



Getting Started

Mpression Helio Board

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1. Overview

1.1 Introduction

This getting started guide walks you through how to setup a board and booting linux on Helio board. After reading this document, you will be able to:

- Basic setup for the Helio board
- Writing microSD boot disk for the Helio board
- Run U-Boot and Linux on the Helio board

1.2 Release Contents and Location

Macnica provides some of reference material for Helio Board as follows:

- Pre-Built ALL-IN-ONE image to create MicroSD boot disk that is included:
 - Preloader
 - U-Boot
 - U-Boot script for bridge management
 - Linux Kernel
 - Device Tree Blob
 - Root File System
- Golden Hardware Reference Design (GHRD)
- Board References
 - Schematic
 - Bill of Materials
 - PWB data

All components can be downloaded from:

<http://www.rocketboards.org/foswiki/Documentation/MacnicaHelioSoCEvaluationKit>

1.3 Prerequisites

You need to prepare & setup following tools to boot up a Linux on Helio Board.

- Terminal Software like TeraTerm (for UART input/output)
- Win32DiskImager (to create SD card boot disk)
 - <http://sourceforge.net/projects/win32diskimager>

2. Board Settings

2.1 Board Layout

This section provides an overview of Helio board and explains how to setup.

Here is a Helio board top view.

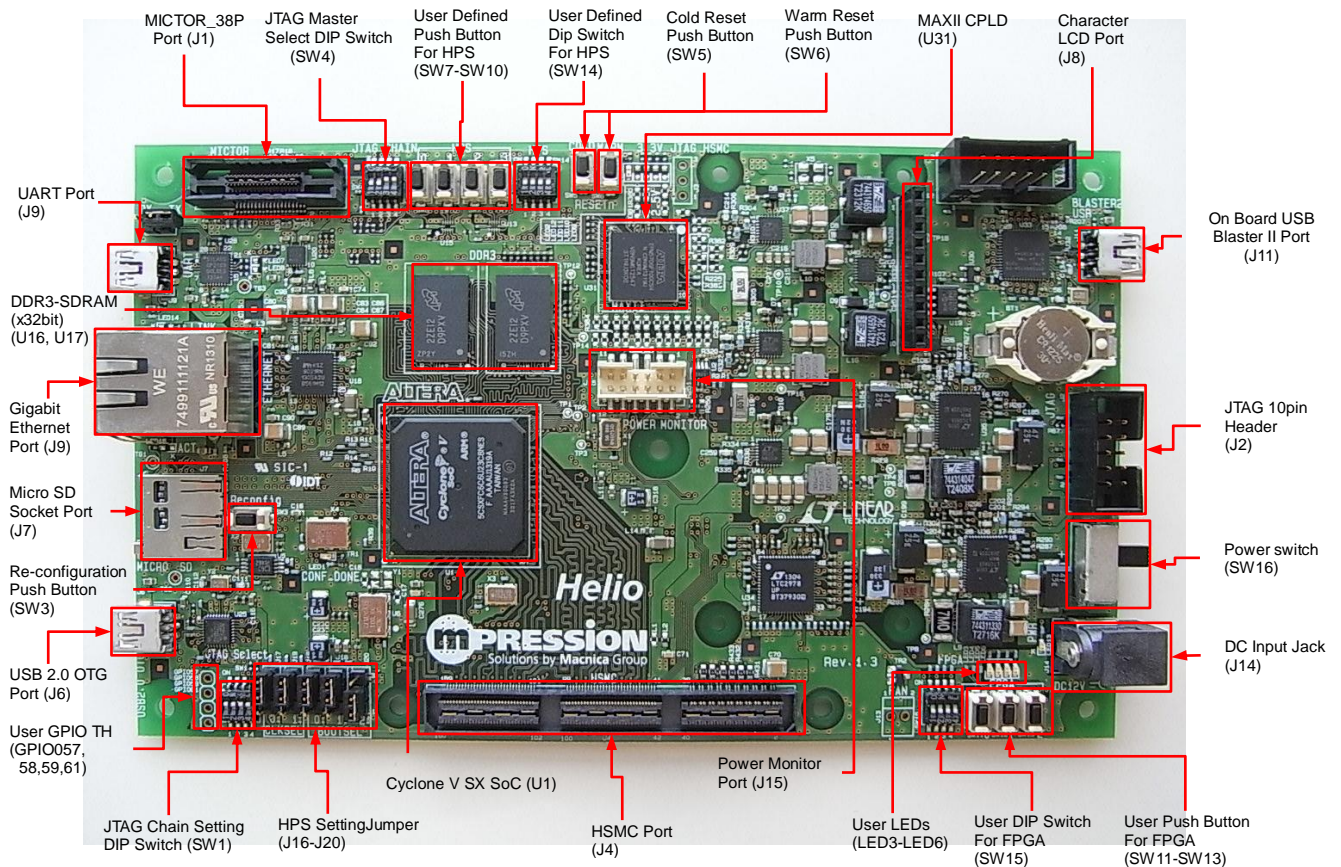


Figure 2-1 Board Top View

2.2 External Connection

This section describes how to setup external connection for boot up a Linux on Helio Board.

