Instruction Manual

MCP8810-118/-S

Basic/Statistical Printer

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1. PRINTER CONFIGURATION

1.1. 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.

After a further delay, the printer will power-on with the new setting.

2. Configuration Options

The table below shows configuration options that are available with the MCP8810-118 printer. The default values are in bold text.

Option	Setting
1	<u>RS232 Baud Rate</u> 1 = 19200 2 = 9600 3 = 4800 **4 = 2400** 5 = 1200 6 = 600 7 = 300

Option	Setting
2	Data bits / Parity 1 = 8, no parity 2 = 8, odd parity 3 = 8, even parity 4 = 7, odd parity **5 = 7, even parity**
3	Country **1 = UK** 2 = Germany 3 = France 4 = Spain 5 = Italy
4	Print Format **1 = Normal** 2 = upside down print
5	Sleep / Wake-up 1 = None 2 = Off, 1 min 3 = Off, 2 min **4 = Off, 5 min** 5 = Off, 10 min
6	Emulation **1 = A&D** 2 = Standard
7	"Approved" Mode **1 = Off** 2 = On
8	Date and Time Stamping **1 = None** 2 = Date Only 3 = Time Only 4 = Date and Time
9	Date Format **1 = DD/MM/YY** 2 = MM/DD/YY

	3 = YY/MM/DD

3. Self-test Report

The current settings of configuration options can be printed out as a self-test report.

4. A&D Custom Settings

4.1. Country

The basic function of the MCP8810-118 is to reformat weight readings transmitted by the balance into text that can be easily understood by the user. The printed text includes some words that vary from country to country. This option is used to identify which language these words should be printed in.

4.2. Emulation

The printer will operate in two basic modes:
In A&D mode, the printer will parse received data for weight readings encoded in A&D data format. When a reading is received, it will be printed in a format that is easy to understand.
In standard mode, the printer will print the data as it is received with no alteration.

4.3. Approved Mode

In this mode, numeric values are be printed with certain digits bracketed.

4.4. Time and Date Stamping

This option is used to configure how the date and time are printed with each weight reading received. Precise rules showing the date and time stamping formats are given below.

4.5. Date Format

This option is used to determine how the date is printed. All dates printed will follow the format selected.

5. A&D Mode Operation

In this mode, the printer will parse the input data for messages which it recognises, assign a “type” code to the message, and extract certain data fields from the message for use in printed output and statistical functions (when enabled).
All messages are assumed to be 24 characters or less, and are terminated with an LF.

The recognised messages are tabulated below:

Message	Type	Data extracted
ST,s00010.15uuu<CR><LF>	1	Sign, weight and units
QT,s00000152uuu<CR><LF>	2	Sign, quantity and units
ST,NT,s0010.15uuu<CR><LF>	3	Sign, weight and units
ST,GS,s0010.15uuu<CR><LF>	4	Sign, weight and units
ST,TR,s0010.15uuu<CR><LF>	5	Sign, weight and units
ST,T*,s0010.15uuu<CR><LF>	6	Sign, weight and units
UW,s00010.15uuu<CR><LF>	7	Sign, weight and units
AQ,s00000152uuu<CR><LF>	8	Sign, count and units
AN,00000011<CR><LF>	9	Number
TR,s00010.15uuu<CR><LF>	10	Sign, weight and units
<ESC>D<CR><LF>	11	*None*
<ESC>T<CR><LF>	12	*None*

s = sign
* = space
u = unit character
0..9 and '.' = numeric data

7a Decimal Point
For numeric values with a decimal point, the point may be omitted, in which case the field will have an additional significant digit to keep the field length the same.

6. Printer Output

In A&D mode, the printer prints a line of text each time a message is successfully parsed. Blank lines are not printed before or after the line unless date/time stamping is enabled. The format of reports with date/time stamping is shown in the appropriate section of this document.
Messages which are not recognised are printed unmodified.
The following table shows how the data fields are formatted for each language and message type.

