DC209

The **DC209** is a boxed 1 line of 20 character **V**acuum **F**luorescent **D**isplay. It has been designed to provide an electrically and mechanically rugged display for industrial enviroments.

FEATURES:

- **1 x 20 character 9mm high VFD.**
- **RS485 interface. (Optional RS232).**
- **Displays can be individually addressed via dip switches enabling up to 63 displays on one RS485 bus.**
- **Wide supply voltage range from 8Vdc to 30Vdc. (Optional +5Vdc supply).**
- **Operating temperature -10°C to +65°C.**
- **High brightness blue green display.**
- **ASCII, Katakana and extended character fonts.**
- **8 user definable character RAM.**
- **Black powder coated metal enclosure.**
- **Detachable screw terminals for easy connection.**
- **CE approved.**

INTERFACE CONNECTION

Display connection.

8 pin Amp “Termi-Blok” screw terminal connector.

PIN NUMBER	SIGNAL
1	RS485 A (RS232 Rx)
2	RS485 A (RS232 Rx)
3	RS485 B
4	RS485 B
5	GND (0V) (RS232 0V)
6	GND (0V)
7	+8 to +30 Vdc
8	+8 to +30 Vdc

Each signal has two connections to enable cascading.

Dip switch setting.

At the rear of the display there are 6 Dip switches used to set the address of the display. These are set in a binary fashion i.e.:

SW1	SW2	SW3	SW4	SW5	SW6	ADDRESS
OFF	OFF	OFF	OFF	OFF	OFF	00
ON	OFF	OFF	OFF	OFF	OFF	01
OFF	**ON**	OFF	OFF	OFF	OFF	02
ON	**ON**	OFF	OFF	OFF	OFF	03
OFF	OFF	**ON**	OFF	OFF	OFF	04
ON	OFF	**ON**	OFF	OFF	OFF	05
-	-	-	-	-	-	-
ON	**ON**	OFF	**ON**	**ON**	**ON**	59
OFF	OFF	**ON**	**ON**	**ON**	**ON**	60
ON	OFF	**ON**	**ON**	**ON**	**ON**	61
OFF	**ON**	**ON**	**ON**	**ON**	**ON**	62
ON	**ON**	**ON**	**ON**	**ON**	**ON**	63

ELECTRICAL SPECIFICATIONS

SYMBOL	PARAMITER	MIN	TYP	MAX	UNIT
+Vdc in	Supply voltage	8.0	24	30	V
+Idc in	Supply currant		100	300 @ 8Vdc	mA
V_{TH}	RS485 Receiver Differential	-0.2		0.2	V
ΔV_{TH}	RS485 Input Hysteresis		70		mV
Vag	RS485 Input ESD Protection Air Gap Method	-15		+15	KV
Vcd	RS485 Input ESD Protection Contact Discharge Method	-8		+8	KV
Top	Operating Semperature	-10		+65	^{o}C
Tstg	Storage Temperature	-40		+85	^{o}C

Note the power on rise time should be less than 50 ms. The inrush current at power on can be 2 x Idc.

Protocol information

Data interface: RS485 at 96,N,8,1.
Optional RS232.

Data Protocol:

Start character	STX (02h)
Address:	Ms nibble (hex ascii 0-3)
Address:	Ls nibble (hex ascii 0-F)
Data	1st character for display (ascii data)
Data	2nd character for display (ascii data)
Data	“
Data	“
Data	79th character for display (ascii data)
End character	ETX (03h)

Note: The buffer holds up to 80 characters including ETX.
Data is only sent to the display on receipt of the ETX character.
Data will only be valid if the address is “00” or matches the address set on the dip switches.

Example: To send “DATACRAFT” to a display with address 2A the following string is required.

ASCII: STX, 2, A, DATACRAFT, ETX
HEX: 02 32 41 44 41 54 41 43 52 41 46 54 03

Command information

The following commands control the operation of the display:

BS **B**ack **S**pace (08 Hex)
The cursor moves one character to the left.
At the left end the cursor doesn't move.

HT **H**orizontal **T**ab (09 Hex)
The cursor moves one character to the right.
At the right end the cursor motion depends on the mode set:

DC1: The cursor doesn't move.
DC2: The cursor doesn't move.
DC3: All the displayed characters move left by one position and the right most position is cleared. The cursor doesn't move.

