Reference Design Users Guide

Reference Design User's Guide

Getting Started

This document describes how to install and operate the Reference Design Kit.
It is divided into the following sections:

1) Minimum PC system requirements
2) Contents of Reference Design Kit (RDK)
3) Contents of CD ROM
4) Software Installation
5) Communicate PC to RDK
6) How to Use the Reference Design Software (download Images)
7) How to Download Firmware to on-board 8051 Microcontroller
8) How to Change Calgary Display to Atlanta Display

1) Minimum PC System Requirements

Software	Windows 98/NT4.0/2000/ME or XP
Display	SVGA (800x600) resolution with 256 colors
Computer	PC with a 120MHz Pentium® or compatible CPU
Memory	64MB of RAM system memory
Hard Disk	13MB of available hard drive space
CD-ROM Drive	4x RW, ISO9660 disk format compatible
RS-232 Port	RS-232 interface port

2) Contents of Reference Design Kit

OLED	OSRAM Pictiva OLED Display Modules
	1. (Atlanta, 128 x 64 1.6" Diagonal)
	2. (Calgary, 128 x 64 2.7" Diagonal)
Hardware	Reference Design Controller Board
CD-ROMs	Keil uVision3 Evaluation Version Compiler and Reference Design software
Cable	RS-232 Cable
Power Supply	Power adaptor for battery charger

3) Contents of Reference Design CD ROM

Data Sheets	Osram Pictiva OLED Driver SSD0323
Software	Reference Design Graphic User Interface Application for Windows, Graphic Generation Source Code for Firmware
Hardware Files	Schematics, Gerber Files, Bill of Materials
User's Manual	PDF version of this documentation
Application notes	Seven application notes are included:

AN001)	OLED Driver Basic Register Setup
AN002)	Hardware Reference Manual: Reference Design
AN003)	Software Reference Manual: Text and Graphics Generation
AN004)	Bitmap File Format and Manipulation
AN007)	Communication Protocol
AN008)	OLED Display Module Handling and Care
AN009)	Effective Use of Pictiva OLED Displays: Power, Image, and Lifetime Optimization

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4) Software Installation

Place the Reference Design CD in the CD ROM drive to install the Reference Design software. If the InstallShield Wizard doesn't start up, follow the instructions below:

1. Launch **Window Explorer**
2. Single click the CD ROM drive (usually D:\ drive)
3. Double click the **Setup.exe** to begin the software installation

5) Communicate PC to RDK

Connecting the RS-232 cable to the Reference Design board

Connect one end of the RS232 cable to a PC COM port and the other end to J1 connector located on the Reference Design board

Connecting the power cable to the Reference Design board to charge the battery

Plug the wall adapter to the AC mains. Connect the DC power cord to J1 connector on the Reference Design board (the same connector for the RS-232 cable).
If the battery is completely drained, then it should be charged at least 2 hours and the "BAT" LED should light up.

6) How to Use the Reference Design Software

Double click on Pictiva icon located at the desktop to launch the software.

Program the Calgary and Atlanta Display Module
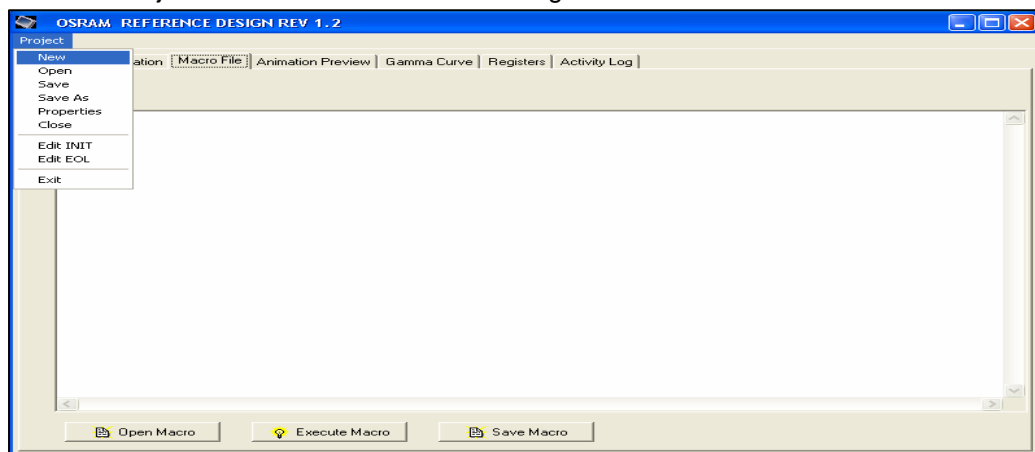
1. Select Project\New and click as shown in Figure 1.