Language	Type	Output
English	1	Weight******zzzs10.15uuu
	2	Count*******zzzzzs152uuu
	3	Net*********zzzs10,15uuu
	4	Gross*******zzzs10,15uuu
	5	Tare********zzzs10,15uuu
	6	Tare********zzzs10,15uuu
	7	Unit*Weight*zzzs10,15uuu
	8	Total*Count*zzzzzs152uuu
	9	Number*******zzzzzz11***
	10	Tare********zzzs10,15uuu
	11	Date************dd/mm/yy
	12	Time************hh:mm:ss
German	1	Gewicht*****zzzs10,15uuu
	2	Zählung*****zzzzzs152uuu
	3	Netto*******zzzs10,15uuu
	4	Brutto******zzzs10,15uuu
	5	Tara********zzzs10,15uuu
	6	Tara********zzzs10,15uuu
	7	Stueckgew.**zzzs10,15uuu
	8	Gesamt*Zahl*zzzzzs152uuu
	9	Ges.*Proben**zzzzzz11***
	10	Tara********zzzs10,15uuu
	11	Datum***********dd/mm/yy
	12	Zeit************hh:mm:ss

Language	Type	Output
French	1	Poids*******zzzs10,15uuu
	2	Compte******zzzzzs152uuu
	3	Net*********zzzs10,15uuu
	4	Brut********zzzs10,15uuu
	5	Tare********zzzs10,15uuu
	6	Tare********zzzs10,15uuu
	7	Poids*Unit.*zzzs10,15uuu
	8	Cumul*******zzzzzs152uuu
	9	Nombre*******zzzzzz11***
	10	Tare********zzzs10,15uuu
	11	Date************dd/mm/yy
	12	Temps***********hh:mm:ss
Spanish	1	Peso********zzzs10,15uuu
	2	Contaje*****zzzzzs152uuu
	3	Neto********zzzs10,15uuu
	4	Bruto*******zzzs10,15uuu
	5	Tara********zzzs10,15uuu
	6	Tara********zzzs10,15uuu
	7	Peso*Unidad*zzzs10,15uuu
	8	Total*******zzzzzs152uuu
	9	Numero*******zzzzzz11***
	10	Tara********zzzs10,15uuu
	11	Fecha***********dd/mm/yy
	12	Hora************hh:mm:ss

Language	Type	Output
Italian	1	Peso********zzzs10,15uuu
	2	Conteggio***zzzzzs152uuu
	3	Netto*******zzzs10,15uuu
	4	Lordo*******zzzs10,15uuu
	5	Tara********zzzs10,15uuu
	6	Tara********zzzs10,15uuu
	7	Peso*Unitá**zzzs10,15uuu
	8	Totale******zzzzzs152uuu
	9	Numero*******zzzzzz11***
	10	Tara********zzzs10,15uuu
	11	Data************dd/mm/yy
	12	Ora*************hh:mm:ss

S = sign
* = space
z = suppress leading zero
u = unit character
0..9 and '.' = numeric data

Note that the ordering of day, month and year for message type 11 is subject to definition by the "Date Format" configuration setting.

6a Percentages
In cases where there is a units field, if either 'N' only, 'DS', or the '%' character appears anywhere in the units field, the value name (e.g "Weight") is not printed.

6.1. Approved Mode Output

In approved mode, certain digits of the weight value (for message types 1, 3, 4, 5 and 6 only) are surrounded by square brackets. Room for the brackets is made by removing spaces before the start of the numeric field of the text line.
For values with 4 or less decimal places the last digit only is bracketed.
For values with 4 or more decimal places all digits after (but not including) the third decimal place are bracketed together.

Examples (English):

Balance transmits	: ST,+00010.15g**<CR><LF>
Normal print	: |Weight 10.15g |
Approved print	: |Weight 10.1[5]g |
Balance transmits	: ST,+010.1745g**<CR><LF>
Normal print	: |Weight 10.1745g |
Approved print	: |Weight 10.174[5]g |
Balance transmits	: ST,+04.87209g**<CR><LF>
Normal print	: |Weight 4.87209g |
Approved print	: |Weight 4.872[09]g |

6.2. Date and Time Stamping

When date/time stamping is enabled, message types 1 to 10 will have their printed output preceded by the date and/or the time depending on the value of the date/time stamping configuration setting.
The date and time prints will appear on separate lines, and will be identical to the output for message types 11 and 12 (for the selected language). When stamping is enabled, each report will be preceded by a blank line.
The ordering of the day, month and year values will follow the value of the date format configuration setting whenever a date is printed.

