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## Product Change Notification

**PCN No: 2007-10-16-01**

**Report Date: October 16, 2007**

**Subject: GLK12232-25-WBL PCB 2.0 New Part Number Release**

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### List of New Products:

All the following Graphic displays (and their variants):

GLK12232-25-WBL PCB Rev 3.0
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### Reason for Change:

The GLK12232-25-WBL Matrix Orbital graphic module series has been upgraded to offer new features and benefits; the physical connections on the PCB boards have been standardized and the components are now RoHS compliant. The display used is now of the FSTN (Film Super Twisted Nematic) technology. Along with these exciting changes, we have deemed that a part number change is necessary. We are now calling the GLK12232-25-WBL PCB Rev 3.0 the GLK12232-25-FGW.

### Product Change:

The following list of hardware and firmware changes are all effective on all the variants of the GLK12232-25-FGW as stated under 'List of New Products'.

Please note that the old PCB 2.0 will be superseded by PCB 3.0, and the old firmware version v2.2 will be superseded by v5.8, this change will be commencing immediately (please see Schedule of Change). We ask that for new design, users please consider developing on PCB Rev 3.0.

The changes stated in this PCN is to compare the old and the new PCB revision.

## **Schedule of Change:**

January 15, 2008

### **Hardware Changes:**

- 1) The 5x5 matrix style keypad connector is present in both the old and the new PCB revisions. The differences between the revisions are:
  - PCB 3.0 offers additional grounding or 5V (selectable) pins on the keypad connector
  - PCB 3.0 keypad connector has been standardized. The middle pin to be column 1, PCB 2.0 keypad connector has the middle pin row 1. Although the keypad values are mapped the same way, the change in the placement of the rows and the columns effectively changes the mapping of the key codes. To keep the old transmitted values for the keypad, contact a Sales Rep to obtain a custom order; or refer to item #1 under Firmware Changes to be able to customize the keypad layout.
  - PCB 3.0 has improved ESD protection on the keypad connectors with incorporated resistors.
- 2) Both PCB revisions offer 2 (active low) general purpose outputs; but pin outs and locations have changed.
- 3) Communication protocol select now comes in a more convenient solder pad matrix. RS232, TTL and I2C protocols are easily selected with the new protocol select. Changing to I2C mode is now as easy as moving the solder jumps to I2C, no more lifting pins and extra solder jump.
- 4) The GLK12232-25-FGW PCB Rev 3.0 now uses dual side firing backlight LEDs that adds brightness to the display.
- 5) The GLK12232-25-FGW PCB 3.0 now incorporates a negative voltage generating circuit for a better looking and more consistent contrast
- 6) Physical placement of the header connectors and their pinouts are different in the PCB 3.0 to conform with our other products.
- 7) The mounting holes on PCB Rev 3.0 are slightly bigger than that of PCB Rev 2.0. PCB Rev 3.0 have 125mil mounting holes.

## **Firmware Changes:**

### **Release v5.8:**

- 1) Keypad keys are now user definable: Command 254/213/<50 bytes>.  
All values returned from the keypad are now user-defined. This command uploads the new key mapping. The first 25 bytes are the key down values, while the last 25 are the key up values. The default values for key down are capital letters starting from `A' and the default values for key up are small letters starting from `a'. This can be the work around for the hardware constraint for the old keypad systems as described in Hardware Changes item # 1
  
- 2) We now offer 16 bytes of EEPROM for the users.
  - User data upload: Command: 254/52/<16 bytes>
  - User data download: Command: 254/53The display now has 16 bytes to store whatever the customer would like. These 16 bytes can be used for anything including serial numbers, addresses, or whatever you can think of that will fit in 16 bytes.
  
- 3) A watchdog timer was added. The units now make full use of a watchdog timer to prevent the display from remaining locked up. The default timeout is approximately 2.1 seconds (depending on ambient temperature). Upon a watchdog reset the display will send 254/212 to the host to indicate that watchdog has reset the module.
  
- 4) The old PCB 2.0 revision used to have an 96-byte buffer. We have increased the buffer size to 128 bytes in PCB 3.0
  
- 5) RS232 speed (baud rate) now takes different parameter values:
  - Command 254 / 57 / <parameter>The following are the parameter values according to baud rate:

<i>Parameter</i>	<i>Baud Rate</i>
207	9600

<i>Parameter</i>	<i>Baud Rate</i>
138	14400
103	19200
68	28800
51	38400
34	57600
25	76800
16	115200

6) Baud rate can now be fine-tuned

- Command 254 / 164 / <speed low byte><speed high byte>

We now offer access to the baud rate generator registers in the uC so that users may be able to fine tune baud rates as necessary.

This command accepts 2 byte parameter which is derived from the equation:

$$\text{speed} = (16,000,000 / 8 \times \text{desired baud rate}) - 1$$

Please see the manual for details on the use of this command. There are caveats as to how to use this command in the manual.

7) I2C now properly ACKs and NAKs the master when it is addressed.

