MK-CY-043
4.3 Inch Capacitive Touch Display

DATASHEET

Amulet

August 2019
Revision D

Introduction

The MK-CY-043 is a 4.3" fully integrated, production ready color module with smartphone-like features.

Compatible with GEMstudio™ for quick and easy GUI design, these production-ready units support GIF, JPEG, PNG, and more graphic formats in 24-bit color, plus 8-bit alpha blending (transparency channel) found in high-end consumer electronic products.

The MK-CY-043 has 256Mb (32Mx8) of SDR SDRAM for image caching , and 32Mb of serial data flash for code storage. The module has a 480 x 272 WQVGA TFT LCD with a capacitive touch panel.

Amulet's Graphical OS Chip™ handles all the graphics processing and control as well as the communication to a host controller.

Features

Module

- Amulet GEM Graphical OS Chip™ with Royalty-free Graphical Operating System™
- Operating Temperature: -20°C to 70°C
- On-Board Memory - 32 Megabit serial flash for storing GUI pages
- Color Supported- up to 24 bit plus 8 bit alpha channel
- Supports Unicode - Foreign language character sets

Display

- 480x272 TFT LCD
- 350 nit (cd/m^2)
- Contrast Ratio: 450:1
- Viewing Angle: 6 o'clock (software controlled rotation)
- PWM controlled brightness

Touch Panel

- Projected capacitive touch (Cypress TrueTouch© Controller)

- Touch area exposed allowing for customized cover glass
- Multi-touch gestures

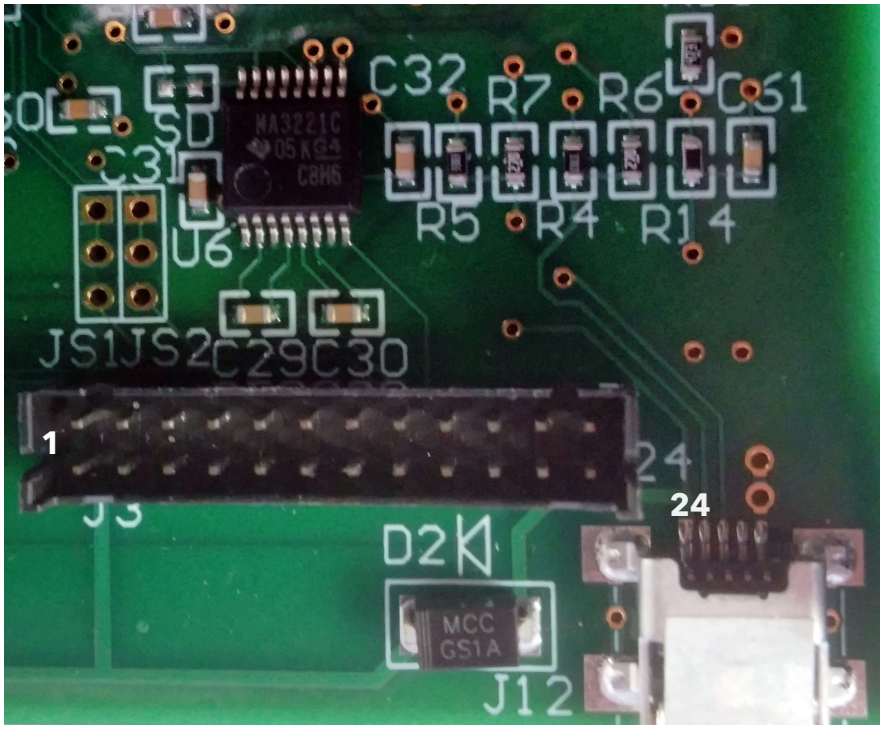
Communication Interfaces

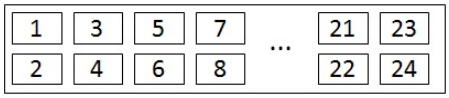
- 1x UART-TTL
- 1x UART RS232
- 1x SPI with 2 Chip Selects
- 1x I2C
- 2x PWM
- USB 2.0 Device Interface

Power

- 5V DC (through USB or I/O header)

