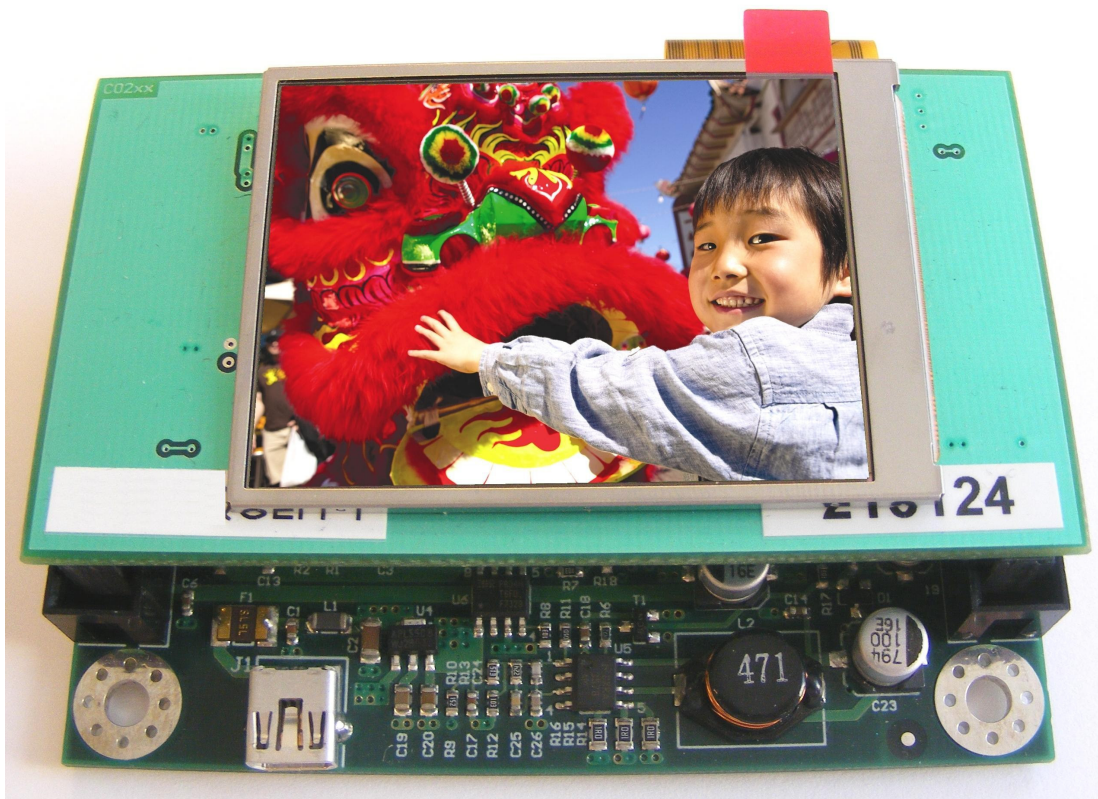


# DUO

## DENSITRON USB OLED



### *HARDWARE AND SOFTWARE MANUAL*

## TABLE OF CONTENTS

|          |                                                        |           |
|----------|--------------------------------------------------------|-----------|
| <b>1</b> | <b>GENERAL DESCRIPTION .....</b>                       | <b>4</b>  |
| 1.1      | HARDWARE FEATURES .....                                | 4         |
| 1.2      | SOFTWARE FUNCTIONS .....                               | 4         |
| <b>2</b> | <b>PARTS OF SUPPLIED SYSTEM .....</b>                  | <b>4</b>  |
| <b>3</b> | <b>SYSTEM REQUIREMENTS .....</b>                       | <b>4</b>  |
| <b>4</b> | <b>START-UP .....</b>                                  | <b>5</b>  |
| 4.1      | ASSEMBLY .....                                         | 5         |
| 4.2      | CONNECTION .....                                       | 5         |
| <b>5</b> | <b>DISCONNECTING TERMINAL.....</b>                     | <b>5</b>  |
| <b>6</b> | <b>USING THE USB06 DEMO SOFTWARE.....</b>              | <b>6</b>  |
| 6.1      | CONNECTING TO DISPLAY .....                            | 6         |
| 6.2      | PICTURE MANAGEMENT.....                                | 8         |
| 6.2.1    | ADD PICTURE TO DUO .....                               | 8         |
| 6.2.2    | CHANGE PICTURE TO DUO.....                             | 8         |
| 6.2.3    | REMOVE PICTURE TO DUO .....                            | 8         |
| 6.2.4    | START/STOP SLIDE SHOW.....                             | 9         |
| 6.2.5    | PICTURE SLIDE.....                                     | 9         |
| 6.3      | SOFTWARE DEVELOPMENT CONTROL .....                     | 9         |
| 6.4      | CONTROLLER MANAGEMENT .....                            | 10        |
| 6.4.1    | SLIDE SHOW DELAY .....                                 | 10        |
| 6.4.2    | BRIGHTNESS .....                                       | 10        |
| 6.4.3    | PROJECT MANAGEMENT.....                                | 10        |
| 6.4.4    | COLOUR SETTING AND POWER SAVING.....                   | 10        |
| 6.4.5    | DISPLAY TYPE OVERRIDE.....                             | 11        |
| <b>7</b> | <b>HARDWARE DESCRIPTION.....</b>                       | <b>12</b> |
| 7.1      | MECHANICAL PARAMETERS OF CONTROLLER CARD .....         | 12        |
| 7.2      | AVAILABLE TRANSITION CARDS FOR DIFFERENT DISPLAY ..... | 13        |
| 7.2.1    | PM OLED .....                                          | 13        |
| 7.2.2    | AMOLED .....                                           | 13        |
| <b>8</b> | <b>MECHANICAL STRUCTURE OF SYSTEM.....</b>             | <b>14</b> |

