

MAP-21S MINIATURE
SERIAL INPUT - 20 COLUMN
ALPHANUMERIC - THERMAL PRINTER

(with MAP-20 compatible software)

OPERATING AND INSTRUCTION MANUAL

INTRODUCTION

The MAP-21S is a miniature, panel-mounting alphanumeric printer utilizing quiet, non-impact thermal printing for low-cost display and instrumentation applications. The MAP-21S features fast, letter-quality 20-column printing in a self contained housing including control and interface electronics, AC power supply, and internal paper reservoir.

The miniature size of the MAP-21S lends itself to a host of new applications. With outline dimensions of 4.44"W x 2.75"H x 7.75"D (113 x 70 x 197 mm) excluding front panel, the MAP-21S uses just 95 cubic inches of space and weighs under 4.2 pounds (1.9kg). The small size is made possible by highly integrated microprocessor circuitry to control communications, character generation, print head control and monitoring, and motor stepping functions.

The MAP-21S is expressly designed for use in smart analytical instruments, process control monitors, security systems, hotel management dispatchers, assembly line tally systems, data acquisition systems, aircraft and vehicle systems, and data logging systems in industrial, telecommunications, traffic, environmental, and noise measurement applications.

DESCRIPTION

The MAP-21S prints the full ASCII set of upper and lower case letters, numerals, and punctuation, up to 20 columns per line, in sharp, high resolution characters (200 dots per inch). In addition to quiet, high speed operation, the MAP-21S offers print formatting features which enhance its versatility in OEM applications. These features are either data-word or DIP-switch selected and include:

Print Direction, Character Size, Form Feed, Vertical Tab, Horizontal Tab, Backspace, Carriage Return, and Line Feed.

The MAP-21S accepts serial input data in ASCII character format. An internal input buffer holds up to 1600 data characters. Data formatting and printing occurs simultaneously with communications to maximize throughput and free the user's system to perform other tasks. The industry-standard RS-232 interface can accept data at rates from 75 to 9600 baud, selected by DIP switches. A Data Terminal Ready output signal is provided to signal buffer full, paper-out, or other conditions when the printer is not read ready to accept data.

Front panel indicators monitor the status of the MAP-21S, and pushbutton switches control on/off line and paper feed functions. Printer reset and self-test functions can also be initiated from the front-panel. The microprocessor performs numerous self-testing functions, and constantly monitors printhead voltage and temperature to provide consistently uniform print quality.

FEATURES

- Miniature low-cost 20-column alphanumeric panel-mount thermal printer.
- Crisp letter-quality printing, 200 dots per inch resolution.
- Entirely self-contained. Internal drive electronics, AC power supply, and paper supply roll.
- Industry-standard RS-232 serial interface. Switch selected data rates from 75 to 9600 baud.
- Drop-in upgrade for the MAP-20S printer. Greatly improved performance, resolution and features.
- Fast, quiet thermal printing, 200 lines per minute.
- Switch-selected TEXT or LIST print orientation.
- Data word selection of single-height or double-height extended characters.
- Includes switchable dual 115/230 VAC power supply. OEMs stock one version. choice of line cords.
- Microprocessor end-of-paper sensing allows printing to the last inch of paper.
- Front-panel indicators display power, paper out and head up/down status.
- Constant monitoring and compensation for printhead voltage and temperature to assure uniform print under varying operating conditions.
- Front panel reset and self-test functions. Self-test performs extensive error-checking, provides an update of switch settings, and provides a printed sample.
- Switch selected hex dump mode aids debugging of software-related problems.
- Variable print adjustment and straight-through paper path permit use of various paper types for specialized applications (consult factory).

