

MPL6020-20K series

-

PANEL MOUNT PRINTER



MPL6020-20K 10-35Vdc

Features

- Easy open paper feature
- High resolution thermal printing
- 10-35Vdc standard
- Kwik clip mounts and panel screw mount
- 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
- Suitable for paper and label printing
- Windows driver for Win 7 / Vista / XP and 2000
- Linux and WinCE 5.0 / 6.0 drivers available
- 60mm diameter paper roll support
- Interface—RS232, USB
- Bezel—Black
- MicroSD integrated data logging

Introduction

The MPL6020-20K is from the latest range of Martel printers, comprising compact thermal panel mount printers incorporating a fixed head mechanism with “Easy open” paper feature, setting new performance standards for panel-mount units, with a selection of standard options and customisable features.

Designed for maximum versatility, the MPL6020-20K Series is capable of many different modes of operation. Numerous international character sets and barcodes are selectable and includes RS232 serial and USB as standard, with RS485, TTL and parallel interfaces available as other products. With flash upgrade capability as standard, it provides a flexible method of remotely updating the printer firmware for new customer requirements or requests with minimal delay

Power supply of a single supply in the range 10-35Vdc, giving fast, high resolution printing whilst a low current version is also possible by adjusting the internal configuration settings of the printer.

Paper changing is simplified by the use of a hinged front to the robust moulded enclosure incorporating a detachable roller facilitating the “Easy open” functionality.

Martel manufactures a wide range of cased and compact panel printers and we would be pleased to discuss the possibility of customising any aspect of the printer to your specific requirements.

SPECIFICATION

Page 2 of 15

General

Printing system	Direct thermal line head
Max Characters per line	48, 32, 24(default), 16 and 12
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

MPL6020-20K	10 lines of text per second (max)
-------------	-----------------------------------

Power supply

MPL6020-20K	10-35 Vdc
-------------	-----------

Current consumption

MPL6020-20K	2.7A @ 10V, 1.75A @ 15V, 1.5A @ 20V, 1.2A @ 25V, 1.1A @ 30V, 1A @ 35V peak)
-------------	---

Paper and language support

Paper width	58mm
Paper capacity	60mm diameter
Character set	UK / United States (437)
Country codes	USA, France, Germany, UK, Denmark I/II, Sweden, Italy, Japan, Norway, Latin America, Spain I/II

Data and Interface

USB	USB v2.0
Serial	
Data format	RS232 (Default, 1 Start, 8 Data, 1 Stop, No Parity)
Baud rates	300, 600, 1200, 2400, 4800, 9600 & 19200, 38400, 57600 & 115200
Handshaking	Hardware (CTS line) or Software (XON/XOFF)

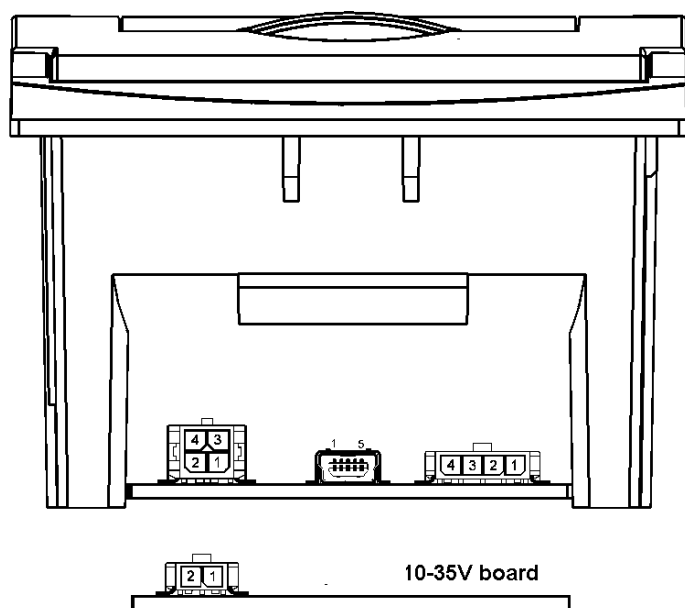
Dimensions

MPL6020-20K	83mm x 93.7mm x 76.5mm (WxHxD)
Panel cut-out	76 x 85mm

ELECTRICAL CONNECTIONS

Page 3 of 15

Standard Connectors (Molex 43xxx Series)



RS232 Connector	
Pin No	
1	RXD In
2	TxD Out
3	CTS
4	GND

Take up Spool Connector	
Pin No	
1	Do Not Use
2	Do Not Use
3	Paper take up power
4	Paper take up drive