- External 12V power supply connected to J14 - DC Input
- Mini USB cable, connected from host PC to J9
 - USB connector. This is used for U-Boot/ Linux serial console
 - Make sure J10 is opened.
- [Optional] Mini USB cable, connected from host PC to J11
 - On-board USB Blaster II. This can be optionally be used for programming the FPGA and debugging the ARM cores.

2.3 Board Revision

You can see your Helio Board revision from board silk as follows. You need this information when you want to download any documents or resources for Helio Board from RocketBoards.org.



Figure 2-2 Helio Board Revision

2.4 Jumper Settings

Make sure that following jumpers are set as described below.

Please note that jumper location is different between “Rev.1.3 or later” and “Rev.1.2 or before”. Please refer to following Figure 2-3 and Figure 2-4 for your reference.

Table 2-1 Jumper Settings

Board Reference	Signal Name	Setting
J16	BOOTSEL0	1-2
J18	BOOTSEL1	2-3
J20	BOOTSEL2	1-2
J17	CLKSEL0	2-3
J19	CLKSEL1	2-3

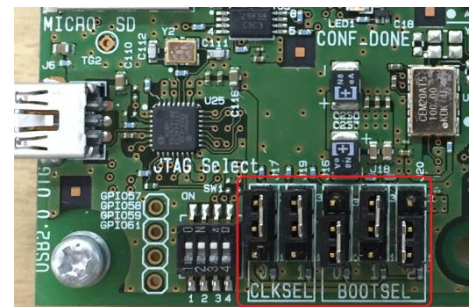


Figure 2-3 Jumper Settings for Rev.1.3 or later

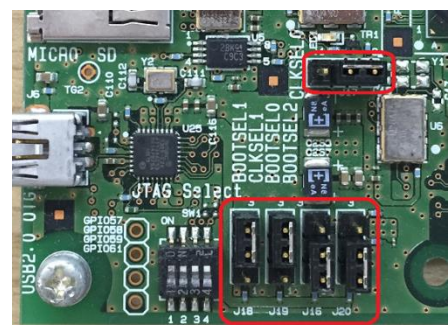


Figure 2-4 Jumper Settings for Rev.1.2 or before

2.5 DIP Switch Settings

2.5.1 SW1

All switches set to ON as follows. This switch need to be changed if you want to use 3rd party debugger connected with mictor connector otherwise you do not need to change this switches.

Table 2-2 SW1 Settings

Board Reference	Signal Name	Description	Setting
SW1-1	JTAG_SEL	JTAG Chain Master Interface Select ON : Select On-board USB Blaster II or JTAG 10pin Header OFF : Select MICTOR 38pin connector	ON
SW1-2	JTAG_HPS_SEL	Cyclone V SoC HPS JTAG Master Select ON : Select On-board USB Blaster II or JTAG 10pin Header OFF : Select MICTOR 38pin connector	ON
SW1-3	-	This switch has to set ON when normal operation.	ON
SW1-4	-	This switch has to set ON when normal operation.	ON

2.5.2 SW4

Those switches are used for jtag-chain selection. Default setup as follows.

Table 2-3 SW4 Settings

Board Reference	Signal Name	Description	Setting
SW4-1	HPS_JTAG_EN	ON : Bypass Cyclone V SoC HPS Side OFF : Cyclone V SoC HPS Side in-chain	OFF
SW4-2	FPGA_JTAG_EN	ON : Bypass Cyclone V SoC FPGA Side OFF : Cyclone V SoC FPGA Side in-chain	OFF
SW4-3	-	This switch has to set ON when normal operation.	ON
SW4-4	-	This switch has to set ON when normal operation.	ON

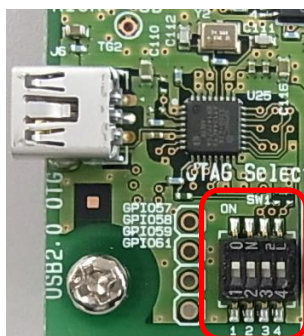


Figure 2-6 SW1 Settings



Figure 2-5 SW4 Settings

3. Creating MicroSD boot disk for Helio Board

3.1 Creating a MicroSD boot disk from pre-built ALL in One Image

The pre-built All in One Image for MicroSD boot disk for Helio board is delivered as an archive named helio_gsrdd_sdimage_[version].tar.gz that is provided from RocketBoards.org.

