

DM4-16268B

2 Lines x 16 Character Intelligent Display
Operation and Instruction Manual
RS232/RS485 Input



Operating Instructions

The DM4-16268B Serial Input LCD Display accepts its input via RS232 or RS485 with a variety of baud rates. A Multidrop Address is provided to allow many displays to operate from the same RS232 or RS485 line.

Data must be in the format of 8 data bits, no parity.

The baud rate and address are set using dip switches as follows:-

Dip Switches (1, 2 & 3)

Dip Switches (1, 2 & 3)			Function
3	2	1	Baud Rate Setting
OFF	OFF	OFF	19200 Baud
OFF	OFF	ON	9600 Baud
OFF	ON	OFF	4800 Baud
OFF	ON	ON	2400 Baud
ON	OFF	OFF	1200 Baud
ON	OFF	ON	600 Baud
ON	ON	OFF	300 Baud
ON	ON	ON	150 Baud

Dip Switches (4, 5, 6, 7 & 8)

Dip Switches (4, 5, 6, 7 & 8)					Function
8	7	6	5	4	Multidrop Address
(16)	(8)	(4)	(2)	(1)	(Switch values for address)

Example

OFF OFF ON ON OFF (e.g. 00110 gives address 6)

If all switches are OFF (address 0) then the display does not require <STX> address and number of characters. It will accept and display whatever characters are received. A message sent with address 0 will be displayed on all units regardless of their individual address settings (address 0 is a broadcast address).

The format for the message is as follows:- <STX> AD NC M1 M2 M3 where:

<STX> = start of text (02 hex)

AD = address (20 hex + address value {0 to 31})

NC = number of characters (20 hex + No of characters {max 96}). Note the number of characters must include any commands in the message which follow
e.g. ^L1234<CR>5678 counts as 10 characters.

M1 etc = messages or command bytes in ASCII

The address has a 20 hex or 32 decimal offset to avoid sending control characters as the address. The number of characters are required so that the display is aware of end of message position. The message bytes consist of ASCII characters which make up the message to be displayed, see "ASCII Code Conversion Table" for a listing of ASCII codes. Various ESCAPE sequences and control characters may be embedded in the message to perform the following tasks:-

<ESC> Y (1B hex 59 hex) - Clear to End of Line:

Clears from the current cursor position to the end of the current line and returns the cursor to the current position.

e.g. For an instrument at address 1 using the standard <STX> AD NC M1 M2 etc. format the command <STX>!"<ESC>Y will clear to the end of the line. In a terminal program this may be entered as ^B!"^Y

<ESC> C XX (1B hex 43 hex XX) - Turn Cursor ON or OFF:

This escape sequence will either enable or disable the cursor depending on the value of XX. When XX is 20 hex the cursor will be disabled, when XX is 21 hex the cursor is enabled. Other values of XX will be ignored.

e.g. For an instrument at address 1 using the standard <STX> AD NC M1 M2 etc. format the command <STX>!#<ESC>C! will turn the cursor on. In a terminal program this may be entered as ^B!#[C!

<ESC> = XX YY (1B hex 3D hex XX YY) - Locate Cursor at Position XX,YY:

This sequence allows the user to locate the cursor anywhere within screen memory. XX is valid from 20 hex to 47 hex and YY is valid for 20 hex and 21 hex only (both XX and YY are offset by 20 hex as per Cursor ON/OFF above). Values outside the valid range will be ignored and no action will be taken. Valid screen addresses for XX are from 20 hex to 2F hex only (display has only 16 characters per line). Note: locations start with 0, this being the left hand side digit for each line.

e.g. For an instrument at address 2 using the standard <STX> AD NC M1 M2 etc. format the command <STX>"\$<ESC>=&! will cause the cursor to move to position 6 on the bottom row of the display. In a terminal program this may be entered as ^B"\$^[&!

