Getting Started

Macnica Helio View
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1. Overview

1.1 Introduction

This getting started guide is intended to familiarize a new user with the Helio View display when paired with a Helio SoC Evaluation Kit. Operation with other platforms offering HSMC connectivity are possible but beyond the scope of this document. This document covers:

1. Locating the Helio View components and interfaces
   *A high-level overview of the kit for a new user.*

2. Assembling the Helio View and Helio SoC Evaluation Kit into a single unit
   *The Helio View can be purchased pre-assembled with a Helio SoC Evaluation Kit or separately as an expansion to an existing Helio SoC Evaluation Kit; assembly may not be necessary.*

3. DirectFB Demonstration
   *Instructions to run a demonstration of DirectFB on the combined platform of Helio View + Helio SoC Evaluation Kit.*

For Helio View information beyond the scope of this document, refer to the Helio View Reference Manual.

1.2 Prerequisites

- **Helio View**
  *LCD Expansion platform to the Helio SoC Evaluation Kit.*

- **Helio SoC Evaluation Kit**
  *Base hardware platform. Potentially pre-assembled with the Helio View display if purchased as such.*

- **Quartus Programmer**
  *Required to load FPGA with demonstration design for DirectFB*
2. Components and Interfaces

This section provides pictures of the Helio View display and identifies the major components and interfaces.

2.1 Helio View Sub-Units

The Helio View is comprised of three sub-units:

1. The LCD Assembly
2. The PCB
3. The HSMC Flex Assembly

These three sub-units are always shipped pre-mated into a single entity. Most users will never need to physically separate the three sub-units of the Helio View.

Figure 2-1-1 illustrates the three sub-units of the Helio View and it is the form in which it is received to most end users. Refer to Section 3 for instructions on assembling the Helio View with the Helio SoC Evaluation Kit.

Figure 2-1-1. Sub-units of the pre-assembled Helio View
2.2 PCB Layout

The PCB and LCD are mated back-to-back such that the front of the LCD and primary component surface of the PCB (that is, the top surface) face away from each other. Figure 2-2-1 illustrates the top view of the PCB and labels the primary components and interfaces.

Figure 2-2-1. PCB Top
The bottom of the PCB is typically not visible due to mating with the LCD sub-unit. Figure 2-2-2 depicts the bottom of the PCB with LCD removed.

Figure 2-2-2. PCB Bottom (typically hidden)

Separation of the LCD and PCB sub-units is not recommended. Refer to the Helio View Reference Manual in the event separation of the LCD and PCB is necessary.
3. Assembly

This section provides instructions for assembly of the Helio View with a Helio SoC Evaluation Kit into a single platform. Figure 3-1-0 illustrates a completed assembly. If the Helio View and Helio SoC Evaluation Kit were purchased pre-assembled, proceed directly to Section 4: DirectFB Demonstration.

Figure 3-1-0. Pre-assembled Unit

3.1 Hardware Provided

Hardware is provided for assembly of the Helio View and Helio SoC Evaluation Kit into a single unit. In the checklists below, the provided hardware is grouped into areas of use and given a letter for reference during assembly. Separate the components into their functional groups and verify no parts are missing before proceeding.

Tip: The alphabetic reference of each part is in order of use in the assembly instructions.

**HSMC Flex Cable Connector:**
- (x2) 4-40 thread low-profile/torx screw.
- (x2) #4 flat washer.
- (x2) 4-40 thread female standoff. 3/16” length.
- (x2) 4-40 thread hex nut
Corner Mounts + Handles:
E. (x4) male+female hex standoff. 15mm length.
F. (x2) plastic handle bars.
G. (x4) phillips screw. 12mm length.

3.2 Tools

Acceptable assembly can be accomplished tool-free with screws and nuts finger-tightened alone. That said, the following hand tools can aid in assembly.

- Phillips screwdriver (Recommended)
- NeedleNose pliers (Optional)
- Torx screwdriver (Optional)

Tip: Do not use power tools and take care not to over-tighten when using hand tools.
3.3 Instructions

The following instructions guide assembly of a separate Helio View and Helio SoC Evaluation Kit into a single unit.

- Place the Helio View. LCD screen face-up, flat on the working surface with the HSMC flex cable oriented north/upwards. Locate the two holes on the HSMC flex connector assembly.

- Pass a torx screw (part A) front-to-back through one of the holes on the free end of the HSMC flex cable. Place a washer (Part B) onto the back of the screw and then thread into a 3/16” female hex standoff (Part C) securing the washer onto the screw. Repeat this process for the other hole in free end of the HSMC flex connector.
• Prepare the **Helio SoC Evaluation Kit** by first removing any existing hex standoffs/feet if present. Any removed standoffs will not be used during this assembly as they are of inappropriate length. Place the **Helio SoC Evaluation Kit** PCB flat on the working surface, primary component side up, above the **Helio View** such that the HSMC connectors are aligned in preparation of mating.

![Prepared Screws](image1)

• Lift the **Helio SoC Evaluation Kit** PCB with both hands and align the HSMC connectors, screws, and holes. Support the PCB from behind with fingers and then mate the HSMC connectors of the flex cable and PCB using even pressure applied with thumbs.