Connectors	Receptacle	Crimp (and quantity)
RS232	Molex 43025-0400	Molex 43030-0007 (4 off)
USB	USB Mini B	N/A
Paper Takeup	Molex 43645-0400	Molex 43030-0007 (2 off)
10-35V Power	Molex 43645-0200	Molex 43030-0007 (2 off)

10-35V Power Connector (option)	
Pin No	
1	0V
2	10-35Vdc Power

Configuration & Setup

Page 4 of 15

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 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	115200 baud
		2	57600 baud
		3	38400 baud
		4	19200 baud
		5	9600 baud
		6	4800 baud
		7	2400 baud
		8	1200 baud
		9	600 baud
		10	300 baud
3	RS232 Handshake	1	None
		2	Software
		3	Hardware

Configuration & Setup

Page 5 of 15

4	Default 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

Control Codes

Page 6 of 15

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

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 ! <i>n</i>	27 33 <i>n</i>	1B 21 <i>n</i>
Set barcode start position	ESC \$ <i>n1 n2</i>	27 36 <i>n1 n2</i>	1B 24 <i>n1 n2</i>
Set bit image (8 pin single density)	ESC * 0 <i>n1 n2 [d]</i>	27 42 0 <i>n1 n2 [d]</i>	1B 2A 00 <i>n1 n2 [d]</i>
Set bit image (8 pin double density)	ESC * 1 <i>n1 n2 [d]</i>	27 42 1 <i>n1 n2 [d]</i>	1B 2A 01 <i>n1 n2 [d]</i>
Set bit image (24 pin single density)	ESC * 32 <i>n1 n2 [d]</i>	27 42 32 <i>n1 n2 [d]</i>	1B 2A 20 <i>n1 n2 [d]</i>
Set bit image (24 pin double density)	ESC * 33 <i>n1 n2 [d]</i>	27 42 33 <i>n1 n2 [d]</i>	1B 2A 21 <i>n1 n2 [d]</i>
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 <i>n</i>	27 67 <i>n</i>	1B 43 <i>n</i>
Set horizontal tabs	ESC D <i>n</i>	27 68 <i>n</i>	1B 44 <i>n</i>
Bold on	ESC G	27 71	1B 47
Bold off	ESC H	27 72	1B 48
Set bit image	ESC K <i>n1 n2 [d]</i>	27 75 <i>n1 n2 [d]</i>	1B 4B <i>n1 n2 [d]</i>
Country select	ESC R <i>n</i>	27 82 <i>n</i>	1B 52 <i>n</i>
Set black line recognition	ESC L	22 76	1B 4C
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 <i>n1 [d1] ... n24 [d24]</i>	27 90 <i>n1 [d1] ... n24 [d24]</i>	1B 5A <i>n1 [d1] ... n24 [d24]</i>
Print & feed paper	ESC d <i>n</i>	27 100 <i>n</i>	1B 64 <i>n</i>
Reversed on	ESC i 1	27 105 1	1B 69 01
Feed to start of next label	ESC f	27 102	1B 66
Reversed off	ESC i 0	27 105 0	1B 69 00
Send Printer Status	ESC v	27 119	1B 76
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 <i>n</i>	29 104 <i>n</i>	1D 68 <i>n</i>
Print UPC-A barcode	GS k 0 [<i>d</i>] NULL	29 107 0 [<i>d</i>] 0	1D 6B 00 [<i>d</i>] 00
Print UCP-E barcode	GS k 1 [<i>d</i>] NULL	29 107 1 [<i>d</i>] 0	1D 6B 01 [<i>d</i>] 00
Print EAN13 barcode	GS k 2 [<i>d</i>] NULL	29 107 2 [<i>d</i>] 0	1D 6B 02 [<i>d</i>] 00
Print EAN8 barcode	GS k 3 [<i>d</i>] NULL	29 107 3 [<i>d</i>] 0	1D 6B 02 [<i>d</i>] 00
Print Code 39 barcode	GS k 4 [<i>d</i>] NULL	29 107 4 [<i>d</i>] 0	1D 6B 04 [<i>d</i>] 00
Print 2 of 5 barcode	GS k 5 [<i>d</i>] NULL	29 107 5 [<i>d</i>] 0	1D 6B 05 [<i>d</i>] 00
Print Codabar barcode	GS k 6 [<i>d</i>] NULL	29 107 6 [<i>d</i>] 0	1D 6B 06 [<i>d</i>] 00
Print CODE128 barcode	GS k 7 <i>n [d]</i>	29 107 7 <i>n [d]</i>	1D 6B 07 <i>n [d]</i>
Set barcode magnification ($2 \leq n \leq 4$)	GS w <i>n</i>	29 119 <i>n</i>	1D 77 <i>n</i>

Control codes

Page 7 of 15

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

Print Mode (ESC!)