LF **L**ine **F**eed (0A Hex)
All displayed characters are cleared . The cursor doesn't move.

FF **F**orm **F**eed (0C Hex)
The cursor moves to the left end.

CR **C**arriage **R**eturn (0D Hex)
The cursor moves to the left end.

CLR **C**lear (0E Hex)
All displayed characters are cleared. The cursor doesn't move.

DC1 **D**evice **C**ontrol 1 (11 Hex) Automatic Carriage Return Mode. (Default).
When the cursor reaches the right end the next character written will cause a carriage return.

DC2 **D**evice **C**ontrol 2 (12 Hex) Over Write Mode.
When the cursor reaches the right end further characters over write the right most position.

DC3 **D**evice **C**ontrol 3 (13 Hex) Horizontal Scroll Mode.
When the cursor reaches the right end the next character written causes the cursor to move to an imaginary right end + one position. Further character writes shift all the displayed characters left and the new character is placed at the right most position. If DC1 or DC2 modes are selected when DC3 mode is set then the cursor moves to the left end.

DC4 **D**evice **C**ontrol 4 (14 Hex) Cursor rendition. (Default).
The Cursor is turned invisible.

DC5 **D**evice **C**ontrol 5 (15 Hex) Cursor rendition.
The Cursor is displayed as a flashing all dot character.

DC6 Device **C**ontrol 6 (16 Hex) Cursor rendition.
The Cursor is turned invisible.

DC7 Device **C**ontrol 7 (17 Hex) Cursor rendition.
The Cursor is turned invisible.

CT0 **C**haracter **T**able 0 (18 Hex)
International Character Font (Default).

CT1 **C**haracter **T**able 1 (19 Hex)
Katakana Character Font.

ESC **E**scape (1B Hex)
The character or data strings following the Escape code have variuos functions as follows:

User Definable Fonts (UDF).

Syntax: ESC (1B Hex) + "C" (43 Hex) + CHR + PT1 + PT2 + PT3 + PT4 + PT5

Any 5 x 7 dot patterns consisting of data from PT1 through to PT5 can be stored in character code location CHR. The maximum number of UDFs is 8 characters at once. Storing more than 8 will over write the oldest unless it is a CHR already specified in which case that CHR will be over written.

1st Byte ESC (1B Hex)
2nd Byte "C" (43 Hex)
3rd Byte CHR (00 to FF Hex)
Avoid selecting CHR as control codes such as BS or ESC as these codes will then be unavailable.
4th to 8th Byte PT1 to PT5
Specify the ON (1) or OFF (0) of 35 dot positions of the character required using the following tables:

	7 MSB	6	5	4	3	2	1	0
4th byte	P8	P7	P6	P5	P4	P3	P2	P1
5th byte	P16	P15	P14	P13	P12	P11	P10	P9
6th byte	P24	P23	P22	P21	P20	P19	P18	P17
7th byte	P32	P31	P30	P29	P28	P27	P26	P25
8th byte	*	*	*	*	*	P35	P34	P33

Character.

P1	P2	P3	P4	P5
P6	P7	P8	P9	P10
P11	P12	P13	P14	P15
P16	P17	P18	P19	P20
P21	P22	P23	P24	P25
P26	P26	P28	P29	P30
P31	P32	P33	P34	P35

Cursor positioning.

The cursor can be moved to any position of the display with the following sequence.

Syntax: ESC (1B Hex) + “H” (48 Hex) + 1 byte data.

Left end	2nd	3rd	----------	18th	19th	Right end
00	01	02	----------	11	12	13

For Data = 14 Hex to FF Hex the cursor is not affected.

Luminance Control.

The display luminance can be varied with the following sequence.

Syntax: ESC (1B Hex) + “L” (4C Hex) + 1 byte data.

Data = 00 Hex to 3F Hex : approx. 25%
40 Hex to 7F Hex : approx. 50%
80 Hex to BF Hex : approx. 75%
C0 Hex to FF Hex : 100% (Default).

Writing Mode.

Flickerless Mode can be selected with the following sequence.

