



INSTRUCTION MANUAL

SPECIFICATION

General

Printing system	Direct thermal line head
Max Characters per line	24(default)
Character matrix	24x8, 24x9, 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 of text per second (max)

Charger for battery version

MCP1000 9V (Centre negative)

Current consumption

MCP1000 500mA Peak

Paper and language support

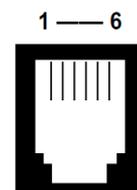
Paper width	58mm
Paper capacity	48mm diameter
Character set	UK / United States (437)
Country codes	France, Germany, UK, Italy, Spain I/II

Data and Interface

RS232 Data format - Default, 1 Start, 8 Data, 1 Stop, No Parity).
Baud rates - 300, 600, 1200, 2400, 4800, 9600 & 19200

PIN	Signal	I/O	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*



Configuration & Setup

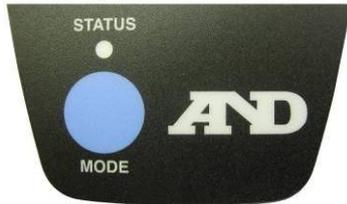
The printer incorporates a number of configurable options, each of which has a number of settings. The default settings of the standard printer are detailed in the table below in bold. To change the setting of any option, follow the procedure below:

1. Ensure the printer is OFF.
2. Press and hold the Mode button whilst powering the printer ON. 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 four times).
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	Setting Number (default in bold)	Setting (default in bold)
1 RS232 Baud Rate	1	19200 baud
	2	9600 baud
	3	4800 baud
	4	2400 baud
	5	1200 baud
	6	600 baud
	7	300 baud
2 RS232 Protocol	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	Standard paper, normal printing
	2	Standard paper, upside down printing
	3	Labels, normal printing (only with standard emulation)
	4	Labels, upside down printing (only with standard emulation)

Option	Setting Number (default in bold)	Setting (default in bold)
5 Sleep/Wake-up	1	Never Sleeps
	2	Off after 1 minute
	3	Off after 2 minutes
	4	Off after 5 minutes
	5	Off after 10 minutes
6 Emulation	1	A & D
	2	Standard
7 "Approved" Mode	1	OFF
	2	ON
8 Date & 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

Mode Button and Status Operation



Power On Self Test

The self test procedure is initiated by supplying power to the printer while the mode button is depressed. When the mode button is released a test print will be produced.

The printer should be charged from the standard charger provided. Charger input voltage, centre pin –ve, 9VDC.

Battery Charging

The printer uses Ni-MH rechargeable AA cells, which will take up to 16 hours to recharge from fully discharged status. Low battery is indicated by a slow flash of the Status LED.

If the printer is left on charge, charging automatically stops to protect against overcharging or overheating. The printer circuitry will protect the battery from total and deep discharge. 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 MPS161(UNI) power adapter. Users wishing to provide their own power source must contact A&D Instruments. **The use of an unapproved source may void the printer's warranty.**

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	-
* * *	Paper out or door open	Fit new paper
** ** *	Thermal head too hot	Allow head to cool
*** ** *	Battery cut-out (no charge remaining)	Recharge batteries
**** ** *	Battery low (approx. 20% charge remaining)	Recharge batteries

Basic Operation

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.

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.

Paper Tear Procedure

When removing printout from the printer, pull the printout toward the tear bar and tear from one side to the other across the serrated edge. Note: paper can be torn in either direction as this printer has a double faced tear bar.

How To Open Lid

Pull the lever (as shown) until the lid is released from its locked position. To avoid damage do not use excessive force.



Replacing Paper Roll

If the paper roll needs replacing, open the paper cup lid and remove the remaining paper. Reel off a few centimetres from a new roll of paper. Hold approximately 5cm of paper outside the device as you place the new roll into the reservoir. Close the lid by applying equal amounts of pressure on each side ensuring the lid is in the locked position. Now tear the spare paper away.

Paper Feed

Depressing the mode button will allow paper to be fed through the printer.