Bit	Function	0	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

Print Density

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

Send Printer Status (ESC v)

Bit	Function	0	1
2	Paper Out	False	True

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

Operation

Page 8 of 15

Mode Button and Status LED Operation



Mode
Button

Status
LED

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.

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

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.

Operation

Page 9 of 15

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 until the lid is released from its locked position. To avoid damage do not use excessive force.

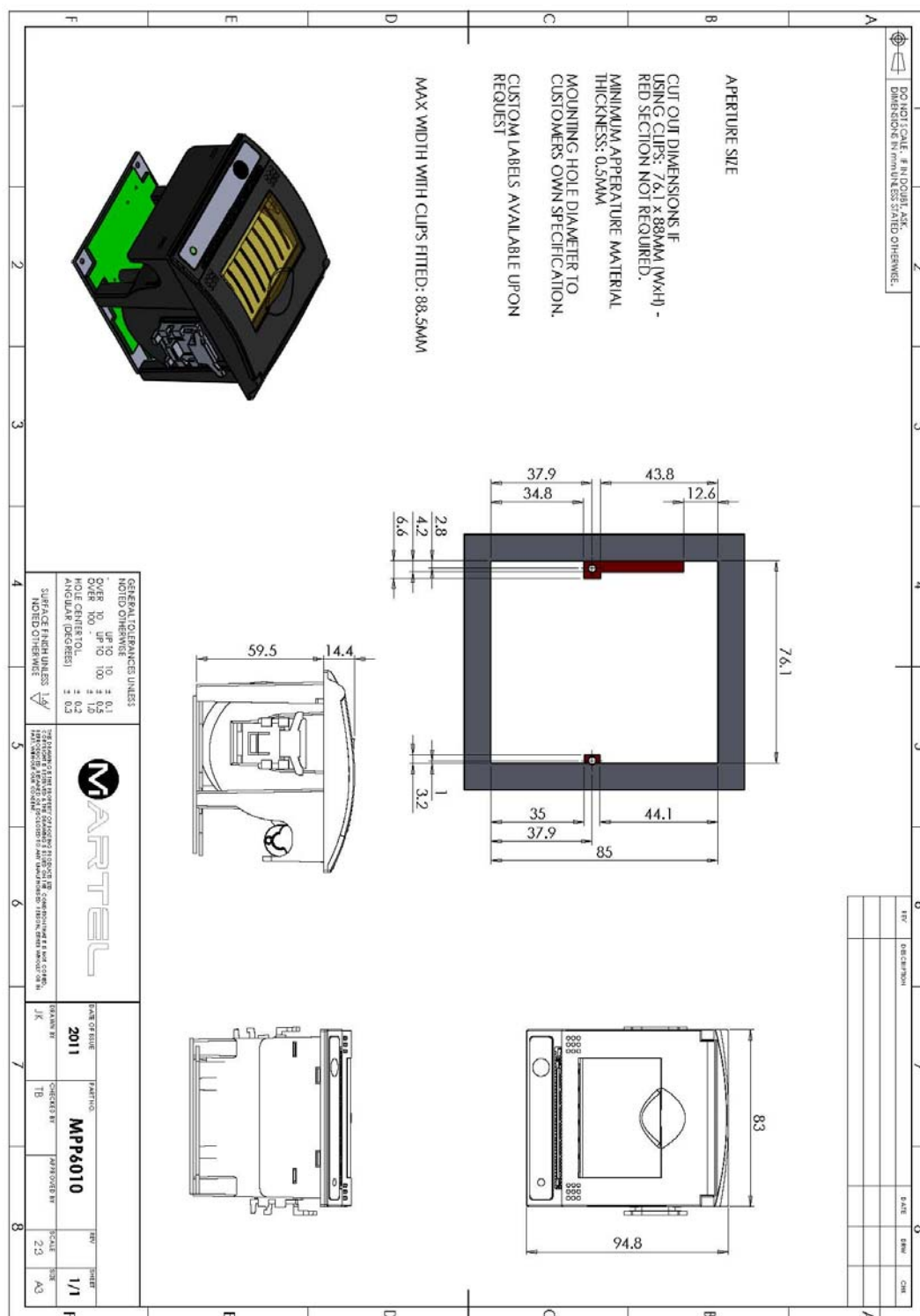


Replacing Paper Roll

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.