Syntax: ESC (1B Hex) + “S” (53 Hex)

Flickerless Mode allows data to be continuously sent to the display without causing any flickering. It is achieved by giving display refreshing priority over data acceptance.

Blink Speed Control.

The Blinking speed of the block cursor can be varied with the following sequence.

Syntax: ESC (1B Hex) + “T” (54 Hex) + 1 byte data.

Data = 00 Hex to FF Hex
Period of Blinking = Data value x 14.5 mS.
Default = 14 Hex (290 mS).

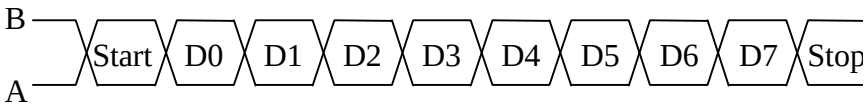
Initialise.

All displayed characters are cleared and function defaults are set with the following sequence. (Same at just after power on).

Syntax: ESC (1B Hex) + “I” (49 Hex)

Serial Interface.

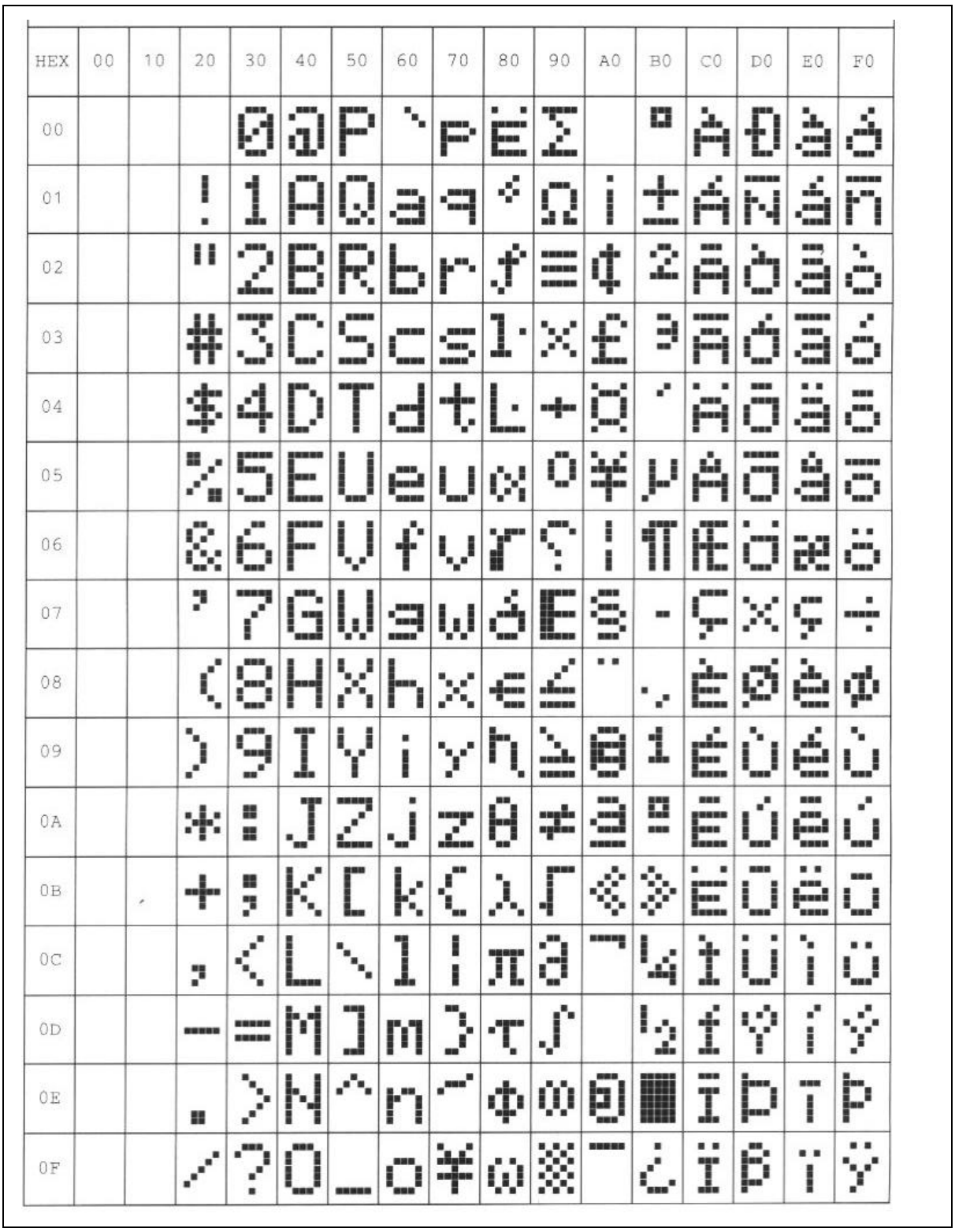
Data can be sent to the display in asynchronous format on an RS485 bus. (Optopnal RS232). At 9600 baud no parity 8 bit data 1 stop bit.



