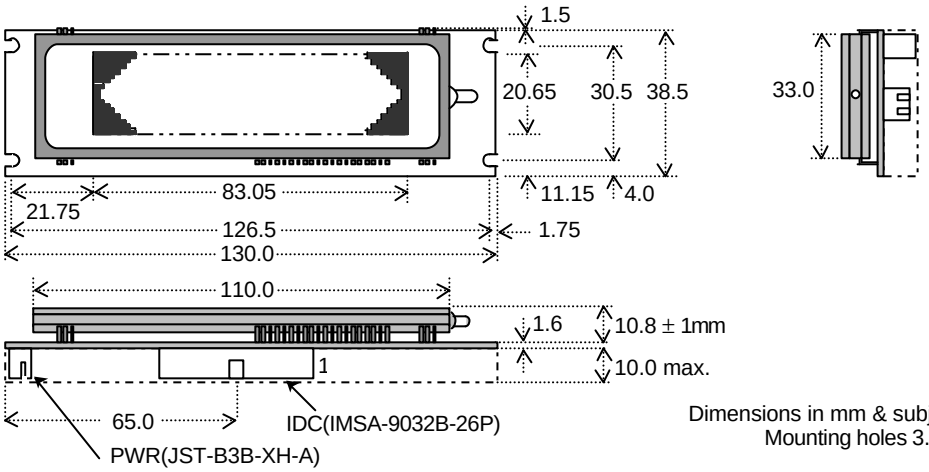
Dot Graphic VFD Module — GU128X32-800A

- 128 x 32 Dot Graphic
- Operating Temp -40°C to +85°C
- Single 5V Supply.
- High Brightness Blue Green Display
- Selectable Parallel (i80/M68)/Serial Interface
- Twin Screen Graphic RAM
- 16 Level Brightness Control Function

The module includes the Vacuum Fluorescent Display glass, driver and control ASIC, with integral refresh Graphic RAM and logic for parallel and synchronous serial interfaces. The high speed 8 bit parallel interface is 5V CMOS compatible suitable for connection to a host CPU bus. Brightness control and power down functions are provided. A full data sheet is available.



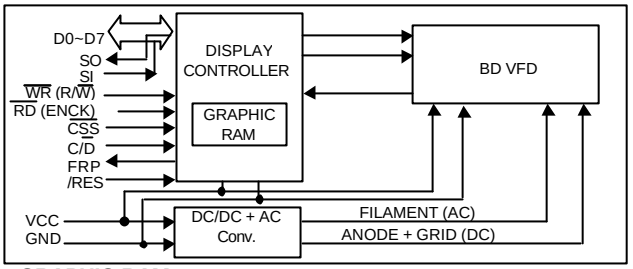
Dimensions in mm & subject to tolerances.
Mounting holes 3.5mm dia.

ELECTRICAL SPECIFICATION

Parameter	Symbol	Value	Condition
Power Supply Voltage	V_{CC}	5.0VDC +/- 5%	G_{ND}=0V
Power Supply Current	I_{CC}	450mADC typ.	V_{CC}= 5V
Logic High Input	V_{IH}	4.0 VDC min.	I_{IH} = 2uA
Logic Low Input	V_{IL}	1.0 VDC max.	I_{IL} = -600uA
Logic High Output	V_{OH}	4.7 VDC min.	I_{OH} = -300uA
Logic Low Output	V_{OL}	0.3 VDC max.	I_{OL} = 300uA
Reset Input Voltage	V_{RH}	4.0 VDC min.	I_{RH} = 5uA
Reset Input Voltage	V_{RL}	0.6 VDC max.	I_{RL} = -600uA

The power on rise time should be less than 100ms.The inrush current at power on can be 2 x I_{CC}.

