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4.3" / 4.7" Controller Board

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CB-TA-TM043NBH02  
CB-TA-TM047NBH01

## Data Sheet

### **GEMboard™** Display Controller Board for Tianma Displays

#### **Introduction:**

The CB-TA-TM043NBH02 and CB-TA-TM047NBH01 are fully integrated controller boards that support the Tianma 4.3" and 4.7" 480x272 TFT displays. These controller boards feature the GEM Graphical OS Chip™ for color displays. Using Amulet's GUI design tool, GEMstudio™ user interface design tool, user interfaces can be quickly and easily developed to support a variety of embedded applications. These boards can drive 24-bit color, plus 8-bit alpha blending (transparency channel) to drive graphics found in high-end consumer electronic products.

#### **Features:**

- Amulet GEM Graphical OS Chip™
- 24-pin Interconnector
- Royalty-Free Graphical Operating System
- On-Board memory - 32-megabit dataflash or storing GUI pages
- Touch Panel Controller built into the GEM Graphical OS Chip™
- Backlight circuit with PWM, can be controlled via touch panel or serial command
- Color Supported - Up to 24-bit + 8-bit Alpha
- Graphics Supported – GIF, JPEG, PNG
- Supports Unicode – Foreign language character sets
- Font Converter - Built-in

## General Specification

Backlight	10 White LED
Backlight Control	PWM
Data Flash	32 Megabit
Interface	USB / RS232 / UART

## Electrical Characteristic

### Recommended Operating Conditions

5V	5V Recommended
5V Current	300mA 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**