Figure 1

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2. Select the module which needed to program.
   a) Atlanta
       i)   Name the Project file name (e.g. Atlanta). The project will be located at the <u>C:\Program Files\Osram\Pictiva\Projects</u> automatically.
       ii)   Select Atlanta (128x64) at the Select Display. Then click ok. The process is shown in the Figure 2a.

   b) Calgary
       i)   Name the Project file name (e.g. Calgary). The project will be located at the <u>C:\Program Files\Osram\Pictiva\Projects</u> automatically.
       ii)   Select Calgary (128x64) at the Select Display. Then click ok. The process is shown in Figure 2b.

P/s: **Images in the image folder at <u>C:\Program Files\Osram\Pictiva\images</u> are a combination image for both Calgary and Atlanta Module. Images start with atlxxx is meant for Atlanta Display Module whereas images start with calxxx is meant for Calgary Module display. Image with no specific name is applicable for both.**
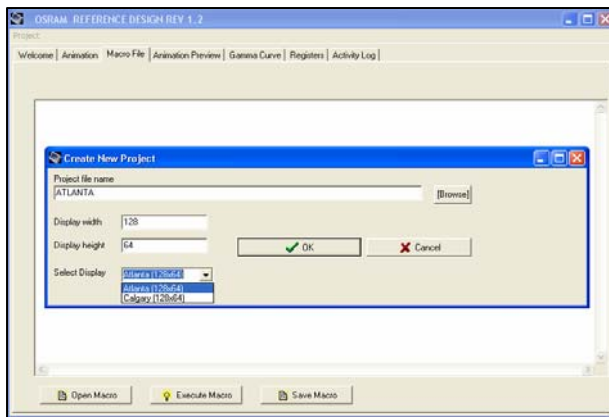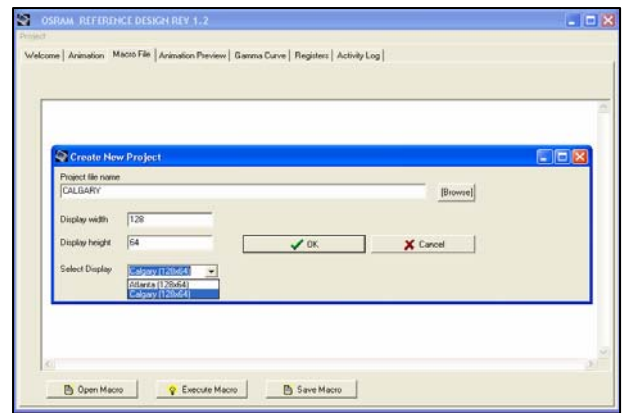