Ctrl-L (0C hex) - Clear Screen and Home Cursor:

This control character will clear the screen memory and return the cursor to the top left corner of the display.

e.g. For an instrument at address 1 using the standard <STX> AD NC M1 M2 etc. format the command <STX>!!<Ctrl-L> will clear the display and home the cursor. In a terminal program this may be entered as ^B!!^L

Ctrl-^ (1E hex) - Home Cursor:

This control character will return the cursor to the top left corner of the display without clearing the display memory.

It may not be possible to successfully send this command via a terminal program since the "^" character may be interpreted as a Ctrl indicator rather than 1E hex. As part of the program sending messages to the display the value 1E hex (30 decimal) must be sent after the <STX> AD and NC characters.

Ctrl-H (08 hex) - Backspace:

This performs a destructive backspace. The previous character is deleted and the cursor is moved back one space. If the cursor is at the start of the line then this control character will be ignored.

e.g. For an instrument at address 2 using the standard <STX> AD NC M1 M2 etc. format the command <STX>!"<Ctrl-H> will cause a destructive backspace. In a terminal program this may be entered as ^B!"^H

<CR>(0D hex) - Carriage Return:

A carriage return will position the cursor on the start of the second line of the display. As there are only 2 lines subsequent carriage returns received when the cursor is already on the second line will just cause the cursor to return to the start of the second line.

Up to forty characters per line may be sent to the display although only 16 will be visible. If more than forty characters are sent without resetting the cursor or sending a carriage return then subsequent characters will be ignored. Each message must have a <STX> and valid address to be decoded by the display.

Examples

Example 1:

e.g. For an instrument at address 2 using the standard <STX> AD NC M1 M2 etc. format the command:

```
<STX>"* <Ctrl-L>1234<CR>5678
```

will give the display:

1234

5678

In a terminal program this may be entered as `^B"*^L1234^M5678`

Where: `^B` = start of text character <STX> (02 hex 02 dec)

`"` = address 2 (22 hex 34 dec)

`*` = number of characters (10 in this case) which follow (2A hex 42 dec)

`^L` = clear screen & home cursor command <Ctrl-L> (0C hex 12 dec)

1234 = display message for the top line (31 to 34 hex 49 to 52 dec)

`^M` = carriage return <CR> command (0D hex 13 dec)

5678 = display message for the bottom line (35 to 39 hex 53 to 57 dec)

Example 2:

e.g. for an instrument with address 0 simply sending 1234<CR>5678 will give the same display as shown in example 1.

Example 3:

e.g. for an instrument with address 1 to send the characters AB to position 3 & 4 on the bottom line of the display the following string could be used:

```
<STX>!&<ESC>=#!AB
```

or in terminal mode `^B!&^[=#!AB`

Where: `^B` = start of text character <STX> (02 hex 02 dec)

`!` = address 1 (21 hex 33 dec)

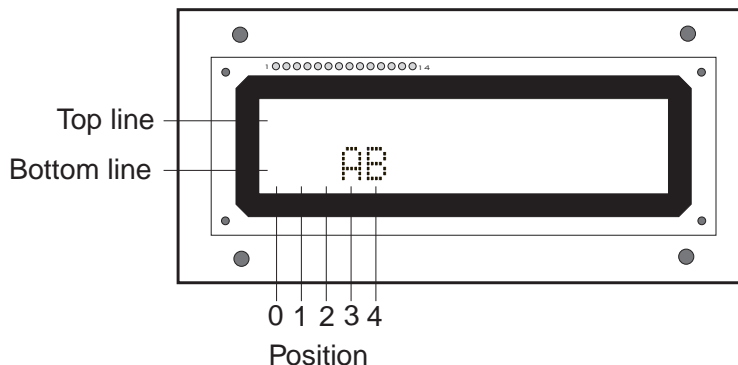
`&` = number of characters (6 in this case) which follow (26 hex 38 dec)

`^[` = is the locate cursor command <ESC>= (1B hex & 3D hex 27 dec & 61 dec)

`#!` is the cursor position (23 hex & 21 hex 35 dec & 33 dec)

AB = display message (41 hex & 42 hex 65 dec & 66 dec)

The drawing below illustrates the results of this message string.



