





SPECIFICATIONS

CUSTOMER : _____
SAMPLE CODE : **GT01-SERIAL**
DRAWIG NO. : _____
DATE : **2008.08.25**
CERTIFICATION : **ROHS**

Customer Sign	Sales Sign	Approved By	Prepared By
			

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Revision Record

Data(y/m/d)	Ver.	Description	Note	page
2008.08.25	00	New		



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General Description:

GT01 is a control board for external Serial that can control color TFT panel as same as black- and- white LCD panel ,Display SDRAM and control circuit on board .

User only need access RS232 or USB can direct control any pixel of the color TFT.

1. Features:

- (1) Support 320x240, panel(Note1)
- (2) 16bits color format (5:6:5)
- (3) LED back-light control circuit on board
- (4) Single address line for command/data
- (5) Support address auto increment mode
- (6) Option RS232 or USB Serial Command mode.(Note2)

Note1: 640x480,800x480,800x600 also available to develop based on requirement.

Note2:Serail command mode please see document “GT01 serial port command”
for more detail

2. Electrical specification

2.1 Absolute max. Ratings

Electrical Absolute max. ratings

Item	Symbol	Condition	Min.	Max.	Unit	Remark
Power voltage	VDD	VSS=0	-0.3	12	V	

2.2 Electrical characteristics

DC Electrical characteristic of the control Board

Typical operating conditions (VSS=0V)

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
External Power supply	PVDD	5.5	9	12	V	Note 1

Electrical characteristic of LED Back-light

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
LED voltage	V _{BAK}	--	10.5	16	V	I _{LED} =150mA,Ta=25°C
LED forward current	I _{LED}	--	150	180	mA	Ta=25°C



3. Interface specifications

3.1 LED Back-light

Driving signals for the back-light

J5 , J3A1 , J3B1

Pin no	Symbol	Level	Description
1	A	-	LED Anode
2	K	-	LED Cathode

3.2 RS232

External RS232 Port

JP3

Pin no	Symbol	Description
1	VSS	GND
2	PVDD	Power supply for the Control Board (5.5V..12V)
3	RXD	RXD
4	TXD	TXD

3.3 DCPower

External Power Port

J1

Pin no	Symbol	Description
1	PVDD	Power supply for the Control Board (5.5V..12V)
2	PVDD	Power supply for the Control Board (5.5V..12V)
3	VSS	GND
4	VSS	GND

3.4 MiniUSB

External USB Port

JP2

Pin no	Symbol	Description
1	USB 5V	USB DC 5V From PC
2	DM	Data M
3	DP	Data P
4	NC	NC
5	VSS	GND



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3.5 5.7 inch 320x240 (GF057FA320240)

External Panel interface

J2

Pin no	Symbol	I/O	Description	Remark
1	VSS		GND	
2	DCLK	I	Clock signal. Latching data at the rising edge.	
3	Hsync	I	Horizontal sync input in digital RGB mode.	
4	Vsync	I	Vertical sync input in digital RGB mode.	
5	R0	I	Red Data	
6	R1	I	Red Data	
8	R2	I	Red Data	
9	R3	I	Red Data	
10	R4	I	Red Data	
11	R5	I	Red Data	
12	VSS		GND	
13	G0	I	Green Data	
14	G1	I	Green Data	
15	G2	I	Green Data	
16	G3	I	Green Data	
17	G4	I	Green Data	
18	G5	I	Green Data	
19	VSS		GND	
20	B0	I	Blue Data	
21	B1	I	Blue Data	
22	B2	I	Blue Data	
23	B3	I	Blue Data	
24	B4	I	Blue Data	
25	B5	I	Blue Data	
26	VSS		GND	
27	ENAB	I	Signal to settle H display position	
28	VCC		+3.3V panel VCC	
29	VCC		+3.3V panel VCC	
30	R/L	I	Select right left signal direction	
31	U/D	I	Select up down signal direction	
32	NC		NC	
33	VSS		GND	