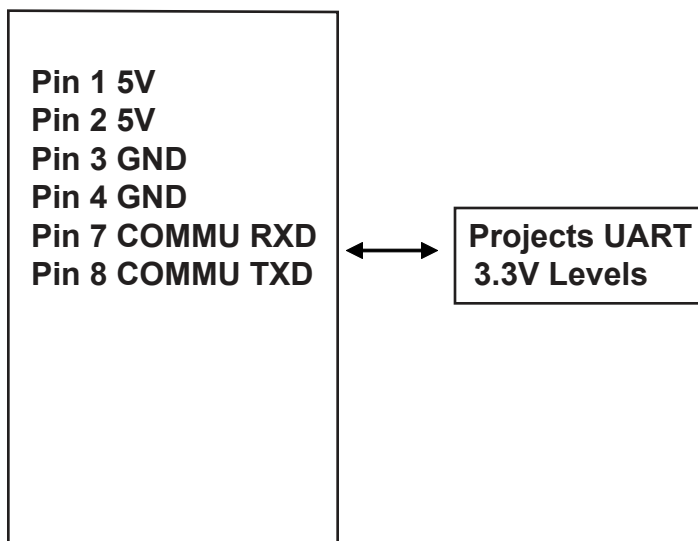
### Mating Connectors

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

JST PHDR-24VS

## J3 Wiring

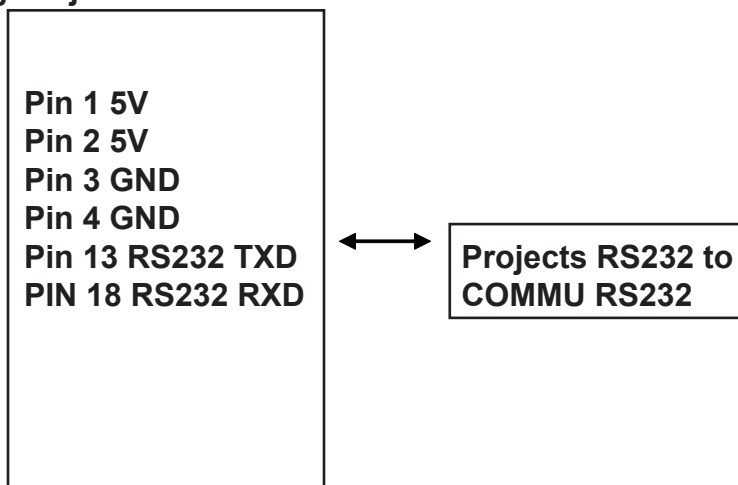
### Connecting Project via UART



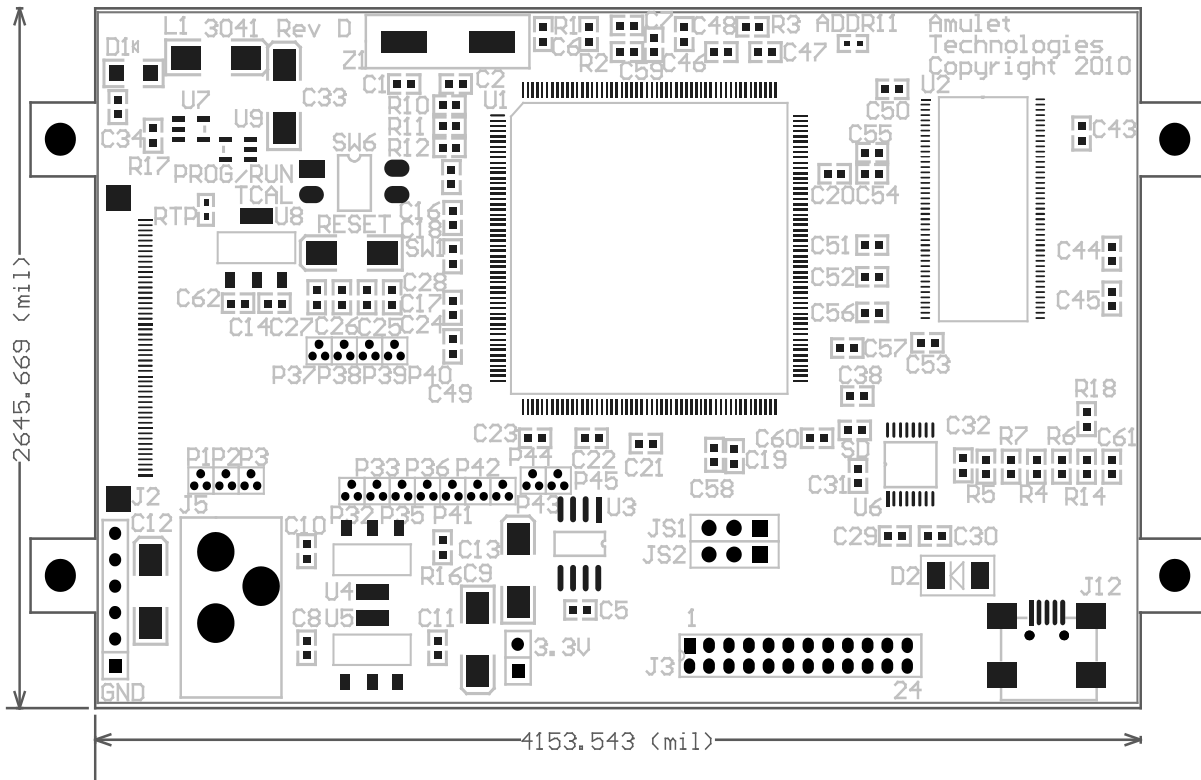
J3

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

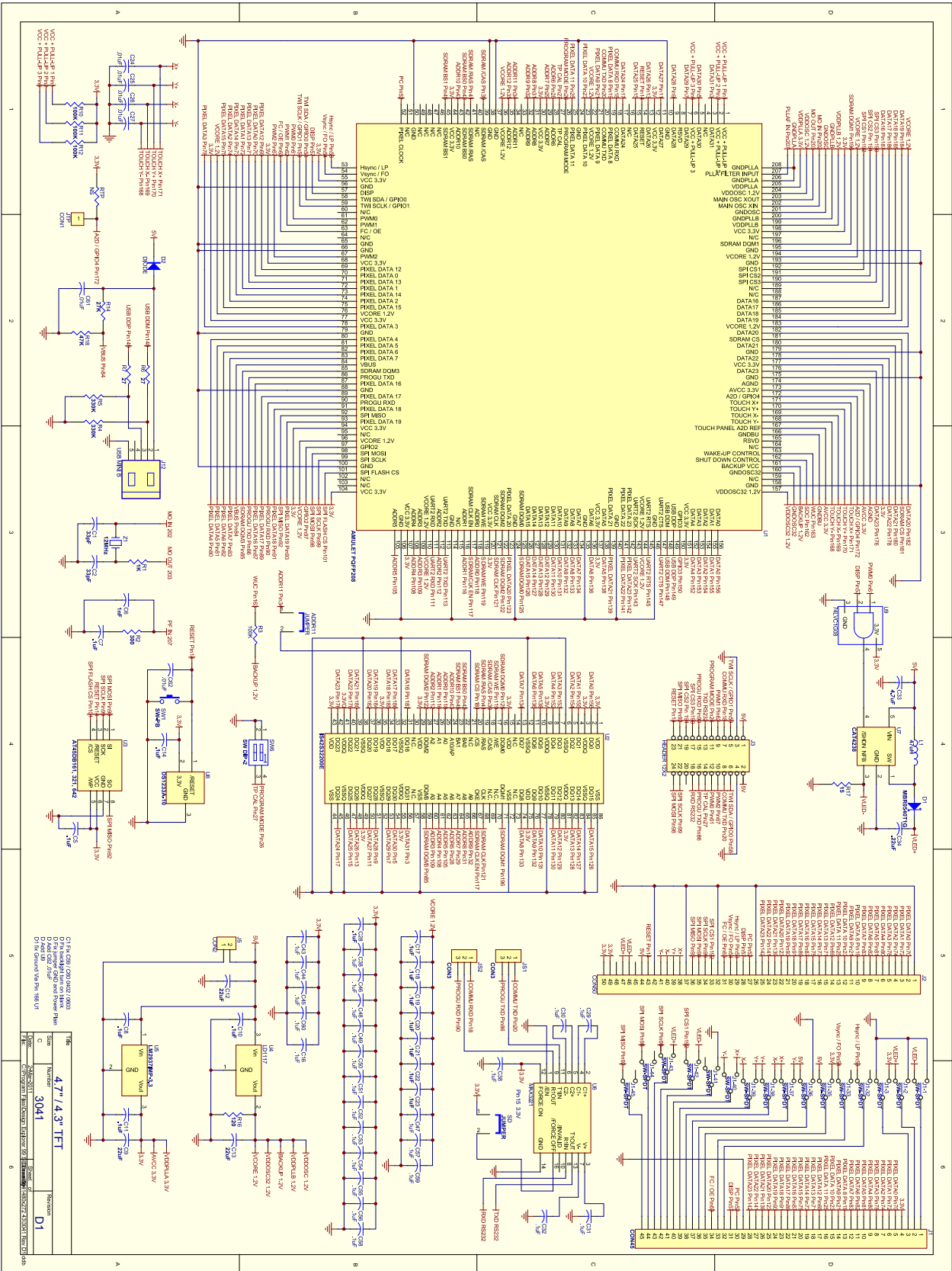
### Connecting Project via RS232



J3



**Mounting Holes 3.15mm 112.5mm by 41.9mm inset 12.65 from edge**



ITEM	PART NUMBER	QTY	REFERENCE LOCATIONS	PACKAGE	DESCRIPTION	MANUFACTURE	MANUFACTURE PART #
1	NS	1	R1	0603	RES, 1K, 1/10W, 1%	Vishay / Dale	CRCW06031KFKEA
2	0603-0301-01	1	R2	0603	RES, 300, 1/10W, 1%	Yageo	RC0603FR-07300RL
3	0603-0270-01	2	R6, R7	0603	RES, 27, 1/10W, 1%	Yageo	RC0603FR-0727RL
4	0603-0334-01	2	R4, R5	0603	RES, 330K, 1/10W, 1%	Vishay / Dale	CRCW0603330K0Z0ED
5	0603-0104-01	4	R3, R10, R11, R12	0603	RES, 100K, 1/10W, 1%	Vishay / Dale	CRCW0603100KFKEA
6	0603-0473-01	1	R18	0603	RES, 47K, 1/10W, 1%	Vishay / Dale	CRCW060347K0FKED
7	0603-0121-01	1	R16	0603	RES, 120, 1/10W, 1%	Vishay / Dale	CRCW0603120RFKEA
8	0603-0150-01	1	R17	0603	RES, 15, 1/10W, 1%	Vishay / Dale	CRCW060315R0FKEA
