mm x 55mm (45mm low profile printer)
Weight	400g approx (inc batteries and paper)
Internal power supply	4 x 1.2V NiMH 1600mAH, AA cells
Paper width	58mm
Paper capacity	45mm dia. 25m (standard printer)
	32mm dia, 10m (low profile printer)
Recommended paper	TF50-KS-E2D
Character set	ASCII
Country codes	USA, France, Germany, UK, Denmark I/II, Sweden, Italy, Spain & Japan
Interfaces	
Data format	(a) RS232C (8 Data, 1 Stop, No Parity).

Interfaces
Data format   (a) RS232C (8 Data, 1 Stop, No Parity).

        Connector   6-way RJ12 socket
        Baud rates   300, 600, 1200, 2400, 4800, 9600 & 19200
        Handshaking   Hardware (CTS line) or Software (XON/XOFF)
(b) HP IR (1 start, 8 data, 4 error detection).
(c) IrDA (V1.0 physical layer).

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 MCP7830 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.

1.3 Serial Interface

The RS232C standard is used, and the baud rate is selectable via Configuration Option 3 (see page 4).

The printer is fitted with a 6-way RJ12 socket (Fig 1 illustrates the pin numbers for the connector), the pin assignments and interface signals are defined below.

PIN	Signal	I/0	Definition
1	GND	N/A	Signal ground
2	TxD	0	Transmitted data to host
3	RxD	1	Received data from host
4	CTS	0	Clear to Send
5	n/c	N/A	No connection
6	n/c	N/A	No connection

Fig 1: Pin Numbers for Serial Interface Connector

1 —— 6
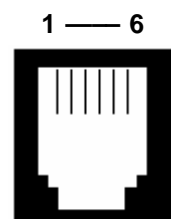
2. PRINTER CONFIGURATION

2.1 Configuration Options

The printer incorporates a number of configurable *options*, each of which has a number of *settings*. The default settings of the standard printer are detailed in the table below in bold. To change the setting of any option, follow the procedure below:

1. Ensure the printer is OFF.
2. Press and hold the Mode button. After about five seconds, the Status light will flash five times to show that the printer is in *configuration mode*. Release the Mode button.
3. Press the Mode button the same number of times as the *option* that you wish to change (for example to change baud rate, press the Mode button twice).
4. After a short delay, the Status light will flash the same number of times as the option that you have chosen. If you have made a mistake at this stage, simply wait: after a delay, the printer will power-on without changing any options.
5. To proceed with configuration, press the Mode button the same number of times as the *setting* that you wish to make (for example, to set the baud rate to 19200, press the Mode button once).
6. After a short delay, the Status light will flash the same number of times as the setting that you have made.
7. After a further delay, the printer will power-on with the new setting.

Option Number	Option Description	Setting Number	Setting
1	**IrDA Protocol**	**1**	**8, No parity**
		2	8, Odd parity
		3	8, Even parity
		4	7, Odd, parity
		5	7, Even Parity
		6	HPIR Mode
		7	IrMP Mode
2	**IrDA Baud Rate**	1	19200 baud
		2	**9600 baud**
		3	4800 baud
		4	2400 baud
		5	1200 baud
		6	600 baud
		7	300 baud
3	**RS232 Protocol**	**1**	**8, No parity**
		2	8, Odd parity
		3	8, Even parity
		4	7, Odd, parity
		5	7, Even Parity
4	**RS232 Baud Rate**	1	19200 baud
		2	**9600 baud**
		3	4800 baud
		4	2400 baud
		5	1200 baud
		6	600 baud
		7	300 baud
5	**RS232 Flow Control**	**1**	**None**
		2	Software
		3	Hardware
6	**Font**	**1**	**Arial 16, 24 CPL**
		2	Arial 12,32 CPL
		3	Arial 8, 48 CPL
		4	Roman 8, 24 CPL
		5	Ecma 94, 24 CPL
7	**Character Format**	**1**	**Normal**
		2	Double Width
		3	Double Height
		4	Double Width and Height
8	**Print Density**	**1**	**Lowest**
		2	
		3	
		4	Highest
9	**Printing Current**	**1**	**Highest**
		2	
		3	
		4	Lowest
10	**Print Format**	**1**	**Standard paper, normal printing**
		2	Standard paper, upside down printing
		3	Labels, normal printing
		4	Labels, upside down printing
11	**Sleep /Wake-up**	**1**	**Never Sleep**
		2	Sleep after 1 minute
		3	Sleep after 2 minutes
		4	Sleep after 5 minutes
		5	Sleep after 10 minutes
		6	Off after 1 minute
		7	Off after 2 minutes
		8	Off after 5 minutes
		9	Off after 10 minutes