|             |            |        |
|-------------|------------|--------|
| Product No. | DUO MANUAL | REV. G |
|             |            |        |

|      |        |
|------|--------|
| Page | 2 / 16 |
|------|--------|

**REVISION RECORD**

| <b>Rev.</b> | <b>Date</b>   | <b>Page</b> | <b>Chapt</b> | <b>Comment</b>                                     | <b>ECR no.</b> |
|-------------|---------------|-------------|--------------|----------------------------------------------------|----------------|
| A           | 24/May/06     |             |              | New Release                                        |                |
| B           | 23/Nov/06     | 10          | 6            | Software Upgrade                                   |                |
|             |               | 12          | 7            | USB06_DEMOV1.3.exe<br>Added Transition Cards       |                |
| C           | 05/October/07 | 9           | 6            | Software development control<br>USB06_DEMOV1.4.exe |                |
| D           | 12/May/08     | 11          | 6            | Added info about display type<br>override.         |                |
|             |               | 12          | 7            | Added Transition Cards                             |                |
|             |               | 1,16        | 7            | Change pictures to AMOLED                          |                |
| E           | 15/June/08    | 13          | 7            | Added Transition Cards                             |                |
| F           | 30/June/08    | 13          | 7            | Added Transition Cards                             |                |
| G           | 17/April/09   | 13          | 7            | Added Transition Board list                        |                |
|             |               |             |              |                                                    |                |

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|             |            |        |
|-------------|------------|--------|
| Product No. | DUO MANUAL | REV. G |
|             |            |        |

|      |        |
|------|--------|
| Page | 3 / 16 |
|------|--------|

# **1 GENERAL DESCRIPTION**

## **1.1 HARDWARE FEATURES**

- USB1.1 and USB2.0 compatible communication interface
- Small board size (88mm x 55mm)
- Supports OLED displays with 8bit parallel interface
- 500KByte display memory for fast display update
- Onboard switching power supply for OLED
- Maximum speed with VCP driver 300kByte/s, with D2XX driver 1MByte/s
- Hot plug and unplug detection
- Software control for OLED

## **1.2 SOFTWARE FUNCTIONS**

- Picture download from PC in Windows BMP format (with USB06 demo software)
- Software Development functions
- Picture slide show
- Display detection
- Brightness control
- Project management
- Colour Setting
- Power saving

# **2 PARTS OF SUPPLIED SYSTEM**

The supplied system contains the following:

- DUO Controller card
- Mini USB cable
- Demo software (works with VCP driver only)
- Transition cards can be ordered separately for different display types (See 7.2)

# **3 SYSTEM REQUIREMENTS**

VCP (Virtual COM Port) drivers are available from *fidichip.com* for the following operating systems:

- Windows 98 and Windows 98 SE

|             |            |        |
|-------------|------------|--------|
| Product No. | DUO MANUAL | REV. G |
|             |            |        |

|      |        |
|------|--------|
| Page | 4 / 16 |
|------|--------|

- Windows 2000 / ME / XP/Vista
- Windows CE \*\*
- MAC OS-8 and OS-9
- MAC OS-X
- Linux 2.40 and greater

D2XX (USB Direct Drivers) are available from *ftdichip.com* for following operating systems:

## 4 **START-UP**

Before connecting the DUO controller to the PC, the display must be plugged to the Transition card and the Transition card to the controller card.

### 4.1 ASSEMBLY

To assemble the DUO controller card with the transition card, a pin is fitted permanently to one side of the female connector on the transition card. This will align with the pin missing to one side of the male connector on the DUO controller card. Care should be taken while aligning the two cards together.

### 4.2 CONNECTION

After the system is assembled correctly then it can be connected to the PC USB port with the mini USB cable. DUO is powered by USB port, no other cable is required. The display will be blank until PC side demo software initializes it. If the display is connected for the first time, the USB VCP drivers must be installed, which can be found in the supplied software package or a latest version can be downloaded from the following address:

<http://www.ftdichip.com/Drivers/VCP.htm>

## 5 **DISCONNECTING TERMINAL**

Always stop the demo program or close COM port before disconnecting terminal from the system. Never remove the display or the Transition card until DUO is powered by PC via USB port.

|             |            |        |
|-------------|------------|--------|
| Product No. | DUO MANUAL | REV. G |
|             |            |        |

