SC180

Control Board for printing mechanism Epson® M180 e M183

CUSTOM TECNOLOGIE ELETTRONICHE APPLICATE

USER MANUAL

The aim of this manual is to provide instructions to enable the customer to make the best possible use of the product. Any suggestion regarding errors in its contents or possible improvements will be greatly appreciated

The products are continuously checked and improved. For this reason Custom Engineering S.r.l. reserves the right to modify the information contained in this manual without prior notice

FOR FURTHER DETAILS PLEASE CONTACT :

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Technical specification

	Column	
Character	24	40
Normal	1,7 x 2,6	1,1 x 2,6
Double height	1,7 x 5,2	1,1 x 5,2
Double width	3,4 x 2,6	2,2 x 2,6
Expanded	3,4 x 5,2	2,2 x 5,2
Graphic point	0,33 x 0,38	0,19 x 0,38
Point for line	144	240
Printing speed		
Lines/sec	2,5	1,5
Characters/sec	60	60
Feed (lines/sec)	6	3,6
Line buffer	24 byte	40 byte
Printing buffer	150 byte	
Printing method	Impact dot matrix	
Character matrix	6 x 10 points	
Printing mode	Normal or Reverse	
Character set	Normal and extended	
Standard interface	Serial and parallel TTL	
Optionally interface	RS232 Current Loop, Centronics	
Supply	Double or single 5Vcc ± 10%	
Absorptions		
Medium in stand by	38 mA	
Medium in printing	880 mA	
Impulsive in printing	3.0 A (600 µSec.)	
Environmental conditions		
Temperature	0 - 50 °C	
Relative humidity	10 % - 85 %	

CONNECTIONS

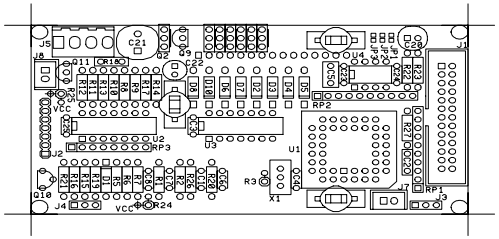
J5 Supply(AMP MODU II 4 PIN)

N° pin	Function	Notes
1	GND	Square Pad
2	GND	
3	+VT	5 Vcc ± 10%
4	+VCC	5 Vcc ± 10%

J2 Real Time Clock (STRIP)

N° pin	Function	N° pin	Function
1	VCC (square pad)	2	ENABLE
3	MOSI	4	MISO
5	CLOCK	6	NC
7	GND		

Layout



Pin out 26 Pin connector

PIN	Signal	PIN	Signal
1	GND	2	GND
3	GND	4	TP
5	+VT	6	+VT
7	+VT	8	+VT
9	+VCC	10	+VCC
11	GND	12	GND
13	TD	14	D6
15	D5	16	D4
17	D3	18	D2
19	D1	20	D0
21	D7	22	RESET
23	S-EN	24	READY/RTS
25	FEED	26	STB/RD

Pin out 20 Pin connector

PIN	Signal	PIN	Signal
1	+VT	2	+VT
3	+VCC	4	+VCC
5	GND	6	GND
7	TD	8	D6
9	D5	10	D4
11	D3	12	D2
13	D1	14	D0
15	D7	16	RESET
17	S-EN	18	READY/RTS
19	FEED	20	STB/RD

The corresponding signals are :

- GND Signal ground and power supply.
- +VT Power supply to the printer needles and motor.
- +VCC Power supply to the logic card.
- S-EN Serial/parallel interface selection : serial = low.
- RESET Resetting initialises the printer's parameters : active at low level.
- FEED Paper feed key, active at low level. This signal is in parallel with the contacts of FEED key on the front panel of the printer
- TP Print key, active at low level. This signal is in parallel with the contacts of the Print key on the front panel of the printer
- READY/RTS In parallel configuration the high level indicates that the printer is ready to receive data.
- STB/RD In parallel configuration a low level tells the printer that there is valid data on the data bus. In serial configuration this correspond to the data reception pin.
- D0,...,D7 Data bus. In parallel configuration, these correspond to the printer input data bus. In serial communication, these are utilised to determine speed of communication and transmission protocol ; normally the data bus is at logic level 1 : in order to obtain logic level 0, it has to be short-circuited to ground (GND).