| Figure 2a | Figure 2b |

3. Click Project\Edit INIT as shown in Figure 3a to observe the download data. The data for Atlanta and Calgary are shown as in Figure 3b and Figure 3c.
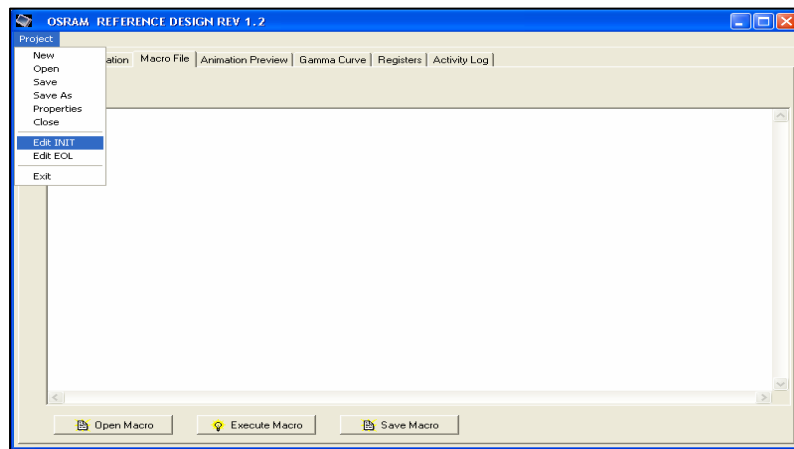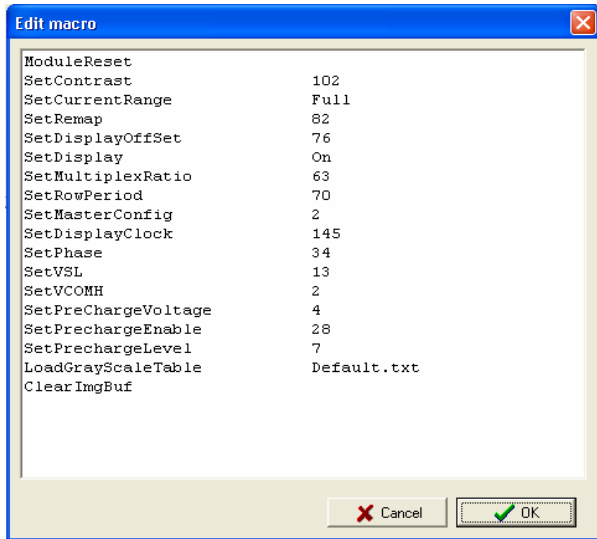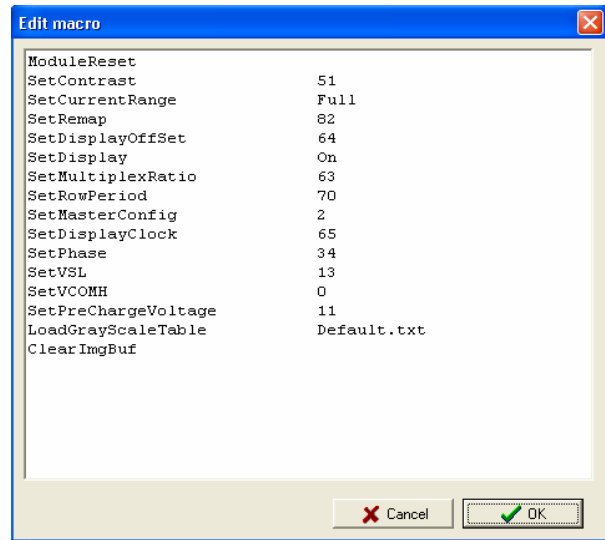

Figure 3a

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Calgary


```
Edit macro
ModuleReset
SetContrast              102
SetCurrentRange          Full
SetRemap                 82
SetDisplayOffSet         76
SetDisplay               On
SetMultiplexRatio        63
SetRowPeriod             70
SetMasterConfig          2
SetDisplayClock          145
SetPhase                 34
SetVSL                   13
SetVCOMH                 2
SetPreChargeVoltage      4
SetPrechargeEnable       28
SetPrechargeLevel        7
LoadGrayScaleTable       Default.txt
ClearImgBuf
                                  X Cancel    ✓ OK
```

Figure 3b

Atlanta


```
Edit macro
ModuleReset
SetContrast              51
SetCurrentRange          Full
SetRemap                 82
SetDisplayOffSet         64
SetDisplay               On
SetMultiplexRatio        63
SetRowPeriod             70
SetMasterConfig          2
SetDisplayClock          65
SetPhase                 34
SetVSL                   13
SetVCOMH                 0
SetPreChargeVoltage      11
LoadGrayScaleTable       Default.txt
ClearImgBuf
                                  X Cancel    ✓ OK
```

Figure 3c

Animation tab

Use COM port pull down menu to select the correct COM port for data transfer via RS232 protocol.

Any images that have been selected to the Animation tab will be transferred to the hardware. Users can just select any images by dragging and dropping them to the Animation tab or just simply click on "**Open Image**" button to select as many images as desired. All images, which are 24-bit bmp or jpg file format, can be stored in any directory on PC. Once all chosen images are on the Animation tab. users can rearrange them in any order by dragging and dropping image icons. If an image that is selected accidentally, users can just highlight that image, then either click on "**Delete Image**" button to delete it or just press the "**Delete"** keystroke on the keyboard to delete that image.