|      |        |
|------|--------|
| Page | 5 / 16 |
|------|--------|

## 6 USING THE USB06 DEMO SOFTWARE

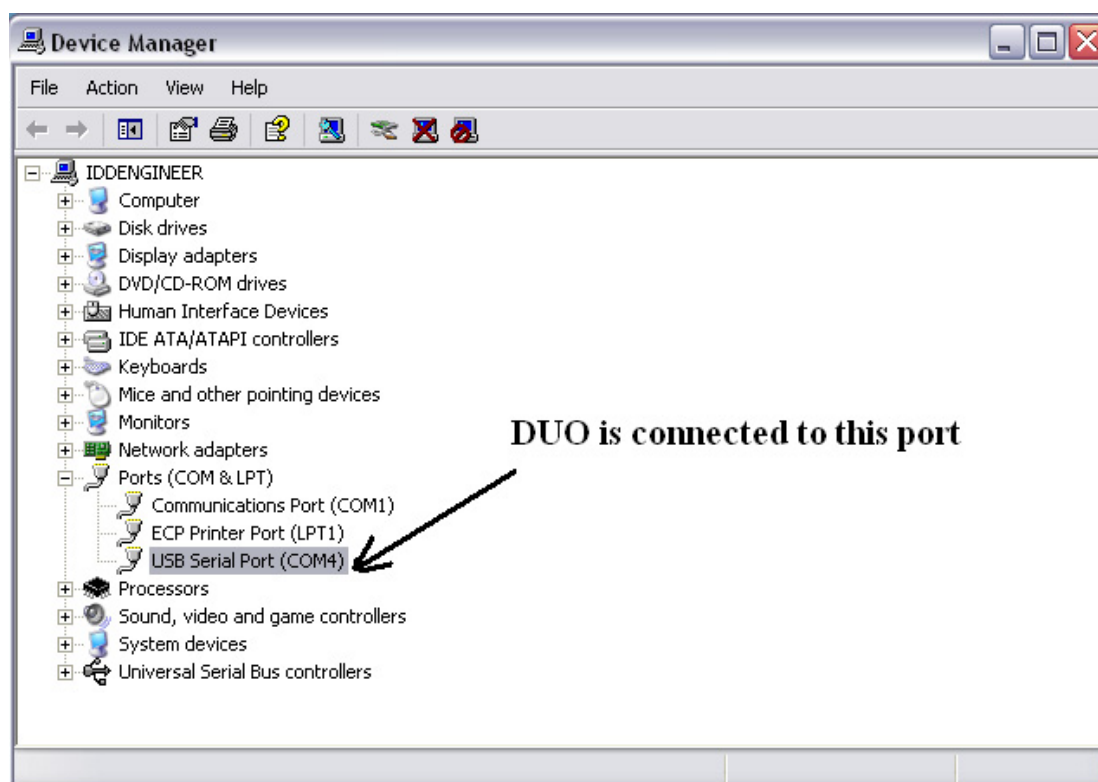
USB06 demo software can be used to demonstrate capability of different OLED displays.

### 6.1 CONNECTING TO DISPLAY

The demo software can be used with the VCP (Virtual COM Port) driver only. When DUO is connected to PC operating system, PC will make a new virtual serial COM port. Serial port's number can be found by following this instruction below:

For Windows XP: "Start menu =>Control Panel=>System=>Device Manager"

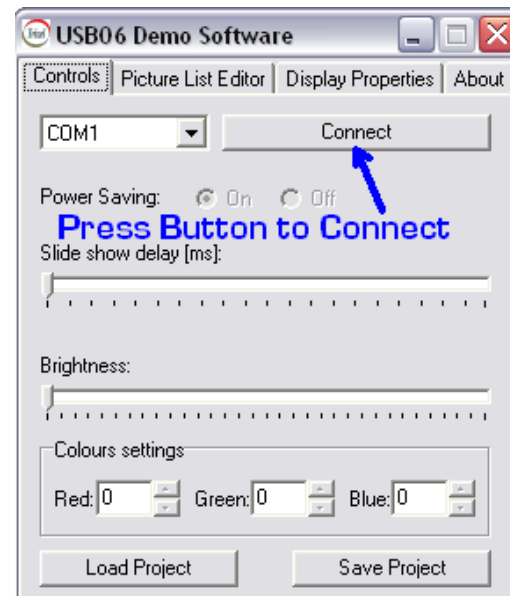
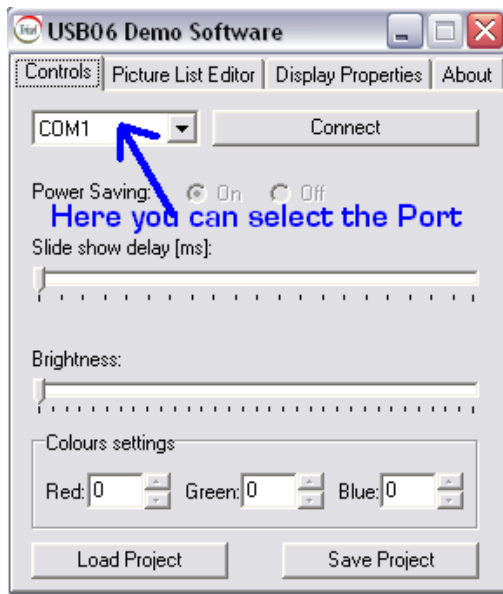
Other versions: "Start menu=>Settings=>Control Panel=>System=>Device Manager"



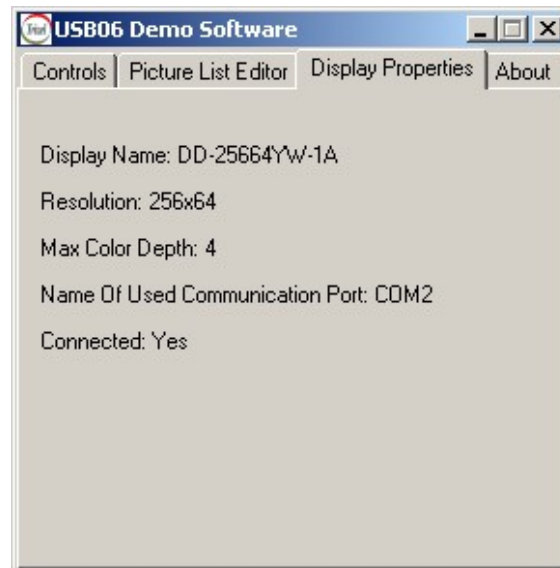
If more than one DUO card is connected to PC each card has an independent COM port. The next two pictures show the way of port selection and connecting method to DUO. All free COM ports are listed by USB06 Demo software, which are available at start-up.