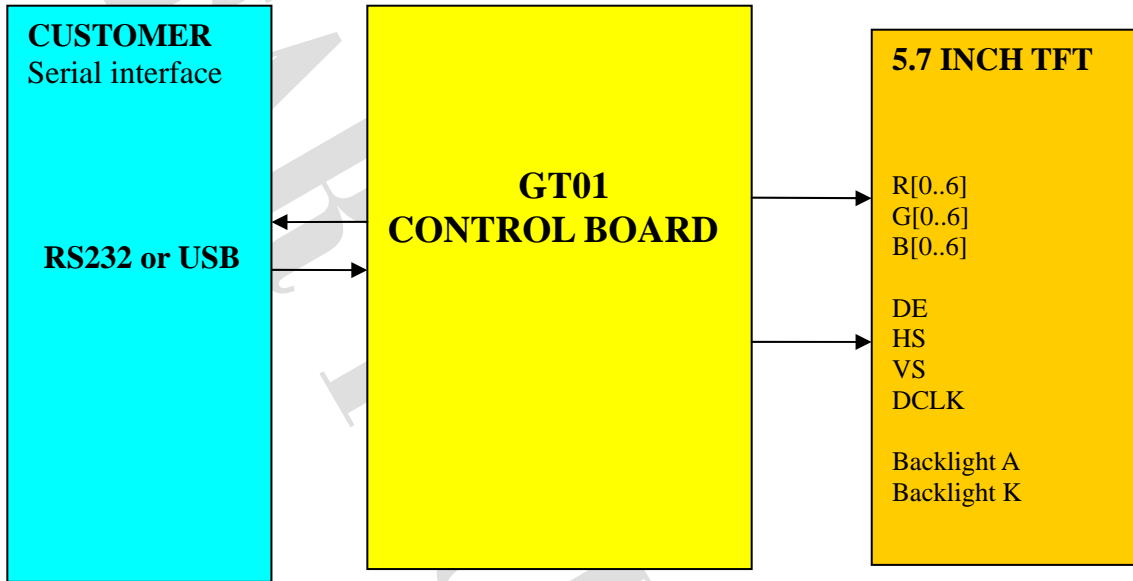


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4. Block Diagram

GT01 TFT Serial Control Board



5. Serial Port Command

Command format : (DLE)(STX)(COMMAND)(LEN)(DATA)(CHECKSUM)

DLE: 1 byte = FE(hex).

STX: 1 byte = FD(hex).

COMMAND: 1 byte. See 3.1 for more detail

LEN: 1 byte = 0 to 128 (dec) ,data length = LEN * 2. So if LEN == 128(dec) means it will send 256 bytes.

DATA: 0 to 256 (dec) bytes. See 3.1 for more detail

CHECKSUM: 1 byte.

checksum = ((COMMAND)+(LEN)+(DATA[0])+...DATA[n]) & 0x7F(hex)



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6. EXAMPLE C program

```
#define UART_DLE          0xfe
#define UART_STX          0xfd

void UartSendCommand(unsigned char ucCommand, unsigned short usDATALength, unsigned char *ucDATAPtr)
{
    unsigned short i;
    unsigned char ucBuf[5];

    ucBuf[0] = UART_DLE;
    ucBuf[1] = UART_STX;
    ucBuf[2] = ucCommand;
    ucBuf[3] = usDATALength/2; // DATA Length = LEN * 2, range : 0 -> 128;
    ucBuf[4] = ucBuf[2] + ucBuf[3]; // CheckSum

    for (i=0; i< 4; i++) {
        while (bUartTxBufInUsed == _TRUE);
        bUartTxBufInUsed = _TRUE;
        SBUF = ucBuf[i];
    }

    for (i=0; i< usDATALength; i++) {
        while (bUartTxBufInUsed == _TRUE);
        bUartTxBufInUsed = _TRUE;
        SBUF = ucDATAPtr[i];

        ucBuf[4] += ucDATAPtr[i];
        if (ucDATAPtr[i] == UART_DLE) {
            while (bUartTxBufInUsed == _TRUE);
            bUartTxBufInUsed = _TRUE;
            SBUF = ucDATAPtr[i];
        }
    }

    ucBuf[4] = ucBuf[4] & 0x7f;
    while (bUartTxBufInUsed == _TRUE);
    bUartTxBufInUsed = _TRUE;
    SBUF = ucBuf[4];
}
```