J3 Interface Connector





24 Pin I/O Socket - J3

Details	Description	Pins Number		Description	Details
Supply Voltage In	5 VDC IN	1	2	5 VDC IN	Supply Voltage In
Common Ground	GND	3	4	GND	Common Ground
I²C - Serial Clock Line	I2C_SCL	5	6	I²C_SDA	I2C - Serial Data Line
UART0 Receive	UART0_RXD	7	8	UART0_TXD	UART0 Transmit
Pulse Width Modulation Port 1	PWM1	9	10	PWM2	Pulse Width Modulation Port 2
Program Mode, Active Low	PROG_MODE[1]	11	12	PWM0	Pulse Width Modulation Port 0
RS-232 Transmit Port	RS232 TXD	13	14	T_CAL[1]	Touchpanel Calibration Active Low
UART1 Receive TTL levels	UART1_RXD	15	16	UART1_TXD	UART1 Transmit TTL levels
SPI - Chip Select 3	SPI_CS3	17	18	RS232 RXD	RS-232 Receive Port
SPI - Chip Select 2	SPI_CS2	19	20		
SPI - Master Input, Slave Output	SPI_MISO	21	22	SPI_SCLK	SPI - Serial Clock
System Reset, Active Low	RESET[1]	23	24	SPI_MOSI	SPI - Master Out, Slave In

Note 1: Internally Pulled Up

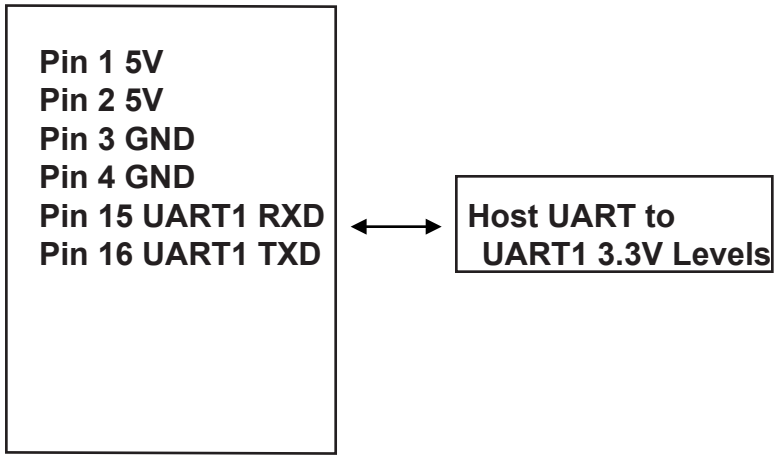
Header J3 24 pin, 2mm, Hirose DF-11-24DP-2DSA