|             |            |        |
|-------------|------------|--------|
| Product No. | DUO MANUAL | REV. G |
|             |            |        |

|      |        |
|------|--------|
| Page | 6 / 16 |
|------|--------|



Software will show Error message if any error has occurred while connecting. If everything is fine, “Connect” button label will be changed to “Disconnect”. After connection, the DUO controller and display are initialised and ready for use. Properties of the detected display can be checked at display properties tab.

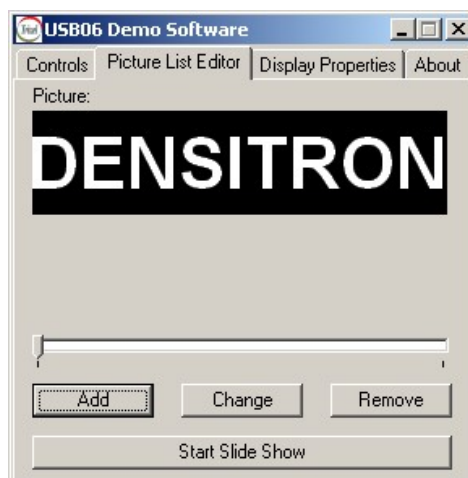


|             |            |        |
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| Product No. | DUO MANUAL | REV. G |
|             |            |        |

|      |        |
|------|--------|
| Page | 7 / 16 |
|------|--------|

## 6.2 PICTURE MANAGEMENT

The USB06 demo software has a Picture list editor, which can be used to make a picture list for slide show and to start and to stop the slide show. If only one picture is loaded to picture list, the slide show will work, as single picture. Picture can be loaded in BMP format only.



### 6.2.1 ADD PICTURE TO DUO

To add picture to DUO, press “Add” button on the Picture List Editor tab. This will prompt you to an explorer window to choose a picture from a specified location on your PC. Some sample pictures are stored in the CD provided with the kit under the folder “Sample Pictures”.

Open the appropriate picture to correspond the display type. New pictures can be created but should be of the size of the OLED display. For example, a display of 256x64 should have an image corresponding to 256x64. Resizing of images can be done using any imaging software's. If the image is not set to the right size of the display, you will be displaying only part of the picture to the OLED.

### 6.2.2 CHANGE PICTURE TO DUO

A picture can be changed at any time by pressing “Change”, it is recommended to do this when the slide show is in stop mode. Changing Picture will change the picture showing in the USB06 demo software not the image on the display. This is because some times there will be a delay between the picture shown on the USB06 demo software and the OLED display. By doing this it will replace the old picture with the new one.

### 6.2.3 REMOVE PICTURE TO DUO

A picture can be removed at any time by pressing “Remove”, it is recommended to do this when the slide show is in stop mode. Removing Picture will remove the picture showing in the USB06 demo software not the image on the display. This is because some times there will be a delay between the picture shown on the USB06 demo software and the OLED display. By doing this it will remove the picture.

|             |            |        |
|-------------|------------|--------|
| Product No. | DUO MANUAL | REV. G |
|             |            |        |

|      |        |
|------|--------|
| Page | 8 / 16 |
|------|--------|



## 6.2.4 START/STOP SLIDE SHOW

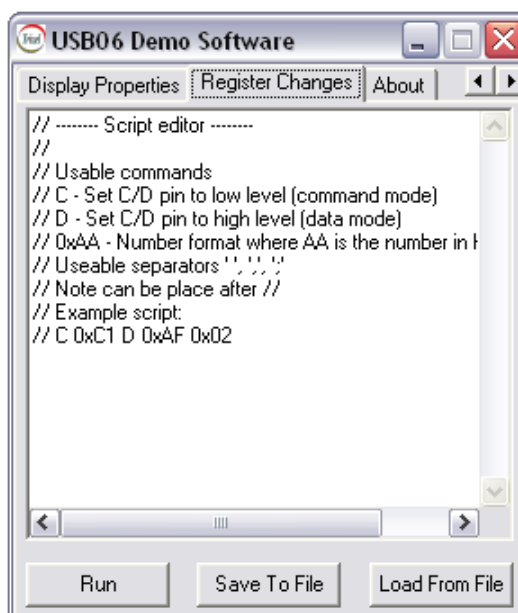
This will start and stop the slide show. Even if a single picture is added, you need to press the start slide show. When the slide show is in stop position it will show “Start Slide Show” and when it is ON then it will show “Stop Slide Show”.

## 6.2.5 PICTURE SLIDE

Picture slide is to navigate between pictures using the mouse cursor. It will also show a dotted line on top of the sliding bar for each picture added. This will scroll automatically scroll during the slide show.

## 6.3 SOFTWARE DEVELOPMENT CONTROL

This function will allow the user to access and change any registers to the driver IC. By having this function the customer can easily evaluate the display without involving in any hardware design.