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7. PC to GT01 Command List

7.1 CLS

Function : Clear screen
 COMMAND: 1 byte = 04(hex)
 LEN: 1 byte = 00(hex)
 DATA: none

7.2 SET_FG_COLOR

Function : Set Foreground Color
 COMMAND: 1 byte = 02(hex)
 LEN: 1 byte = 01(hex)
 DATA: 2 byte

DATA[0]								DATA[1]							
B4	B3	B2	B1	B0	G5	G4	G3	G2	G1	G0	R4	R3	R2	R1	R0

Blue color 5 bits, Green color 6 bits, Red color 5 bits

7.3 SET_BG_COLOR

Function : Set Background Color
 COMMAND: 1 byte = 03(hex)
 LEN: 1 byte = 01(hex)
 DATA: 2 bytes

DATA[0]								DATA[1]							
B4	B3	B2	B1	B0	G5	G4	G3	G2	G1	G0	R4	R3	R2	R1	R0

Blue color 5 bits, Green color 6 bits, Red color 5 bits

7.3 SET_XY

Function : Set XY location
 COMMAND: 1 byte = 01(hex)
 LEN: 1 byte = 02(hex)
 DATA: 4 bytes

DATA[0]								DATA[1]							
X15	X14	X13	X12	X11	X10	X9	X8	X7	X6	X5	X4	X3	X2	X1	X0

2 bytes X location

DATA[2]							DATA[3]								
Y15	Y14	Y13	Y12	Y11	Y10	Y9	Y8	Y7	Y6	Y5	Y4	Y3	Y2	Y1	Y0

2 bytes Y location



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7.4 LINE_TO_XY

Function : Draw a line from cursor to XY location

COMMAND: 1 byte = 07(hex)

LEN: 1 byte = 02(hex)

DATA: 4 bytes

DATA[0]								DATA[1]							
X15	X14	X13	X12	X11	X10	X9	X8	X7	X6	X5	X4	X3	X2	X1	X0

2 bytes X location

DATA[2]								DATA[3]							
Y15	Y14	Y13	Y12	Y11	Y10	Y9	Y8	Y7	Y6	Y5	Y4	Y3	Y2	Y1	Y0

2 bytes Y location

7.5 LINE

Function : Draw a line from XaYa to XbYb

COMMAND: 1 byte = 08(hex)

LEN: 1 byte = 04(hex)

DATA: 8 bytes

DATA [0]								DATA[1]							
Xa15	Xa14	Xa13	Xa12	Xa11	Xa10	Xa9	Xa8	Xa7	Xa6	Xa5	Xa4	Xa3	Xa2	Xa1	Xa0

2 bytes Xa location

DATA [2]								DATA[3]							
Ya15	Ya14	Ya13	Ya12	Ya11	Ya10	Ya9	Ya8	Ya7	Ya6	Ya5	Ya4	Ya3	Ya2	Ya1	Ya0

2 bytes Ya location

DATA [4]								DATA[5]							
Xb15	Xb14	Xb13	Xb12	Xb11	Xb10	Xb9	Xb8	Xb7	Xb6	Xb5	Xb4	Xb3	Xb2	Xb1	Xb0

2 bytes Xb location

DATA [6]								DATA[7]							
Yb15	Yb14	Yb13	Yb12	Yb11	Yb10	Yb9	Yb8	Yb7	Yb6	Yb5	Yb4	Yb3	Yb2	Yb1	Yb0

2 bytes Yb location



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7.6 BOX_TO_XY

Function : Draw a box from cursor to XY location

COMMAND: 1 byte = 09(hex)