ASCII Code Conversion Table

ASCII Char.	Dec	Hex	ASCII Char.	Dec	Hex	ASCII Char.	Dec	Hex
NUL (^@)	000	00	+	43	2B	V	86	56
SOH (^A)	001	01	,	44	2C	W	87	57
STX (^B)	002	02	-	45	2D	X	88	58
ETX (^C)	003	03	.	46	2E	Y	89	59
EOT (^D)	004	04	/	47	2F	Z	90	5A
ENQ (^E)	005	05	0	48	30	[	91	5B
ACK (^F)	006	06	1	49	31	\	92	5C
BEL (^G)	007	07	2	50	32	]	93	5D
BS (^H)	008	08	3	51	33	^	94	5E
HT (^I)	009	09	4	52	34	_	95	5F
LF (^J)	010	0A	5	53	35	'	96	60
VT (^K)	011	0B	6	54	36	a	97	61
FF (^L)	012	0C	7	55	37	b	98	62
CR (^M)	013	0D	8	56	38	c	99	63
SO (^N)	014	0E	9	57	39	d	100	64
SI (^O)	015	0F	:	58	3A	e	101	65
DLE (^P)	016	10	;	59	3B	f	102	66
DC1 (^Q)	017	11	<	60	3C	g	103	67
DC2 (^R)	018	12	=	61	3D	h	104	68
DC3 (^S)	019	13	>	62	3E	i	105	69
DC4 (^T)	020	14	?	63	3F	j	106	6A
NAK (^U)	021	15	@	64	40	k	107	6B
SYN (^V)	022	16	A	65	41	l	108	6C
ETB (^W)	023	17	B	66	42	m	109	6D
CAN (^X)	024	18	C	67	43	n	110	6E
EM (^Y)	025	19	D	68	44	o	111	6F
SUB (^Z)	026	1A	E	69	45	p	112	70
ESC (^[)	027	1B	F	70	46	q	113	71
FS (^)	028	1C	G	71	47	r	114	72
GS (^])	029	1D	H	72	48	s	115	73
RS (^)	030	1E	I	73	49	t	116	74
US (^_)	031	1F	J	74	4A	u	117	75
SP ()	032	20	K	75	4B	v	118	76
!	033	21	L	76	4C	w	119	77
"	034	22	M	77	4D	x	120	78
#	035	23	N	78	4E	y	121	79
\$	036	24	O	79	4F	z	122	7A
%	037	25	P	80	50	{	123	7B
&	038	26	Q	81	51	|	124	7C
'	039	27	R	82	52	}	125	7D
(	040	28	S	83	53	~	126	7E
)	041	29	T	84	54	DEL	127	7F
*	042	2A	U	85	55			

Mechanical Installation

The DM4-16268B is designed for mounting behind a panel with a window cutout. To install measure and cut out a window (size 99 x 23mm) and drill 4 x 3mm screw mounting holes, as shown below (fig 2). Mount clear acrylic faceplate behind panel and bolt into position with 3mm bolts - being careful not to overtightened (acrylic may break). If required a sealant may be used between panel and acrylic to improve sealing.

