



# TAG Heuer

PROFESSIONAL TIMING

## MARTEL THERMAL PRINTER HL 200

### User's Manual

Version 2008

#### Features

- High speed, high resolution printing
- Quiet, non-impact system
- Maintenance-free
- Compact and light-weight
- High Reliability
- Versatile for use with text or graphics
- 12, 16, 24, 32 or 48 characters per line
- Barcode capability
- Auto wake-up facility
- Supports labels and dual ply paper

The MCP9810-112 is a compact and lightweight portable printer with an RS232 serial interface via a 9-way D-type connector.

It is powered from internal NiMH batteries and has maintenance free operation, only available with thermal printers. The standard unit is intended to be trickle charged from a mains power adapter and fast charge option can be supplied. UK, Euro and US versions of the power adapter are available.

Designed for maximum versatility, the MCP9810-112 is capable of many different modes of operation with numerous character sets.

Operation is controlled by a combination of switch settings and external software Commands.

The MCP9810-112 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

#### Specification

Printing System	Thermal line head system
Max characters per line	48
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	10 lines per second
Dimensions	135mm x 130mm x 64mm
Weight Approx.	425 grammes
Internal power supply	4.8V (600mAH, NiMH battery pack)
Paper width	58mm
Character set	UK/United States (437)
Country codes	USA, France, Germany, UK, Denmark I/II, Sweden, Italy, Spain & Japan

#### Interface

Input data format	RS232C (1 Start, 8 Data, 1 Stop, No Parity)
Connector	9-way D-type socket
Baud rates	1200, 2400, 4800 & 9600
Handshaking	Hardware (CTS line) or Software (XON/XOFF)
Buffer size	5 KBytes

#### Environmental Conditions

Operating range	-20oC to +50oC
Storage range	-20oC to +60oC
Charging range	+10oC to +45oC
MTBF	Approx. 10 Million lines (20oC, print ratio = 25%)

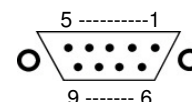
#### Serial Interface

The RS232 standard is used, and the baud rate is selectable from 1200, 2400, 4800 and 9600 bits per second via the DIP switches. 110, 300, 600 and 19200 baud rates can be made available as an option.

The printer is fitted with a 9-way D-type socket (Fig 1 illustrates the pin numbers for the connector), the pin assignments and interface signals are defined below.

PIN	Signal	I/O	Definition
1	n/c	N/A	No connection
2	TxD	0	Transmitted data to host
3	RxD	I	Received data from host
4	n/c	N/A	No connection
5	GND	N/A	Signal Ground
6	n/c	N/A	No connection
7	n/c	N/A	No connection
8	CTS	0	Clear to send
9	n/c	N/A	No connection

Fig 1: Pin Numbers for Serial Interface Connector



## Printer Mechanism

The printer mechanism comprises a 384 element, thin film head and stepper motor driven transport. Battery voltage and head temperature compensation is utilised to provide constant print quality across the range of operating conditions.

**Paper out:** The printer will automatically detect when the printer paper has run out. The Status indicator will flash (0.5 sec on 0.5 sec off) to denote that the paper has run out. Use the paper feed button to feed through the last few centimetres of paper and fit a new roll as described on page 4.

**Head thermal limit:** After extensive printing the print head temperature may rise to an unusable level. If this occurs the Status indicator will flash (0.25 sec on 0.5 sec off) and printing will be suspended until the head temperature returns to normal levels.

## Power Supply

Power is supplied to the printer from a 4.8V internal NiMH battery pack or from the external mains adapter. The mains adapter will trickle charge the batteries when the printer is turned on or off (charge time approx. 16 hours). The Status indicator will light to show that the battery pack is nearly exhausted.

### Power consumption

Sleep		130µA
Standby		40mA
Running –	Min	0.4A
	Ave	1.3A
	Max	2.8A

### Battery Pack

Capacity	600mAH
Charge current	50mA
Weight	100g
Battery life Approx	10000 (30m) of continuous printing

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

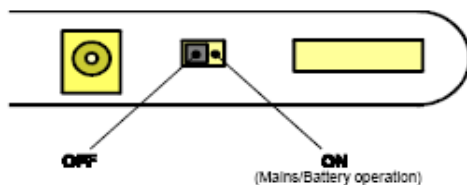
The MCP9810-112 should only be used in conjunction with an MPS101(UK), MPS102(EURO) or MPS103(US) power adapter. Users wishing to provide their own power source must contact Martel.

**The use of an unapproved source may void the printer's warranty.**

## Power On Procedure

Check the batteries are sufficiently charged or that 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. Switch on the printer using the power switch located on the left hand side of the printer. The Power indicator will light and the printer mechanism will reset.

### Power Switch



Trickle charge will take place when the Printer is ON or OFF.

### Power On Self Test

The self test procedure is initiated by turning on the printer with the Paper Feed button pressed. Release the Paper Feed button and the self test procedure will start. This will check most of the printer functions, except for the serial interface, i.e.