Delay window allows users to select the delay period in second between images.

The preview animation tab allows users to preview animation. Click "**Start**" to start the animation preview. If everything runs as expected, click "**Download Animation**" button to download selected images to the Pictiva display module.

At anytime when images get drag-and-drop into an animation tab, an equivalent read-only macro file is generated on the Macro File tab but can from the Animation Tab. If users wish to modify the macro file, select "**Project -> Edit Initialization File**" to make changes to the original settings.

Every time when a new project gets created and saved as a*.PPJ project file, the software automatically creates a folder, which has the same name and stores the file directory: C:\Program Files\OSRAM\Pictiva\Projects\(ProjectnameFolder). All macro files users create have to be saved in this new project folder before downloading them to the hardware.

Basic steps to download images to the OLED display:
   a. Specify correct COM port, such as COM1, COM2, etc.

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b. Select one or more images by using "**Open Image**" button on the Animation tab or Drag-and-Drop them to the GUI.
c. Set interval delay between images if necessary.
d. Select Animation Preview tab to preview animation.
e. Click on '**Download Animation**" button to download images to the OLED display.
f. Save project as ***.ppj** when finish. At anytime, users can reopen any previously saved project by double-clicking on YourProject.ppj file.

Macros File Tab

Macro file consist of commands that allow users to:

- Send multiple images or parts of images to the display.
- Send command to OSRAM OLED display.
- Write pixel data to the display.

Use Macro tab to open, execute, edit, and save user generated macros.
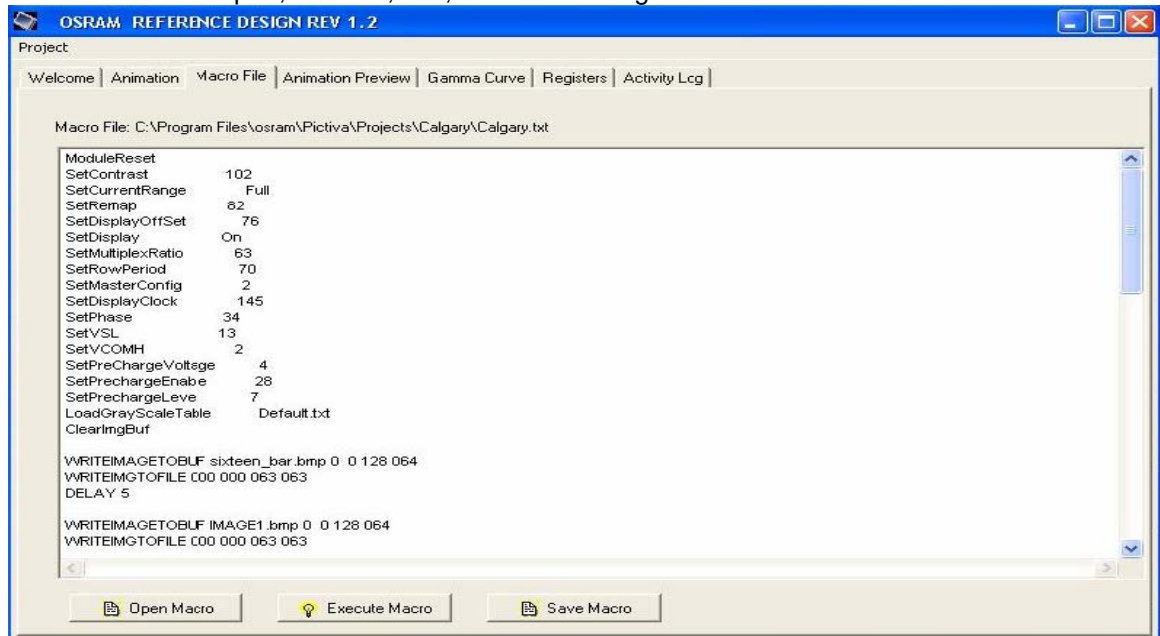
Figure 4

1. When users open the Reference Design software but haven't saved the project, then all macro files are stored in the "**Empty**'" folder, which is located in C:\Program Files\Osram\Pictiva\Projects\empty.
2. If users have already saved the project by using Project -> Save As -> (then project name), then all macro file have to be resided in the newly created project folder.