Examples:
Language = Spanish, Date format = DD/MM/YY.

Date / Time stamping = NONE

```
|Peso        10.15g      |
|Peso        15.20g      |
```

Date / Time stamping = Date Only

```
|                        |
|Fecha       24/12/00    |
|Peso        10.15g      |
|                        |
|Fecha       24/12/00    |
|Peso        15.20g      |
```

Date / Time stamping = Time Only

```
|                        |
|Hora        09:56:20    |
|Peso        10.15g      |
|                        |
|Hora        09:56:37    |
|Peso        15.20g  |
```

Date / Time stamping = Date and Time

```
|                        |
|Fecha       24/12/00    |
|Hora        09:56:20    |
|Peso        10.15g      |
|                        |
|Fecha       24/12/00    |
```

|Hora 09:56:37 |
|Peso 15.20g |

6.3. Storing Weights

When the statistics feature is enabled, the printer will store each incoming weight reading (from message types 1, 2, 3, 4 and 8) in non-volatile memory in IEEE-754 floating-point format.
The printer will also record the maximum number of decimal places present in received readings, and the message type and unit string of the first reading.
If messages of types not stored are received, these will be parsed and printed in the normal way, but no data will be stored.
If a message is received which has a valid type for storing but which is either of a different type or has different units to the first reading stored, an error message advising that the results must be cleared will be printed. In this case, the weight value is not printed.
A maximum of 2000 readings will be stored. When more than 1949 readings have been stored, the printer will accompany each weight reading with a language-dependent warning message to be specified by A&D. When 2000 weights have been stored the text of the warning will change to another language-dependent message.

6.4. Statistical Report

A statistical report includes the following variables, which are calculated using the library functions of the Keil C51 C compiler in IEEE-754 floating-point format:

Name	Definition
N	The total number of readings stored
Total	The arithmetic sum of all readings
Maximum	The highest reading
Minimum	The lowest reading
R	Maximum – Minimum
σ	Standard Deviation
$\bar{x}$	Arithmetic Mean
SREL	Relative Standard Deviation
CV	SREL * 100%

6.5. Report Format

Below is an example statistic report. The report will be language-dependent.

Date	01/04/04
Time	08:00:01
N	7
TOTAL	15.206 g
MAX	16.154 g
MIN	14.223 g
R	2.761 g
σ	0.0467 g
x	15.3452 g
SREL	0.0035
CV	3.5000 %

The results are printed using the following precision rules.

- The values for TOTAL, MAX, MIN and R are printed with the same number of decimal places as used in the readings transmitted by the balance. When received values have different precisions then the most precise (i.e. most number of DPs) is used.
- The values for σ, x, SREL and CV have one additional decimal place to the TOTAL value.

7. Button Operation

When the printer is off:

- A short press (<1s) of the button switches the printer on.
- A longer press of the button (1s to 5s) will switch the printer on. The printer will print a self-test, then will operate as normal.
- Holding down the button for >5s enters configuration mode. This operates as standard.

When the printer is on:

- Pressing and holding down the button will make paper feed through the printer mechanism (after 1s).
- A short press of the button (<1s) will turn the printer off if there is no paper loaded.
- A short press of the button (<1s) when paper is loaded places the printer into menu mode.

8. Menu Mode

This mode is selected each time the printer is manually switched off (and paper is loaded).
At the start of menu mode, the printer prints a menu, and ejects enough paper so that the menu can be viewed.
The top level menu is shown below:

|Please Choose an option |
|0 presses = switch off |
|1 press = set time |
|2 presses = set date |
|3 presses = stats print |
|4 presses = erase all |
|5 presses = erase last |

Options 3&4 will only appear if statistical functions have been enabled. Option 5 will only appear if single reading erase has been enabled.

Once the menu has been printer, the user has 5 seconds to press the mode button for the first time. The printer counts presses, and assumes that the user has finished making a selection after 5 seconds have elapsed.