After extract this archive file, helio_gsrdd_sdimage_[version].img is generated.

This SD card image file contains all the items that are needed to run Linux on Helio board.

- Preloader
- U-boot
- U-boot script
- Device Tree Blob
- Linux Kernel
- Linux Root Filesystem

To create MicroSD boot disk, you can use free tool called Win32DiskImager.exe on windows machine. Please refer [1.3 Prerequisites] . The instructions are as follows:

1. Insert MicroSD card to host PC
2. Execute Win32DiskImager.exe
3. Select all in one image for MicroSD card
4. Click write

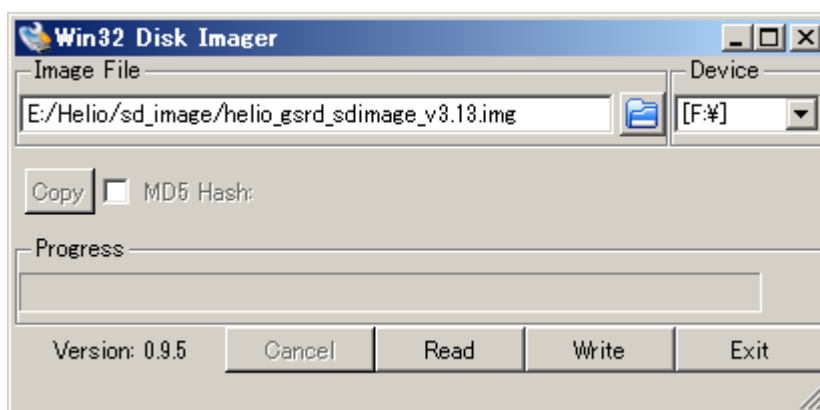


Figure 3-1 Win32DiskImager

*Note executing Win32DiskImager.exe after your PC recognizes MicroSD card

4. Running Linux on Helio Board

4.1 Setup USB-to-Serial Interface

4.1.1 Install Device Driver for USB-to Serial Chip

This section presents how to install the drivers for the USB-to-Serial chip on the Helio board. The necessary steps on Windows 7 are:

1. Go to following URL and download the VCP Driver Kit archive file.
<http://www.silabs.com/products/mcu/Pages/USBtoUARTBridgeVCPDrivers.aspx>
2. Extract the downloaded archive and execute one of the installer files:
*Run CP210xVCPInstaller_x64.exe if you have a 64 bit OS, or
*Run CP210xVCPInstaller_x86.exe if you have a 32 bit OS

4.1.2 Setup Terminal Software

Make sure terminal software settings as below

With Linux kernel v3.7 (SoC EDS v13.0)

- Baud Rate: 57600
- Parity: none
- Stop: 1 bit
- Flow Control: none

With Linux kernel v3.9 or later (SoC EDS v13.1 or later)

- Baud Rate: 115200
- Parity: none
- Stop: 1 bit
- Flow Control: none

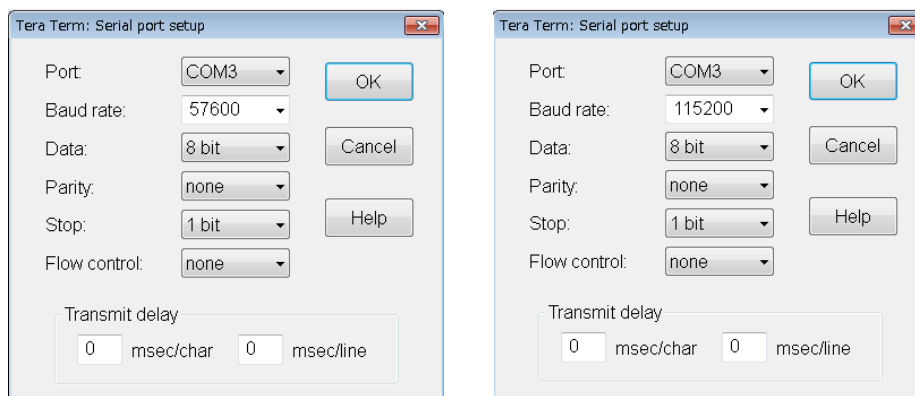
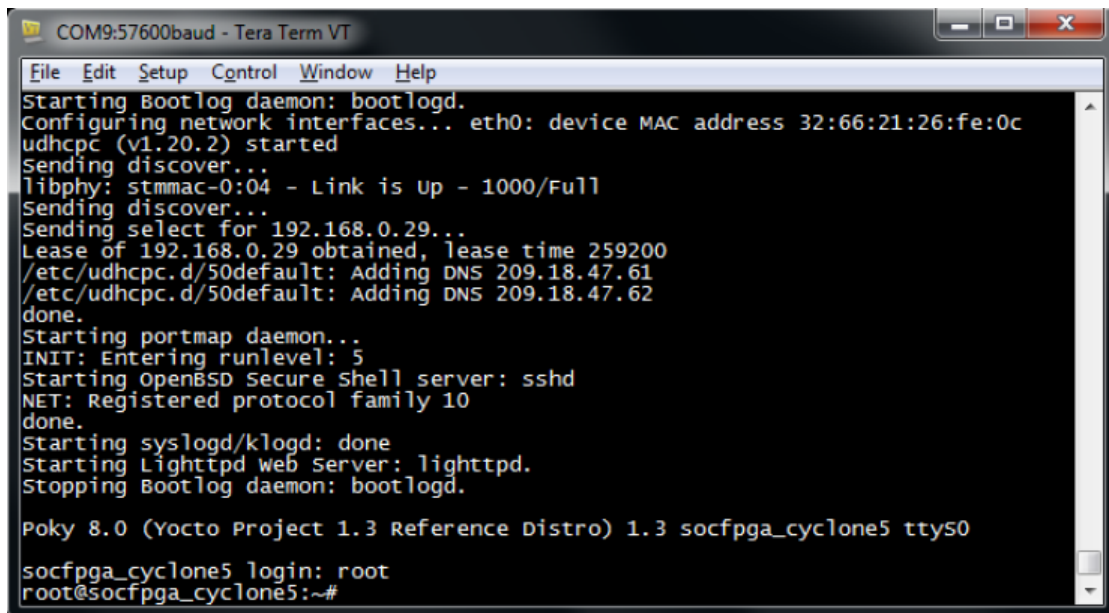