![Support From Behind](image2)

![Apply Even Pressure](image3)
• Lift the **Helio SoC Evaluation Kit** PCB and thread two hex nuts (Part D) to the exposed ends of the torx screws to complete the HSMC flex connector assembly.

![Image of Helio SoC Evaluation Kit with screws and nuts](image1)

Secure Screws with Nuts (Part D)

• Now lift the joined assembly in the middle, tilting the LCD screen towards you. The HSMC flex connector will form a hinge and the **Helio SoC Evaluation Kit** PCB will swing into place behind the LCD screen. Continue turning the LCD towards you, past vertical, until it is face down on the working surface.

![Image of LCD being tilted](image2)

Lift from Center, Ribbon Cable forms Hinge
• Align the holes of the **Helio Soc Evaluation Kit** PCB with the pre-installed standoffs of the **Helio View**. Using the four remaining hex standoffs (Part E) fasten the PCB at all four corners into the standoffs beneath.

• Place one plastic handle bar (Part F) on top of the left edge standoffs. Orient the bar such that the slotted hole is closest to the HSMC flex cable. Fasten the bar to the standoffs using two screws (Part G). Repeat this process for the right edge.
Congratulations, assembly is complete. The unit should now stand solidly on edge with a slight, rearward tilt to improve viewing. The rear bars will also aid in hand-held operation protecting components now on the back of the unit from rough handling.
4. DirectFB Demonstration

In this section, the completed assembly of a Helio SoC Eval Kit and Helio View are used for a demonstration of DirectFB under Linux. This demonstration only uses pre-generated output files of the completed project. For complete details on the hardware and software behind the DirectFB and other demonstrations, refer to the Reference Design section of www.Rocketboards.org.

4.1 Requirements

The DirectFB demonstration requires the following hardware:

- Helio SoC Evaluation Kit + Helio View combined assembly
  
  See Section 3
- External power adapter
  
  Supplied with Macnica Helio Evaluation Kit
- USB A to mini-B cable
  
  Supplied with Macnica Helio Evaluation Kit
- MicroSD USB adapter
  
  Supplied with Macnica Helio Evaluation Kit
- MicroSD flash preloaded for this demonstration
  
  Supplied with Helio View. For instructions on restoring the flash to the factory image, refer to the Helio View Reference Manual.

This demonstration requires the following software:

- Altera Quartus tools or standalone programmer (v13.0 or later)
4.2 Demonstration Instructions

Figure 4.2.0 identifies the primary locations referenced in the demonstration instructions.

Tip: Your screen may vary slightly from the above graphic due to enhancements of the demonstration between the generation of this document and final shipment.

1. Verify Jumpers and Switches are Factory Default:
If they have been modified, the Helio SoC Evaluation Kit should be returned to factory settings for jumpers and switches before proceeding. Refer to the Helio SoC Evaluation Kit Reference Manual for factory-default settings.

2. Copy Helio_View_DFB_Demo_FPGA_Image.sof from MicroSD:
The DirectFB demonstration requires a specific configuration image be loaded into the Altera SoC device. For convenience, this device image is provided on the Helio View MicroSD flash factory image; it is not otherwise necessary to be present on the flash. The device configuration file is labeled: Helio_View_DFB_Demo_FPGA_Image.sof. Copy this .sof file from the supplied MicroSD card to the system with Quartus Tools or Standalone Programmer installed.

3. Insert MicroSD Flash, then Power.
It is not recommended to install flash into the Helio SoC Evaluation Kit while it is powered.
4. **Program Altera SoC device:**
Using Altera Quartus tools and the USB-A to mini-B cable, load the previously copied `Helio_View_DFB_Demo_FPGA_Image.sof` into the Altera SoC device. Note: the provided FPGA image is in .sof format meaning it is volatile (will need to be re-programmed in the event of power cycle). Refer to the **Helio View Reference Manual** for instructions on programming the configuration data into non-volatile flash.

5. **Reset Processors:**
Issue a cold reset to the SoC processors using the pushbutton on the top/center/rear of the unit. A color chart should appear on the display within 10 seconds as Linux boot starts.

6. **Interact with DirectFB Demo:**
Within 30 seconds, Linux will complete its boot and the DirectFB Demo will automatically launch. The demo features a simple Menu screen to invoke one of 8 different rendering demonstrations.

- **To Launch:**
  
  *touch the desired demonstration*

- **To Return to Menu:**
  
  *press button 0 of the array nearest the power connector on the back of the unit*
5. Additional Information

1. Macnica **Helio SoC Evaluation Kit** online documentation:
   http://www.rocketboards.org/foswiki/Documentation/MacnicaHelioSoCEvaluationKit

2. Macnica **vWorkshops** for SoC Hardware and Software Training (Free)
   http://www.macnica-na.com/web/americas/vworkshops

3. Macnica **Technical Support Blog**:
   http://macnicatech.com/

4. Altera **CycloneV SoC** online documentation:
   http://www.altera.com/literature/lit-cyclone-v.jsp

5. Altera SoC Open Source Portal:
   http://www.rocketboards.org/
6. Document Revision History

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