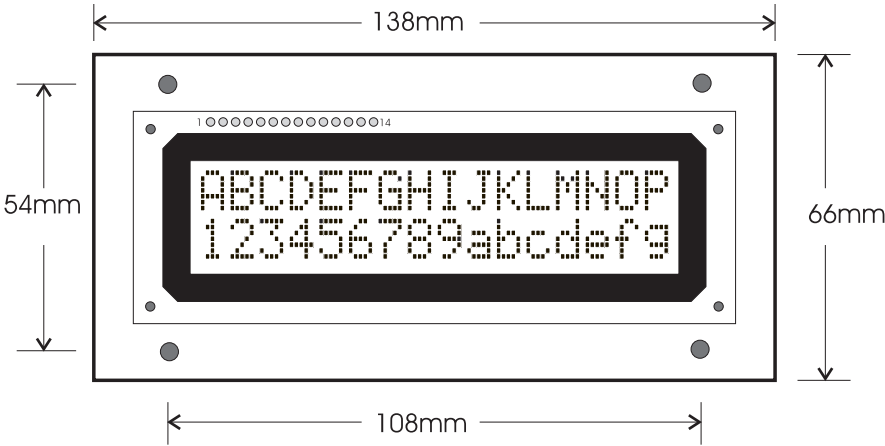


Fig 1: Module dimensions and location of mounting holes

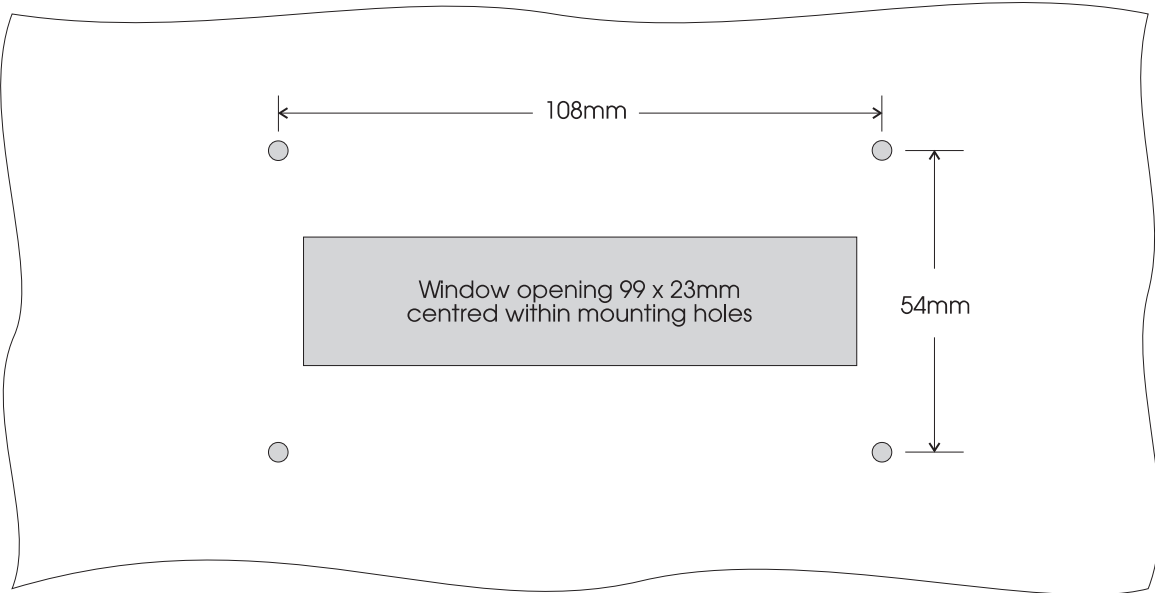


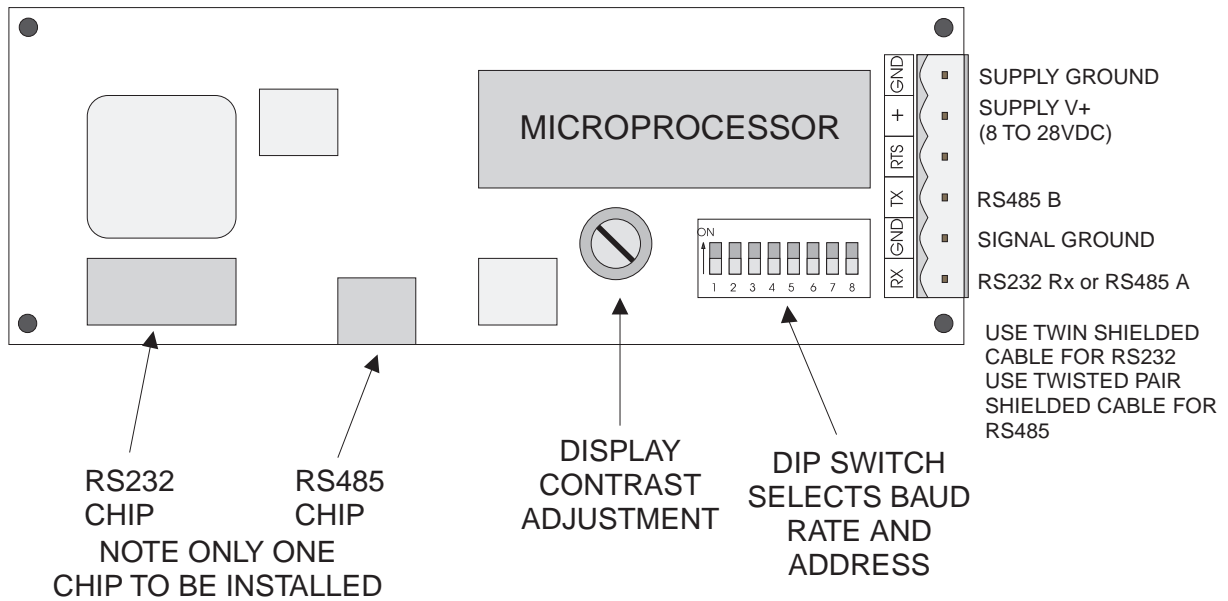
Fig 2: Installation into a panel or housing

Electrical Installation

The DM4-16268B is designed for installation into OEM equipment, electrical connections are made via plug-in screw terminal connectors as shown below. The module is supplied fitted with the components required for either RS232 or RS485 - for RS232 operation the MAX232 chip or similar is fitted and for RS485 operation the MAX483 chip or similar is fitted (only one of these chips should be installed).

The Dip switches are used for setting up the baud rate and the mulidrop address (see "Operating Instructions").

If required the display contrast adjustment may be carefully trimmed to obtain the optimum display readability.



Specifications

Power supply:	8 to 28 VDC
Input:	RS232 or RS485 (factory configured)
Data:	8 data bits
Parity:	None
Baud rate:	Dip switch selectable 150 to 19200 baud
Multidrop address:	Dip switch selectable 0 to 31
Display:	2 lines x 16 characters
Character size:	4.84mm wide x 9.22mm high (5 x 8 dots)
Display illumination:	Rear lit LED panel
Power consumption:	Typical values: 130mA at 9V 90mA at 12V 70mA at 18V 60mA at 24V
Display window size:	99 x 23mm
Module size:	138 x 66mm
IP65 model size:	170 mm (W) x 80 mm (H) x 65 mm (D)
Behind panel depth:	50mm (allow additional for cable)
Weight:	200 grams (module only)

Guarantee & Service

The product supplied with this manual is guaranteed against faulty workmanship for a period of 2 years from the date of dispatch.

Our obligation assumed under this guarantee is limited to the replacement of parts which, by our examination, are proved to be defective and have not been misused, carelessly handled, defaced or damaged due to incorrect installation. This guarantee is VOID where the unit has been opened, tampered with or if repairs have been made or attempted by anyone except an authorised representative of the manufacturing company.

Products for attention under guarantee (unless otherwise agreed) **must be returned to the manufacturer freight paid** and, if accepted for free repair, will be returned to the customers address in Australia free of charge.

When returning the product for service or repair a full description of the fault and the mode of operation used when the product failed must be given.

In any event the manufacturer has no other obligation or liability beyond replacement or repair of this product.

Modifications may be made to any existing or future models of the unit as it may deem necessary without incurring any obligation to incorporate such modifications in units previously sold or to which this guarantee may relate.

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