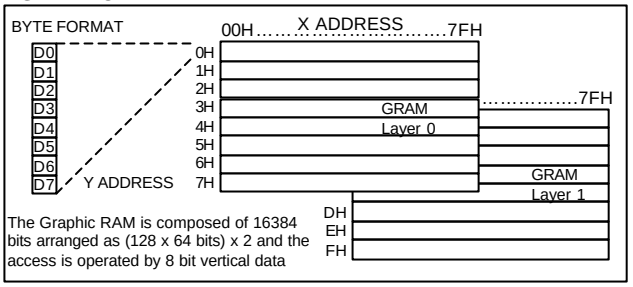
BLOCK DIAGRAM



OPTICAL and ENVIRONMENTAL SPECIFICATIONS

Parameter	Value
Display Area (XxY mm)	83.05 x 20.65
Dot Size/Pitch (XxY mm)	0.5 x 0.5/0.65 x 0.65
Luminance	350 cd/m^2 Min.
Colour of Illumination	Blue-Green (Filter for colours)
Operating Temperature	-40°C to +85°C
Storage Temperature	-40°C to +85°C
Operating Humidity (non condensing)	20 to 80% RH @ 25°C

GRAPHIC RAM



The Graphic RAM is composed of 16384 bits arranged as (128 x 64 bits) x 2 and the access is operated by 8 bit vertical data

SOFTWARE COMMANDS

Instruction	C//D	Instruction Byte	No. Bytes
Set Display On/Off / Layer Merge	1	20H-2FH	2
Set Display Brightness	1	40H-4FH	1
Clear Display	1	52H-5FH	1
Set Cursor XY Address	1	60H-67H	3
Set Display Start X Address	1	70H-7FH	2
Set Write Address Mode	1	80H-8FH	1
Scroll Display Vertically Up/Down	1	B0H-BFH	1
Read Cursor XY Address	1	D4H-D7H	3
Write Data	0	00H-FFH	1

IDC DATA CONNECTOR

Pin	i80	M68	Serial	Pin	Sig
1	D7	D7	X	2	GND
3	D6	D6	X	4	GND
5	D5	D5	X	6	GND
7	D4	D4	X	8	GND
9	D3	D3	X	10	GND
11	D2	D2	X	12	GND
13	D1	D1	SO	14	GND
15	D0	D0	SI	16	GND
17	/WR	R//W	X	18	GND
19	C//D	C//D	C//D	20	GND
21	/RD	ENCK	SCK	22	GND
23	/CS	/CS	/CS	24	GND
25	FRP	FRP	FRP	26	/RES

3 PIN POWER CONNECTOR

Pin	Sig
1	Vcc
2	Test (Factory only)
3	GND

PCB JUMPERS (O)pen (L)ink

Interface	J1	J2
Serial	L	O / L
i80 Parallel	O	O
M68 Parallel	O	L

TIMING PARAMETERS (min)

i80/M68 Parameters	Time
Write /WR/EN Cycle Time	400ns
Write /WR/EN Pulse Width	100ns
Set Up To Write /WR/EN	30ns
Hold after Write /WR/EN	20ns

Serial Parameters	Time
SCK Cycle Time	200ns
SCK Pulse Width	80ns
Set Up To SCK, /CSS='L'	40ns
Delay After 8th bit, /CSS='H	150ns

SCROLLING GRAPHIC DISPLAY

The pattern in GRAM can be scrolled around the display. Horizontal scroll is achieved by increment/decrement of the Display Start X Address. The vertical scroll process considers layer 0, then layer 1 as a continuous 128 bit high vertical area within RAM.

Subject to change without notice.

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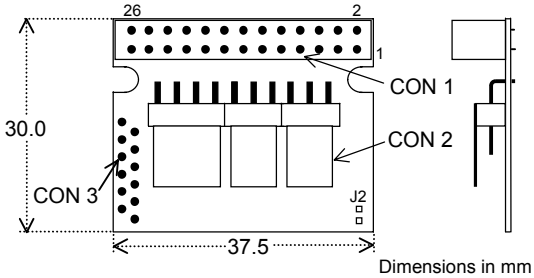
RS232 Serial Interface Controller MCBK10JRA

- **RS232 to Graphic VFD Controller**
- **2400 – 38400 baud rate Selection**
- **3 Font sizes and user graphic display**
- **8 Icons stored in EEPROM (16x16 pixels)**
- **12 Way Matrix Keyboard Scanning**