Opening a macro

1. From the Macro File tab, click the "**Open Macro**" button.
2. Navigate to the directory where the Osram Pictiva has been installed, or navigate to C:\Program Files\Osram\Pictiva\projects\(projectname)\.*txt if the users installed it at the default location.
3. Select a macro file, for example testloop.txt.
4. Click the "**Open"** button. The contents of the macro file, testloop.txt, are inserted into the window of the Macro File tab. Refer to Figure 4.

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Executing a macro

Click on the **Execute Macro** button to download the content of the macro file to the hardware.

Saving a macro

1. Macro files can be edited directly under this Macro Tab. Just click the "**Save Macro**" button to save a macro file when it is ready to be saved.
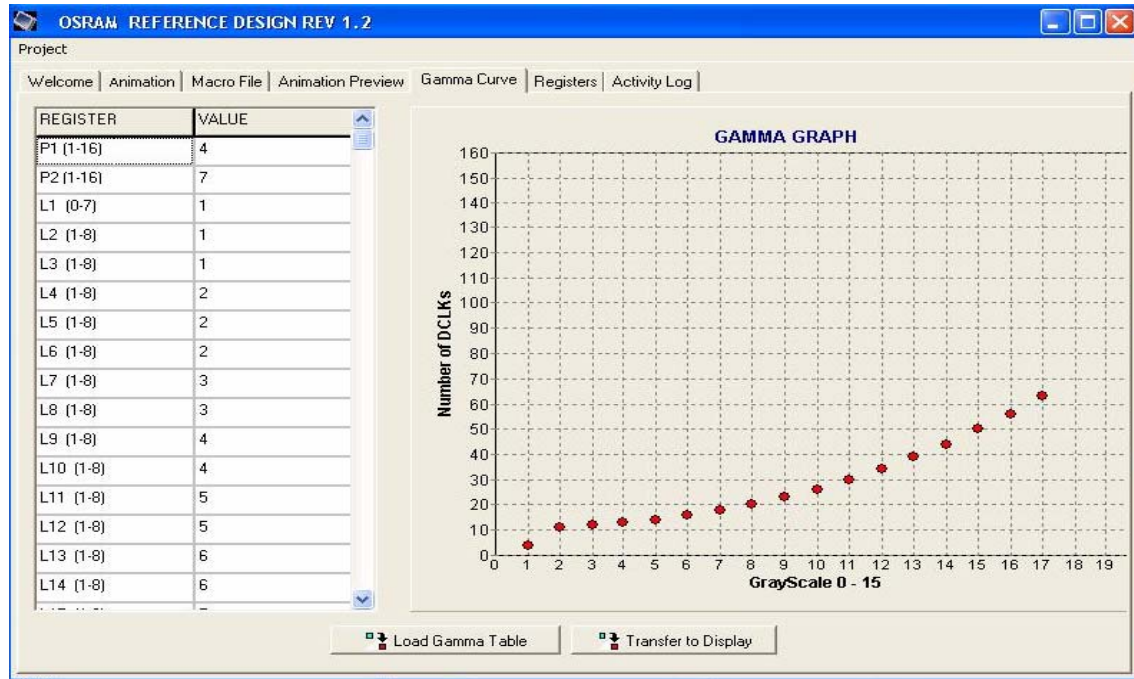
Gamma Curve Tab

Figure 5

Load Gamma Table is used to open any gamma input file. The file must reside in the gamma folder of the Pictiva directory. The file requires the values for phase 1 and phase 2 followed by 8 bytes (15 levels) of input from the user. Refer to Figure 5.

Select **Transfer to Display** to execute the gamma input file and send it to the display module. The Gamma Graph is the plot of gamma level from 1 to 15.

Activity Log Tab

The Activity Log records all the session activities while the Pictiva Display software is under execution, from a start time to an end time. The data, time, and the locations of all the input files are displayed in this activity log field.

