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**7" GEMmodule™**

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**MK-070R****Data Sheet****Introduction:**

The MK-070R is a fully integrated 7" WVGA production color display module to support a variety of embedded control interface applications. Featuring the Amulet GEM Graphical OS Chip™ for color displays, the module can be easily programmed using GEMstudio™, the easiest GUI design tool in the embedded space.

**Features:**

- 800x480 WVGA TFT LCD
- White LED backlight
- Integrated resistive touch panel
- Amulet GEM Graphical OS Chip™
- 24 Pin Interconnector
- Royalty-free Graphical Operating System™
- On-Board memory - 64Mb Serial Flash for storing GUI pages
- Touch Panel Controller - Built into Graphical OS Chip™
- Color Supported - Palettized 8bit (1-bit alpha)
- Backlight can be controlled via the touch panel or external command
- Supports Unicode - Foreign language character sets
- Font Converter - Built-in

## General Specification

ITEM	STANDARD VALUE	UNIT
Pixels (Resolution)	800 X 480	dots
Outline dimension	164.9(H) x 100(V) x TBD(D)	mm
Active area	154.8(H) x 85.92(V)	mm
Pixel Size	0.1929 x 0.179	mm
Luminance	350 Typ.	Cd/m2
Operation Temp.	70 - 20	C
View Angle	12 O'Clock	
Display Mode	TM, NW	
Backlight	24 White LED	
Backlight Control	PWM	
Data Flash	64 Megabit	
Interface	USB / RS232 / UART	

## Electrical Characteristic

### Recommended Operating Conditions

5V	5V Recommended
5V Current	TBD Min

### DC Characteristics

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

## Pin Descriptions

### Pin Type

I = Input

O = Output

P = Power Supply

Pin #	Signal	Type	Description
1	5V	P	5V @ 300mA
2	5V	P	5V @ 300mA
3	GND	P	Ground
4	GND	P	Ground
5	SCL	O	Serial Clock
6	SDA	O	Serial Data
7	COMMU RXD	I	CommU RXD UART
8	COMMU TXD	O	CommU TXD UART
9	PWM 1	O	Programmable Clock 1
10	PWM 2	O	Programmable Clock 2
11	Prog M	I	Program Mode - Float = Prog / GND = Run Note:1
12	PWM 0	O	Programmable Clock 0
13	RS232 TXD	O	TXD from RS232 Transceiver
14	T_CAL	I	Touch Panel Cal. - Float = Cal / GND = Normal Note:1
15	PROGU RXD	I	PROGU RXD UART
16	PROGU TXD	O	PROGU TXD UART
17	SPI C3	O	SPI Chip Select 3
18	RS232 RXD	I	RXD from RS232 Transceiver
19	SPI C2	O	SPI Chip Select 2
20			
21	MISO	O	SPI DATA In
22	SCLK	O	SPI Clock
23	RESET	O	System Reset by driving pin low
24	MOSI	O	SPI DATA Out

Note:1 Internally pulled up. Only pull to ground

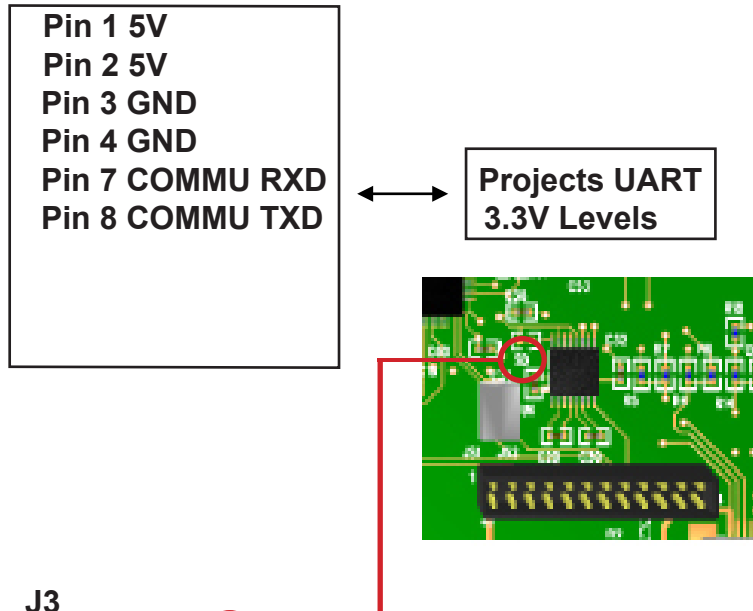
**Table 1. Header J3 24pin, 2mm, Hirose DF-11-24DP-2DSA**

### Mating Connectors

Hirose DF11-24DS-2R26 Straight  
 DF11-24DS-2C Right Angle  
 DF11-24DS-2DSA Board  
 JST PHDR-24VS