SPECIFICATIONS

GENERAL

Dimensions, outline:	4.44" x 2.75" x 7.00" (112.8 x 69.9 x 177.8 mm)
Dimensions, front panel:	5.25" x 2.81" 133.4 x 71.4 mm
Dimensions, front panel cutout:	4.50" x 2.78" 114.3 x 70.6 mm
Weight, with paper:	approx. 4.2 lb. (1.9 kg)
Operating temperature:	32 to 122°F (0 to 50°C)
Storage temperature:	-4 to 140°F (-20 to 60°C)
Humidity:	20 to 90%, non-condensing
Line voltage:	115 or 230 VAC ±10%, 50/60 Hz switch selected
Power consumption:	=5W idle, 9W printing, 25W pk
Fuse rating (type 3AG, slow blow):	½ amp, 250V (115 volt range) ¼ amp, 250V (230 volt range)

PAPER

Type:	direct thermal
Width:	2.26" (57.5 mm)
Thickness:	.0025" (.065 mm)
Roll diameter:	2.425" (61.5 mm)
Roll length:	=130 feet (39.6 meters)
Data capacity (normal char size):	11,300 lines
Order number: (box of 10 rolls)	11688710

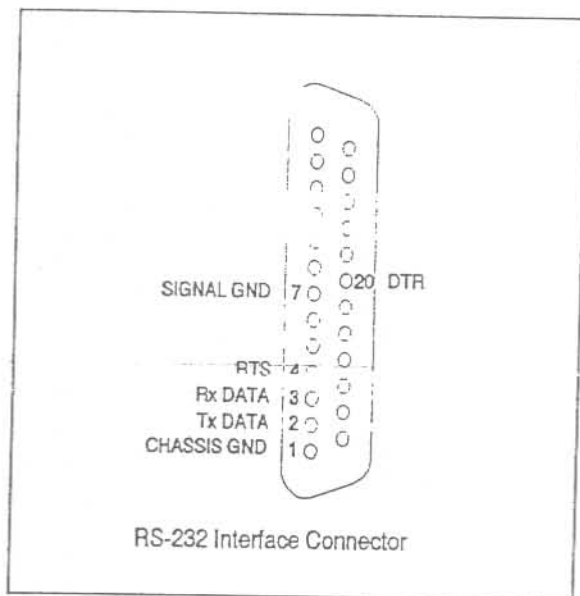
PRINT CHARACTERISTICS

Print width:	1.89" (48mm)
Dot columns:	384
Resolution:	203 dots /inch (8 dots/mm)
Character columns:	20
Character set:	95 character ASCII
Nominal char size (upper-case "H"):	
normal:	.089" x .079" (2.25 x 2.00 mm)
extended:	.177" x .079" (4.50 x 2.00 mm)
Line spacing:	.138" (3.50 mm) 7.25 lines /inch (.286 lines /mm)
Print speed (typical):	3.33 lines /second 0.46" /second (11.7 mm /second)
Paper feed:	5.8 lines /second 0.8" /second (20 mm /second)