Interface selection :

S-EN	Interfacea
0	Serial
1	Parallel

BAUD RATE Selection

D0	D1	D2	BAUD
0	0	1	300
1	0	1	600
1	1	1	1200
0	1	1	2400
0	0	0	4800
1	0	0	9600

Protocol Selection

D7	D6	D5	Format
1	1	1	N,8,1
0	1	1	E,8,1
0	1	0	O,8,1
1	1	0	N,7,1
1	0	1	E,7,1
1	0	0	O,7,1

J6 Printing mechanism (PAD)

PIN	Signal	PIN	Signal
1	+VT	2	SL
3	GND	4	ZERO
5	+VT	6	MOT
7	NEEDLE 5	8	NEEDLE 6
9	NEEDLE 1	10	NEEDLE 2
11	NEEDLE 3	12	+VT
13	NEEDLE 4	14	STROBE
15	GND		

The corresponding signals are :

- GND Signal ground and power supply.
- +VT Power supply to the printer needles.
- NEEDLE1,...,NEEDLE8 Printing head needles
- SL magnet for fast form feed
- ZERO This signal .indicate the reset position of printing head
- MOT Motor excitation of printing truck.

J8 Rewinder(AMP MODU I 2 POLI)

N° pin	Function	Notes
1	+VT	Square Pad
2	VCC	In stand by mode
2	GND	To print

The maximum current to draw out is 300mA.

J7 external key (AMP MODU I 2 POLI)

N° pin	Function	Notes
1	GND	Square Pad
2	Key pressed	0 Value
2	key rest	1 Value

J3 Print key

PIN	Signal
1	Print Led
2	TPRINT
3	GND

J4 Feed key

PIN	Signal
1	LEDON
2	FEED
3	GND

Installation instructions :

Before supplied the controller card, verify :

- the supply is connected in a correct mode, that the supply correspond as is specified in the technical spefications.
- the connectors is connected in a correct mode.
- the printer is in your desired configuration.
- the environment conditions correspond as is specified in the technical spefications.

General instruction

Custom Engineering. S.r.l. declines all responsibility for accidents or damage to persons or property occurring as a result of tampering, structural or functional modifications, unsuitable or incorrect installation, environments not in keeping with the equipment's protection degree or with the required temperature and humidity conditions, failure to carry out maintenance and periodical inspections and poor repair work.

The printer is in conformity with the essential Electromagnetic Compatibility and safety requirements laid down in Directives :

- 89/336/EEC dated 3 May 1989 and subsequent revisions (Directive 92/31/EEC of 28 April 1992 and Directive 93/68/EEC of 22 July 1993)

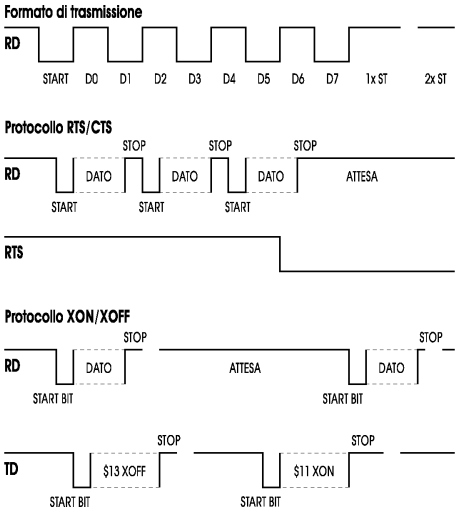
in as much as it was designed and constructed in conformity with the provisions laid down in the following Harmonised Standard :

- EN55022 (Limits and methods of measurements of radio interference characteristic of Information Technology Equipment)

CE

TTL Serial

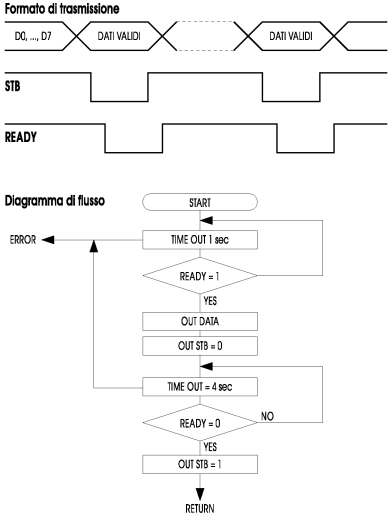
The signal characterising communication in the serial protocol are TD, RD, RTS if the protocol is RTS/CTS ; if the protocol is XON/XOFF has been selected the signals are TD and RD.



