

Terasic Technologies

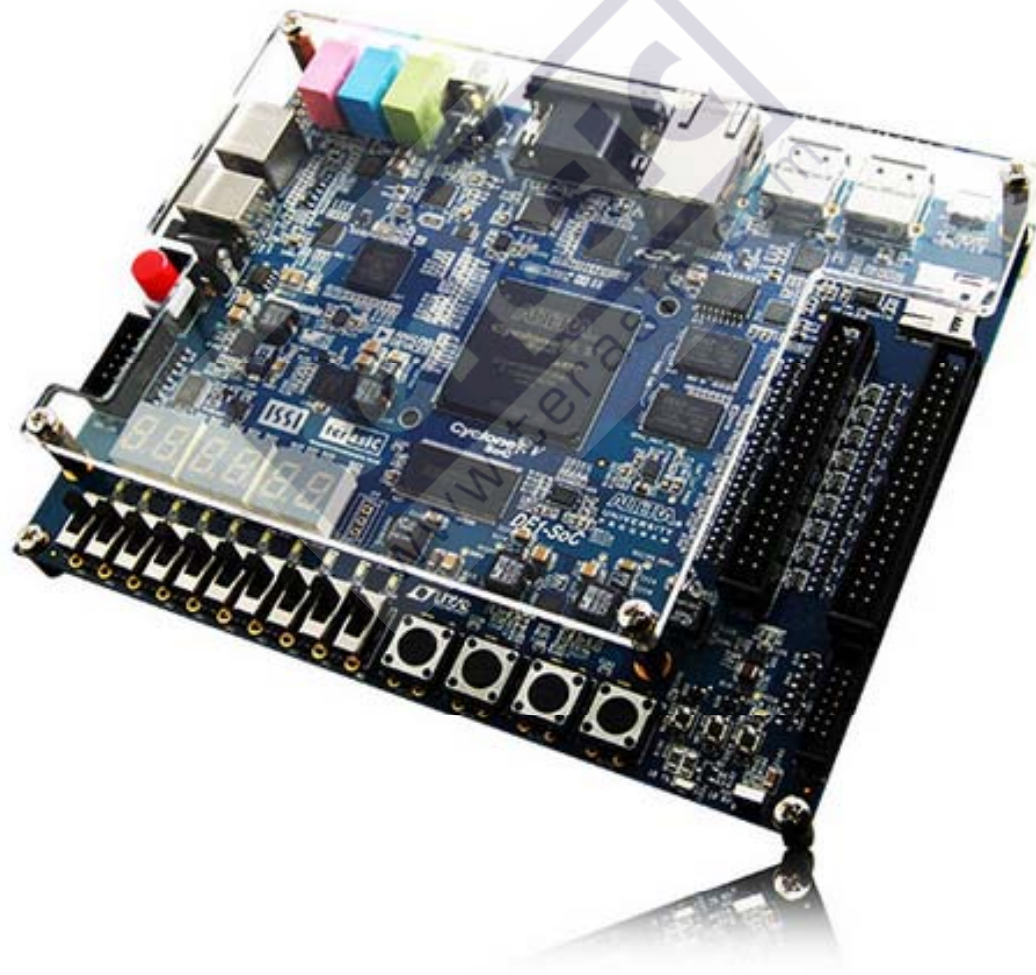
DE1-SoC Development Kit



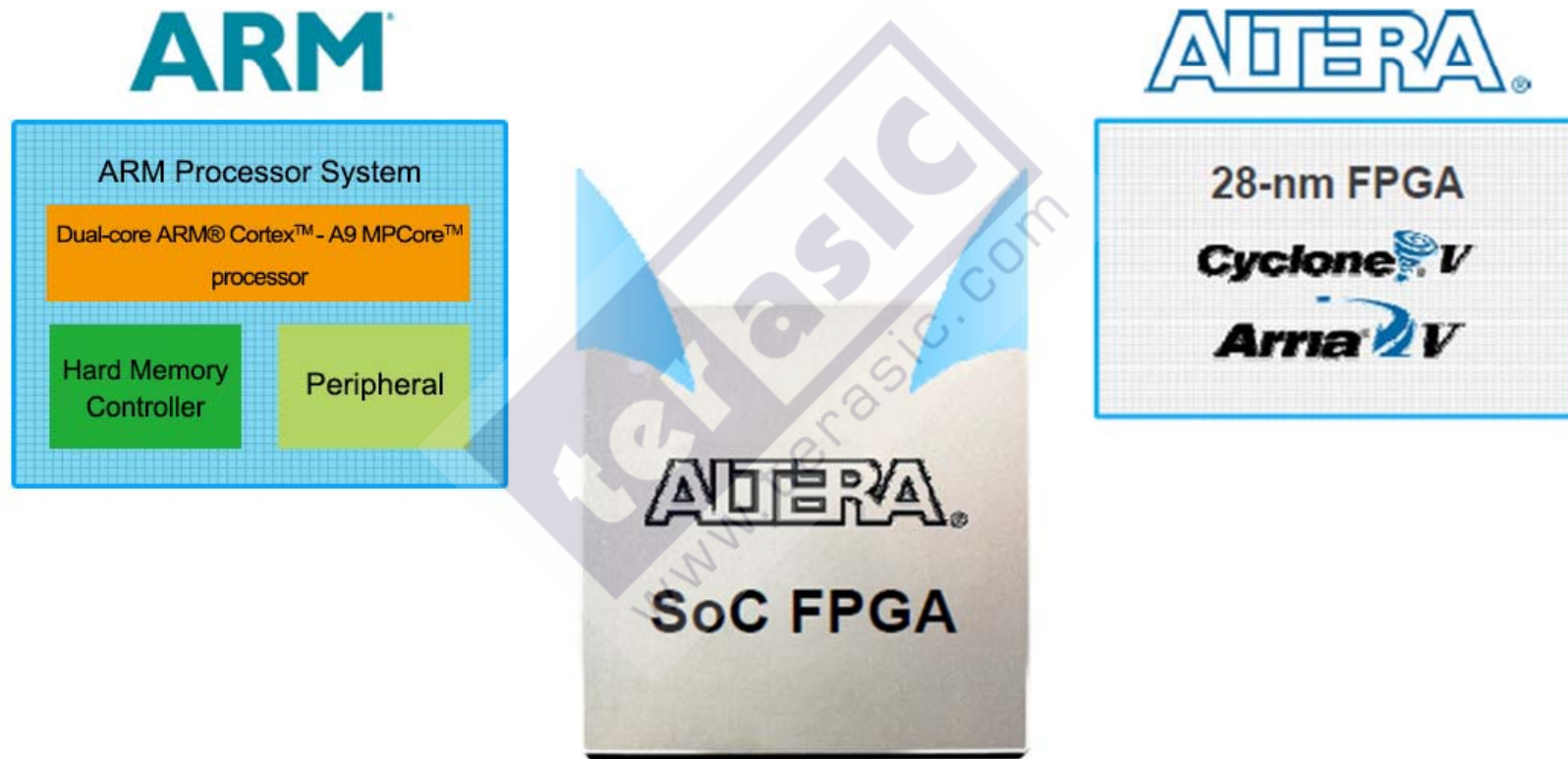
ALTERA
UNIVERSITY
PROGRAM

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Altera DE1-SoC

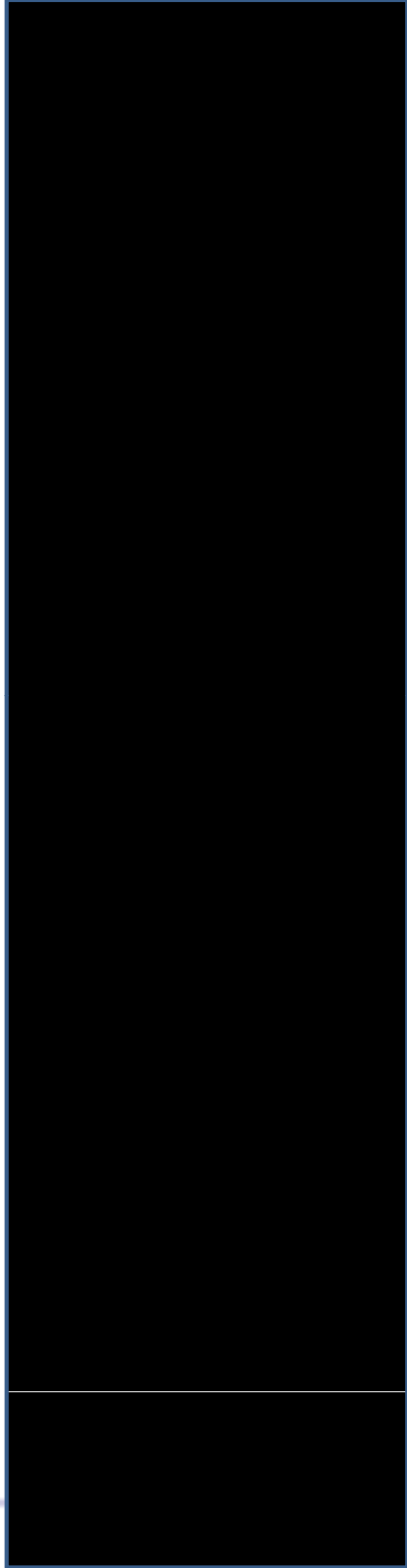


SoC FPGA !