9	0603-0273-01	1	R14	0603	RES, 27K, 1/10W, 1%	Vishay / Dale	CRCW060327K0FKEA
10	0800-0047	1	L1	SMT	Inductor, 47uH 0.5A SMD	Sumida Corp	CDRH62BNP-470MC
11	NS	1	RTP	0603	RES, 100K, 1/10W, 1%	Vishay / Dale	CRCW0603100KFKEA
12	0603-0033-02	2	C1, C2	0603	CAP, 33pF, 50V,NPO, 5%	AVX	06035A330JAT2A
13	0603-0104-02	43	C5, C7, C8, C10, C11, C14, C16 C17 - C23, C28 - C32, C38, C43 - 60	0603	CAP, .1uF,50V,X7R, 10%	Kemet	C0603C104K5RACTU
14	0603-0103-02	6	C24 -C27, C61, C62	0603	CAP, .01uF, X7R, 50V, 10%	AVX	06035C103KAT2A
15	0603-0102-02	1	C6	0603	CAP, .001uF, 200V, PPS, 5%	Panasonic	ECH-U1C102JX5
16	1200-0220-01	3	C9, C12, C13	6032	CAP, 22uF, 10V, 10%, Tant	KEMET	T491C226K010AT
17	NS	2	C41, C42	0603	NS		
18	1206-0471-02	1	C33	3X5.5CAN	CAP, 4.7uF, 25V, Electrolytic, 20%	United Chemi-con	BMVK350ADA4R7ME60G
19	0603-0224-02	1	C34	0603	CAP, .22uF, 16V, X7R, 10%	EPCOS Inc	B37931K9224K60
20	1900-0001	1	SW1	6X3.7	Momentary Push Button	C&K	PTS635SL25SMTR-LFS
21	1900-0002-01	1	SW6		2-POS Dip Switch	CTS	2192LPST
22	2100-0012	1	Z1	CSM-7	CRYSTAL, 12MHz, 30pF	Transko	HC49/SMD-BF20-25-12.000M-TR
23	2000-0045	1	J1	SMT	Con, 45pin,ZIF, R ANG B CNT, .5MM	Molex	541324597