Example code to access a register and write a data will be C 0xC1 0xAF  
On the above example 0xC1 is the register and 0xAF is the data written to the register.  
Once the code is written the Run Button should be pressed for the code to be updated.  
Codes of the above format can be saved or loaded from a file.

Example to modify 2 registers is as follows C 0xC1 0xAF 0xD1 0xFF where first register will be 0xC1 and the second is 0xD1.

|             |            |        |
|-------------|------------|--------|
| Product No. | DUO MANUAL | REV. G |
|             |            |        |

|      |        |
|------|--------|
| Page | 9 / 16 |
|------|--------|

## 6.4 CONTROLLER MANAGEMENT

This controls the brightness, speed of the slide show and projects.

### 6.4.1 SLIDE SHOW DELAY

Slide show delay track bar is to increase and decrease the delay timing between two consecutive pictures during the slide show. Speed of slide show can be set by this track bar.

### 6.4.2 BRIGHTNESS

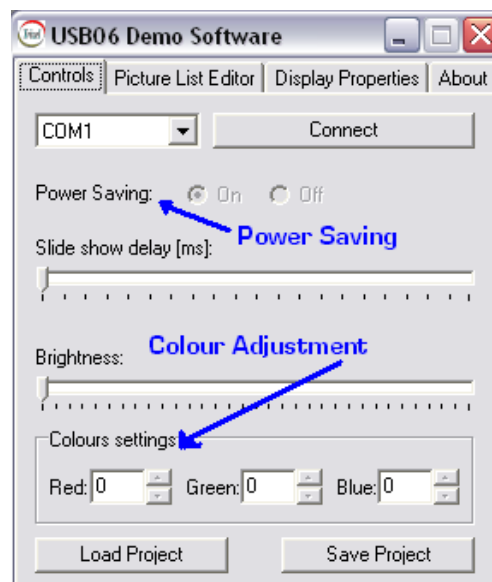
The brightness of the picture can be changed by Brightness track bar. This will increase or decrease the brightness of the Display.

### 6.4.3 PROJECT MANAGEMENT

The demo software has a project management section. It is used to save and load pre-configured to the software. Picture list, brightness value, and slideshow delay can be stored and loaded by these functions. Save Project will create a file which stores all the information as mentioned previously. Loading the Project will set the parameters to run the pre-configured slide show. Any change to the picture file, like name change or moving to a different location, will result to an error message saying “Missing picture”. The project management file can be edited using WordPad.

### 6.4.4 COLOUR SETTING AND POWER SAVING

For Colour Displays, colours Red, Green and Blue can be adjusted from 0 to 255. Power saving mode can be used in certain displays to enable the user to see the difference in their display properties and current consumption.

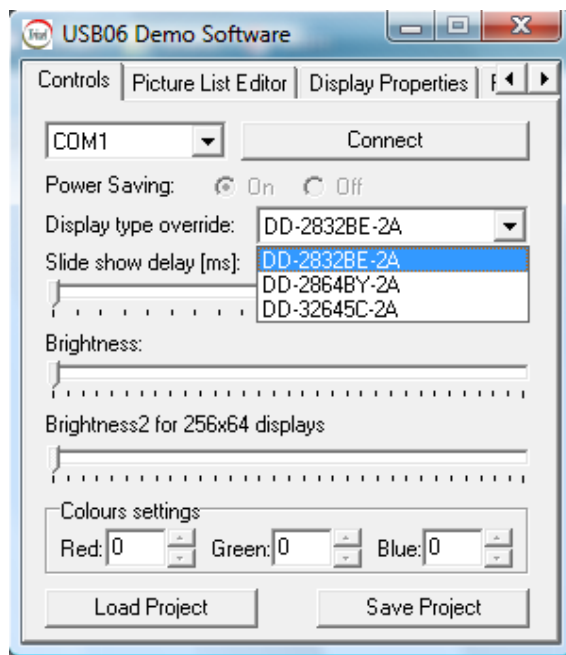


|             |            |        |
|-------------|------------|--------|
| Product No. | DUO MANUAL | REV. G |
|             |            |        |

|      |         |
|------|---------|
| Page | 10 / 16 |
|------|---------|

### 6.4.5 DISPLAY TYPE OVERRIDE

When using either: DD-2832BE-2A, DD2864BY-2A or DD-32645C-2A display, the user must select the type in the Display type override menu.