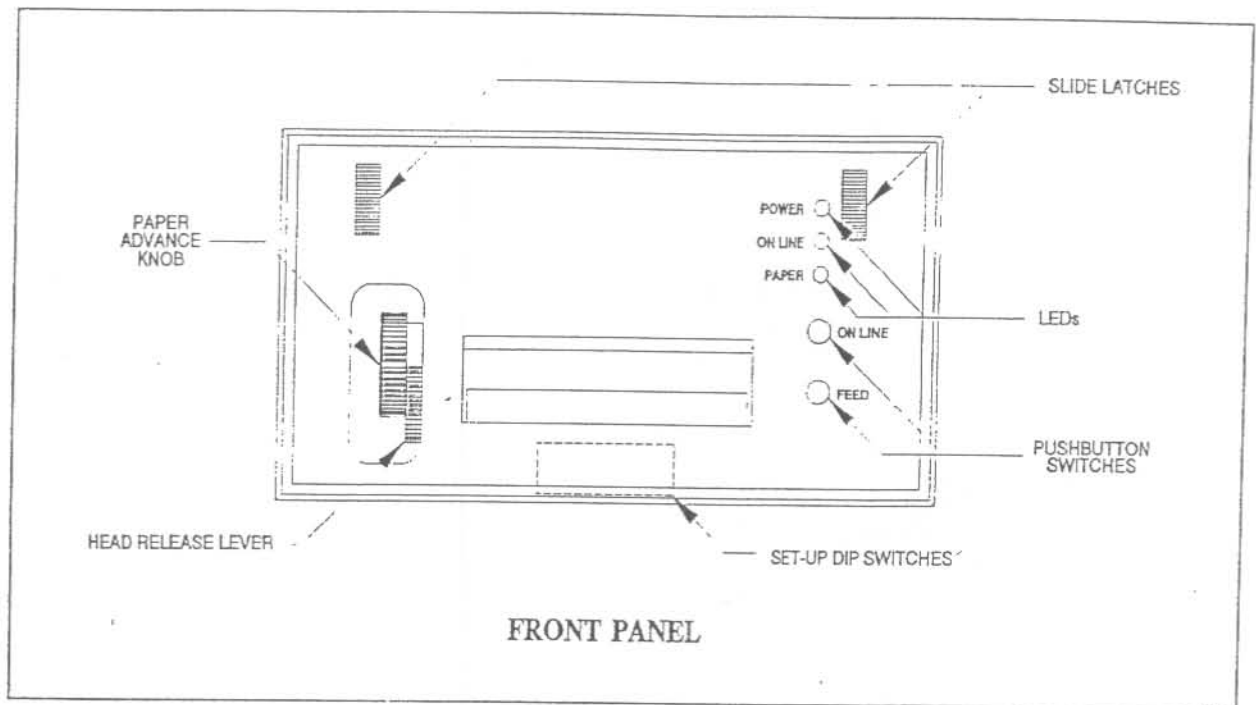
(Conditions:
25°C, continuous print, 20 single-height characters per
line, data rate = 9600 baud.)

RS-232 SERIAL INTERFACE

Configuration:	DTE (data terminal equipment)
Data rates (switch selected):	75, 150, 300, 600, 1200, 2400, 4800, 9600 baud
Data word format:	1 start, 8 data, 1 stop bit (8th data bit ignored)
Handshake method:	DTR (data terminal ready) signal
Data buffer (FIFO):	1600 characters
Connector:	DB25P (25 pin male)



- PIN 1: Chassis ground. Connector shell is also tied to chassis ground.
- PIN 2: Transmitted data. Output, active low. One RS-232 transmitter. Remains low when printer is on.
- PIN 3: Received data. Input, active low. One RS-232 receiver. Serial asynchronous data input.
- PIN 4: Ready to send. Output, active high. One RS-232 transmitter. Remains high when printer is on.
- PIN 7: Signal ground. Jumpered internally to chassis ground.
- PIN 20: Data terminal ready. Output, active high. One RS-232 transmitter. Goes high when printer is on line and ready to receive data, goes low when printer is off-line or unable to receive data. The host computer must stop sending data when DTR is low.

FRONT PANELINDICATORSPOWER

Green LED. On whenever power is applied to the printer.

ON LINE

Green LED. Indicates printer on-line / off-line status. When the ON LINE indicator is off, printing is paused, and the DTR signal on the interface goes false to indicate that the printer is busy. When the ON LINE indicator is on, the DTR signal will go true and the MAP-21S will accept, buffer, and print data received from the host. If the FIFO buffer fills while the printer is on-line, the MAP-21S will remain on-line and continue to print, but the DTR pin will go false, signalling the host to stop sending data until more FIFO space becomes available. The ON LINE LED is also used together with the PAPER LED to indicate unusual error conditions. (See the table below).

PAPER

Red LED. Normally off. Is lit continuously when the printer is out of paper. Flashes when the printer has paper but the printhead release lever is in the released position. In either of these cases, the printer goes off-line, and ON LINE indicator is turned off. The PAPER LED is also used together with the ON LINE LED to indicate unusual error conditions. (See the table below).