LEN: 1 byte = 02(hex)

DATA: 4 bytes

DATA [0]								DATA[1]							
X15	X14	X13	X12	X11	X10	X9	X8	X7	X6	X5	X4	X3	X2	X1	X0

2 bytes X location

DATA [2]								DATA[3]							
Y15	Y14	Y13	Y12	Y11	Y10	Y9	Y8	Y7	Y6	Y5	Y4	Y3	Y2	Y1	Y0

2 bytes Y location

7.7 BOX

Function : Draw a box from XaYa to XbYb

COMMAND: 1 byte = 0A(hex)

LEN: 1 byte = 04(hex)

DATA: 8 bytes

DATA [0]								DATA[1]							
Xa15	Xa14	Xa13	Xa12	Xa11	Xa10	Xa9	Xa8	Xa7	Xa6	Xa5	Xa4	Xa3	Xa2	Xa1	Xa0

2 bytes Xa location

DATA [2]								DATA[3]							
Ya15	Ya14	Ya13	Ya12	Ya11	Ya10	Ya9	Ya8	Ya7	Ya6	Ya5	Ya4	Ya3	Ya2	Ya1	Ya0

2 bytes Ya location

DATA [4]								DATA[5]							
Xb15	Xb14	Xb13	Xb12	Xb11	Xb10	Xb9	Xb8	Xb7	Xb6	Xb5	Xb4	Xb3	Xb2	Xb1	Xb0

2 bytes Xb location

DATA [6]								DATA[7]							
Yb15	Yb14	Yb13	Yb12	Yb11	Yb10	Yb9	Yb8	Yb7	Yb6	Yb5	Yb4	Yb3	Yb2	Yb1	Yb0

2 bytes Yb location



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7.8 BOX_FILL_TO_XY

Function : Draw a box from cursor to XY location and fill foreground color

COMMAND: 1 byte = 0B(hex)

LEN: 1 byte = 02(hex)

DATA: 4 bytes

DATA [0]								DATA[1]							
X15	X14	X13	X12	X11	X10	X9	X8	X7	X6	X5	X4	X3	X2	X1	X0

2 bytes X location

DATA [2]								DATA[3]							
Y15	Y14	Y13	Y12	Y11	Y10	Y9	Y8	Y7	Y6	Y5	Y4	Y3	Y2	Y1	Y0

2 bytes Y location

7.9 BOX_FILL

Function : Draw a box from XaYa to XbYb and fill foreground color

COMMAND: 1 byte = 0C(hex)

LEN: 1 byte = 04(hex)

DATA: 8 bytes

DATA [0]								DATA[1]							
Xa15	Xa14	Xa13	Xa12	Xa11	Xa10	Xa9	Xa8	Xa7	Xa6	Xa5	Xa4	Xa3	Xa2	Xa1	Xa0

2 bytes Xa location

DATA [2]								DATA[3]							
Ya15	Ya14	Ya13	Ya12	Ya11	Ya10	Ya9	Ya8	Ya7	Ya6	Ya5	Ya4	Ya3	Ya2	Ya1	Ya0

2 bytes Ya location

DATA [4]								DATA[5]							
Xb15	Xb14	Xb13	Xb12	Xb11	Xb10	Xb9	Xb8	Xb7	Xb6	Xb5	Xb4	Xb3	Xb2	Xb1	Xb0

2 bytes Xb location

DATA [6]								DATA[7]							
Yb15	Yb14	Yb13	Yb12	Yb11	Yb10	Yb9	Yb8	Yb7	Yb6	Yb5	Yb4	Yb3	Yb2	Yb1	Yb0

2 bytes Yb location



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7.10 PRINT_TEXT

Function : Print text string from XY cursor

COMMAND: 1 byte = 0D(hex)

LEN: 1 byte = 01 .. 80(hex)

DATA: N bytes. N = 2 .. 256(dec)

If you want only print a 'A' please set LEN = 1 and DATA[0] = 'A', DATA[1] = 0

7.11 PRINT_TEXT_TO_XY

Function : Print text string from XY location

COMMAND: 1 byte = 0E(hex)