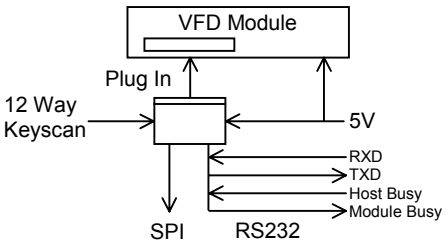
This simple controller will automatically detect and drive GU300 or GU800 graphic VFD modules up 256x64 pixels in size. The controller contains 3 fonts, 8 icons and 12 way keyboard scanning. Two screens are available which allows for slow updates on a hidden screen whilst displaying another. Please inquire for low cost, custom software solutions.



Dimensions in mm

CON 2
Molex 22-05-7038 (x2)
22-05-7048 (x1)
Mates with 22-01-2035 (x2)
22-01-2045 (x1)
or 22-01-2105 (x1)

CON 3
Holes suitable for soldering
AMP 8-215460-2
Molex 52044-1245



ELECTRICAL & ENVIRONMENTAL SPECIFICATION

Parameter	Symbol	Value	Condition
Power Supply Voltage	VCC	5.0VDC +/- 10%	GND=0V
Power Supply Current	ICC	30mA DC Typ.	Vcc=5V
Logic High Input	VIH	2.0VDC min.	VCC=5V
Logic Low Input	VIL	0.8VDC max.	VCC=5V
Logic High Output	VOH	4.6VDC min.	VCC=5V
Logic Low Output	VOL	0.4VDC max.	VCC=5V
RS232 High Input	VSIH	+24V max.	Vcc=5V
RS232 Low Input	VSIL	-24V max.	Vcc=5V
RS232 High Output	VSOH	+5V min.	3K load to GND
RS232 Low Output	VSOL	-5V min.	3K load to GND
Operating Temperature	OpT	-25°C to +75°C	non condensing
Storage Temperature	StT	-40°C to +85°C	non condensing
Operating Humidity	RH	20 to 90%	25°C non condensing

CON1 – 26WAY IDC

Pin	Signal	Pin	Signal
1	D7	3	D6
5	D5	7	D4
9	D3	11	D2
13	D1	15	D0
17	/WR	19	C/D
21	/RD	23	GND
25	FRP	26	/BL/RE

Pins 2-24 = GND Pin 20 = NC
GU800 series modules should have their i80 interface selected

CON2 - 10 WAY SERIAL I/O

Pin	I/O	Signal
1	+	VCC (5V)
2	I	RXD
3	-	GND (0V)
4	O	TXD
5	O	DTR (Module Busy)
6	I	CTS (Host Busy)
7	I	/RES
8	O	DATA
9	O	LATCH
10	O	CLK

Connect DTR to CTS to disable handshaking.

CON3 – 12WAY I/O

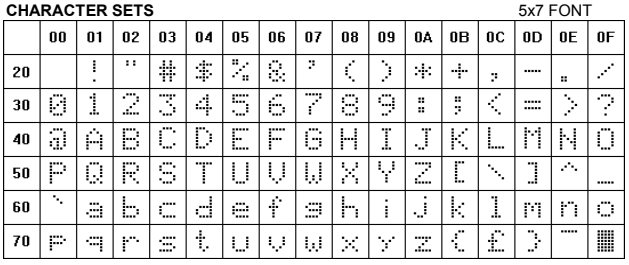
Pin	Signal
1	D7
2	D6
3	D5
4	D4
5	D3
6	D2
7	D1
8	D0
9	C3
10	C2
11	C1
12	C0