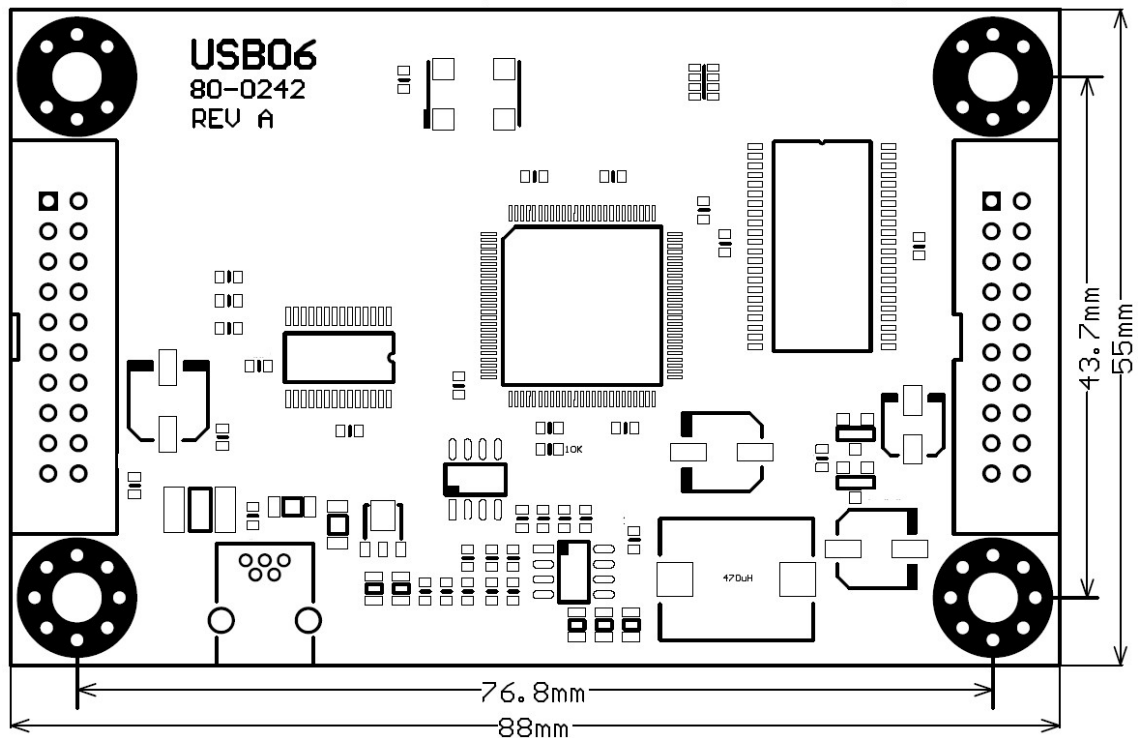
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| Product No. | DUO MANUAL | REV. G |
|             |            |        |

|      |         |
|------|---------|
| Page | 11 / 16 |
|------|---------|

## 7 HARDWARE DESCRIPTION

### 7.1 MECHANICAL PARAMETERS OF CONTROLLER CARD

The controller card has one mini USB connector (bottom side of picture), two IDC type connectors for the Transition cards at both sides of board, and four fixing holes for correspond fixing. Transition card connectors have a key pin; therefore Transition card can not be plugged to wrong position.



|             |            |        |
|-------------|------------|--------|
| Product No. | DUO MANUAL | REV. G |
|             |            |        |

|      |         |
|------|---------|
| Page | 12 / 16 |
|------|---------|

## 7.2 AVAILABLE TRANSITION CARDS FOR DIFFERENT DISPLAY

Currently three different Transition cards are available for this system. These cards support the following OLED displays:

### 7.2.1 PM OLED

| Display                     | Transition board               |                 |
|-----------------------------|--------------------------------|-----------------|
| 1. DD-128128FC-5B           | 1. PDT-N-128128FC-5B           | Colour          |
| 2. DD-160128FC-1A           | 2. PDT-N-160128FC-1A           | Colour          |
| 3. DD-160128FC-2A           | 3. PDT-N-160128FC-2A           | Colour          |
| 4. DD-25664YW-3A            | 4. PDT-N-25664YW-3A            | Yellow          |
| 5. DD-25664YW-4A            | 5. PDT-N-25664YW-4A            | Yellow          |
| <del>6. DD-25664BE-1A</del> | <del>6. PDT-N-25664BE-1A</del> | <del>Blue</del> |
| 7. DD-12832YW-1A            | 7. PDT-N-12832YW-1A            | Yellow          |
| 8. DD-12832BE -1A           | 8. PDT-N-12832BE -1A           | Blue            |
| 9. DD-2832BE-2A             | 9. PDT-N-2832BE-2A             | Blue            |
| 10. DD-12864WE-1A           | 10. PDT-N-12864WE-1A           | White           |
| 11. DD-2864BY-2A            | 11. PDT-N-2864BY-2A            | Blue/Yellow     |
| 12. DD-32645C-2A            | 12. PDT-N-32645C-2A            | 5 Colour        |
| 13. DD-12864YO-1A           | 13. PDT-N-12864YO-1A           | Yellow          |
| 14. DD-12864YO-3A           | 14. PDT-N-12864YO-3A           | Yellow          |
| 15. DD-12864YO-5A           | 15. PDT-N-12864YO-5A           | Yellow          |
| 16. DD-12864YO-7A           | 16. PDT-N-12864YO-7A           | Yellow          |