- Printer mechanism
- Control circuitry
- Firmware version
- DIP switch settings
- Print Quality

## Battery Charging

Connect the MCP9810-112 printer to the MPS power adapter and recharge the batteries as soon as the Status LED lights continuously during printing.

If the batteries in the MCP9810-112 become exhausted, printing will become faint, erratic or not possible at all.

**Turn off** the MCP9810-112 and recharge the batteries for at least 1 hour before attempting further printing. The MPS adapter cannot supply the full power requirements for the MCP9810-112 during printing, so the batteries must be partially charged before printing is possible.

When the MCP9810-112 is first delivered there may be little or no charge in the printer's batteries. The MCP9810-112 should be **turned off**, connected to the MPS adapter and allowed to charge for 16 hours before it is used for the first time.

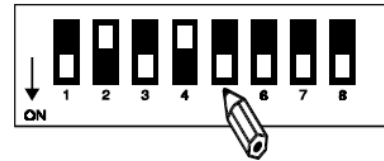
It is permissible to leave the MCP9810-112 permanently connected to the MPS power adapter, constantly charging the printer's batteries between printouts. Alternatively the printer can be recharged from a 9-17VDC power supply, ensure -ve centre pin connection.

## Hardware Selectable Functions

These are set using the DIP switches and are only read with the printer when the printer is turned on.

SW 1: Print format	<b>Default settings</b>	
SW 2: Handshake protocol	Print format	24cpl
SW 3: Baud rate	Handshake protocol	Hardware
SW 4: Baud rate	Baud rate	9600
SW 5: Character height	Character height	Normal
SW 6: Character width	Character width	Normal
SW 7: Line spacing	Extra blank lines	Inserted
SW 8: Auto wake up	Auto wake up	Disabled

**Fig 2: DIP switch default settings**



See below for a detailed explanation of the DIP switch settings (Fig 2: illustrates the default DIP switch settings). To change the DIP switch settings, (make sure the printer is off before making any changes), use a pencil or similar thin pointed object.

	SW 1	SW 2	SW 3	SW 4	SW 5	SW 6	SW 7	SW 8
24 Character per line	ON							
48 Character per line	OFF							
Software handshake		ON						
Hardware handshake		OFF						
1200 Bauds			OFF	OFF				
2400 Bauds			ON	ON				
4800 Bauds			OFF	ON				
9600 Bauds			ON	OFF				
Normal height					ON			
Double height					OFF			
Normal width						ON		
Double width						OFF		
Extra blank lines inserted							ON	
No extra blank lines							OFF	
Auto wake up disabled								ON
Auto wake up enabled								OFF

## Paper Selection

The setting of DIP switch 7 selects the type of paper being used. If the MCP9810-112 is loaded with label stock, SW7 must be placed in the Up (OFF) position for correct operation to take place.

The 'ESC f' sequence, which advances to the next label, can only be used if SW7 is Up. Since dual ply paper is less sensitive than normal thermal paper, the 'Esc !' sequence should be used to increase the print density to 4 when printing on dual ply (see **Print Density** for details).

## Auto Wake Up

The MCP9810-112 incorporates an auto wake up facility which minimises the printer's power consumption. If auto wake up is enabled, the printer will turn itself off after approximately five minutes of inactivity on the receive data line. The printer will then wake up only when activity is detected on the receive line.

To wake the printer up, the user should ignore the status of the CTS line and send a NUL character (00H) to the printer. The user should then wait at least 0.7 seconds for the printer to initialise before sending further data. Once the printer has initialised, handshaking should be resumed.

Since the NUL character is non-printable, this procedure may be followed even if the printer is awake and will not cause unwanted characters to be printed.

To enable the auto wake up facility, place DIP switch 8 in the UP position. If the switch is in the DOWN position the printer will remain operational until turned off via the power switch.

If auto wake up is enabled, the printer may not turn on when power is applied via the power switch. Sending a NUL character will cause the printer to power up normally.