SOFTWARE COMMAND FUNCTIONS

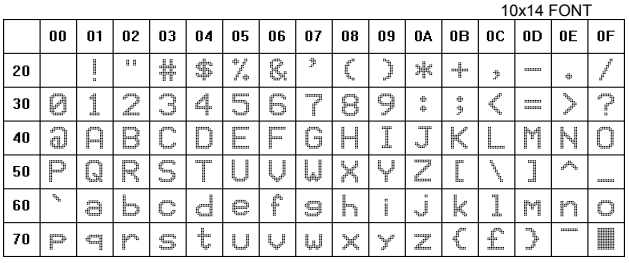
ASCII	Command Description
00H – FFH	Send Data, except ESC and BS, CR & LF (font mode only). *6
BS	Backspace (font mode only)
LF	Linefeed (font mode only)
CR	Carriage Return (font mode only)
ESC+ESC	Send ESC as Data.
ESC+C+x+y	Set X & Y co-ordinates.
ESC+D+setup	Set up Display:- 'O' = On *2, 'F' = Off '1' = Show screen 1 *2 '2' = Show screen 2 'A' = Write to screen 1 *2 'B' = Write to screen 2
ESC+F+font	Select font: mode - '1' = 5x7 font *2, '2' = 10x14 font, '3' = 20x28 font.
ESC+G	Send graphical data direct to the display.
ESC+H	Set data format as Hex. *4
ESC+I	Set data format as Binary. *1 *4
ESC+K+cmd	Keyboard command. 'R' = keyboard read, response in the form of "ESC+'K'+byte1+byte2" *3 1st byte (bits 3-0) = C3-C0 (bit 7) = key already read 2nd byte (bits 7-0) = D7-D0 'A' = Auto key send mode. *1 *4 'M' = Manual key read mode. *4
ESC+L+level	Set display luminance ('A'-'P'):- 'A'= minimum, 'P' = maximum. *2
ESC+M+icon+data	Download 16x16 icon '1'-'8' plus 32 bytes. *4
ESC+N+icon	Write 16x16 Icon '1'-'8'.
ESC+P+byte	Send byte direct to VFD with C/D line high (command) *6
ESC+Q+byte	Send byte direct to VFD with C/D line low (data) *6
ESC+R	Reset controller to power ON defaults.
ESC+S+bytes	Send start up commands. *4 (The 3rd byte indicates number of data bytes to follow)
ESC+T+bytes	Transfer data to clocked serial port: - DATA, CLK & LATCH. (The 3rd byte indicates number of data bytes to follow)
ESC+V	Read controller status, response in the form of "ESC+'V'+byte". *3
ESC+W	Clear current write screen. *2
ESC+Y+byte	Set baud rate and parity. *4 *5
ESC+Z	Lock EEPROM. *4

*1 Factory settings: - 19,200 baud, no parity. Automatic key response. Binary data format.
*2 Power on default.
*3 Transmitted by controller.
*4 Stored in EEPROM. On Power up/reset these settings apply.
(Connect DTR to RXD at power up to reset EEPROM to factory settings.)
*5 No effect until power down / reset.
*6 All necessary control lines are operated on each data write.
This specification applies to this controller and does not include attached display modules.
The inrush current of certain display modules at power on can be twice the module's Icc.

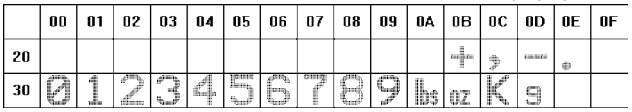
CHARACTER SETS 5x7 FONT



10x14 FONT



20x28 FONT



Please refer to our full specification for details. Subject to change without notice.
Doc Ref: 02987 Iss:7
27 Jan 2003

