PRODUCT INFORMATION

MARTEL INSTRUMENTS

MCP7810X THERMAL PRINTER

Applications Datasheet

Features

- Easy-Load paper feature
- RS232 Interface
- External Power
- 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
- Range of configurable options
- Windows driver for XP and 2000
- Low Profile paper lid, protective boot and belt clip available
- Windows drivers for XP and 2000

Introduction

The MCP7810X is an ultra-compact, lightweight portable printer with an “easy-load” paper feature. Housed in a new innovative enclosure this printer has an RS232 serial interface via a 6-way RJ12 socket.

Designed for maximum versatility, the MCP7810X is compatible with existing systems whilst allowing many upgrades in terms of printing speed and functionality.

It is powered from an external 5Vdc supply and has maintenance free operation, only available with thermal printers. .

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

The MCP7810X 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.

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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	285g approx (inc paper roll)
External power supply	5VDC $^{+}$/-_0.5V
Paper width	58mm
Paper capacity	45mm dia, 25m (std 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
Interface	
Data format	RS232C
Connector	6-way RJ12 socket
Baud rates	300, 600, 1200, 2400, 4800, 9600 & 19200
Handshaking	Hardware (CTS line) or Software (XON/XOFF)
Buffer size	5 Kbytes
Environmental Conditions	
Operating range	0^{o}C to +50^{o}C
Storage range	-20^{o}C to +60^{o}C
Charging range	+10^{o}C to +45^{o}C
MTBF	Approx. 10 Million lines (20^{o}C, print ratio = 25%)
Power consumption	
Sleep	<1mA
Standby	30mA
Running	Min 0.4A Ave 1.3A Max 2.8A

Note: The peak current can reach a maximum of 4A.

1.2 Serial Interface

The RS232C standard is used, and the baud rate is selectable via Configuration Option 2 (see page 3).

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

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 (default in bold)	Setting (default in bold)
1	**RS232 Protocol**	**1**	**8, No parity**
		2	8, Odd parity
		3	8, Even parity
		4	7, Odd, parity
		5	7, Even Parity
2	**RS232 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 Flow Control**	**1**	**None**
		2	Software
		3	Hardware
4	**Font**	**1**	**Arial 16, 24 CPL**
		2	Arial 12, 32 CPL
		3	Arial 8, 48 CPL
5	**Character Format**	**1**	**Normal**
		2	Double Width
		3	Double Height
		4	Double Width and Height
6	**Print Density**	**1**	**Lowest**
		2	
		3	
		4	Highest
7	**Printer Current**	**1**	**Highest**
		2	
		3	
		4	Lowest
8	**Print Format**	**1**	**Standard paper, normal printing**
		2	Standard paper, upside down printing
		3	Labels, normal printing
		4	Labels, upside down printing
9	**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, 1 min
		7	Off, 2 min
		8	Off, 5 min
		9	Off, 10 min

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

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 ($1 \leq n \leq 23$)	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 ($1 \leq n \leq 23$)	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 ($1 \leq n \leq 255$)	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 International Character Sets

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

2.5 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

2.6 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

2.7 Print Density

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

Maximum Current (ESC I n)

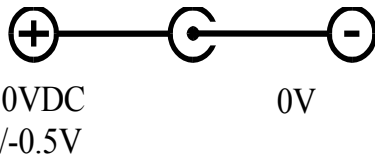
This sequence sets the maximum current of the printer. This can be used to reduce the peak current used by externally powered printers so that the power supply demands are reduced. *n* must be between 0 (the highest current, default) and 3 (lowest).

3. PRINTER OPERATION

3.1 Power Supply

The printer should only be used in conjunction with an MPS120 Universal Power Supply. Users wishing to provide their own power source must contact Martel. ***The use of an unapproved source may void the printer's warranty.***

Power is supplied to the printer from a 5VDC external supply via a 2.1/5.5mm connector (+VE OUTER)



3.2 Power On Procedure

Ensure the power supply is correctly fitted and operational. 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 printer incorporates a low-power mode which minimises the printer's power consumption after a period of inactivity. If the host instrument transmits a NULL chracter one second before any report, the printer will wake-up in time to print the report.

The printer can be re-activated by pressing the Mode button. Printer mode settings and any data stored in the buffer will not be lost during this procedure. Low power mode will not be activated while the mains adapter is used.

Low power mode operation is controlled by Configuration Option 9 (see page 3).

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

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	-
✷ ✷ ✷	Paper out	Fit new paper
✷✷ ✷✷ ✷✷	Thermal head too hot	Allow head to cool
✷✷✷ ✷✷✷ ✷✷✷	Supply voltage low	Check power supply

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 Supply

	Part Number
Universal Power Supply	MPS120

5.2 Mains Leads for MPS120 Universal Power Supply

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
Continuous Thermal Label Roll, 6m	ML58/C48

5.4 Data Cables

Description	Part Number
Serial Cable, RJ12/D9	MGK20

5.5 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.

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MCP7810X/AD/B