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7) How to Download Firmware to on board 8051 Microcontroller (Only if Necessary)

Firmware is a piece of software that gets downloaded to the 8051 microcontroller in order for the 8051 to handle the date transfer from PC to the OLED Display. Upon delivery, the firmware has already been downloaded to the board. However, downloading a free version of the Flash Magic software (or any other compatible software) from the link http://www.esacademy.com/software/flashmagic/ is recommended for future use. Always note that downloading the firmware file, **Reference_Design.hex**, to the on-board 8051 microcontroller using the Flash Magic software only when the hardware get corrupted, meaning that only when the hardware appears to have a problem or doesn't have the display to light up. The **Reference_Design.hex** file is located in C:\Program Files\Osram\Pictiva\firmware.

How to Download the Hex File to the 8051 Microcontroller

1. Double-click on Flash Magic icon located at the desktop to launch the software.

2. The Figure 6 as shown below will be appearing.
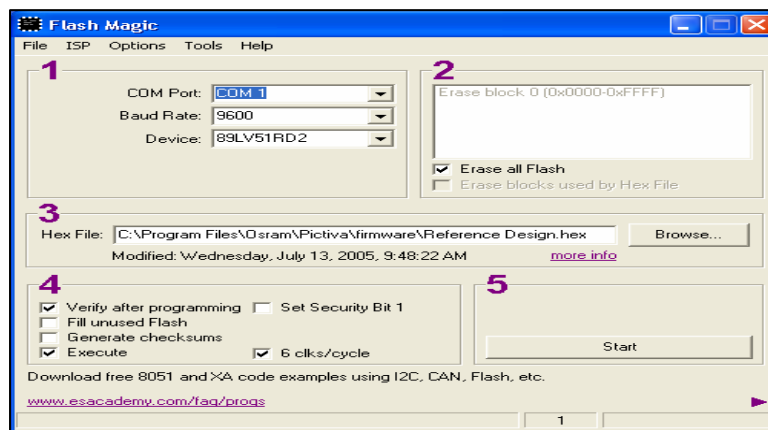
Figure 6

3. There are a few settings that need to be configured on the Flash Magic window before downloading the hex file:
    a) **COM Port** is the RS232 port located on the back of the computer. Set the parameter according to which COM Port the RS232 cable is plugged into.

    b) **Baud Rate** is used to set the rate of how fast each data bit is transferred. The typical value for Baud Rate is **9600**. If there is a massage popped up saying that the Baud Rate is too high, hen reduce the Baud Rate to **2400**.

    c) **Device** is the 8051 microcontroller target device. In our case, it should be assign to **89LV51RD2**.

    d) **Hex File** indicates the location of the hex file to be programmed. C:\Program Files\Osram\Pictiva\firmware\Reference Design.hex

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e) **Verify after programming** option is not required but it is a way to verify whether the programming process had been done successfully or not. Before clicking on the **start** button for programming, the 8051 flash has to be erased by selecting either **Erase all Flash** or **Erase blocks used by Hex File** if the address of that specific block is known.

4. Reset Device will appear as Figure 7a. Switch ON the Reference Design Controller board. Automatically it would download the hex file to the IC until finished as the Figure 7b.
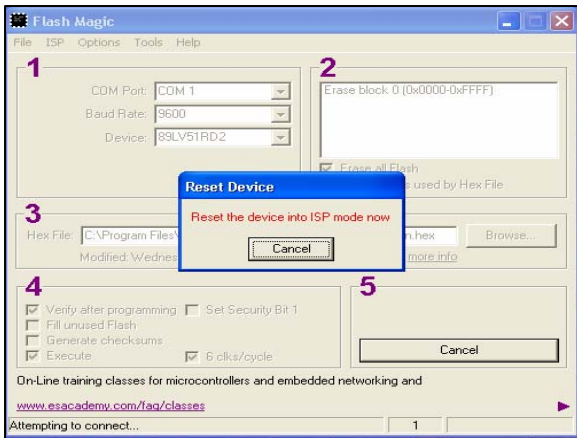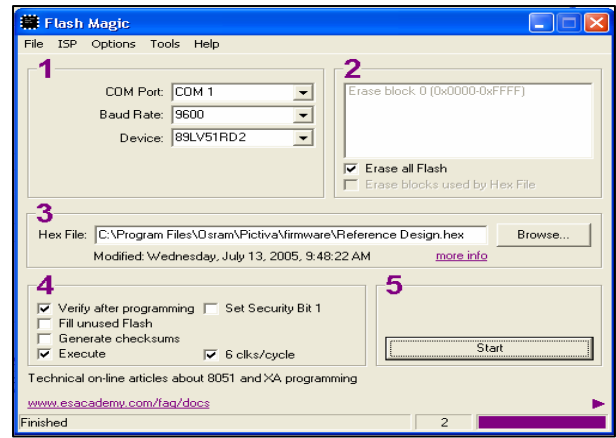
Figure 7a   Figure 7b