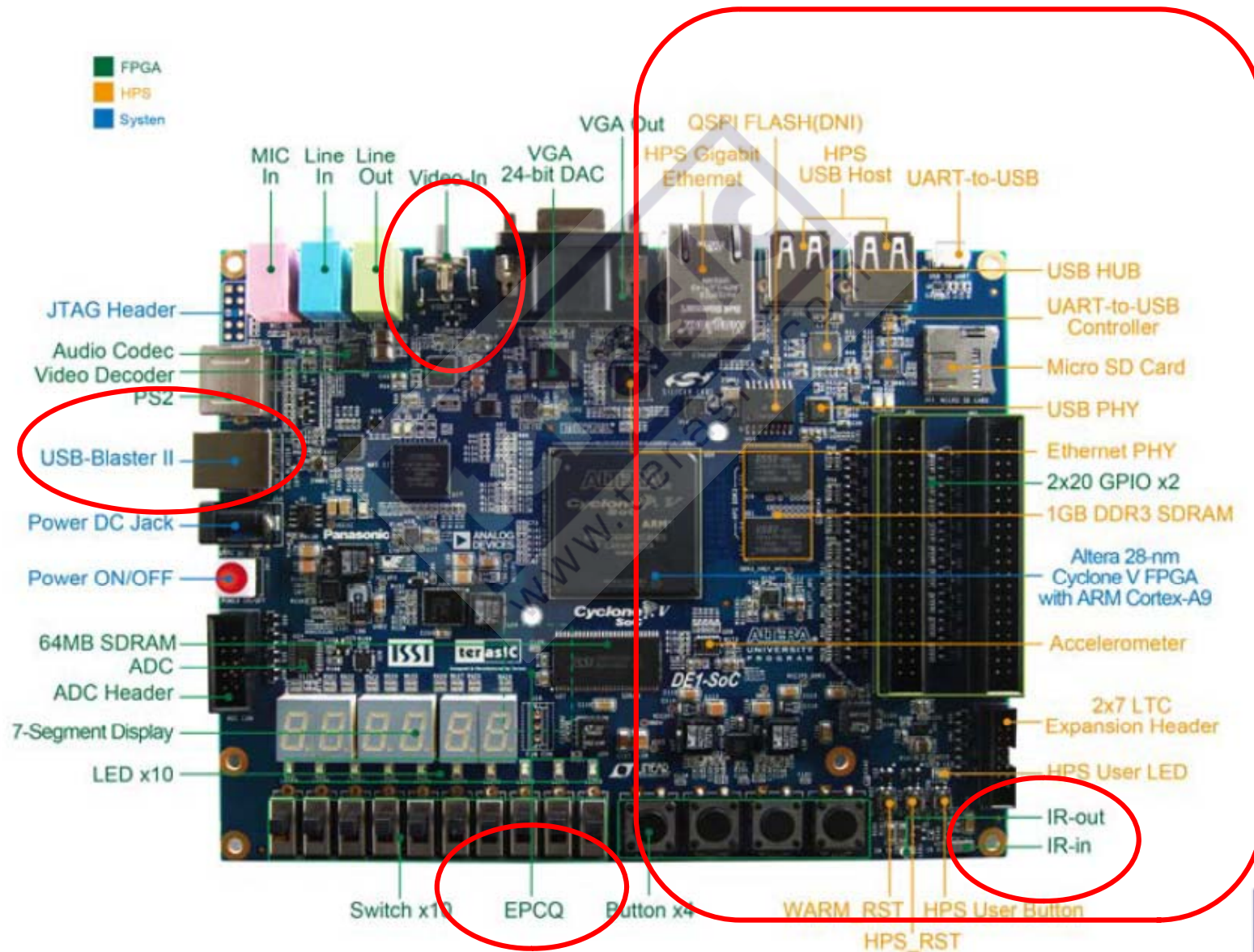


ARM + Altera = SoC FPGA

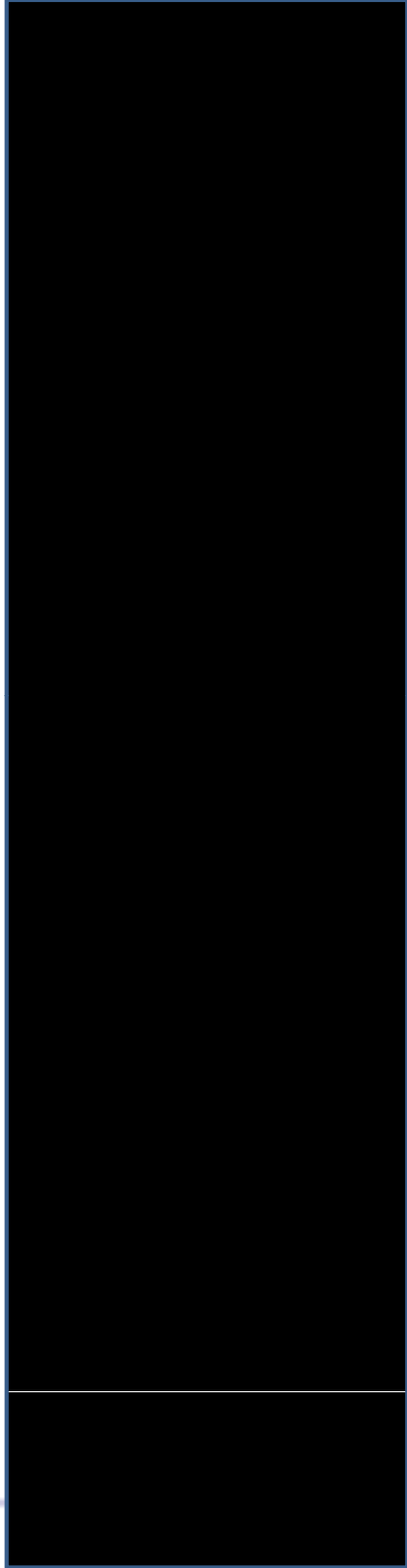
DE1-SoC Features



DE1-SoC Board View – Function

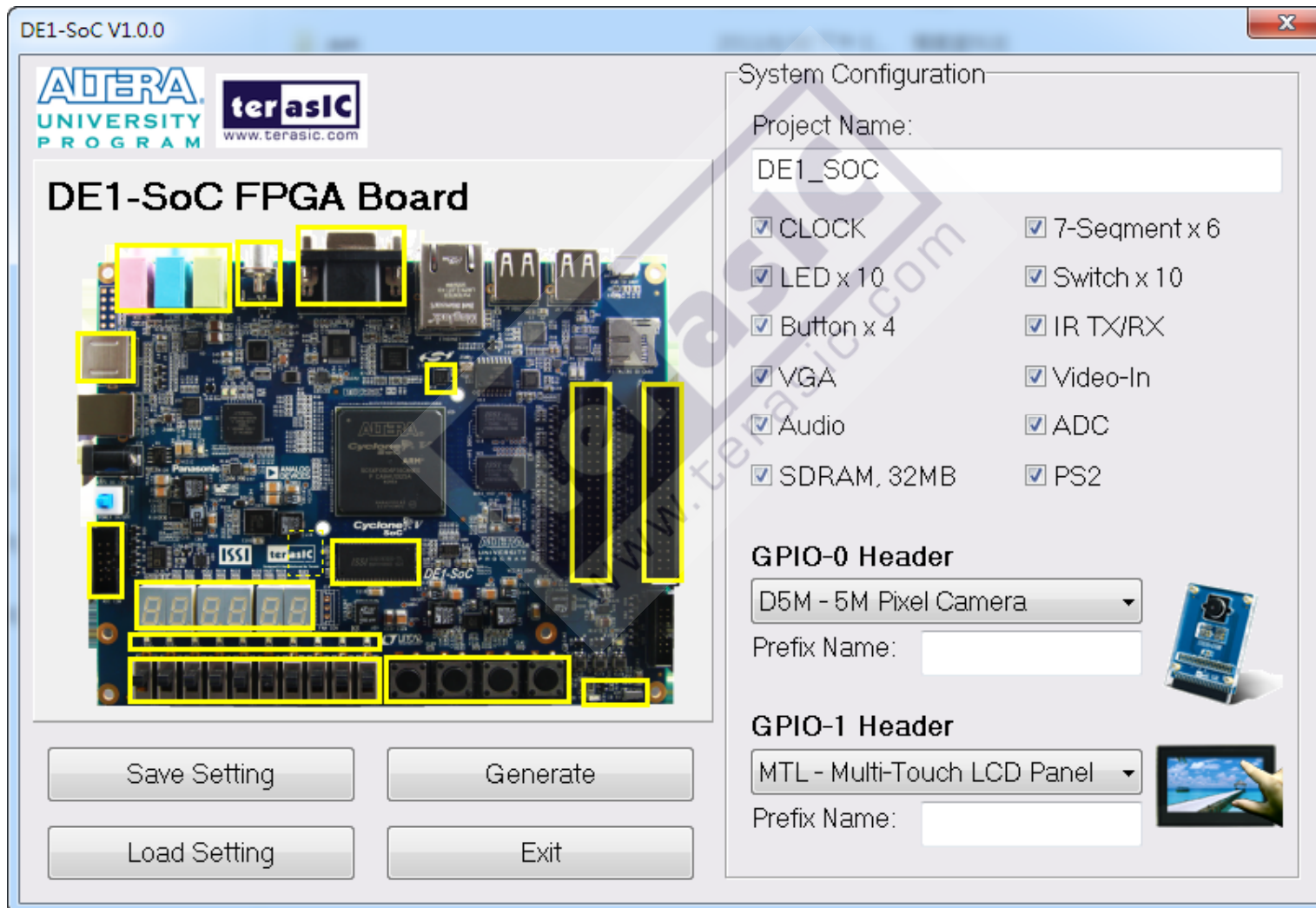


Utility and Resource



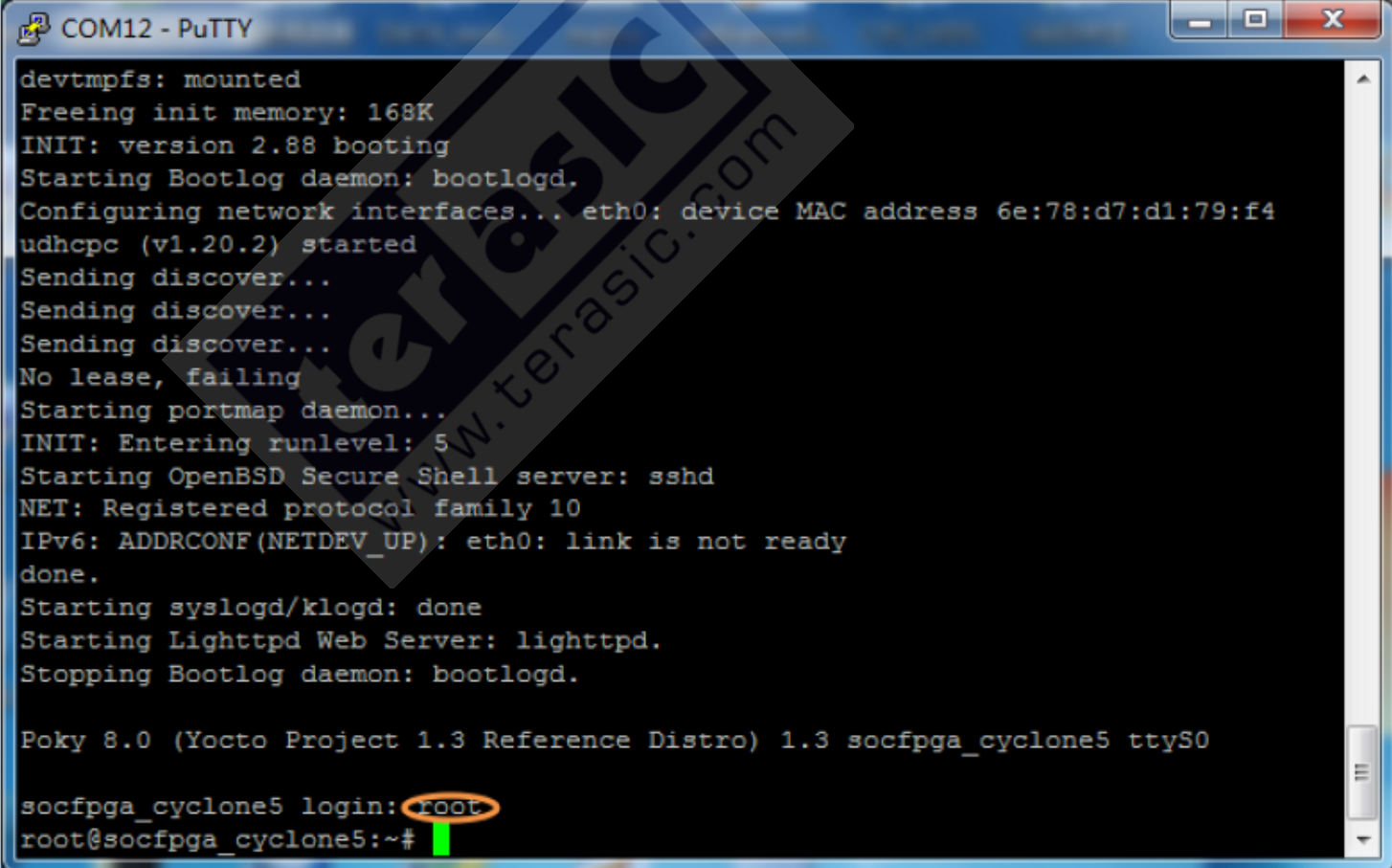
System Builder

- Create Quartus golden top, including various GPIO daughter boards



Linux BSP (Board Support Package)

- Linux kernel 3.12 with support of Ethernet, UART, SD/MMC, GPIO and SDRAM
- U-boot version 2013.0101 with support of Ethernet, UART, SD/MMC and SDRAM