8.1. Setting the Time

On choosing “Set Time” the user must will be presented with the following text:
|hh:mm:ss increase hours|

Each press of the mode button will increase the hours by one (wrapping from 23 to 0). When the user does not press within one second, the latest the time is printed again. When the user does not press within a further five seconds, the text…
|hh:mm:ss increase mins |
prompts the user to alter the next field, and so on, until the time setting is complete.
As the clock is stopped for the whole of the time setting process, the text…
|hh:mm:ss start clock |
will allow the user to start the clock at a precise time. If the user does not press the mode button within 1 minute, the clock starts anyway.
At the end of the process, the printer prints:
|hh:mm:ss time set |

8.2. Setting the Date

The date setting system follows the same basic rules (but the date is printed in the chosen format), but the year setting always starts from 04, so that the user is not required to make 100 steps to decrease the year.
It is not necessary to start the clock running, as it is not stopped for this option.

8.3. Printing Statistics

The “stats print” option causes the statistics report shown above to be printed.

8.4. Erase Last Weight

This option asks for confirmation thus…

```
|Erase last weight?      |
|0 presses = no          |
|1 press   = yes         |
```

before printing either…

```
|Last weight erased      |
```

or

```
|Erase Cancelled         |
```

8.5. Erase All Weights

This option asks for confirmation thus…

```
|Erase all weights?      |
|0 presses = no          |
|1 press   = yes         |
```

before printing either…

```
|All weights erased      |
```

or

```
|Erase Cancelled         |
```

8.6. Language Support

Printed strings of the menu, statistical report and self-test, will be shown in the appropriate language.

9. Miscellaneous

9.1. Self Test

As mentioned in Section 11, it is possible to print out a self test. This can be achieved only when the printer is off, a press of the button (1s to 5s) will switch the printer on. The printer will print a self-test, then will operate as normal.

The header of the self test will appear as follows.

```
|                              |
|  A&D INSTRUMENTS LTD         |
|                              |
|     +44 (0)1235 550 420      |
|                              |
|       www.aandd-eu.net       |
|                              |
|       MCP8810-118 V0.4       |
|                              |
|        © MIL 2000-2004       |
|                              |
```

The rest of the self test will display RS232 configuration, Set-up information, Date and Time option, the character set, Character widths, a barcode, shades followed by the date and time.

9.2. 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
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	ESC * 33	27 42 33 *n1*	1B 2A 21

double density)	*n1 n2 [d]*	*n2 [d]*	*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
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
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 ≤ n ≤ 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 ≤ n ≤ 4)	GS w *n*	29 119 *n*	1D 77 *n*

9.3. 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

9.4. 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.***

9.5. 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.

9.6. 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 character 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).

9.7. Paper Tear Procedure

When removing 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.

10. PRINTER MAINTENANCE

10.1. 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.

10.2. 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

10.3. Paper Out

The printer will automatically detect when the printer paper has run out, and report this using the Status LED. Use the Mode button to feed through the last few centimetres of paper and fit a new roll as described on page 6.

10.4. 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.

10.5. Replacing Paper Roll

If the paper roll needs replacing, open the paper cup lid and remove the remaining paper using the Mode 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. 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 Mode button and feed the paper through

the printer mechanism. Keep the Mode 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 Mode button, and reload ensuring the paper has a clean straight edge.

11. ACCESSORIES

11.1. Power Supplies

Description	Part Number
UK Charger Unit	MPS101
Euro Charger Unit	MPS102
USA Charger Unit	MPS103
9V Universal Charger Unit	MPS160

11.2. Paper / Labels

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

11.3. Data Cables

Description	Part Number
Serial Cable, RJ12/D9	AX-MCP-9P
Serial Cable, RJ12/D25	AX-MCP-25P
Serial Cable, RJ12/7PIN DIN	AX-MCP-SCA

11.4. Replacement Battery

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

11.5. Dimensions

Length 185mm x Width 91mm x Height 58mm

A&D Instruments Ltd
24 Blacklands Way, Abingdon Business Park
Abingdon, Oxford OX14 1DY UK
Tel +44 (0)1235 550420
Fax +44 (0)1235 550485