ON LINE LED	PAPER LED	STATUS INDICATION
ON	OFF	On line. Printing and communications enabled.
OFF	OFF	Off line. Printing and communications disabled. Press ON LINE switch to resume.
OFF	ON	Paper out (off line). Refill paper supply, engage print head, and press ON LINE to resume.
OFF	FLASH	Head up (off line). Engage print head, and press ON LINE to resume.
ON	ON	Hardware error. Printer CPU not running properly. Turn printer off, then on again to clear. Contact factory if condition persists.
ON	FLASH	Head over/under voltage error. Reset printer or turn printer off, then on again to clear. Contact factory if condition persists.
FLASH	OFF	Hardware error. Printer CPU not running properly. Turn printer off, then on again to clear. Contact factory if condition persists.
FLASH	ON	Self-test error. Reset printer to clear. Contact factory if condition persists.
FLASH	FLASH	Head over/under temperature error. Wait for print head to cool and reset printer to clear. Contact factory if condition persists.

CONTROLS

ON LINE

Pushbutton switch. Toggles the MAP-21S between on-line and off-line status, as shown by the ON LINE indicator. The printer will not go on-line if it is out of paper, the head release lever is in the up position, or if some other error condition exists. Also used together with the FEED switch to reset the printer or initiate a self-test. (See description below).

FEED

Pushbutton switch. If the MAP-21S is off-line, pressing FEED causes the current line to be printed. Holding the FEED switch will cause additional paper to be fed until the switch is released. The FEED switch has no effect when the printer is on-line. The FEED switch is also used together with the ON LINE switch to reset the printer or initiate a self-test. (See description below).

Reset Function

Press and hold both ON-LINE and FEED switches simultaneously; release the FEED switch first. The set-up switches will be read and the MAP-21S will be re-initialized. The current line and the FIFO buffer will be cleared.

Self Test Function

Press and hold both ON-LINE and FEED switches simultaneously; release the ON-LINE switch first. The Reset Function will be performed as above, then a self-test strip will be printed out.

The self-test printout consists of a memory test report, a listing of the MAP-21S configuration according to the current set-up switch settings, a character set printout, and a checkerboard test pattern. At the end of the self-test, the printer will go on-line after a short delay.

The self-test function may also be activated by pressing and holding the FEED switch while turning on power to the MAP-21S.

SET-UP (DIP) SWITCHES

Various MAP-21S set-up functions are controlled by a bank of DIP switches located on the underside of the front panel slide assembly. The settings of these switches are read when the printer is first turned on or whenever the printer is reset from the front panel. The MAP-21S is shipped from the factory with all switches in the OFF position

SWITCH	Function, switch OFF	Function, switch ON
1	BAUD RATE SELECTION:	#3 #2 #1 RATE
		off off off 9600
		off off on 4800
		off on off 2400
2	off on on 1200	
	on off off 600	
3	on off on 300	
	on on off 150	
	on on on 75	
4	Print orientation = TEXT	Print orientation = LIST
5	Line wrap = ENABLED	Line wrap = DISABLED
6	not used	
7	not used	
8	Hex dump mode = DISABLED	Hex dump mode = ENABLED

Print orientation:

This switch determines whether the characters emerge from the printer right-side-up or upside-down.

In TEXT orientation, character lines emerge upside down. Each line of the final printout is printed below the preceding line. This mode should be used for normal document printing.

In LIST orientation, characters emerge from the printer right-side-up for easy reading as the data is being printed. This mode is sometimes used for data-logging application. Note that on the final printout, each line of characters is printed above the preceding line.

Line wrap:

This switch determines what the printer does if it receives more than 20 character columns of data per line.

If line wrap is ENABLED, receipt of the 21st character will cause the filled line buffer to be printed. The 21st and succeeding characters will go on the next line, to be printed when the line buffer overflows again or a carriage return is received.

If line wrap is DISABLED, the 21st and succeeding characters will be ignored. Nothing will be printed until a carriage return is received.

Hex dump mode:

This switch enables or disables a special hex dump mode. With the switch enabled, data is printed in a numeric format for debugging purposes. With the switch disabled, the MAP-21S operates in the normal manner.

The hex dump printout consists of five columns of hexadecimal numbers. If the data are printable ASCII characters, these characters are also printed on the right side of the printout. Control code characters have no effect in this mode; only their numeric value will be printed. Take the MAP-21S off-line and press the FEED switch to view the last partially-completed line of the printout.