Figure 4-1 Terminal Software Setup

4.2 Running Linux

This section presents how to run the pre-build Linux images on the Helio board.

1. Setup the board as described in 2 Board Settings section.
2. Setup the SD card as described in 3 Creating MicroSD boot disk for Helio Board Section.
3. Connect a serial terminal from host PC to the serial port corresponding to UART USB connection, and use appropriate settings described in [4.1.2 Setup Terminal Software].
4. Power up the board using PWR switch
5. After successful boot, Linux will ask for the login name. Enter root and press Enter:



```
COM9:57600baud - Tera Term VT
File Edit Setup Control Window Help
Starting bootlog daemon: bootlogd.
Configuring network interfaces... eth0: device MAC address 32:66:21:26:fe:0c
udhcpd (v1.20.2) started
Sending discover...
libphy: stmmac-0:04 - Link is up - 1000/Full
Sending discover...
Sending select for 192.168.0.29...
Lease of 192.168.0.29 obtained, lease time 259200
/etc/udhcpd.d/50default: Adding DNS 209.18.47.61
/etc/udhcpd.d/50default: Adding DNS 209.18.47.62
done.
Starting portmap daemon...
INIT: Entering runlevel: 5
Starting OpenBSD Secure Shell server: sshd
NET: Registered protocol family 10
done.
Starting syslogd/klogd: done
Starting Lighttpd web Server: lighttpd.
Stopping Bootlog daemon: bootlogd.

Poky 8.0 (Yocto Project 1.3 Reference Distro) 1.3 socfpga_cyclone5 ttys0
socfpga_cyclone5 login: root
root@socfpga_cyclone5:~#
```

Figure 4-2 Linux boot log

Have fun!!

5. Additional Information

1. Macnica Helio SoC Evaluation Kit online documentation:
<http://www.rocketboards.org/foswiki/Documentation/MacnicaHelioSoCEvaluationKit>
2. Mpression – Solutions by Macnica Group
<http://www.mpression.com/home>
3. Altera CycloneV SoC documentation:
<http://www.altera.com/literature/lit-cyclone-v.jsp>
4. Altera SoC Embedded Software Tools documentation:
<http://www.altera.com/literature/lit-soc.jsp>
5. Altera SoC Linux Community Portal:
<http://www.rocketboards.org/>

6. Document Revision History

Date	Revision	Changes
Nov 16th, 2015	1.4	<ul style="list-style-type: none">Fixed default BSEL settings
Sep 11th, 2014	1.3	<ul style="list-style-type: none">Added [2.3 Board Revision] section.
June 4th, 2014	1.2	<ul style="list-style-type: none">Typo Fix
Mar 27th, 2014	1.1	<ul style="list-style-type: none">Added terminal setting for Linux kernel v3.9
Nov 14th, 2013	1.0	<ul style="list-style-type: none">Template changed and some fixes
May 2, 2013	0.31	<ul style="list-style-type: none">Some screenshot and explanations added
April 2, 2013	0.1	<ul style="list-style-type: none">Document Created