### 7.2.2 AMOLED

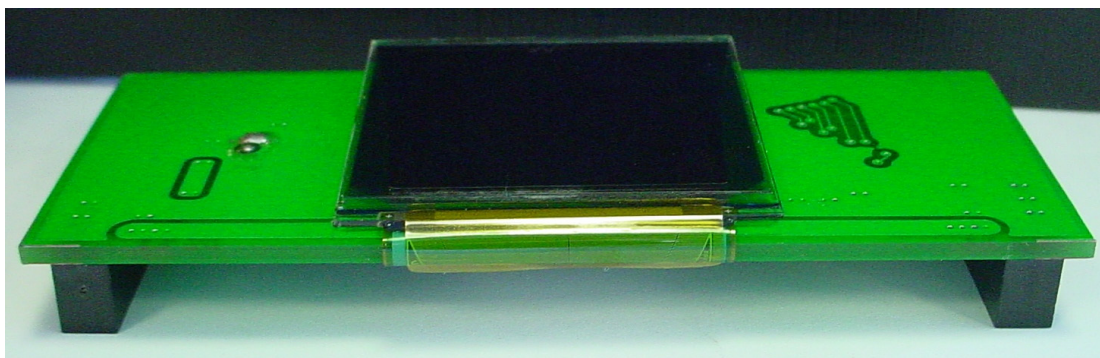
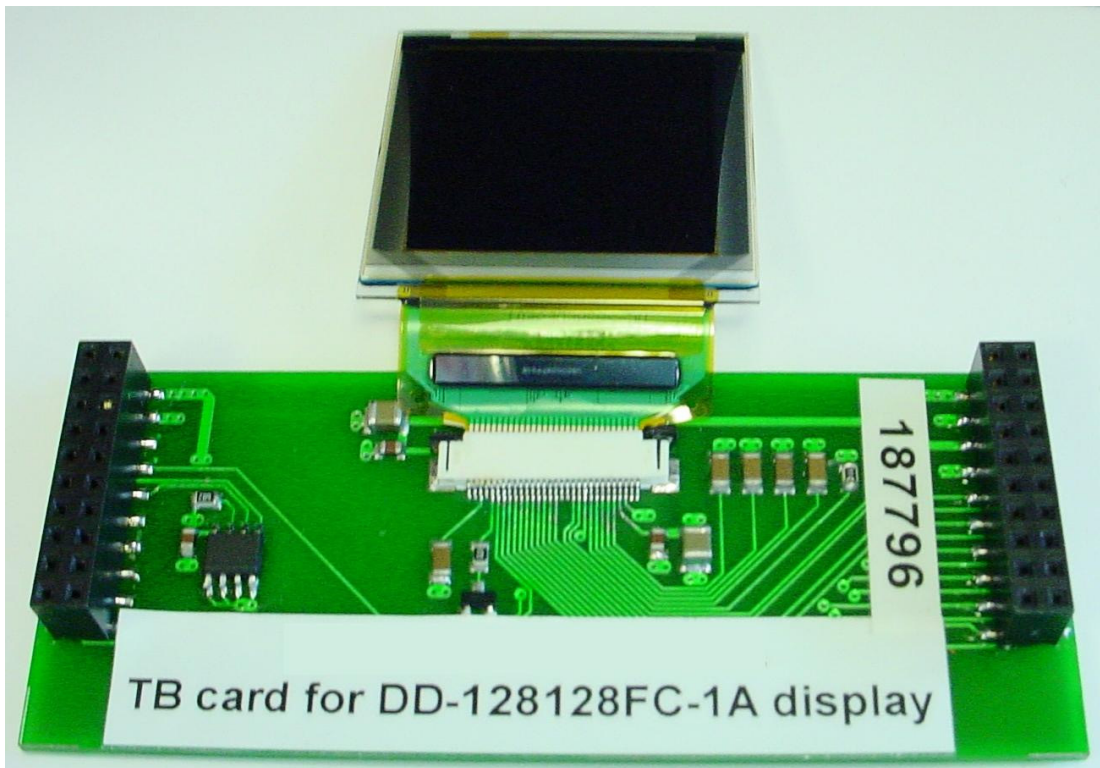
| Display        | Transition board |             |
|----------------|------------------|-------------|
| 1. C0201ILK-C  | ADT-N-2"         | Full Colour |
| 2. C0240QGLA-T | ADT-N-2.4"       | Full Colour |
| 3. C0240QGLB-T | ADT-T-2.4"       | Full Colour |
| 4. C0283QGLH-T | ADT-T-2.8"       | Full Colour |
| 5. C0283QGLD-T | ADT-N-2.8"       | Full Colour |

|             |            |        |
|-------------|------------|--------|
| Product No. | DUO MANUAL | REV. G |
|             |            |        |

|      |         |
|------|---------|
| Page | 13 / 16 |
|------|---------|

## 8 MECHANICAL STRUCTURE OF SYSTEM

### Display connection on Transition card



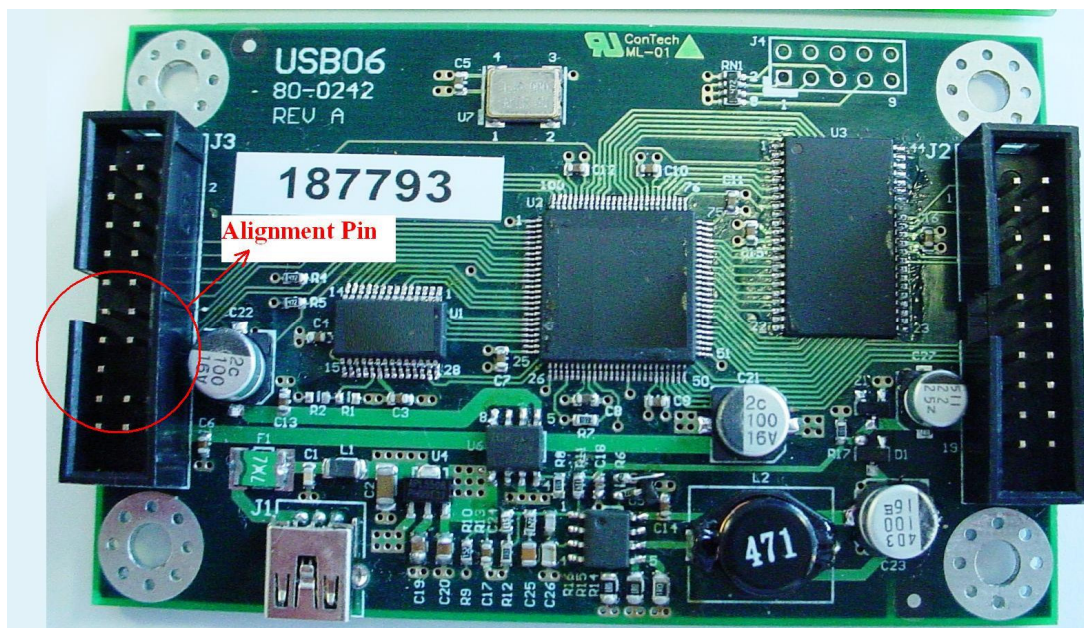
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| Product No. | DUO MANUAL | REV. G |
|             |            |        |