## Software Selectable Functions

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

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

# Control Codes and Escape Sequences

Function	Code	Decimal	Hex	Function	Code	Decimal	Hex
Horizontal tab	HT	9	09	Country select	ESC R n	27 82 n	1B 52 n
Line feed	LF	10	0A	Double width on	ESC W 1	27 87 1	1B 57 01
Form feed	FF	12	0C	Double width off	ESC W 0	27 87 0	1B 57 00
Carriage return	CR	13	0D	Compress bit image graphics	ESC n[d1]... n24[d24]	27 90 n1 ... n24	1B 5A n1 ... n24
Double width on	SO	14	0E	Print & feed paper	ESC d n	27 100 n	1B 64 n
Double width off	SI	15	0F	Label advance	ESC f	27 102	1B 66
Cancel	CAN	24	18	Reversed on	ESC i 1	27 105 1	1B 69 01
Set print mode	ESC l n	27 33 n	1B 21 n	Reversed off	ESC i 0	27 105 0	1B 69 00
Set barcode start position	ESC \$ n1 n2	27 36 n1 n2	1B 24 n1 n2	Double height on	ESC w 1	27 119 1	1B 77 01
Set bit image (8 pin single density)	ESC * 0 n1 n2 [d]	27 42 0 n1 n2 [d]	1B 2A 00 n1 n2 [d]	Double height off	ESC w 0	27 119 0	1B 77 00
Set bit image (8 pin single density)	ESC * 1 n1 n2 [d]	27 42 1 n1 n2 [d]	1B 2A n1 n2 [d]	Inverse on	ESC { 1	27 123 1	2B 7B 00
Set bit image (24 pin single density)	ESC * 32 n1 n2 [d]	27 42 32 n1 n2 [d]	1B 1A 20 n1 n2 [d]	Inverse off	ESC { 0	27 123 0	1B 7B 00
Set bit image (24 pin single density)	ESC + 33 n1 n2 [d]	27 42 33 n1 n2 [d]	1B 1A 21 n1 n2 [d]	Set barcode height (1<n<225)	GS h n	29 104 n	1D 68 n
Underline on	ESC - 1	27 45 1	1B 2D 01	Print UPC-A barcode	GS k 0 [d] NULL	27 107 0 [d] 0	1D 6B 00 [D] 00
Underline off	ESC - 0	27 45 0	1B 2D 00	Print UCP-E barcode	GS k 1 [d] NULL	27 107 1 [d] 0	1D 6B 01 [D] 00
Reset	ESC @	27 64	1B 40	Print EAN13 barcode	GS k 2 [d] NULL	27 107 2 [d] 0	1D 6B 02 [D] 00
Set page length	ESC C n	27 67 n	1B 43 n	Print EAN8 barcode	GS k 3 [d] NULL	27 107 3 [d] 0	1D 6B 03 [D] 00
Set horizontal length	ESC D n	27 68 n	1B 44 n	Print Code 39 barcode	GS k 4 [d] NULL	27 107 4 [d] 0	1D 6B 04 [D] 00
Bold on	ESC G	27 71	1B 47	Print 2 of 5 barcode	GS k 5 [d] NULL	27 107 5 [d] 0	1D 6B 05 [D] 00
Bold off	ESC H	27 72	1B 48	Print codabar barcode	GS k 6 [d] NULL	27 107 6 [d] 0	1D 6B 06 [D] 00
Set bit image	ESC K n1 n2 [d]	27 75 n1 n2 [d]	1B 4B n1 n2 [d]	Print CODE 128 barcode	GS k 7 n [d]	27 107 7 n [d]	1D 6B 07 [D] 00
				Set barcode magnification	GS w n	29 119 n	1D 77 n
				2<n<4			

## Print Mode (ESC !)

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

Print Density	Bit 3	Bit 2
Light		
1 (Default)	0	0
2	0	1
3 (Label Default)	1	0
Dark	1	1

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

## Replacing Paper Roll

If the paper roll needs replacing, open the paper cup lid (squeeze cup lid as shown in Fig 3) and remove the remaining paper using the Paper Feed button, **do not pull paper through the printer mechanism**. Reel off a few centimetres from a new roll of paper and check that the end has a clean straight edge (see Fig 4). Slide the leading edge of the paper through the paper entry slot, with the leading edge of the paper feeding forwards from the bottom of the roll, until you feel resistance. Press the paper feed button and feed the paper through the printer mechanism (see Fig 5). Keep the paper feed button depressed until enough paper is fed through the printer mechanism to pass through the paper exit slot. Sit the new paper roll in the paper cup and close the lid.

Should the paper become creased or out of line when feeding in a new roll, cut the end off the paper roll, feed out the creased paper using the Paper Feed button, and reload ensuring the paper has a clean straight edge.

Fig 3: Squeeze cup lid to gain access to paper roll

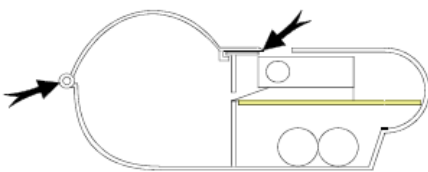


Fig 4: Cut the end off the paper roll so that the end has a clean straight edge

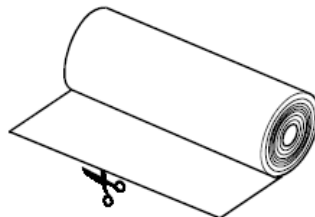
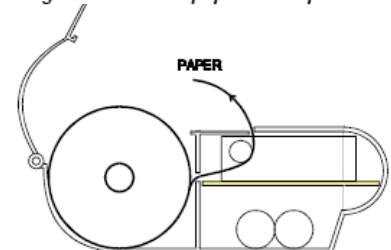


Fig 5: Position of paper roll in printer



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