LEN: 1 byte = 02(hex) + N/2

DATA: 4+(2*N) bytes. N = 2 .. 252(dec)

DATA [0]								DATA[1]							
X15	X14	X13	X12	X11	X10	X9	X8	X7	X6	X5	X4	X3	X2	X1	X0

2 bytes X location

DATA [2]								DATA[3]							
Y15	Y14	Y13	Y12	Y11	Y10	Y9	Y8	Y7	Y6	Y5	Y4	Y3	Y2	Y1	Y0

2 bytes Y location

DATA[4] .. DATA[256] please fill the text string.

7.12 CIRCLE

Function : Draw a CIRCLE from center XY and R pixels radius

COMMAND: 1 byte = 11(hex)

LEN: 1 byte = 03(hex)

DATA: 6 bytes

DATA [0]								DATA[1]							
X15	X14	X13	X12	X11	X10	X9	X8	X7	X6	X5	X4	X3	X2	X1	X0

2 bytes X center

DATA [2]								DATA[3]							
Y15	Y14	Y13	Y12	Y11	Y10	Y9	Y8	Y7	Y6	Y5	Y4	Y3	Y2	Y1	Y0

2 bytes Y center

DATA [4]								DATA[5]							
R15	R14	R13	R12	R11	R10	R9	R8	R7	R6	R5	R4	R3	R2	R1	R0

2 bytes R pixels radius

Note: This command still limited by panel resolution



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7.13 CIRCLE_FILL

Function : Draw a CIRCLE from center XY and R pixels radius and fill foreground color

COMMAND: 1 byte = 12(hex)

LEN: 1 byte = 03(hex)

DATA: 6 bytes

DATA [0]								DATA[1]							
X15	X14	X13	X12	X11	X10	X9	X8	X7	X6	X5	X4	X3	X2	X1	X0

2 bytes X center

DATA [2]								DATA[3]							
Y15	Y14	Y13	Y12	Y11	Y10	Y9	Y8	Y7	Y6	Y5	Y4	Y3	Y2	Y1	Y0

2 bytes Y center

DATA [4]								DATA[5]							
R15	R14	R13	R12	R11	R10	R9	R8	R7	R6	R5	R4	R3	R2	R1	R0

2 bytes R pixels radius

Note: This command still limited by panel resolution

7.14 PANEL_ON

Function : Turn on back light

COMMAND: 1 byte = 14(hex)

LEN: 1 byte = 00(hex)

DATA: none

7.15 PANEL_OFF

Function : Turn off back light

COMMAND: 1 byte = 15(hex)

LEN: 1 byte = 00(hex)

DATA: none

7.16 SET_FONT

Function : Set current text font

COMMAND: 1 byte = 16(hex)

LEN: 1 byte = 02(hex)

DATA:

DATA[0] = 0

DATA[1] = 0 .. 4(hex)

0:default(8x16), 1:default AscII(8x16) + Chinese(16x16),

2:user(8x16), 3:user(8*8), 4:user(16*16);

Note: mode 2,3,4 user must build bitmap font by yourself .



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7.17 SHOW_LOGO

Function : Draw a bitmap picture logo

COMMAND: 1 byte = 17(hex)

LEN: 1 byte = 02(hex)

DATA:

DATA[0] = 0

DATA[1] = 0 .. 1(hex)

0: logo 0 , 1: logo 1

Note: Our windows XP tool program will support download the logo picture bitmap

7.18 SET_BITMAP_WINDOW

Function : Set a window from XaYa to XbYb

COMMAND: 1 byte = 0F(hex)

LEN: 1 byte = 04(hex)

DATA: 8 bytes

DATA [0]								DATA[1]							
Xa15	Xa14	Xa13	Xa12	Xa11	Xa10	Xa9	Xa8	Xa7	Xa6	Xa5	Xa4	Xa3	Xa2	Xa1	Xa0