Revision History

Revision	Changes	Date
A	Original	28-SEP-11
B	Update following specification review	30-SEP-11
C	Added folder creation option	17-OCT-11
D	Integrated into specific products data sheets	21-AUG-12

Hardware

There is a slot in the printer case adjacent to the paper roll that accommodates a micro SD push-push holder. This allows easy access to the Martel supplied micro SD card, and is hidden from sight by the lid of the paper bucket.

The maximum size of a provided micro SD card is 2GB, also known as SD Standard Capacity or SDSC.

Due to the variance of SD card functionality and standards, the SD card functionality is only certified for use on SD cards provided with initial purchase of product. Replacements may be purchased from Martel Instruments.

Firmware operation

The provided microSD card is formatted prior to insertion in the printer. This can be done via the user also on any Windows XP, Windows Vista and Windows 7 PCs (with a suitable SD card reader), with formats suitable for Martel logger use are FAT16 or FAT32. Please note – exFAT / NTFS is not supported at this time.

The operation of the logging features (as factory default) is as follows.

Any characters sent to the printer will be printed on the paper roll and then also stored real-time in a designated location and file on the microSD card.

If the printer is idle for more than a pre-set “time out” period, the buffered characters will be written to the SD card file. Any new characters will be saved to a new file.

All files are stored in the microSD card's root directory, by default.

The file naming format is

<pppp><nnnn>.PRN

where pppp is the number of times the printer has powered up and nnnn is the auto incremented sequence number. So 00530061.PRN is from a printer that has powered up 53 times and it is the 61st file since the printer last powered up.

The escape sequence ESC 'F' <ddddddd> CR will create and cause all subsequent files to be placed in directory <ddddddd> where d is an alphanumeric character and can be up to eight characters in length. Non alphanumeric characters will be ignored. A zero length directory name will cause files to be written to the root directory.

Esc 'v' has now changed to provide a status of the memory card as well as the paper out state. The ESC 'v' status request has 'card present' and 'card functioning correctly' bits.

Card error. A customer configurable option gives the user of the host machine an indication of an error by giving 5 short flashes every second on the printer's status LED.

Storage encryption. The SD stored data is encrypted by default to ensure viewing of the captured data can only be carried out via the Martel viewing software (download from www.martelinstruments.com after registering), and is therefore protected from unauthorised viewing by any laptop unless this software is used.

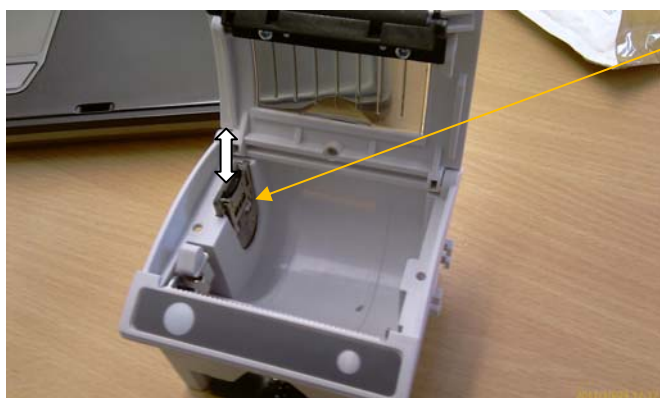
Enable / disable SD card storage. ESC 'E' will enable data storage and ESC 'e' will disable storage. This has no effect on printing.

Idle time out. When the printer has not received any data for a certain time any new data will be written to the next file in the sequence described earlier. ESC 'c' <x> provides this configurable time out. The time out values are given in the table below.

ESC 'c' <x> Setting delays (1-9 as options 'x')

1	2	3	4	5	6	7	8	9
1sec	10sec	30s	1min	10mins	30mins	1hr	5hrs	10hrs

ESC 'n' will also force a "file save" and "new next file" creation, to ensure the user can directly control when, and how the data is saved.

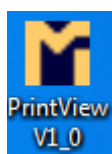


To release the MicroSD card, the card should be first pressed “downwards” (with minimal pressure) and then allowed to be released upwards.

