

# TB3012

### Conversion of Graphics PICtail<sup>™</sup> Plus Board 2 for Compatibility with USB PICtail Plus and Firmware Modification

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### INTRODUCTION

Microchip Technology's Graphics PICtail<sup>™</sup> Plus Board Version 2.0 (AC164127 – PCB 05-1999 Rev 3) is not compatible with the USB PICtail Plus Daughter Board (AC164131 – PCB 05-02033 Rev 1). This document describes how to modify the PICtail Plus Board Version 2.0 to remove the conflicts in the pin used by the two boards. This document also describes the firmware modifications to the drivers used to adapt to the hardware changes.

### HARDWARE MODIFICATION

Two possible connections of the three components are shown in the following Figure 1. This assumes the modification on the Graphics PICtail Plus Board Version 2.0 has already been performed on the J1 connector edge (the connector on the left side).

## FIGURE 1: CONNECTION CONFIGURATION WITH MODIFICATION ON GRAPHICS PICtail™ PLUS BOARD



The hardware changes needed to modify the Graphics PICtail Plus Board Version 2.0 are relatively easy. They are shown in the layout in Figure 2, with locations corresponding to the steps listed below.

- 1. Cut the signals going into the Graphics PICtail Board to isolate the following signals:
  - a. RG0
  - b. RG1
  - c. RG12
  - d. RG13
  - e. RG14
  - f. RG15

- 2. Connect RD8 signal to RG12 signal.
- 3. Connect RD9 (P102) signal to RG13 signal.
- 4. Connect RA9 signal to RG14 signal.
- 5. Connect RA10 signal to RG15 signal.

### FIGURE 2: SIGNAL MODIFICATION SUMMARY







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### FIGURE 4: BOTTOM VIEW OF THE BOARD



### FIRMWARE MODIFICATION

The firmware modification includes the modification of the following drivers: Display Driver, Flash Memory Driver and Touch Screen Driver. This is only necessary when using Microchip Graphics Library Version 1.52 or older. A newer version has a compile-time switch that takes care of the signal remapping in the firmware.

1. Modifying the External Flash Memory Driver: In
the SST39VF040.h file, replace the following
lines:
#define SST39\_CS\_TRIS TRISDbits.TRISD1
#define SST39\_CS\_LAT PORTDbits.RD1
#define SST39\_A18\_TRIS TRISCbits.TRISC2
#define SST39\_A18\_LAT LATCbits.LATC2

#define SST39\_A17\_TRIS TRISGbits.TRISG15
#define SST39\_A17\_LAT LATGbits.LATG15
#define SST39\_A16\_TRIS TRISGbits.LATG14
#define SST39\_A16\_LAT LATGbits.LATG14
To:
#define SST39\_CS\_TRIS TRISDbits.TRISD1

```
#define SST39_CS_TRIS TRISDbits.TRISD1
#define SST39_CS_LAT PORTDbits.RD1
#define SST39_A18_TRIS TRISCbits.TRISC2
#define SST39_A18_LAT LATCbits.LATC2
#define SST39_A17_TRIS TRISAbits.TRISA10
#define SST39_A17_LAT LATAbits.LATA10
#define SST39_A16_TRIS TRISAbits.TRISA9
```

#define SST39\_A16\_LAT

Note: SST39 chip select signal (SST39\_CS\_TRIS and SST39\_CS\_LAT signals) can be generated by RD1 or RD11. Selecting one will mean a proper jumper (JP4) setting.

LATAbits.LATA9

```
2. Modifying the on-board LG LGDP4531
LCD controller driver: In the
LGDP4531_R61505_S6D0129_S6D0139_S
PFD5408.h file, replace the following lines:
#elif (GRAPHICS_PICTAIL_VERSION == 2)
```

```
. . . . . . . .
#define POWERON LAT BIT
                            LATCbits.LATC3
#define POWERON_TRIS_BIT TRISCbits.TRISC3
#endif // GRAPHICS PICTAIL VERSION
To:
#elif (GRAPHICS_PICTAIL_VERSION == 2)
. . . . . . . .
// Definitions for POWER ON pin
#ifdef PIC32MX
       #define POWERON LAT BIT
LATCbits.LATC3
       #define POWERON_TRIS_BIT
TRISCbits.TRISC3
#else
       #define POWERON_LAT_BIT
LATGbits.LATG15
#define POWERON TRIS BIT TRISGbits.TRISG15
```

#endif // GRAPHICS\_PICTAIL\_VERSION

3. Modifying the on-board SSD1906 external controller driver: In the SSD1906.h file, replace the following lines:

#define	A17_LAT_BIT	LATGbits.LATG14
#define	A17_TRIS_BIT	TRISGbits.TRISG14

#### To:

```
#define A17_LAT_BIT LATAbits.LATA9
#define A17_TRIS_BIT TRISAbits.TRISA9
```

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4. Modifying the EEPROM driver (use this modification only when you use the PIC24FJ256GB110 PIM (MA240014) and PIC32MX460F512L PIM (MA320002) in the Explorer 16 board). Other PIM may have different remappable pin configuration. Please refer to device specification for details. In the EEPROM. h file, replace the following lines:

```
#define EEPROM_SS_TRIS TRISDbits.TRISD12
#define EEPROM_SS_PORT PORTDbits.RD12
To:
#ifdef __PIC32MX___
#define EEPROM_SS_TRIS TRISDbits.TRISD12
#define EEPROM_SS_PORT PORTDbits.RD12
#else
#define EEPROM_SS_TRIS TRISGbits.TRISG0
#define EEPROM_SS_PORT PORTGbits.RG0
#endif
```

In the EEPROM.c file, add the following lines in the EEPROMINIT() function:

```
#ifndef __PIC32MX___
__builtin_write_OSCCONL(OSCCON & 0xbf);
// unlock PPS
```

```
RPOR10bits.RP21R = 11; // assign RP21 for SCK2
RPOR9bits.RP19R = 10; // assign RP19 for SD02
RPINR22bits.SD12R = 26; // assign RP26
for SD12
```

```
__builtin_write_OSCCONL(OSCCON | 0x40);
// lock PPS
#endif
```

```
5. Modifying the Touch Screen Driver: In the
   TouchScreen.h file, replace the following
   lines:
#define LAT XNEG
                        LATGbits.LATG13
#define TRIS XNEG
                        TRISGbits.TRISG13
#define PORT XNEG
                        PORTGbits.RG13
#define LAT YNEG
                        LATGbits.LATG12
#define TRIS YNEG
                        TRISGbits.TRISG12
#define PORT YNEG
                        PORTGbits.RG12
To:
#ifdef PIC32MX
   #ifdef _USB
       #define LAT_XNEG LATGbits.LATG15
       #define TRIS XNEG TRISGbits.TRISG15
       #define PORT XNEG PORTGbits.RG15
   #else
       #define LAT_XNEG LATDbits.LATD9
       #define TRIS_XNEG TRISDbits.TRISD9
       #define PORT XNEG PORTDbits.RD9
       #endif
#else
   // PIC24
   #define LAT_XNEG LATDbits.LATD9
   #define TRIS_XNEG TRISDbits.TRISD9
   #define PORT_XNEG PORTDbits.RD9
#endif
#define LAT_YNEG LATDbits.LATD8
#define TRIS_YNEG TRISDbits.TRISD8
```

```
#define TRIS_YNEG TRISDbits.TRISD
#define PORT_YNEG PORTDbits.RD8
```

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