Customisation.

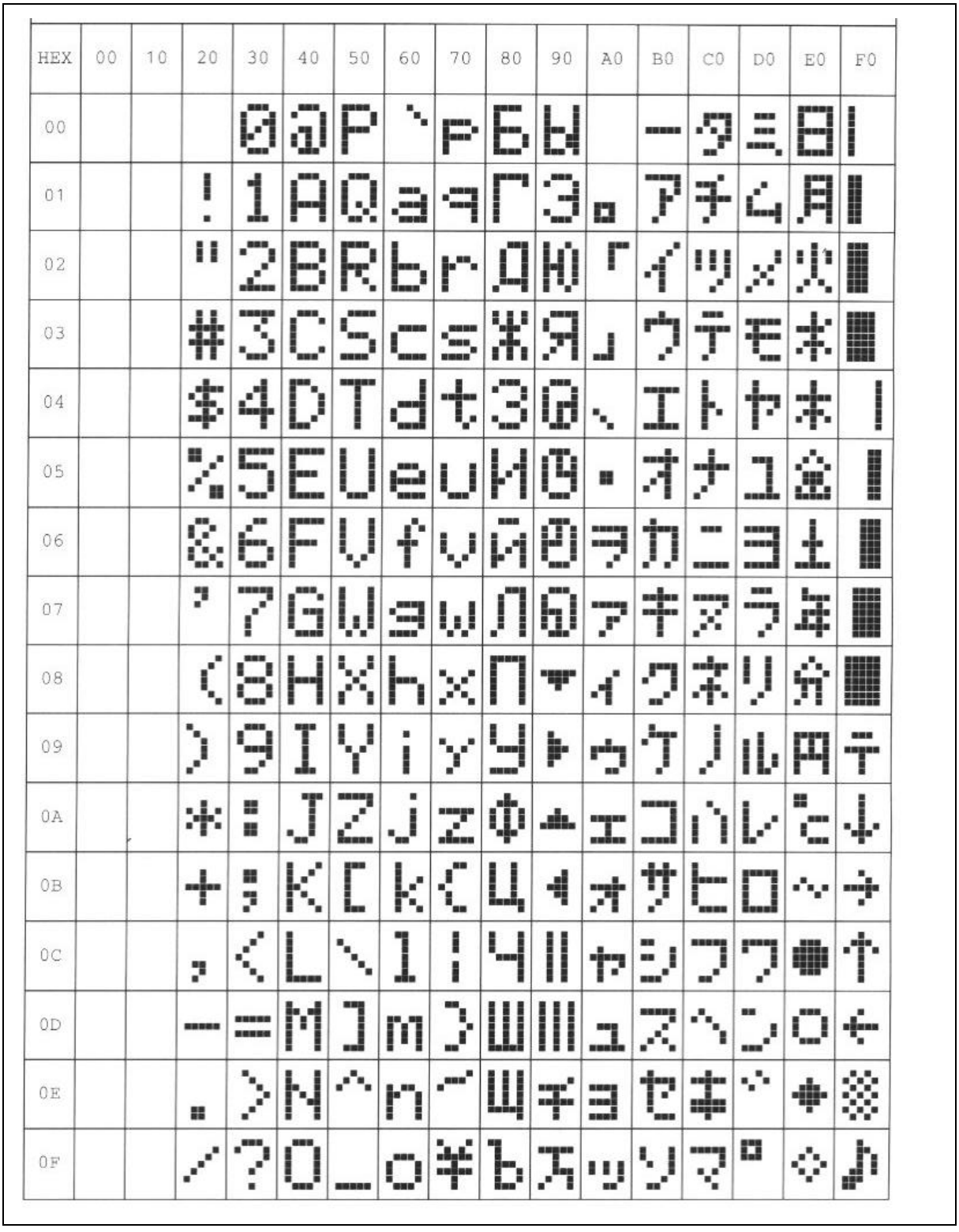
Datacraft will be happy to discuss any customisation to the above product to help it suit your specific application. Please contact us on 01493 332325 or Email us at sales@datacraft.uk.com

International Character Font (CT0).