TTL Parallel

In parallel communications the signals that which can be used are :

1. 7 or 8 bit data bus
2. Strobe signal indicating data validity
3. Ready signal indicating that the printer is ready to receive data



Printing modes

The SC180 printers has two printing modes :

Control characters

List all commandos for function management the printer

ASCII	Description
$00(1)	Printing in small characters
$01(1)	Double width printing
$02(1)	Double height printing
$03(1)	Expanded printing
$04(1)	Restores normal printing
$0A	Forward feeds one line
(n) $0B(3)	Forward feed (n) lines
$0D	Prints line buffer
$0F	Sets CRLF mode
$11	Graphic mode
$12	Prints the time and date
$13	Sets the time and date in serial
$14	Transmits the time and date in serial
ESC R	Sets the printer in Reverse mode
ESC N	Sets the printer in Normal mode
ESC @	Resets the printer
ESC D	Enters the date in the line buffer
ESC T	Enters the time in the line buffer
ESC U	Enters the date (mm-dd-yy) in the buffer

NOTES :

(1) This command clears the line buffer and for this reason, it must not sent after an ASCII string not ended with CR or LF character, therefore this string will be deleted.

ASCII - Hex $00

Printing in small characters

The command is used for printing in small characters

ASCII - Hex $01

Double width printing

This command is use to activate double width printing

ASCII - Hex $02

Double height printing

The command "$02" is used to activate double height printing

ASCII - Hex $03

Expanded printing

This command is used to activate expanded printing

ASCII - Hex $04

Restores normal printing

The command is used for reverting to printing in small characters (it is identical to "$00" and is used when it is impossible to use the latter)

ASCII- Hex $0A

Forward feeds one line

The command forward feeds the printer by one line. If there are any characters in the line buffer, the buffer itself is automatically printed. A line feed is equivalent to 10 dots of normal printing.

ASCII - Hex $0B

Forward feeds (n) lines

The command "$0B" forward feeds the printer by the number of lines previously set. This must be an ASCII number from 0-9.

ASCII - Hex $0D

Prints line buffer

This command (carriage return) prints the line buffer. If the buffer is empty, nothing happens.

ASCII - Hex $0F

Sets CRLF mode

The command enables the CRLF option. It inhibits the action of the command "$0D", and keeping only the command "$0A" as a print command.

ASCII - Hex $12

Prints the time and date

This command prints the time and date in the following format :

hh : mm dd-mm-yy

If the expanded or double width formats are selected, only the time will be printed. If seconds printing is enabled, the format will be :

hh : mm : ss dd-mm-yy

In any event this command resets the line buffer

ASCII - Hex $11

Graphic mode

The command enables the P150 printer graphic mode, i.e. to print in graphic mode transmit the command $11 at the beginning of each line.

ASCII - Hex $13

Sets the time and date in serial

The command sets the time and date of the clock installed inside the P190. There are two ways of setting it : the first uses the 24-hour clock and the second the 12-hour a.m., p.m. clock. In the first case the 10 ASCII characters corresponding to the time and date have to be transmitted, followed by the command "$13". By example for setting the 12.45 19-01-93 send in sequence these character string :

$31-$32-$34-$35-$31-$39-$30-$31-$39-$33-$13

In the second case the 10 ASCII characters corresponding to the time and date preceded by "A" or "P", are sent to the printer followed by the command "$13". By example for setting the 12.45 A.M. 19-01-93 send in sequence these character string :

$41-$31-$32-$34-$35-$31-$39-$30-$31-$39-$33-$13

ASCII - Hex $14

Transmits the time and date in serial

The command transmits the contents of the Real Time Clock to the printer's serial port in the format of 11 ASCII characters

ASCII :ESC R - Hex :$1B $52

Sets the printer in reverse mode

The command selects reverse mode printing

ASCII :ESC N - Hex :$1B $4E

Sets the printer in normal mode

The command selects normal mode printing

ASCII :ESC @ - Hex :$1B $40

Resets the printer

This command resets the printer software. This command is identical to the hardware reset command.