I2C now sends a NAK when the module is busy or when the communication buffer is full. Since the module uses the same In and Out buffer with the RS232, there are commands necessary to be able to configure the buffer accordingly. These commands are:

- Command 161: Clear Out buffer – since I2C transactions are master-initiated, the replies of the slave module are placed in an Out buffer (16 byte buffer) until the master decides to read. If for some reason the master is out of sync with the data in the Out buffer because it did not clock the data out when it was supposed to, the master has the option of clearing the Out buffer but then it would have to re-send query commands and clock the data out from the module immediately after (provided the end of the command, so all the parameters should be clocked to the module first).

- Command 160: Set RS232 Tx Data <on/off> - just like how Out buffer is shared between I2C and RS232, so is the In buffer. Because of this there is a need to tell the module if data is coming from RS232 or from I2C. When this command is sent with parameter 0 (off), this hints that the data is from I2C, and that data responses in the Out buffer are checked against a flag that holds the value of the parameter for this command. When the parameter is 0 (off) the data remains in the Out buffer and is NOT transmitted out via RS232. When the parameter is 1 (on – default case) the data responses are automatically transmitted via RS232. This command MUST be issued with parameter 0 when in I2C and expecting to read the module. The default for this flag is on, which means the module will send its reply or report via RS232.

- Command 163: Dump Out buffer via RS232 – this command is used to dump the Out buffer via the RS232. In the case that command 160 is sent with parameter = 0, the data responses are placed in the Out buffer and can be accessed via RS232 using this command.

8) More memory file system capabilities and features are added on PCB 2.0 (for more details on these commands, please refer to the manual):

-Command 173: Delete File – this command deletes the specified file

-Command 175: Get File System Space – this command queries the module for free memory space

-Command 179: Get File System Directory – this command queries the module for its file system directory

-Command 178: Download a File – this command downloads a single file (font or bitmap) from the module

-Command 180: Move a File – this command allows for moving a file to a different location (ref ID)

-Command 176: Upload File System – this command allows for uploading of the full file system. This command, together with command 48 allows for file system cloning.

-Command 48: Download File System – this command allows for downloading a full file system on the module. This command, together with command 176 allows for file system cloning.

9) Creating fonts on the new PCB 3.0 has now been changed to standardize font / bitmap conversions on all our graphic products. The old PCB Rev

2.0 (and earlier) defines the data bytes of the font glyphs vertically. This has now been changed horizontal definition.

10) The display now has an enhanced data locking capability. The users can now lock the module in different levels.

- Command 202: Set Data Lock: 254 / 202 / 245 / 160 / <level>

- Command 203: Set and Save Data Lock: 254 / 203 / 245 / 160 / <level>

Level is an 8-bit value with the following bits defined:

bit 7 – when this bit is 1, users can not display anything on the module

bit 6 – when this bit is 1, users can not send any commands to the module but commands 202 / 203

bit 5 – when this bit is 1, users can not alter the file system (ext EEPROM)

bit 4 – when this bit is 1, users can not alter the module settings (internal EEPROM)

bit 3 – when this bit is 1, users can not change the BAUD RATE and the I2C Addr

bit 2 – reserved and should be left 0

bit 1 – reserved and should be left 0

bit 0 – reserved and should be left 0

Eg: to lock the display (no text will be displayed) send command: 254 / <202 or 203> / 245 / 160 / 128

Eg: to lock the display properties (no commands will be followed, with the exception of the Data lock command) send command: 254 / <202 or 203> / 245 / 160 / 192

## 11) List of New or Changed Commands:

### **Keypad Related Commands:**

213: Assign Keypad Key ID

- new command, as described in item #1 under Firmware Changes

### **RS232 / I2C Related Commands:**

57: Set Standard Baud - new command, as described in item # 5

164: Set Non Standard Baud - new command, as described in item # 6

160: Set RS232 Tx Data - new command, as described in item # 7

161: Clear Out buffer - new command, as described in item # 7

163: Dump Out buffer via RS232 - new commands, described in item # 7

### **File System Related Commands:**

48: Download File System - new command, as described in item # 8

173: Delete File - new command, as described in item # 8

175: Get File System Space - new command, as described in item # 8

176: Upload File System - new command, as described in item # 8

178: Download a File - new command, as described in item # 8

179: Get File System Directory - new command, as described in item # 8

180: Move a File - new command, as described in item # 8

### **Module Property Query Commands:**

52: Write Customer Data - changed, as described in item # 2

53: Read Customer Data - changed, as described in item # 2

### **Display Screen Control Commands:**

202: Set Data Lock - new command, as described in item # 10

203: Set and Save Data Lock - new command, as described in item # 10

**Please see the manual for in depth details.**

## Documentation Revision

Revision	Changes	Date	Author
1.0	Initial Release	October 26/07	R Malinis
2.0	Changed the display name; and the Schedule of Change	December 19/07	R Malinis
2.1	Typo on the part number corrected	December 20/07	R Malinis

### Contact Information:

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### Reference Documents/Attachments:

Location: <http://www.matrixorbital.ca/manuals/>

### Approvals:

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