- Yocto version 'Danny'
- Preloader
- Root file system







```
COM12 - PuTTY
devtmpfs: mounted
Freeing init memory: 168K
INIT: version 2.88 booting
Starting Bootlog daemon: bootlogd.
Configuring network interfaces... eth0: device MAC address 6e:78:d7:d1:79:f4
udhcpc (v1.20.2) started
Sending discover...
Sending discover...
Sending discover...
No lease, failing
Starting portmap daemon...
INIT: Entering runlevel: 5
Starting OpenBSD Secure Shell server: sshd
NET: Registered protocol family 10
IPv6: ADDRCONF(NETDEV_UP): eth0: link is not ready
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:~#
```


Download form Terasic Website

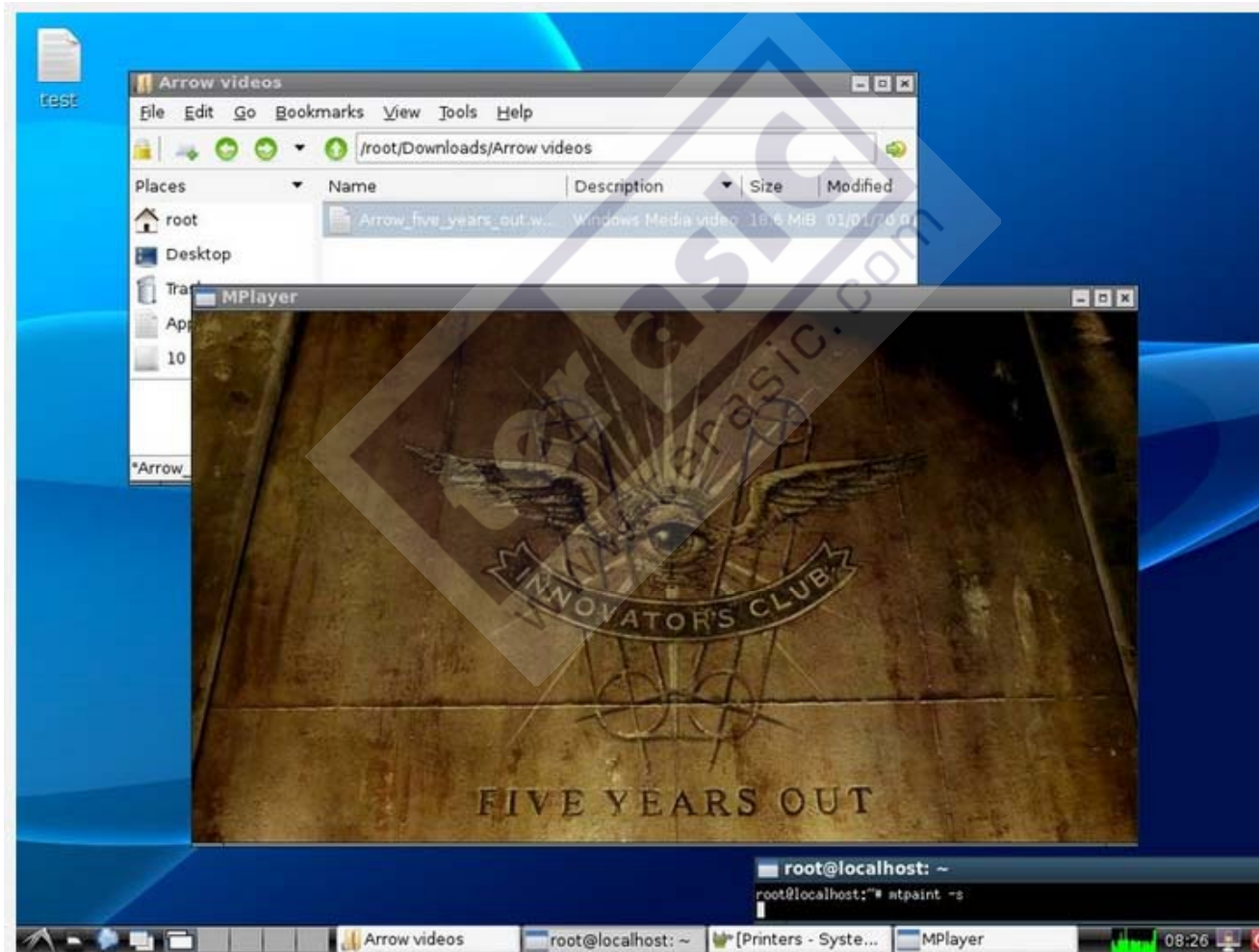
DE1-SoC Board

Linux BSP (Board Support Package): MicroSD Card Image

Title	Linux Kernel	Min. microSD Capacity	Size(KB)	Date Added	Download
Linux Console	3.12	4GB	66495	2014-01-14	
Linux Console with framebuffer	3.12	4GB	328524	2014-03-24	
Linux LXDE Desktop	3.12	8GB	1369526	2014-03-21	
Linux Ubuntu Desktop	3.12	8GB	1136075	2014-02-11	