ASCII :ESC D - Hex :$1B $44

Enters the date in the line buffer

The command is used for entering the date of the Real Time Clock fitted inside the printer in the line buffer. The format of the date is dd-mm-yy

ASCII :ESC T - Hex :$1B $54

Enters the time in the line buffer

The command is used for entering the time of the real Time Clock fitted inside the printer in the line buffer, the format of the time is hh-mm

ASCII :ESC U - Hex :$1B $55

Enters the date (mm-dd-yy) in the buffer

This command is used for entering the date, American style mm-dd-yy, of the Real time Clock fitted inside the printer in the line buffer.

Graphic mode

The size of graphic point and the number of points per line vary depending on the number of columns.

	Graphic point dimension	
Columns	24	40
Graphic point	0.33 x 0.38	0.19 x 0.38
Point per line	144	240

To obtain a graphic printout, enter the command $11 at the beginning of each line. The graphic configuration byte format is as follows :

X	R	P6	P5	P4	P3	P2	P1
D7	D6	D5	D4	D3	D2	D1	D0

where :

X is not utilized

R must be set at 1

P1,...,P6 are the data of the graphic points (1 prints,0 does not print)

The P6 bit of the string of points transmitted is printed on the left and the others (P5, P4, P3, P2, P1) follow from left to right, as shown :

1° byte					
P6	P5	P4	P3	P2	P1
2° byte					
P6	P5	P4	P3	P2	P1
3° byte					
P6	P5	P4	P3	P2	P1

To print a line of points you must transmits :

$11, n x $7F (where n is the line character number), $0D

To print a line of points you must transmits :

$11, $40, $0D

Optional interface

RS232 serial

The card is also supplied with an RS232 serial interface or current loop. To select the desired serial see the following tabella:

JP1 Jumper Pin	Serial
2-3	RS232
1-2	CURRENT LOOP

The connection is made with a 25-pin rectangular female connector. The signals on the connector pins are indicated in table. The pins which are not indicated are not connected.

PIN 1,...7	GND output signal, indicate the signal ground
PIN 2	TXD output signal, to be connect with RXD and is the serial output (from Host)
PIN 3	RXD input signal, to be connect with TXD and is the serial input (towards Host)
PIN 4	DTR output signal, and Printer on and operating
PIN 9	LOOP RD+ input signal, used for data reception in current loop
PIN 10	LOOP RD- is the RD LOOP return
PIN 11	LOOP RTS+ output signal, indicate that is ready to receive data
PIN 12	LOOP RTS- is the RTS LOOP return
PIN 13	LOOP DTR+ output signal, indicates that the printer is ON
PIN 14	LOOP DTR- is the DTR LOOP return
PIN 15	LOOP TD+ output signal, Current loop : positive level data transmission
PIN 16	LOOP TD- is the TD LOOP return
PIN 20	RTS output signal, indicate that is ready to receive data

Table Pin Connector

The following personalizations may be obtained, relative to transmission format and the PRINT key on the SC180 front, by using the dip-switch on the RS232 card

DIP 1	DIP 2	DIP 3	Baud rate
ON	ON	OFF	300
OFF	ON	OFF	600
OFF	OFF	OFF	1200
ON	OFF	OFF	2400
ON	ON	ON	4800
OFF	ON	ON	9600

DIP 6	DIP 7	DIP 8	Protocol
OFF	OFF	OFF	N,8,1
OFF	OFF	ON	E,8,1
ON	OFF	ON	O,8,1
ON	OFF	OFF	N,7,1
OFF	ON	OFF	E,7,1
ON	ON	OFF	O,7,1

where N indicate none, E indicate even and O indicate odd (on parity type used) ; 8 or 7 is the bits number transmits and 1 is the number of bit's stop. Alls this parameters defined the communication protocol trough card and printer.