2.2 Software Selectable Functions

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

2.3 Control Codes and Escape Sequences (HP IR Mode)

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 ! *n*	27 0 33 *n*	1B 00 21 *n*
Set barcode start position	ESC NULL $ *n1 n2*	27 0 36 *n1 n2*	1B 00 24 *n1 n2*
Set bit image (8 pin single density)	ESC NULL * 0 *n1 n2 [d]*	27 0 42 0 *n1 n2 [d]*	1B 00 2A 00 *n1 n2 [d]*
Set bit image (8 pin double density)	ESC NULL * 1 *n1 n2 [d]*	27 0 42 1 *n1 n2 [d]*	1B 00 2A 01 *n1 n2 [d]*
Set bit image (24 pin single density)	ESC NULL * 32 *n1 n2 [d]*	27 0 42 32 *n1 n2 [d]*	1B 00 2A 20 *n1 n2 [d]*
Set bit image (24 pin double density)	ESC NULL * 33 *n1 n2 [d]*	27 0 42 33 *n1 n2 [d]*	1B 00 2A 21 *n1 n2 [d]*
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 *n*	27 0 67 *n*	1B 00 43 *n*
Set horizontal tabs	ESC NULL D *n*	27 0 68 *n*	1B 00 44 *n*
Set bit image	ESC NULL K *n1 n2 [d]*	27 0 75 *n1 n2 [d]*	1B 00 4B *n1 n2 [d]*
Country select	ESC NULL R *n*	27 0 82 *n*	1B 00 52 *n*
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 *n1 [d1] … n24 [d24]*	27 0 90 *n1 [d1] … n24 [d24]*	1B 00 5A *n1 [d1] … n24 [d24]*
Print & feed paper	ESC NULL d *n*	27 0 100 *n*	1B 00 64 *n*
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 *n [d]*	27 *n [d]*	1B *n [d]*
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 *n*	29 104 *n*	1D 68 *n*
Print UPC-A barcode	GS k 0 *[d]* NULL	29 107 0 *[d]* 0	1D 6B 00 *[d]* 00
Print UCP-E barcode	GS k 1 *[d]* NULL	29 107 1 *[d]* 0	1D 6B 01 *[d]* 00
Print EAN13 barcode	GS k 2 *[d]* NULL	29 107 2 *[d]* 0	1D 6B 02 *[d]* 00
Print EAN8 barcode	GS k 3 *[d]* NULL	29 107 3 *[d]* 0	1D 6B 02 *[d]* 00
Print Code 39 barcode	GS k 4 *[d]* NULL	29 107 4 *[d]* 0	1D 6B 04 *[d]* 00
Print 2 of 5 barcode	GS k 5 *[d]* NULL	29 107 5 *[d]* 0	1D 6B 05 *[d]* 00
Print Codabar barcode	GS k 6 *[d]* NULL	29 107 6 *[d]* 0	1D 6B 06 *[d]* 00
Print CODE128 barcode	GS k 7 *n [d]*	29 107 7 *n [d]*	1D 6B 07 *n [d]*
Set barcode magnification (2 $\leq$ n $\leq$ 4)	GS w *n*	29 119 *n*	1D 77 *n*

2.4 Control Codes and Escape Sequences (IrDA/RS232 Mode)

Function	Code	Decimal	Hex
Horizontal tab	HT	9	09
Line feed	LF	10	0A
Form feed	FF	12	0C
Carriage return	CR	13	0D
Double width on	SO	14	0E
Double width off	SI	15	0F
Cancel	CAN	24	18
Set print mode	ESC ! n	27 33 n	1B 21 n
Set barcode start position	ESC \$ $n1$ $n2$	27 36 $n1$ $n2$	1B 24 $n1$ $n2$
Set bit image (8 pin single density)	ESC * 0 $n1$ $n2$ [d]	27 42 0 $n1$ $n2$ [d]	1B 2A 00 $n1$ $n2$ [d]
Set bit image (8 pin double density)	ESC * 1 $n1$ $n2$ [d]	27 42 1 $n1$ $n2$ [d]	1B 2A 01 $n1$ $n2$ [d]
Set bit image (24 pin single density)	ESC * 32 $n1$ $n2$ [d]	27 42 32 $n1$ $n2$ [d]	1B 2A 20 $n1$ $n2$ [d]
Set bit image (24 pin double density)	ESC * 33 $n1$ $n2$ [d]	27 42 33 $n1$ $n2$ [d]	1B 2A 21 $n1$ $n2$ [d]
Underline on	ESC – 1	27 45 1	1B 2D 01
Underline off	ESC – 0	27 45 0	1B 2D 00
Reset	ESC @	27 64	1B 40
Set page length	ESC C n	27 67 n	1B 43 n
Set horizontal tabs	ESC D n	27 68 n	1B 44 n
Bold on	ESC G	27 71	1B 47
Bold off	ESC H	27 72	1B 48
Move n dot lines forwards ($1 \le n \le 23$)	ESC J n	27 74 n	1B 4A n
Set bit image	ESC K $n1$ $n2$ [d]	27 75 $n1$ $n2$ [d]	1B 4B $n1$ $n2$ [d]
Country select	ESC R n	27 82 n	1B 52 n
Double width on	ESC W 1	27 87 1	1B 57 01
Double width off	ESC W 0	27 87 0	1B 57 00
Compressed bit image graphics	ESC Z $n1$ [d1] ... $n24$ [d24]	27 90 $n1$ [d1] ... $n24$ [d24]	1B 5A $n1$ [d1] ... $n24$ [d24]
Print & feed paper	ESC d n	27 100 n	1B 64 n
Label advance	ESC f	27 102	1B 66
Reversed on	ESC i 1	27 105 1	1B 69 01
Reversed off	ESC i 0	27 105 0	1B 69 00
Move n dot lines backwards ($1 \le n \le 23$)	ESC j n	27 106 n	1B 6A n
Double height on	ESC w 1	27 119 1	1B 77 01
Double height off	ESC w 0	27 119 0	1B 77 00
Inverse on	ESC { 1	27 123 1	1B 7B 01
Inverse off	ESC { 0	27 123 0	1B 7B 00
Set barcode height ($1 \le n \le 255$)	GS h n	29 104 n	1D 68 n
Print UPC-A barcode	GS k 0 [d] NULL	29 107 0 [d] 0	1D 6B 00 [d] 00
Print UCP-E barcode	GS k 1 [d] NULL	29 107 1 [d] 0	1D 6B 01 [d] 00
Print EAN13 barcode	GS k 2 [d] NULL	29 107 2 [d] 0	1D 6B 02 [d] 00
Print EAN8 barcode	GS k 3 [d] NULL	29 107 3 [d] 0	1D 6B 02 [d] 00
Print Code 39 barcode	GS k 4 [d] NULL	29 107 4 [d] 0	1D 6B 04 [d] 00
Print 2 of 5 barcode	GS k 5 [d] NULL	29 107 5 [d] 0	1D 6B 05 [d] 00
Print Codabar barcode	GS k 6 [d] NULL	29 107 6 [d] 0	1D 6B 06 [d] 00
Print CODE128 barcode	GS k 7 n [d]	29 107 7 n [d]	1D 6B 07 n [d]
Set barcode magnification ($2 \le n \le 4$)	GS w n	29 119 n	1D 77 n