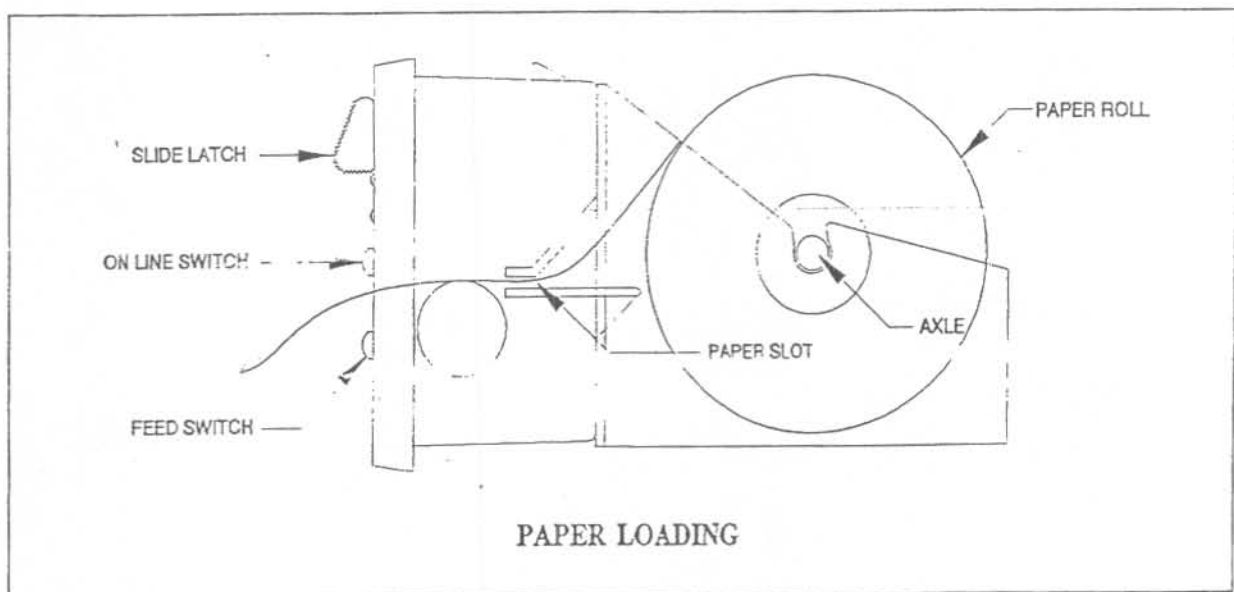
SOFTWARE COMMANDS

The MAP-21S recognizes 95 of the 128 possible 7-bit ASCII characters as printable. Of the remaining characters, those shown in the table below are interpreted as control characters. All other non-printable characters are interpreted as spaces. The 8th data bit is ignored.

CONTROL CODE				ACTION
ASCII	HEX	DECIMAL	KEYBD	
NUL	00,80	0,128	CTRL-SHFT-P	Null - do nothing.
BS	08,88	8,136	CTRL-H	Backspace. Delete the previous printable character.
HT	09,89	9,137	CTRL-I	Horizontal Tab. Advance to next tab column: 4, 9, or 15.
LF	0A,8A	10,138	CTRL-J	Line Feed. Advance 1 character line. Does not print. Has no effect on line buffer.
VT	0B,8B	11,139	CTRL-K	Vertical Tab. Advance 5 character lines. Does not print. Has no effect on line buffer.
FF	0C,8C	12,140	CTRL-L	Form Feed. Advance one character line. Does not print. Has no effect on line buffer.
CR	0D,8D	13,141	CTRL-M	Carriage return. Print contents of line buffer, advances paper. Line buffer is clear after printing.
SO	0E,8E	14,142	CTRL-N	Shift Out. Set character height to double (extended characters).
SI	0F,8F	15,143	CTRL-O	Shift In. Set character height to single (normal characters).
DEL	7F,FF	127,255	DEL	Delete. Clear line buffer.