|      |         |
|------|---------|
| Page | 14 / 16 |
|------|---------|

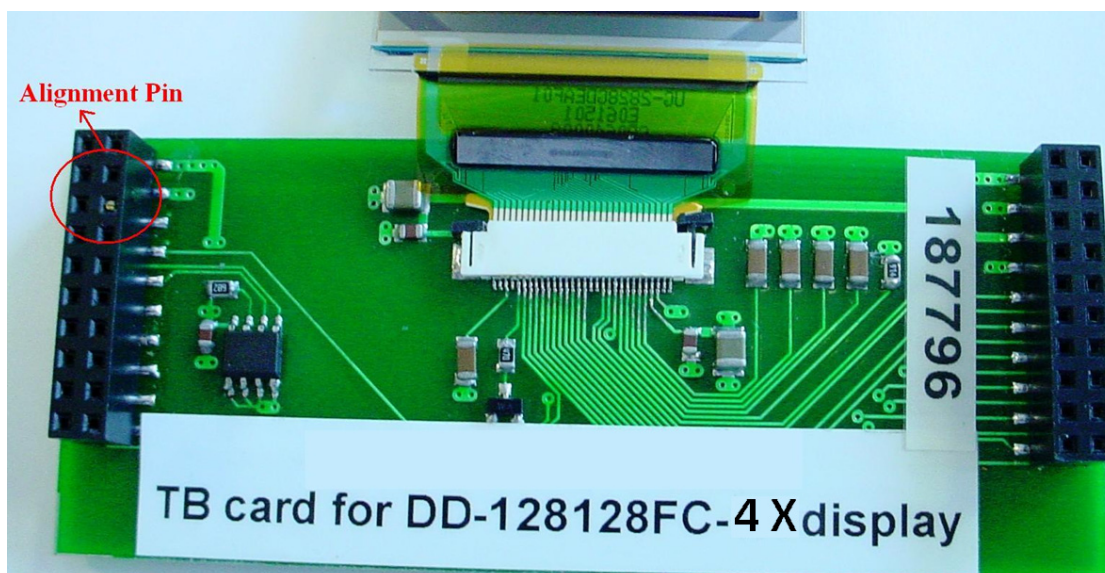


## Alignment position on controller and Transition card

### Controller Card



### Transition Card



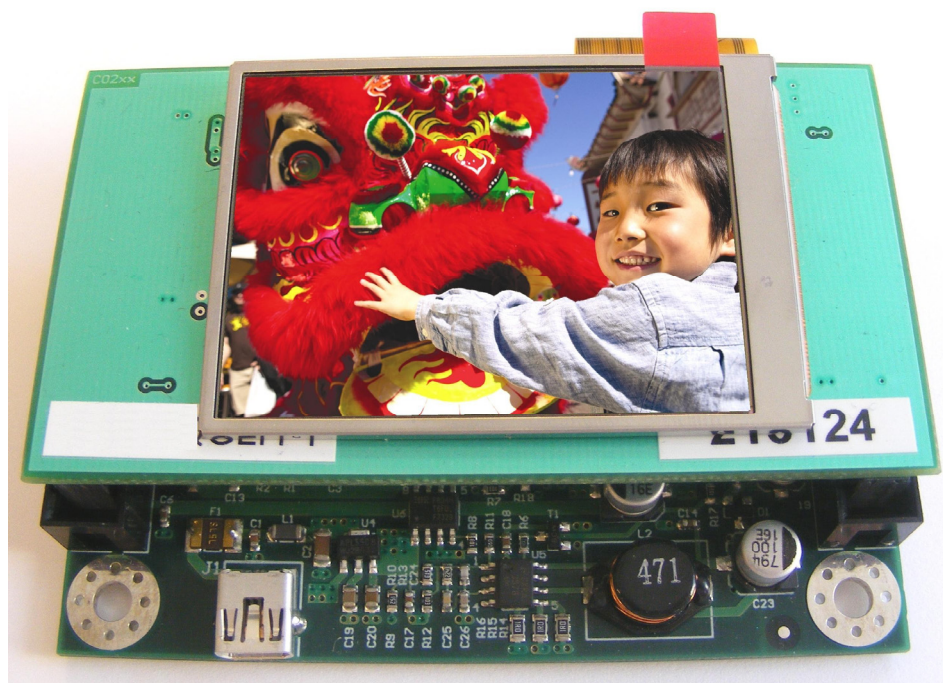
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| Product No. | DUO MANUAL | REV. G |
|             |            |        |

|      |         |
|------|---------|
| Page | 15 / 16 |
|------|---------|

## Fully assembled system



## Working System



|             |            |        |
|-------------|------------|--------|
| Product No. | DUO MANUAL | REV. G |
|             |            |        |

|      |         |
|------|---------|
| Page | 16 / 16 |
|------|---------|