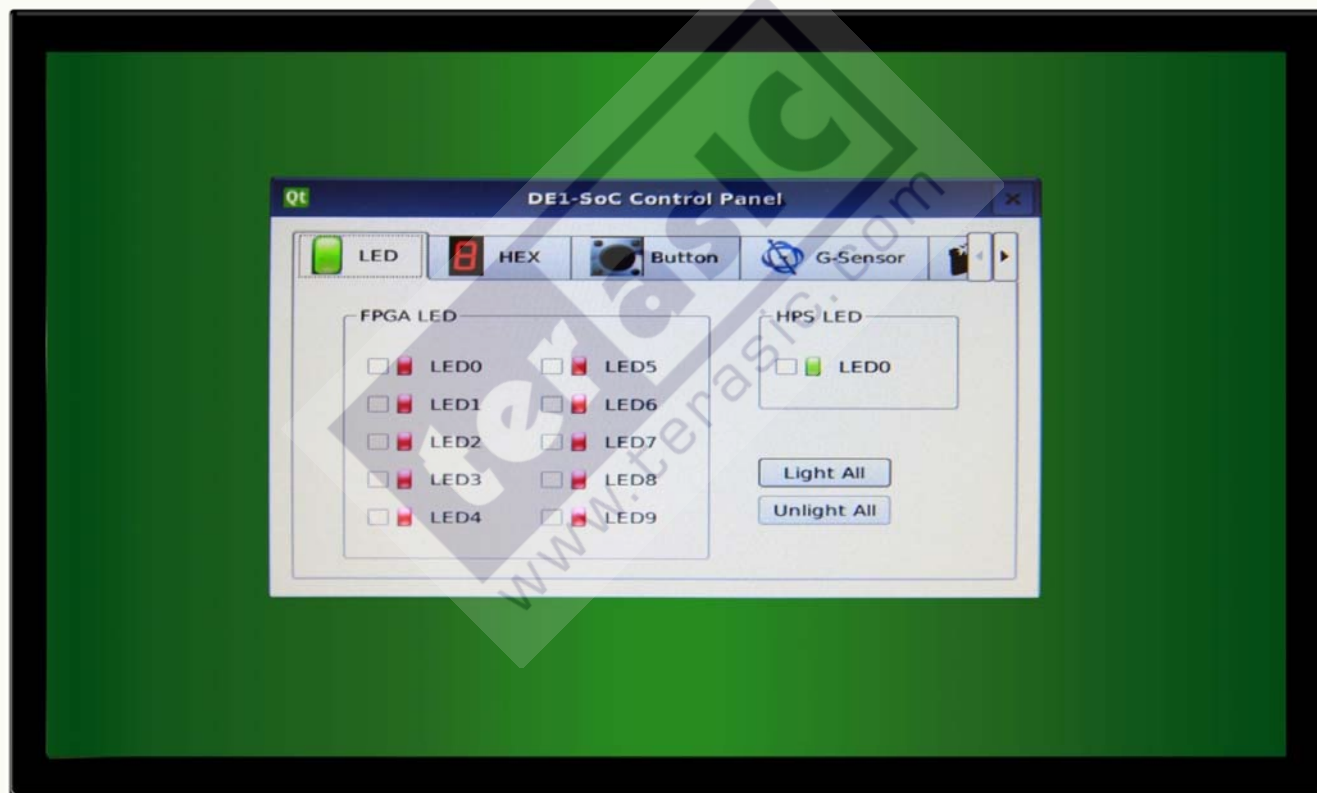
Desktop Linux Supporting

- Desktop ready for DE1-SoC: LXDE (Lightweight [X11](#) Desktop Environment)
- Display Scheme: frame buffer is implemented by FPGA + DDR3 + Altera VIP



Control Panel on Linux

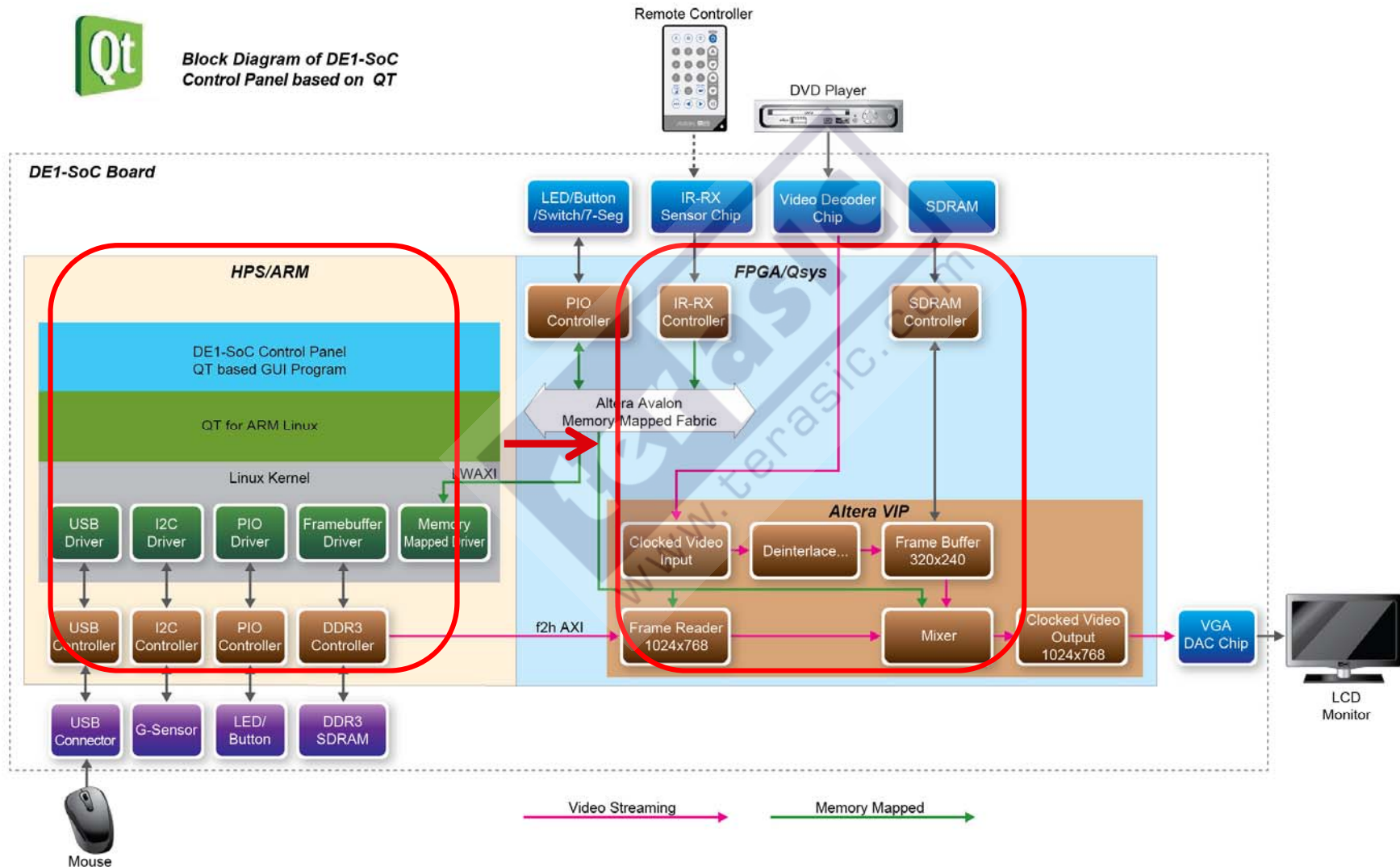
- HPS Control FPGA device
- Base on QT



Block Diagram of Control Panel



Block Diagram of DE1-SoC Control Panel based on QT



Daughter Card

- **GPIO Interface:**

- **MTL:**
 - 7" LCD, 800x480 pixel, 24-bits color
 - Multi-touch Gesture
- **D5M: 5 Mega Pixel Camera**
- **ADA: High speed**
 - 14-bit 65 MSPS A/D
 - 14-bit 125 MSPS D/A