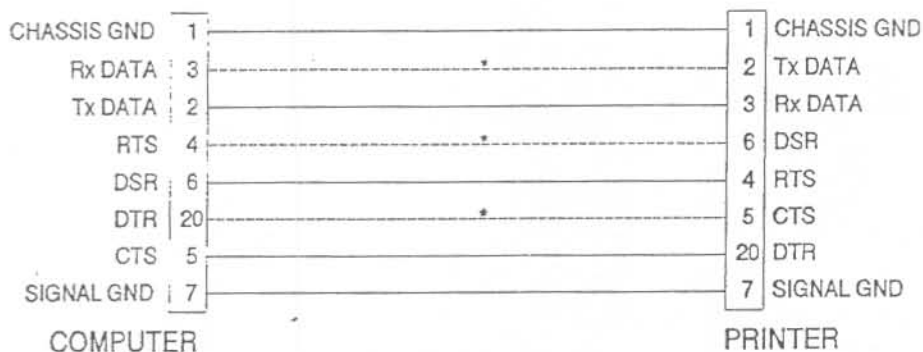
PAPER LOADING

- 1) Rotate the paper advance knob downward to advance any remaining paper out of the printer. Lift up on the head release lever to raise the print head from the roller.
- 2) Lift up on both slide latches to release the slide assembly and pull the slide out of the housing until it stops. Lift the spent paper roll and axle from the notches in the slide assembly. Slide the axle out of the used paper roll. Do not discard the axle!
- 3) Break the seal on the new roll of paper. Tear off and discard the first layer of paper, including the glue or tape seal. Tear or cut cleanly for easy paper insertion. Slide the axle into the new paper roll and position the axle with the new roll above the notches in the slide assembly. Be sure the paper is fed from the top of the roll; only the outside surface of the paper is treated for printing.



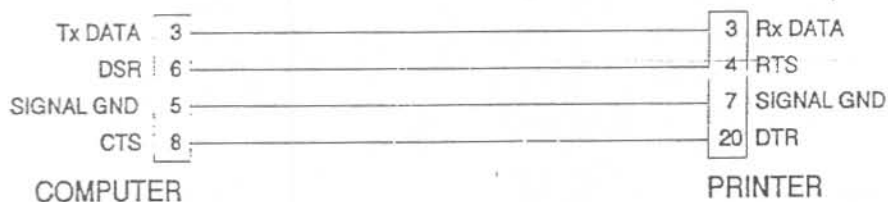
- 4) Thread the paper into the paper slot and through the mechanism until it comes out the slot of the front panel. The PAPER light on the front panel change from on to flashing.
- 5) Push down on the paper roll to seat the axle firmly into the bottom of the notches. Make sure the paper passes straight through the mechanism, then lower the head release lever. The PAPER light should turn off.
- 6) Push the slide back into the housing until the latches engage. Press the front-panel FEED button to check that the paper emerges smoothly from the mechanism. Press the ON LINE button to resume operation.

RS-232 Serial interface Cable to PC with 25-pin serial port



* NOTE: These connections are not required; adding them makes the cable ends interchangeable.

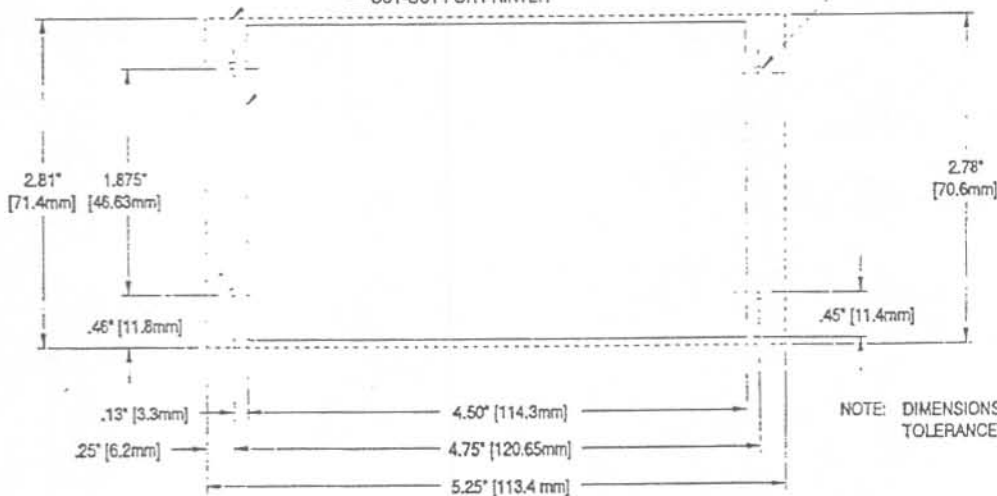
RS-232 Serial interface Cable to PC with 9-pin serial port