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 π ,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
 π = space
u = unit character
0..9 and '.' = numeric data

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.

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#####zzzs152uuu
	3	Net#####zzzs10,15uuu
	4	Gross#####zzzs10,15uuu
	5	Tare#####zzzs10,15uuu
	6	Tare#####zzzs10,15uuu
	7	Unit#Weight#zzzs10,15uuu
	8	Total#Count#zzzs152uuu
	9	Number#####zzzzz11###
	10	Tare#####zzzs10,15uuu
	11	Date#####dd/mm/yy
	12	Time#####hh:mm:ss
German	1	Gewicht#####zzzs10,15uuu
	2	Zählung#####zzzs152uuu
	3	Netto#####zzzs10,15uuu
	4	Brutto#####zzzs10,15uuu
	5	Tara#####zzzs10,15uuu
	6	Tara#####zzzs10,15uuu
	7	Stueckgew. #zzzs10,15uuu
	8	Gesamt#Zahl#zzzs152uuu
	9	Ges. #Proben#zzzzz11###
	10	Tara#####zzzs10,15uuu
	11	Datum#####dd/mm/yy
	12	Zeit#####hh:mm:ss

Language	Type	Output
French	1	Poids*****zzzs10,15uuu
	2	Compte*****zzzs152uuu
	3	Net*****zzzs10,15uuu
	4	Brut*****zzzs10,15uuu
	5	Tare*****zzzs10,15uuu
	6	Tare*****zzzs10,15uuu
	7	Poids*Unit.*zzzs10,15uuu
	8	Cumul*****zzzs152uuu
	9	Nombre*****zzzzz11***
	10	Tare*****zzzs10,15uuu
	11	Date*****dd/mm/yy
	12	Temps*****hh:mm:ss
Spanish	1	Peso*****zzzs10,15uuu
	2	Contaje*****zzzs152uuu
	3	Neto*****zzzs10,15uuu
	4	Bruto*****zzzs10,15uuu
	5	Tara*****zzzs10,15uuu
	6	Tara*****zzzs10,15uuu
	7	Peso*Unidad*zzzs10,15uuu
	8	Total*****zzzs152uuu
	9	Número*****zzzzz11***
	10	Tara*****zzzs10,15uuu
	11	Fecha*****dd/mm/yy
	12	Hora*****hh:mm:ss

Language	Type	Output
Italian	1	Peso#####zzzs10,15uuu
	2	Conteggio#####s152uuu
	3	Netto#####zzzs10,15uuu
	4	Lordo#####zzzs10,15uuu
	5	Tara#####zzzs10,15uuu
	6	Tara#####zzzs10,15uuu
	7	Peso#Unitá#####s10,15uuu
	8	Totale#####zzzs152uuu
	9	Número#####zzzzz11###
	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.

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

Approved Mode Output

In approved mode, certain digit 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,+00010.15gꠄꠄꠄ<CR><LF>

Normal print :|Weight 10.15g |

Approved print :|Weight 10.1[5]g |

Balance transmits : ST,+010.1745gꠄꠄꠄ<CR><LF>

Normal print :|Weight 10.1745g |

Approved print :|Weight 10.174[5]g |

Balance transmits : ST,+04.87209gꠄꠄꠄ<CR><LF>

Normal print :|Weight 4.87209g |

Approved print :|Weight 4.872[09]g |

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.

Example:

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 |
```

Storing Weights (MCP1000-118-S)

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 to be specified by A&D.

A statistical report includes the following variables, which are calculated using the library functions of the GCC 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%

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       |
```

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      |
```

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 printed, 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.

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    |
```

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.

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|  
| $\bar{X}$          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 , \bar{X} , SREL and CV have one additional decimal place to the TOTAL value.

Control Codes and Escape Sequences

MCP series printers contain and respond to a full set of control codes and escape sequences enabling the user to manipulate font size, positioning, paper feed, barcode printing and many other features. Please contact A&D for details should you require further information.