DIP 4	Description
OFF	RTS/CTS Protocol
ON	XON/XOFF Protocol

DIP 5	Description
OFF	Disable transmission
ON	Enable transmission on holding PRINT key

Centronics parallel

The connection is made with a 25-pin rectangular female connector. The signal layout is exactly the same as that used by personal computer which use the same connector, as shown in table. The pins which are not indicated are not connected.

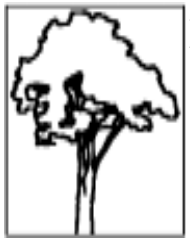
PIN 1	STROBE, input signal, an low level impulse on this pin indicate data ready to be read by the printer
PIN 2,...9	Input signals there are the 8 data (DATA1, DATA2,..., DATA8) and a low level indicate the binary number 1
PIN 10	ACK, output signal, data recognition
PIN 11	BUSY output signal, data detection.
PIN 13	SELECT, output signal, the signal is connected to Vcc with 4.7 Ohm resistance
PIN 18,...25	Pins connected to GND

There are other option further than serial or parallel interface. It can also be possible to install a power supply and a Real Time Clock (RTCK).

Autotest

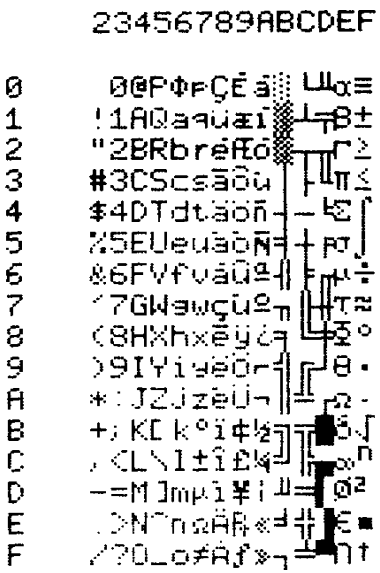
The autotest is carried out by keeping the FEED key depressed on switching the printer on. Execution of the autotest produces printout of the current printer setting data, memory check and printing of the complete ASCII character set.

Using PRINT key, the printer executes print's test for check the printer's hardware part.



The format used for this manual improves use of natural resources reducing the quantity of necessary paper to print this copy.

Character's set:



How to order the product :

Product		Code
Printers		
SC180		SC180-xx[(1)]
Options		
RS232 serial interface		RS232
Centronics parallel interface		CENTR
Real Time Clock		RTCK
Accessories		
Power supply 220 Vac - 5 Vdc		ALI150
Power supply 110/220 Vac - 5 Vdc		A150SW
Power supply 9/40 Vac - 5 Vdc		ALI9/40
Rewinder dispositive		AV2
Printing mechanism		
columns 24		MSM150
columns 42		MSM153
Consumable materials		
Paper roll 57,5 mm x Ø 50 mm		RP58
Blue ink ribbon		ERC 09 purple
Black ink ribbon		ERC 09 Black
"Long life" ink ribbon		ERC 22
Note (1)		
x = connector pin number of signal connector		
20	20 pin flat connector	
26	26 pin flat connector	

DOFE-SC180
(Rev. 100)

Custom Engineering designs and manufactured a range of integrated products and solutions for the industrial sector : panel, desk and rack printers, receipt dispenser, printing and coding systems, control cards, linear and switching power supplies and accessories

Custom Engineering designs and manufactures for specific "Custom made" application in a wide variety of sector.

Custom Engineering is a national distributor of EPSON® OEM products, in particular of printing mechanism, printers, FDD, LCD graphic and modular screens, oscillators, RTCK, PC Cards

Custom Engineering directs and manages each project from its initial planning stages to the accomplishment of the final product ; it can provide the technical back up, kits and accessories required to improve and facilitate the application of the products. We place our qualified personal, know-how, equipment, test laboratory and CE certification at the complete disposal of our clientele

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Notes :

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