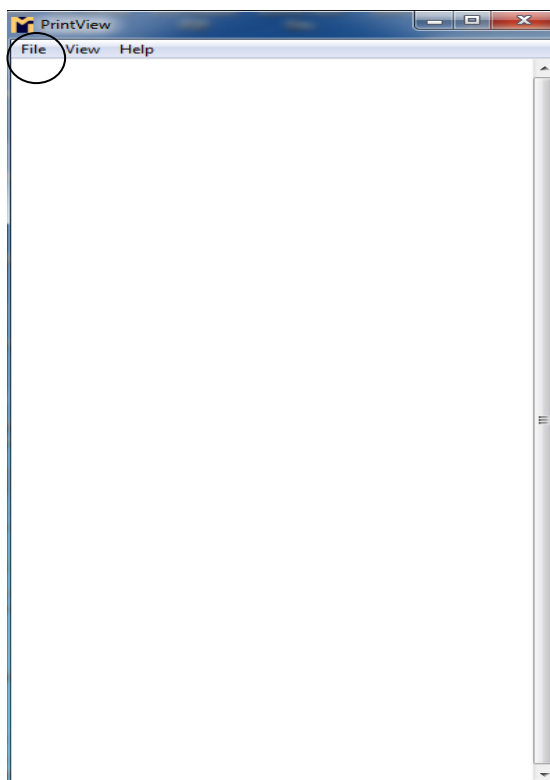
The SD card should then be easily removed



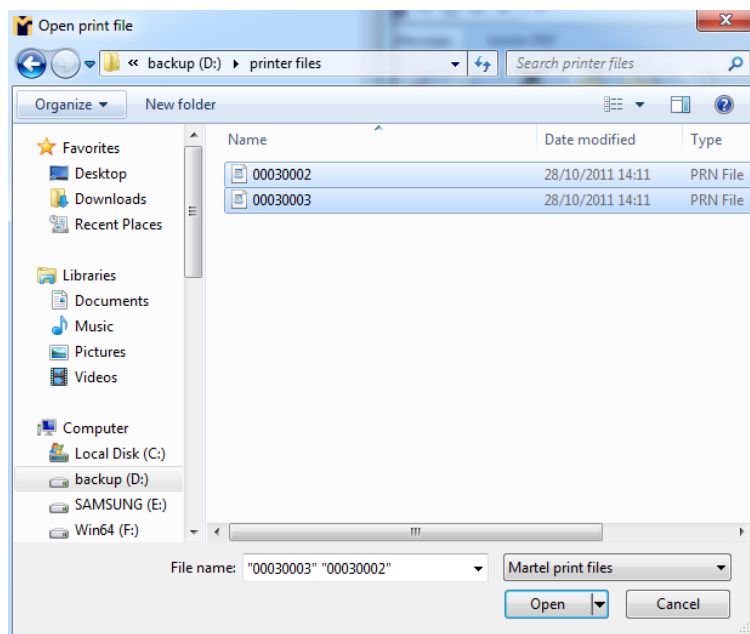
To load the microSD card, please insert with the orientation of the SDcard as shown (electrical contacts on the bottom / Right hand side)



Open "PrintView" software (icon as above) which is a self contained executable, compatible with all Windows version software (XP/Vista/Win7)

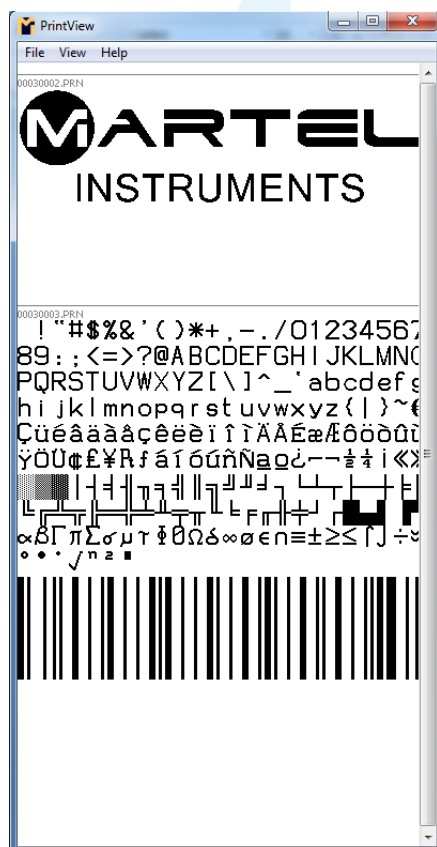


Insert the SD card into a suitable adapter for reading on a Windows PC. Then select "File" – "open" from within the PrintView software



Select the files to be viewed within the PrintViewer software.

If multiple files are required please select via shift+select for full list, or control button for individual selections as left.



Captured files are then viewed within the program, and different sequential files indicated by a line break and name.

View can either be printed directly to any standard printer, or can be exported as a .BMP