- **LTC Interface**

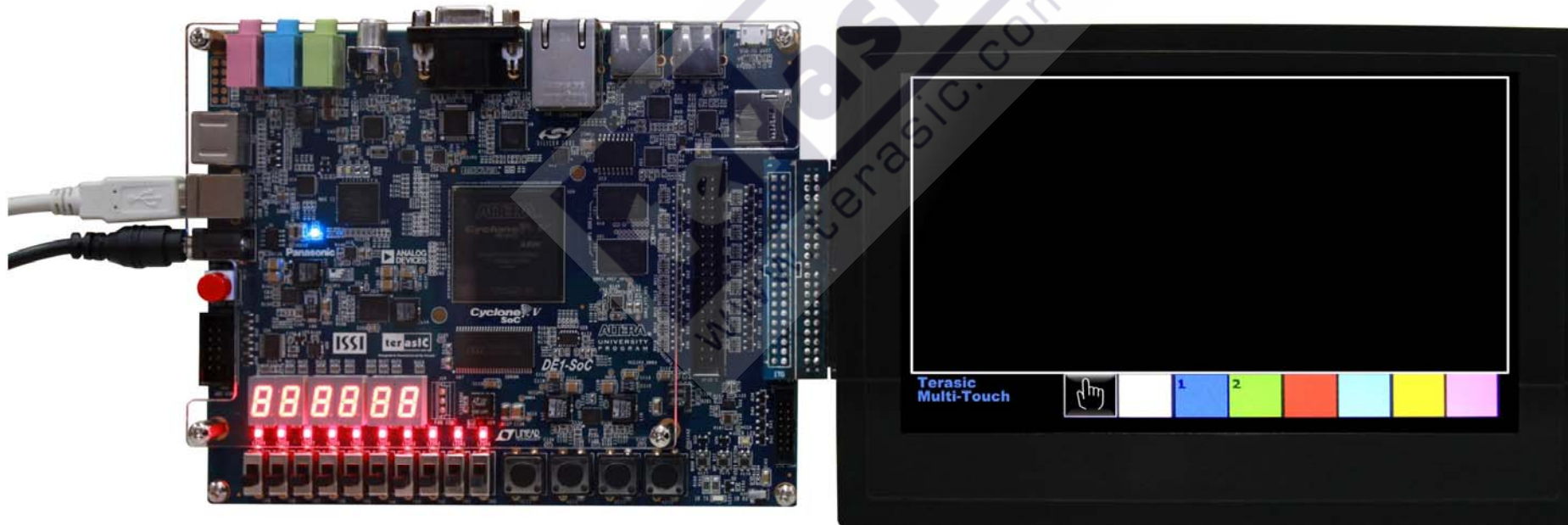
- **DC934A: 20-bit A/D, 16-bit D/A**

Expansion



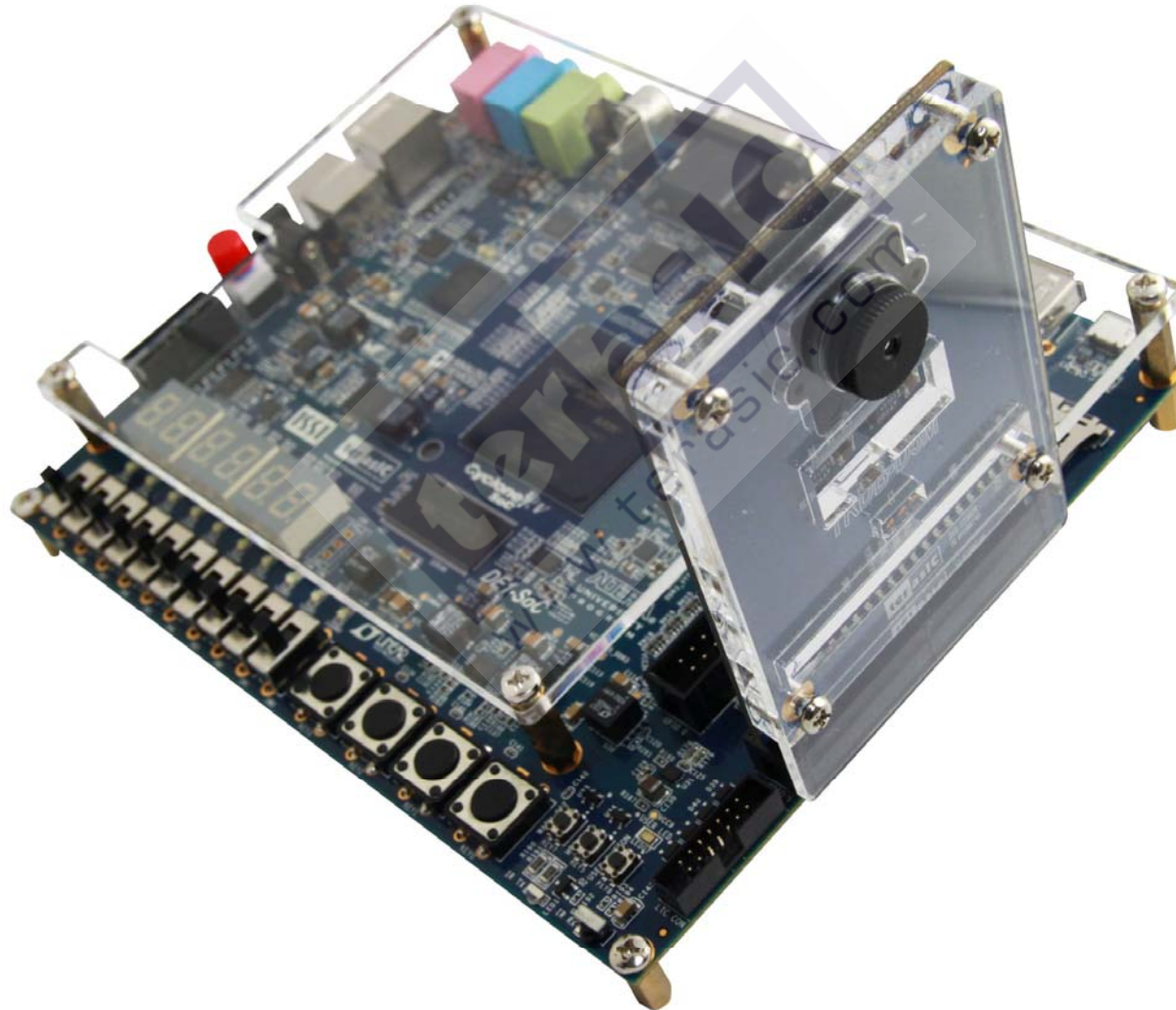
DE1-SoC + MTL

- Will support Android developed by Fujisoft
- MTL specification:
 - 7" LCD, 800x480 pixels, 24-bit color
 - Multi-touch Gesture