8) How to Change Calgary Display to Atlanta Display

Tools & Equipments required
- Hexagon Keys 1.5mm and 2.0mm
- Atlanta OLED Display module 128*64 pixel 1.6" Diagonal
- Reference Design Board with Calgary OLED Display Module 128*64 pixel 2.7" Diagonal attached initially

Calgary OLED Display Module

Atlanta OLED Display Module

ON / OFF Switch

Reference Design Board

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Figure 8

Opening the front cover
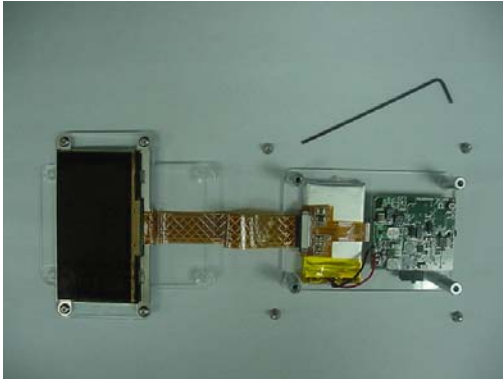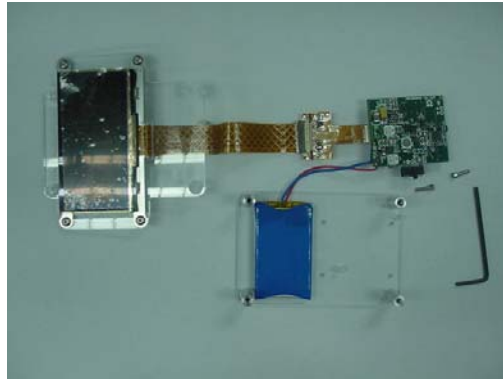
Figure 9a   Figure 9b

Use the hexagon key sizes 1.5mm to open up the front Calgary OLED display cover as shown in Figure 9a. Next, remove the Reference Design board by using hexagon key 2.0mm as shown in Figure 9b.

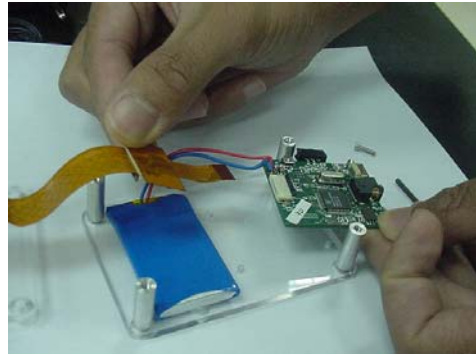## Changing an OLED Display Module
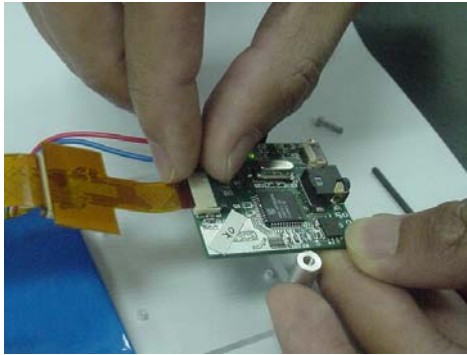
Figure 10a   Figure 10b

Removing the Calgary OLED Display Module from Reference Design board

Open up the connector of the Reference Design Board as shown in Figure 10a. Next, pull out the Calgary flex from the connector as shown in Figure 10b.