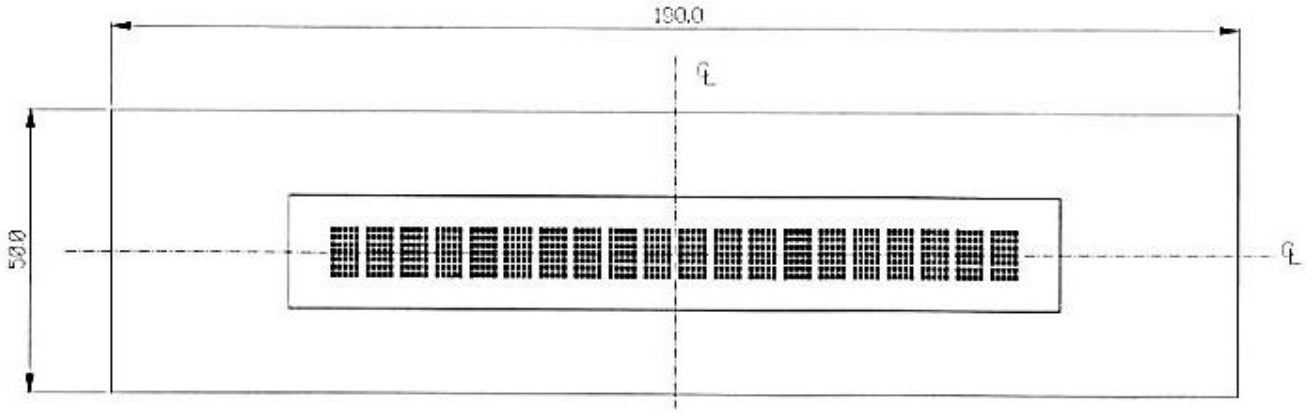


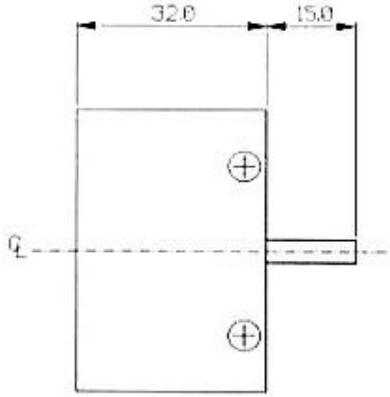
HEX	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
00				0	@	P	`	p	Ç	Σ		°	À	Ð	à	ð
01			!	1	A	Q	a	q	ü	Ω	¡	±	Á	Ñ	á	ñ
02			"	2	B	R	b	r	é	≡	¢	²	Â	Ò	â	ò
03			#	3	C	S	c	s	â	≤	£	³	Ã	Ó	ã	ó
04			$	4	D	T	d	t	ä	⌠	¤	´	Ä	Ô	ä	ô
05			%	5	E	U	e	u	à	⌡	¥	µ	Å	Õ	å	õ
06			&	6	F	V	f	v	å	÷	¦	¶	Æ	Ö	æ	ö
07			'	7	G	W	g	w	ç	≈	§	·	Ç	×	ç	÷
08			(	8	H	X	h	x	ê	°	¨	¸	È	Ø	è	ø
09			)	9	I	Y	i	y	ë	∙	©	¹	É	Ù	é	ù
0A			*	:	J	Z	j	z	è	·	ª	º	Ê	Ú	ê	ú
0B			+	;	K	[	k	{	ï	√	«	»	Ë	Û	ë	û
0C			,	<	L	\	l	¦	î	ⁿ	¬	¼	Ì	Ü	ì	ü
0D			-	=	M	]	m	}	ì	²		½	Í	Ý	í	ý
0E			.	>	N	^	n	~	Ä	■	®	¾	Î	Þ	î	þ
0F			/	?	O	_	o	Δ	Å	ƒ	¯	¿	Ï	ß	ï	ÿ

Katakana Character Font (CT1).