Mating Connectors: Hirose DF11-24DS-2R26

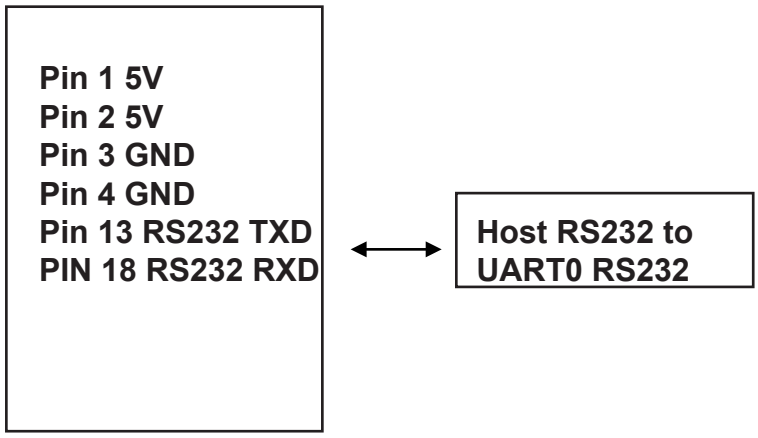
JST PHDR-24VS

UART Connections

For UART TTL-level Communication

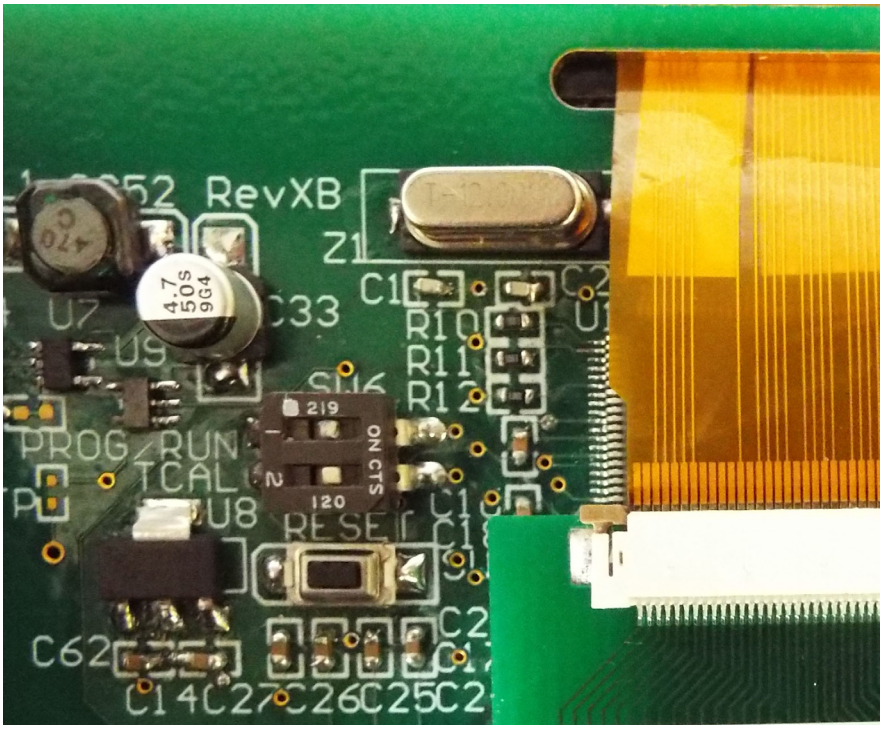


For UART RS232 Communication



Note: If RS232 is not required, the MK-CY-043 can be hardware configured to utilize UART0 as another TTL-level UART in addition to UART1. Please contact our support department at support@amulettechnologies.com for details. For I/O requirements through SPI or I^2C, also contact Amulet's support department

SW6 DIP Switch



For normal operation the DIP switch remains in the default setting with switch 1 in the RUN position and switch 2 in the TCAL position. See figure above for the default settings.

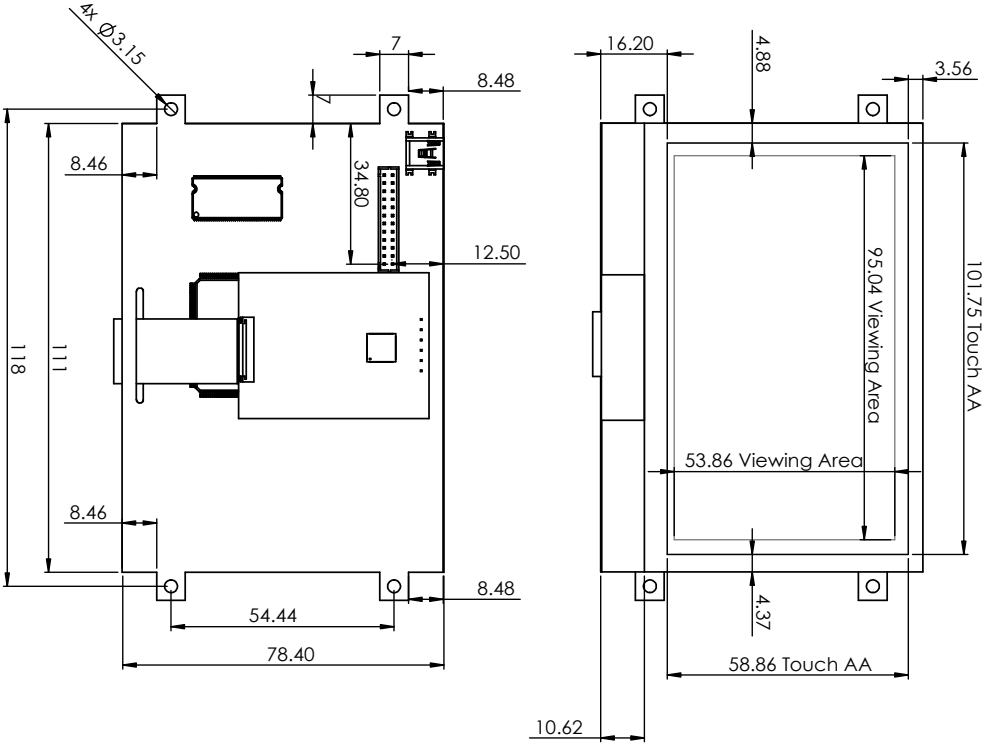
During the development of GEMstudio Projects it is possible to place the module into a non responsive state. This is not uncommon, and is recoverable in the field with minimal effort. Please follow the following steps to recover the GEMmodule.