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Command	Description
BS	Performs a non-destructive backspace. Font mode only.
LF	Performs a line feed command. The vertical cursor position is moved down one line. Font mode only.
CR	Performs a carriage return. The horizontal cursor position is moved to the left most column. Font mode only.
ESC + C + Xpos + Ypos	Set cursor co-ordinates. X = horizontal pixel position (0-255). Y = vertical byte position (0-7). Cursor range is dependent on VFD module connected.
ESC + D + cmd	Sets the display mode. 'O' = Turn Display On - this is the power on default. 'F' = Turn Display Off - the display contents are retained. The graphic modules contain two displays areas, which allows for writing to a hidden screen, whilst display another. This can help improve the appearance of a slow display update. '1' = Display screen 1 – power on default. 'A' = Write to screen 1 – power on default. '2' = Display screen 2. 'B' = Write to screen 2.
ESC + F + font	Select font mode. All data transmitted to the controller is interpreted as character data. '1' = 5x7 font '2' = 10x14 font '3' = 20x28 font
ESC + G	Select graphic mode. All data transmitted to the controller is interpreted as graphic data. Graphical data is displayed at the current cursor position in a vertical format (bit 7 = top, bit 0 = bottom). After each data write, the cursor x position is advanced by one pixel.
ESC+ H	Set data format as hex. All data transmitted to or from the interface module will be in a 2 byte hex format. This setting is retained in EEPROM.
ESC + I	Set data format as binary. This setting is retained in EEPROM.
ESC + K + cmd	Keyboard command. 'A' = Change keyboard mode to automatic send. A key response is transmitted from the controller each time a key is pressed. 'M' = Change keyboard mode to manual. No key response from the controller unless manually read. 'R' = Read keyboard – A key response is immediately transmitted from the controller. Keyboard responses takes the form of - "ESC + 'K' + byte1 + byte2". The 1st byte bits 3-0 = keyboard lines C3-C0, bit 7 = keyboard unchanged flag. The 2nd byte bits 7-0 = keyboard lines C7-C0.
ESC + L + level	Set the display luminance:- 'A' = minimum luminance. 'P' = maximum luminance – power on default. Note: The number of luminance levels is dependent on the VFD module connected.
ESC + M + icon + data	Download icon. The 3rd byte indicates which icon to create - '1' to '8'. The icons are 16x16 pixels in size. The data (32 bytes) is in a vertical format. All icon data is retained within EEPROM.
ESC + N + icon	Write icon '1' to '8' at the current cursor position.
ESC + P + byte	Send single byte direct to the VFD module with control line C/D held high.
ESC + Q + byte	Send single byte direct to the VFD module with control line C/D held low.
ESC + R	Re-initialise controller to power on defaults. All error status flags are reset. The start-up string is executed from EEPROM.
ESC + S + bytes	Send start-up data to EEPROM. The 3rd byte should indicate the number of bytes to send to the EEPROM (240 maximum). This data is executed upon each reset, re-initialise and power-up.
ESC + T + bytes	Transfer data to SPI port. The 3rd byte indicates the number of bytes to send. Data is clocked out of the SPI port (DATA & CLK lines). After the data has been sent, a positive pulse is generated on the LATCH line.
ESC + V	Read controller status, response in the form of – "ESC + 'V' + byte". bit 7 = Module type - GU300 (0)/GU800 (1) bit 3 = UART parity error bit 2 = UART overrun error bit 1 = UART framing error bit 0 = EEPROM locked
ESC + W	Wipe the current screen.
ESC + Y + byte	Set baud rate and parity. The byte bits 2, 1, 0 are not used.

Baud Rate	Bit 7	Bit 6	Bit 5	Bit 4		Parity	Bit 3
2400	0	0	1	1		NONE	0
4800	0	1	0	0		EVEN	1
9600	0	1	0	1			
14400	0	1	1	0			
19200	0	1	1	1			
38400	1	0	0	0			

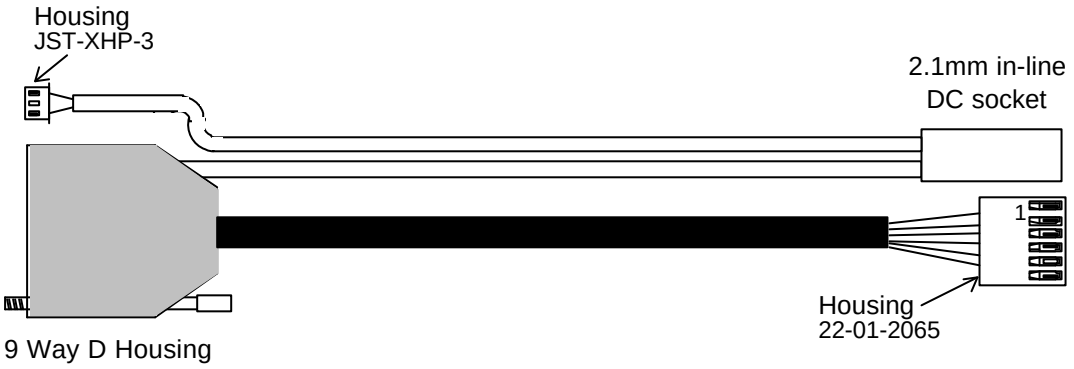
ESC + Z	Lock EEPROM. Once the required icons & communication settings have been sent, it is recommended to lock the EEPROM with this command. Any subsequent changes made to the EEPROM will be ignored. Unlocking can only be achieved by erasing the whole EEPROM, this is done by shorting the DTR & RXD lines at power on.