Figure 11a   Figure 11b

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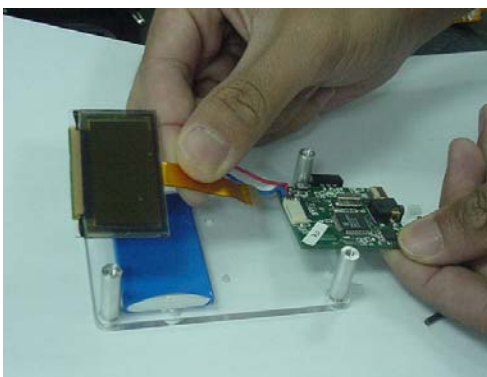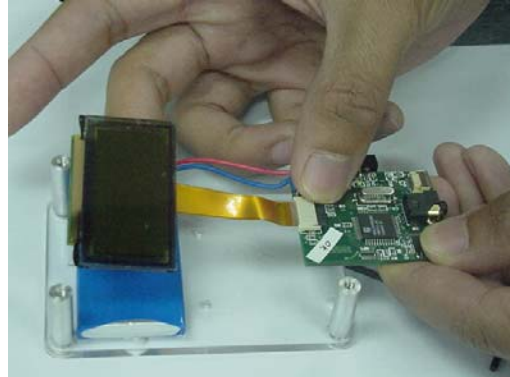
Replacing the Atlanta OLED Display Module on Reference Design board

Open up the connector again and replace the Atlanta OLED Display Module on the Reference Design Board as shown in Figure 11a. Next, close up the connector as shown in Figure 11b.

Ready to Light Up

The replaced Atlanta OLED Display Module on Reference Design Board is ready to be programmed and lighted up. Please refer to **Instructions on How to Use the Reference Design Software** and **Instructions on How to Download Firmware to on-board 8051 Microcontroller (only if necessary)** to program and light up the OLED Display.

Safety Information

- Please **DO NOT** turn on the power while performing process of changing OLED Display Module.
- Please **MAKE SURE** the connection between the OLED Display flex and connector is correct before turn on power.
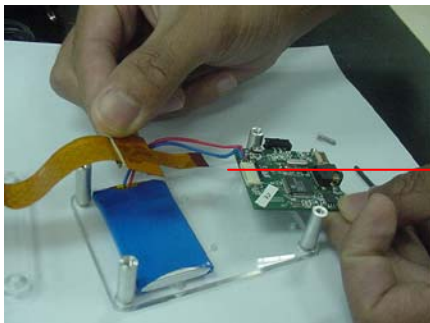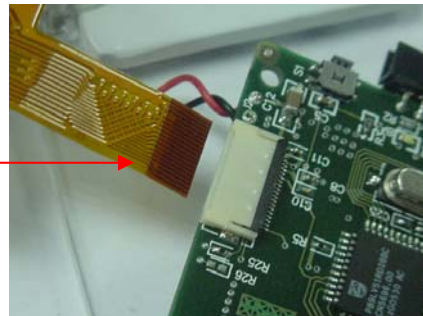
| Figure 12a | Figure 12b |

Bottom connection between Calgary OLED Display Module and connector on Reference Design board
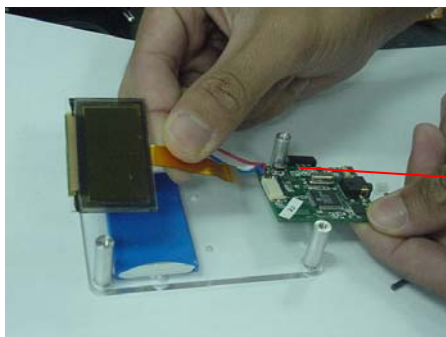

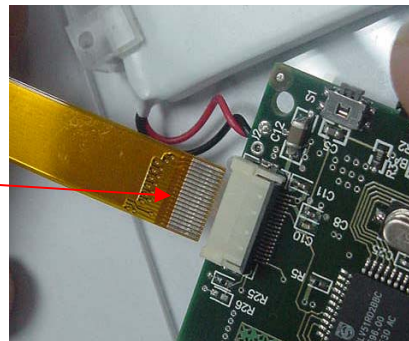| Figure 13a | Figure 13b |

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Top connection between Atlanta OLED Display Module and connector on Reference Design board

WARNING! The OLED Display will be damaged if the connection between flex and connector is wrong.

Revised by :   Ng Vic Tor, Hassrizal B. Hassan Basri, Lee Eng Yeow
OLED Product Development
Penang MALAYSIA

Original Author :   Paulina t. Nguyen

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