2 bytes Xa location

DATA [2]								DATA[3]							
Ya15	Ya14	Ya13	Ya12	Ya11	Ya10	Ya9	Ya8	Ya7	Ya6	Ya5	Ya4	Ya3	Ya2	Ya1	Ya0

2 bytes Ya location

DATA [4]								DATA[5]							
Xb15	Xb14	Xb13	Xb12	Xb11	Xb10	Xb9	Xb8	Xb7	Xb6	Xb5	Xb4	Xb3	Xb2	Xb1	Xb0

2 bytes Xb location

DATA [6]								DATA[7]							
Yb15	Yb14	Yb13	Yb12	Yb11	Yb10	Yb9	Yb8	Yb7	Yb6	Yb5	Yb4	Yb3	Yb2	Yb1	Yb0

2 bytes Yb location

Note: Xb must > Xa and Yb must > Ya, It will set a area user can fill continue pixel by PUT_BITMAP_DATA command.

While (Xa,Ya) = (0,0) and (Xb,Yb) = (319,239) means full panel area.



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7.19 PUT_BITMAP_DATA

Function : Put the bitmap data
 COMMAND: 1 byte = 10(hex)
 LEN: 1 byte = N/2(hex)
 DATA: N byte N = 2,4,6...256(dec)

DATA [0]									DATA[1]						
B4	B3	B2	B1	B0	G5	G4	G3	G2	G1	G0	R4	R3	R2	R1	R0

Blue color 5 bits, Green color 6 bits, Red color 5 bits

DATA [N-1]									DATA[N]						
B4	B3	B2	B1	B0	G5	G4	G3	G2	G1	G0	R4	R3	R2	R1	R0

Blue color 5 bits, Green color 6 bits, Red color 5 bits

Note: 2 bytes color will means a bitmap pixel

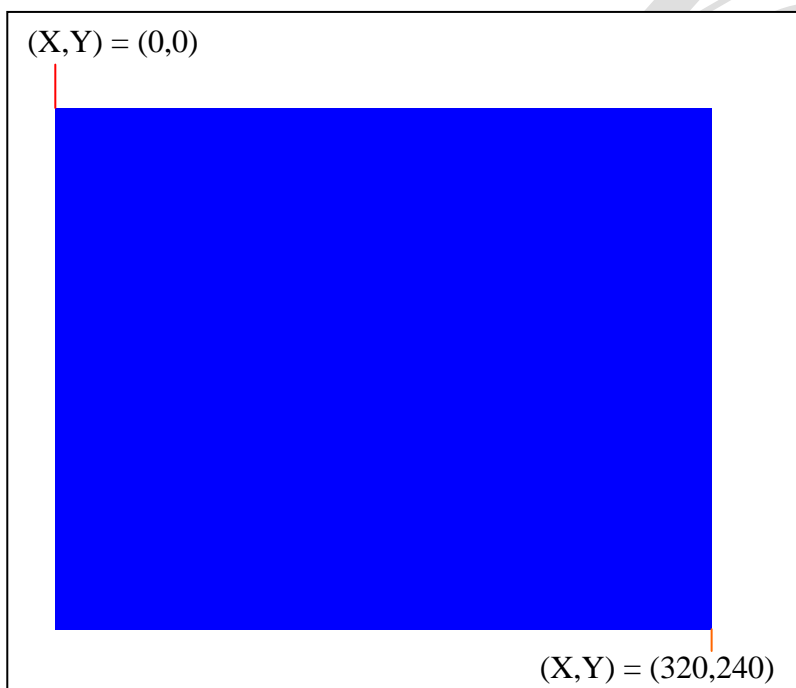
8. GT01 to PC Command List

8.1 COMMAND_ACK

Function : Command ACK
 COMMAND: 1 byte = 20(hex)
 LEN: 1 byte = 00(hex)
 DATA: none
 Note:GT01 will ACK the command to PC (or host controller)

9. Panel X Y location

5.7 inch TFT 320X240 Panel





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10. Control Board