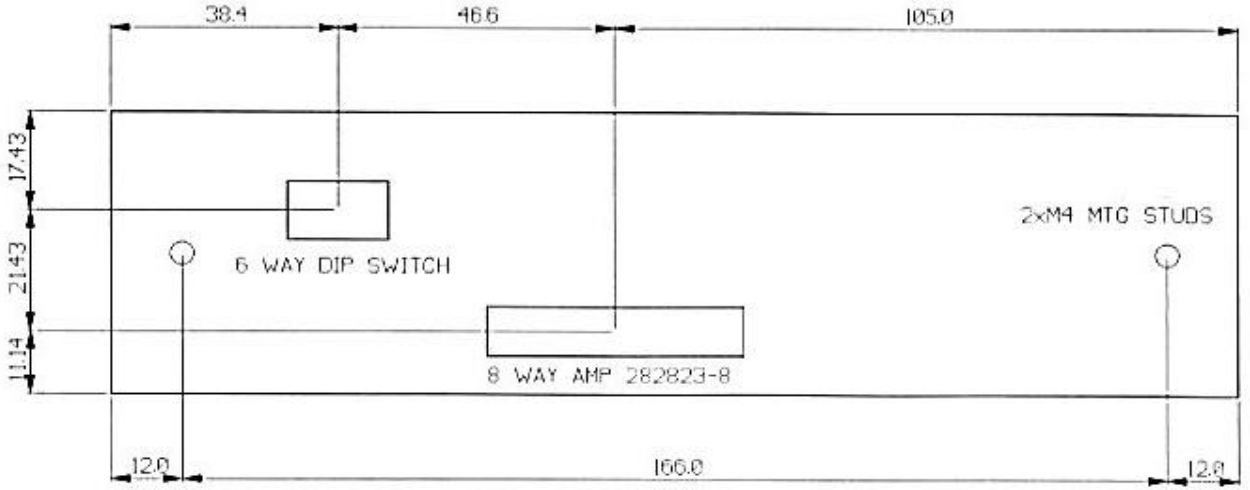
HEX	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
00				0	@	P	`	p	Б	Ы		ー	タ	ミ	目	
01			!	1	A	Q	a	q	Г	Э	。	ア	チ	ム	月	
02			"	2	B	R	b	r	Д	Ю	「	イ	ツ	メ	火	
03			#	3	C	S	c	s	Ж	Я	」	ウ	テ	モ	水	
04			$	4	D	T	d	t	З	@	、	エ	ト	ヤ	木	
05			%	5	E	U	e	u	И	Ф	・	オ	ナ	ユ	金	
06			&	6	F	V	f	v	Й	Р	ヲ	カ	ニ	ヨ	土	
07			'	7	G	W	g	w	Л	Б	ァ	キ	ヌ	ラ	日	
08			(	8	H	X	h	x	П	▼	ィ	ク	ネ	リ	分	
09			)	9	I	Y	i	y	У	▶	ゥ	ケ	ノ	ル	円	
0A			*	:	J	Z	j	z	Ф	▲	ェ	コ	ハ	レ	゛	
0B			+	;	K	[	k	{	Ц	◀	ォ	サ	ヒ	ロ	゜	
0C			,	<	L	¥	l	|	Ч	Ш	ャ	シ	フ	ワ		
0D			-	=	M	]	m	}	Ш	Щ	ュ	ス	ヘ	ン	○	
0E			.	>	N	^	n	~	Щ	ъ	ョ	セ	ホ	゛		
0F			/	?	O	_	o	⌂	Ь	Э	ッ	ソ	マ	゜		





DIMENSIONS IN mm TOL +- 1mm

SPECIFICATION
- 1x20 VFD MODULE
- 9mm CHARACTER HEIGHT
- STEEL ENCLOSURE
- SATIN BLACK POWDER COAT
- RS485 INTERFACE
- 8 TO 30V SUPPLY
- ADDRESS SELECTABLE



REAR VIEW

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