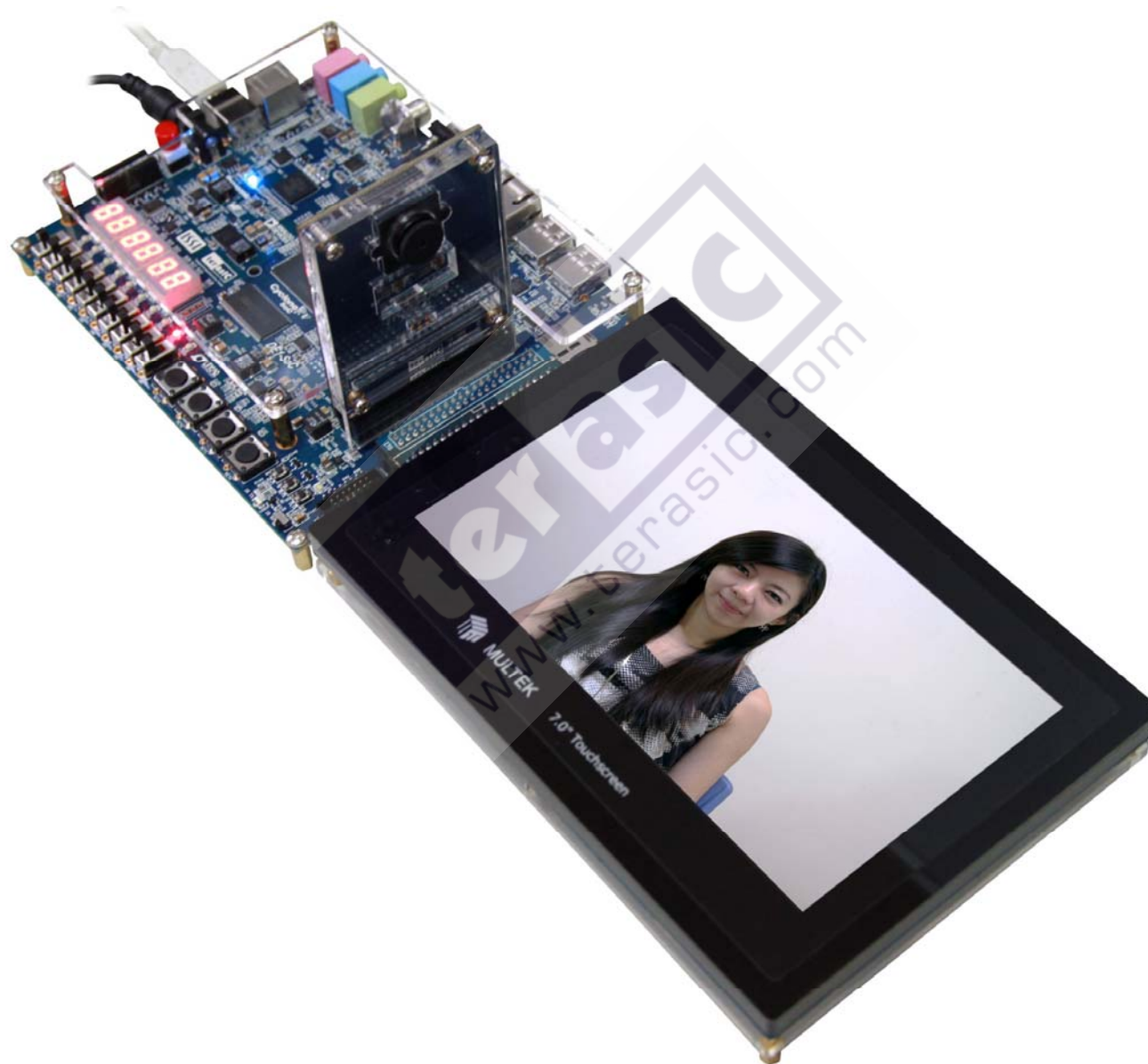


DE1-SoC + D5M

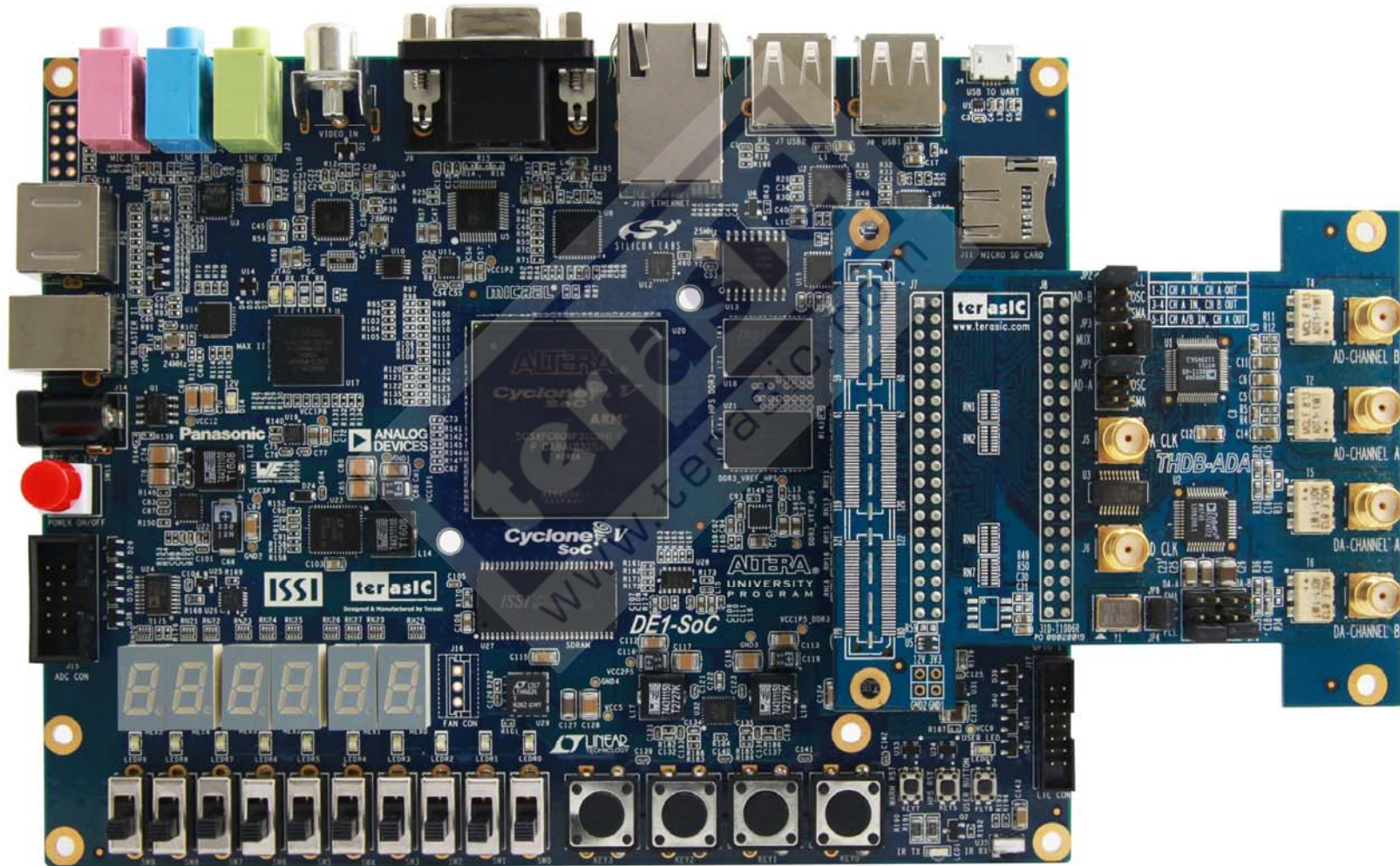
- **D5M specification**
 - 5 Mega Pixel CMOS sensor