2.5 International Character Sets

(HP IR Mode)

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

(IrDA/RS232 Mode)

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

2.6 Print Mode (ESC!)

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

2.7 Character Font

	Bit 1	Bit 0
24 characters per line	0	0
48 characters per line	0	1
32 characters per line	1	0
Undefined	1	1

2.8 Print Density

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

3. PRINTER OPERATION

3.1 Battery Charging

When the printer is first delivered there may be little or no charge in the printer's batteries. The printer should be *turned off*, connected to the MPS adapter and allowed to charge for 16 hours before it is used for the first time.

It is recommended to connect the printer to the MPS power adapter and recharge the batteries as soon as the Status LED indicates low battery.

It is permissible to leave the printer permanently connected to the MPS power adapter to trickle charge the batteries. If the printer is asleep it will wake up when the adapter is connected and will not sleep while it is connected. To fast charge the batteries, the printer must be off.

If the batteries in the printer become exhausted, printing will become faint, erratic or not possible at all. *Turn off* the printer and recharge the batteries for at least 15 minutes before attempting further printing. The MPS adapter cannot supply the full power requirements for the printer during printing, so the batteries must be partially charged before printing is possible.

The printer should only be used in conjunction with an MPS101(UK), MPS102(EURO), MPS103(US) or MPS160(UNI) power adapter. Users wishing to provide their own power source must contact Martel. *The use of an unapproved source may void the printer's warranty.*

3.2 Power On Procedure

Check the batteries are sufficiently charged. 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.

3.3 Low Power Mode

The MCP7830 incorporates two low power modes; configured via option 11, page 3, however the printer will not enter low power mode if the charger is attached.

In **Sleep mode** the printer enters low power mode after a preset period of inactivity. Once asleep, the printer can be woken by sending a NULL character 1 sec before data to be printed, OR the printer can be woken by pressing the Mode button.

In **Auto off mode** the printer cannot be woken by data transfer and must be powered-on manually.

3.4 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.

4. PRINTER MAINTENANCE

4.1 Power On Self Test

The self test procedure will check most of the printer functions, except for the serial 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.

4.2 Status LED

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

4.3 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.

4.4 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.

4.5 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.

4.6 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.

5. ACCESSORIES & CONSUMABLES

5.1 Power Adaptors

	Part Number
Adaptor with UK plug	MPS101
Adaptor with Euro plug	MPS102
Adaptor with US plug	MPS103
Universal Power Adaptor	MPS160

5.2 Mains Leads for MPS160 Universal Power Adaptor

Description	Part Number
Mains Lead with US style plug	MGK50
Mains Lead with UK style plug	MGK51
Mains Lead with Euro style plug	MGK52

5.3 Paper / Labels

Description	Part Number
Thermal Paper Roll, 25m	MM58
Thermal Paper Roll, 10m	MM58/10
Thermal Label Roll, label size 54mm x 70mm, 75 per roll	ML58/75
Continuous Thermal Label Roll, 6m	ML58/C48

5.4 Data Cables

Description	Part Number
Serial Cable, RJ12/D9	MGK20

5.5 Replacement Battery

Description	Part Number
Battery, AA 1.5V, Ni-MH (4 required)	MJ10

5.6 Protective Boot

Description	Part Number
Protective Boot with magnetic inserts	MPB500

Low profile paper lid (10m paper roll capacity), belt clip and threaded insert options available on request.