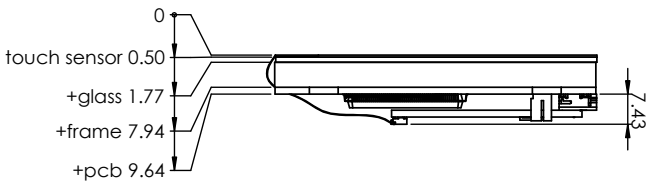
1. Disconnect the module from all USB and power connections.
2. Flip switch 1 to the OFF position. This will tell the GEMmodule to operate in PROG mode instead of RUN mode.
3. Start GEMstudio/GEMcompiler.
4. Connect the GEMmodule to USB and power if required.
5. In GEMstudio navigate to the File Menu and select 'Restore Amulet OS'.

The system reset switch, labeled RESET, is directly below the SW6.

Mechanical Specification

Note: Touchpanel on top of glass. A cover glass is recommended on top of touch panel with thickness from 2mm-6mm.





Recommended Operating Conditions

Parameter	Conditions	Min	Typ	Max	Units
Supply Voltage	Stable external supply required	4.5	5	5.5	Vdc

DC Characteristics

Parameter	
Vcore Supply Current	22mA @1.2V
V input Low Level	-0.3V to 0.8V
V input High Level	2V to (Vcc + 0.3V)
Pull Up Resistors	70K to 175K Ohms
IO Output Current	8mA
Static Current Excluding Power on Reset; Vcore = 1.2V	600uA
Static Current Logic cells consumption, including Power on Reset and all input drivers; Vcore = 1.2V	30uA

Environmental Specification

Parameter	Min	Typ	Max	Units
Storage Temp	-30		80	°C
Operating Temp	-20		70	°C

Notes:

6 Communication and Program UARTs can be used for programming as well as for communication with the application's host processor.

7 If you wish to program via UART, make sure you can get to the Reset and the Program Mode pins. These will only be needed if a serious programming issue occurs.

8 To switch the module into Program Mode, reset must be applied after the DIP switch has been toggled.

9 In System programming information can be found in the GEMstudio Pro User's Guide under the section titled, "GEMstudio Production File".

10 GEMstudio Pro User's Guide found under Support/Documentation on the website: http://www.amulettechnologies.com

Revision History

Date	Revision	Notes
13 July 2015	A	Publication
12 September 2015	B	Format change. Uart descriptions. DIP switch descriptions. Mechanical drawings
11 January 2016	C	Added DC Characteristics

Contact Us:

You have Embedded GUI Questions. We have Answers.

Amulet Technologies Headquarters
1475 S. Bascom Ave., Suite 111
Campbell, CA 95008
USA
Phone: (408) 374-4956
Fax: (408) 374-4941
Email: info@amulettechnologies.com

Sales and Customer Support:
Phone: (888) 374-8688
Sales Email: sales@amulettechnologies.com
Support Email: support@amulettechnologies.com

Developer Support: devSupport@amulettechnologies.com

Disclaimer: The information in this document is provided in connection with Amulet Technologies, LLC (Amulet) products. No license, express or implied, to any intellectual property right is granted by this document or in connection with the sale of Amulet products. EXCEPT AS SET FORTH IN AMULET'S TERMS AND CONDITIONS OF SALE WHERE AMULET IS THE SELLER, AMULET ASSUMES NO LIABILITY WHATSOEVER AND DISCLAIMS ANY EXPRESS, IMPLIED OR STATUTORY WARRANTY RELATING TO ITS PRODUCTS INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT. IN NO EVENT SHALL AMULET BE LIABLE FOR ANY DIRECT, INDIRECT, CONSEQUENTIAL, PUNITIVE, SPECIAL OR INCIDENTAL DAMAGES (INCLUDING, WITHOUT LIMITATION, DAMAGES FOR LOSS AND PROFITS, BUSINESS INTERRUPTION, OR LOSS OF INFORMATION) ARISING OUT OF THE USE OR INABILITY TO USE THIS DOCUMENT, EVEN IF AMULET HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. Amulet makes no representations or warranties with respect to the accuracy or completeness of the contents of this document and reserves the right to make changes to specifications and product descriptions at any time without notice. Amulet does not make any commitment to update the information contained herein. Unless specifically provided otherwise, Amulet products are not approved for use in automotive applications, medical applications (including, but not limited to, life support systems and other medical equipment), avionics, nuclear applications, or other high-risk applications (e.g., applications that, if they fail, can be reasonably expected to result in significant personal injury or death).