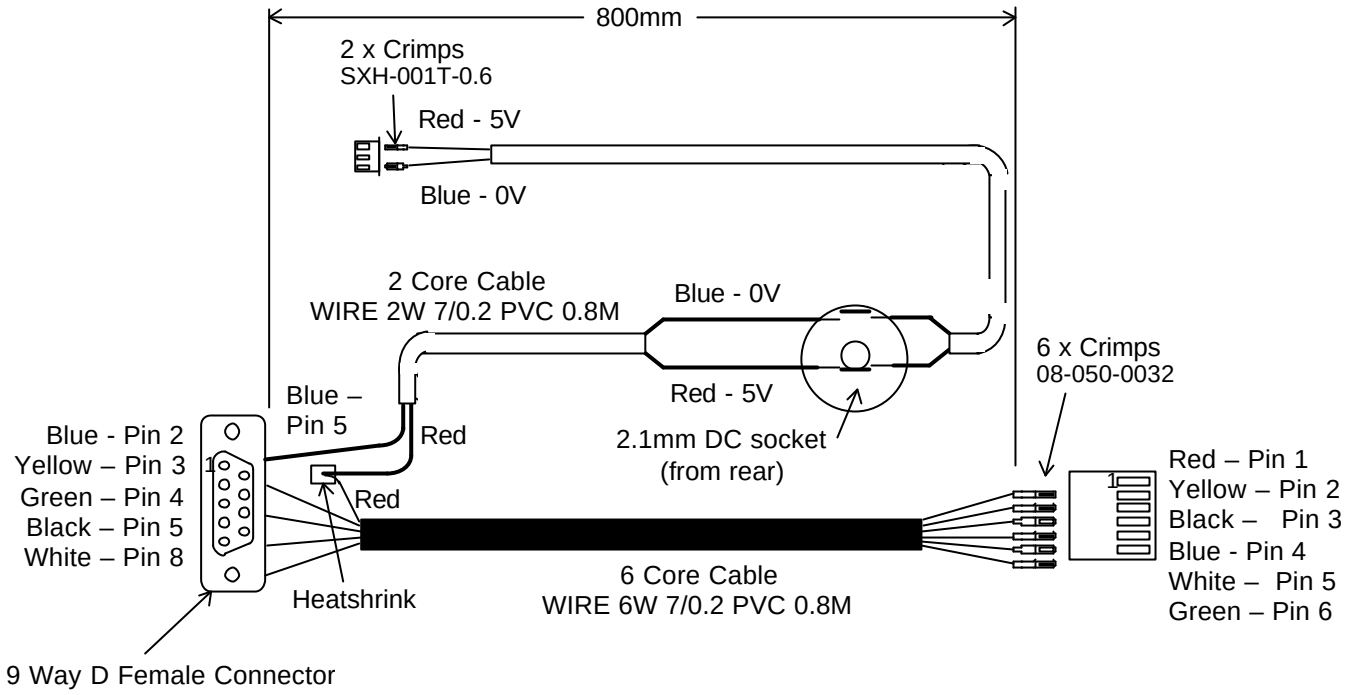
Subject to change without notice

800A INTERFACE CABLE IFCK0659FD-K612C

- **PC to 800A series Interface**
- **COM 1 Compatible**
- **Simple Plug & Go**

This cable is used with the MCBK10JRA interface controller for GU-800A graphic modules. The 9 way female D Type connector is configured to directly plug into COM 1 of a PC. Power is supplied to the display and interface module via a 2.1mm in-line DC socket & flying leads.





Coil cable and put in clear plastic bag with label.

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