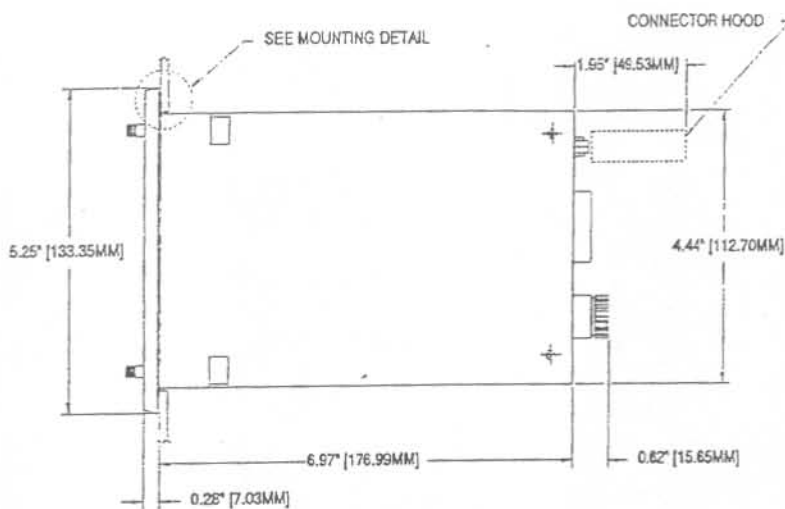
— FRONT PANEL OF PRINTER

— CUT-OUT FOR PRINTER

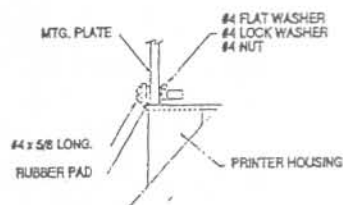
(4) .125" DIA. THRU FOR #4 (M3)
MOUNTING HARDWARE



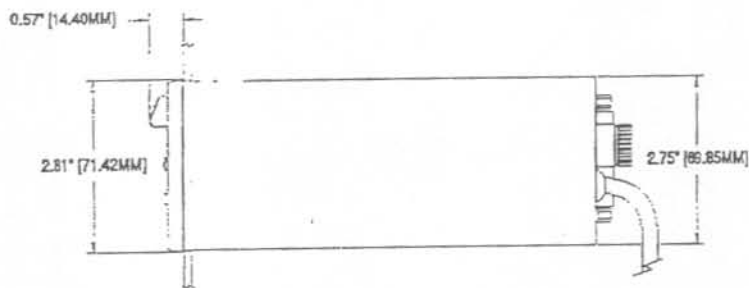
FRONT PANEL OUTLINE AND PANEL MOUNTING CUTOUT



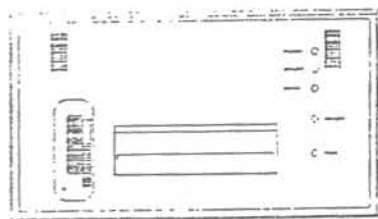
PRINTER OUTLINE - TOP VIEW



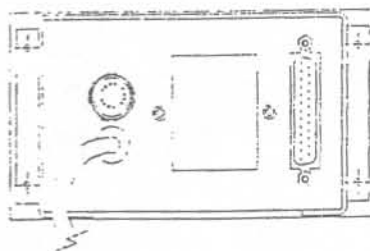
MOUNTING DETAIL



PRINTER OUTLINE - SIDE VIEW



PRINTER OUTLINE - FRONT VIEW



PRINTER OUTLINE - REAR VIEW