24	NS	1	J2	SMT	Con, 50pin,ZIF, R ANG B CNT, .5MM	Molex	54132-5097
25	2000-0024-03	1	J3		Con,24pin, Header, 2mm	Hirose	DF11-24DP-2DSA
26	NS	1	J5		DC Power Jack	SMP Tech	P002-7000-000-Z
27	2000-0005	1	J12	SMT	Con, MINI USB 5pin	Hirose	UX60-MB-5ST
28	NS	2	JS1, JS2		Con, 3pin Header		
29	5500-0540	1	D1	SOD-123	Diode, Schottky, .5A, 40V	ON	MBR0540T1G
30	5500-4001	1	D2	DO-214AC	Diode, Rectifier 1A, 50V	MCCSemi	GS1A
31	6000-3000	1	U1	PQFP-208	Color LCD Driver	Amulet	AGB75LC04-QU-E
32	6000-3220	1	U2	TSOP-86	SDRAM, 512K X 32 x 4 , 64M-Bit	ISSI	IS42532200E-6TL
33	6000-4532	1	U3	SOIC-8	Data Flash	Atmel	AT45DB321D-SU
34	6000-1117	1	U4	SOT-223	1.2V Reg	ST	LD1117512TR
35	6000-3940-33	1	U5	SOT-223	3.3V Regulator	NATIONAL	LM3940IMP-3.3/NOPB
36	6000-4238	1	U7	MSOP8	LED Driver	Catalyst	CAT4238TD-GT3
37	6000-1233	1	U8	SOT-223	Reset	Dallas Semi / Maxim	DS1233AZ-10+
38	6000-3221	1	U6	SSOP-16	RS-232 Transceiver	TI	MAX3221CDBR
39	6000-0008	1	U9	SOT-25	2 Input AND gate	NXP	74LVC1G08GV
40	3041-0001	1			PCB FAB		

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.





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