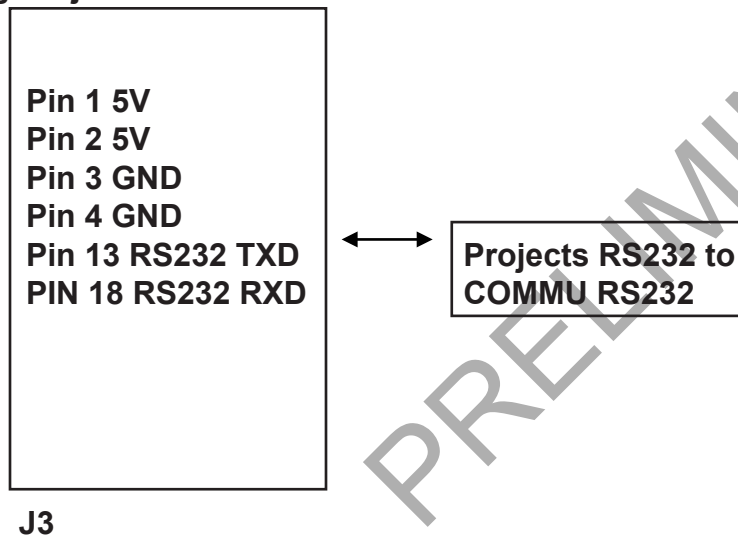
## J3 Wiring

### Connecting Project via UART



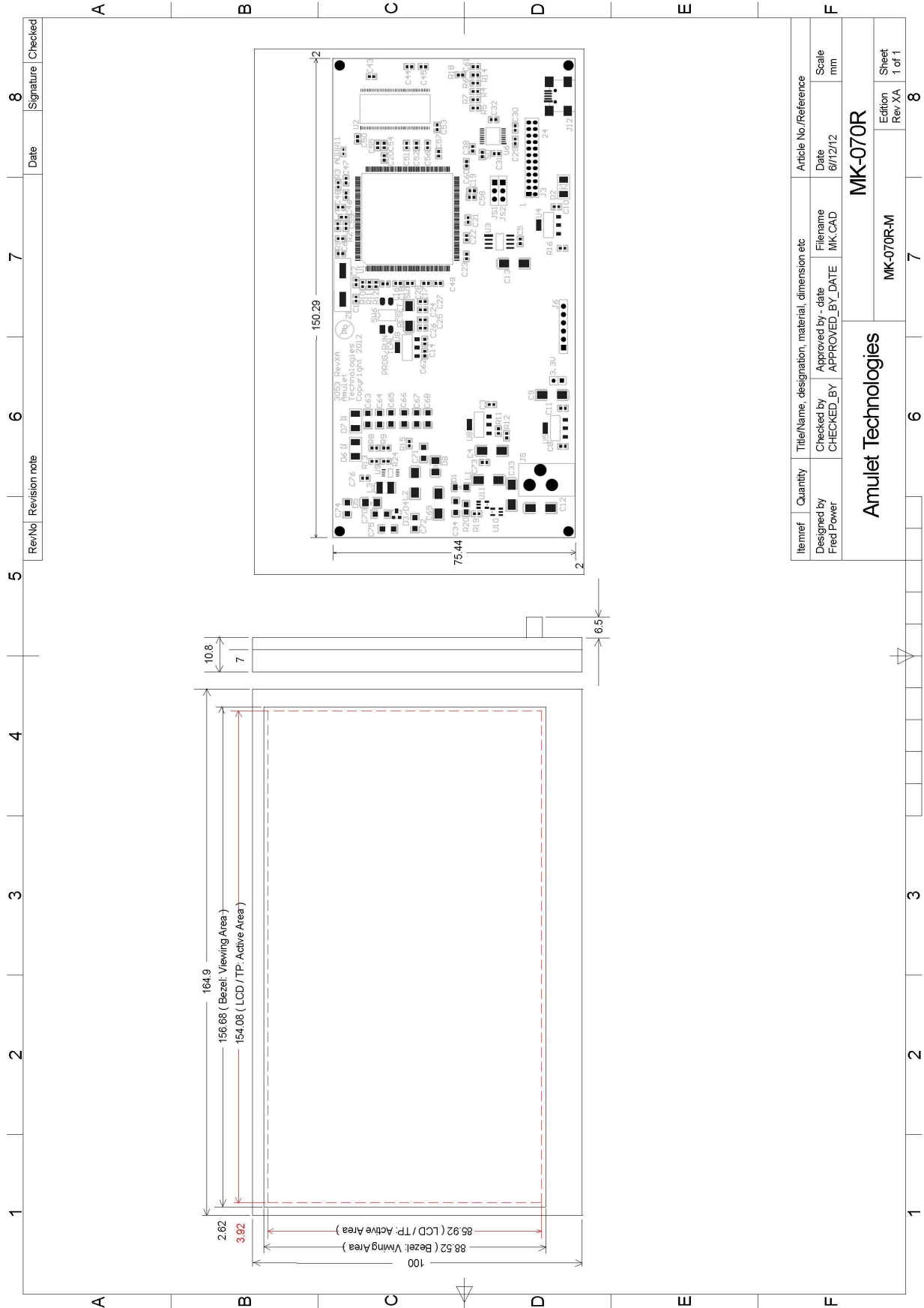
Note: Cut Trace across SD and Jumper “D” side to C38 “8” side GND to take the RS232 Transceiver out of circuit.

### Connecting Project via RS232



# MK-070R

Datasheet 1.1 - 0612



Itemref	Quantity	Title/Name, designation, material, dimension etc	Article No./Reference
Designed by Fred Power		Checked by APPROVED_BY_DATE	Date 6/12/12
		File Name MK.CAD	Scale mm
Amulet Technologies		MK-070R	
		MK-070R-M	Sheet Rev XA 1 of 1

PRELIMINARY

PRELIMINARY

Notes:

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

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.

Pass-Through Programming information is available at our website under Field Update Utilities: <http://www.amulettechnologies.com/support/downloads/fieldupdates.html>.

Momentarily grounding reset with an open collector device or momentary switch will cause a reset. Reset must be applied after the Program Mode pin is changed for us to see it.

PRELIMINARY





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