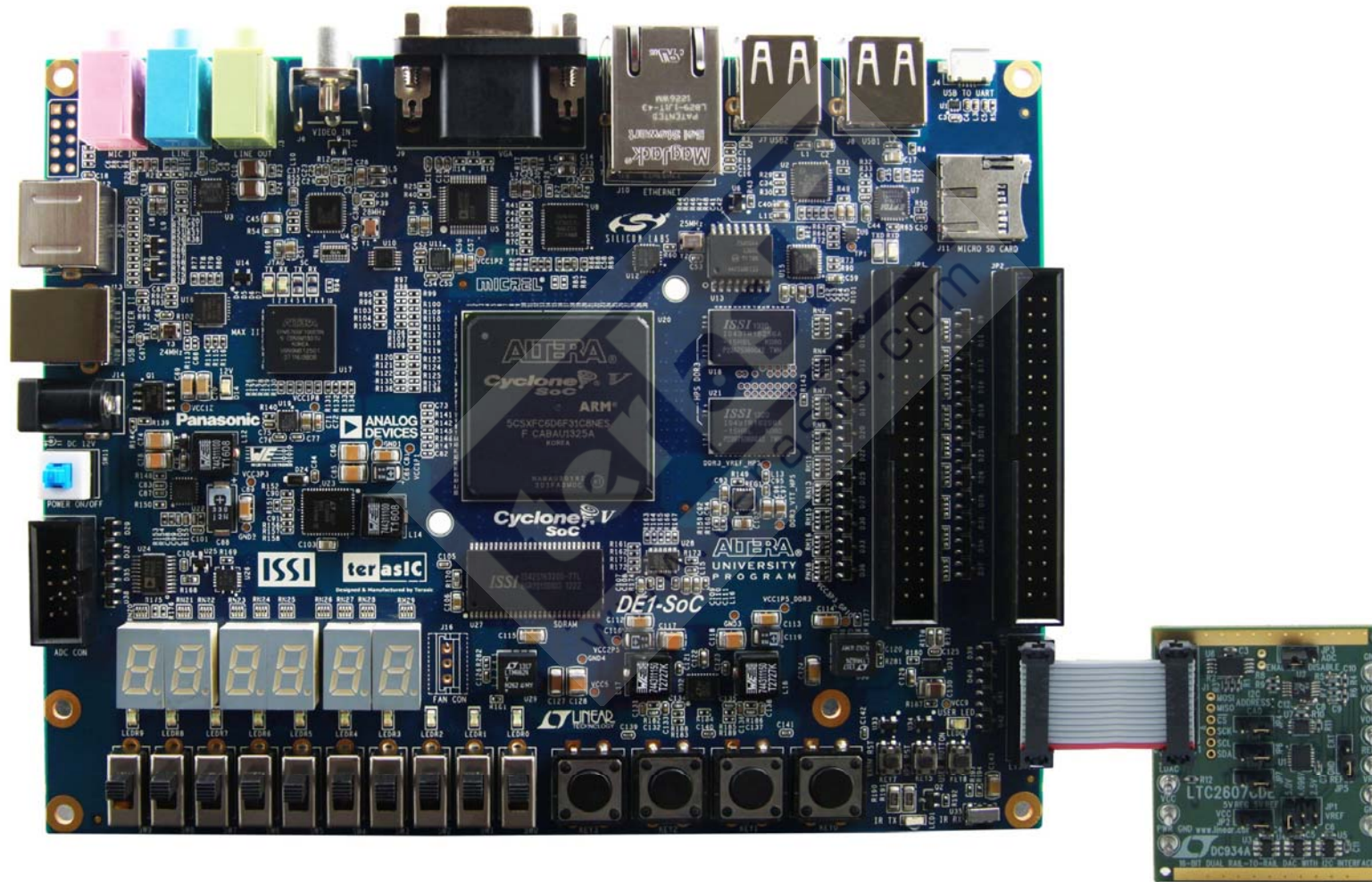
DE1-SoC + D5M + MTL



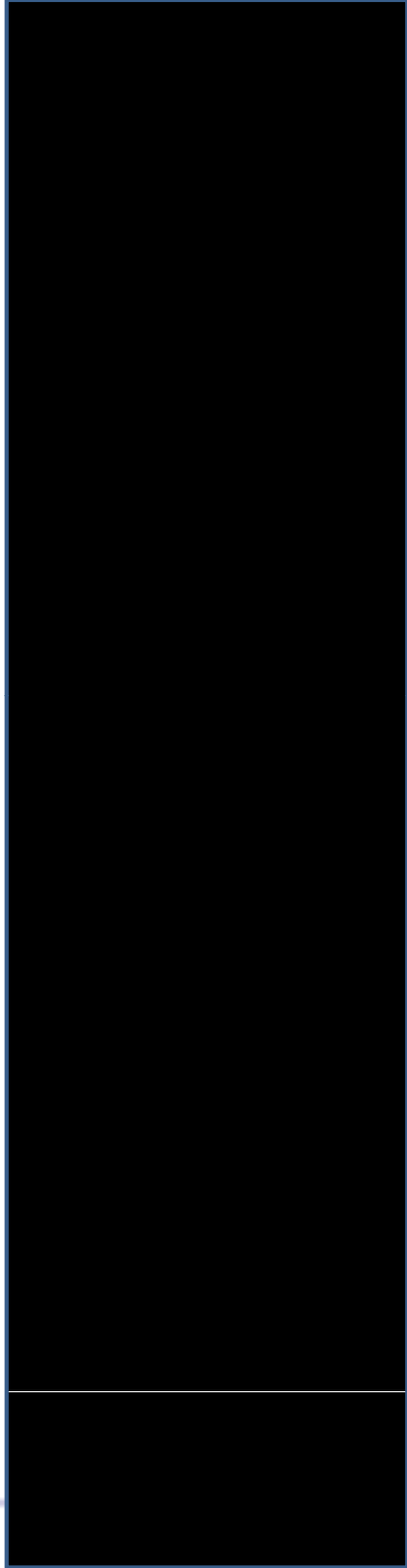
DE1-SoC + ADA



DE1-SoC + LTC DC934A

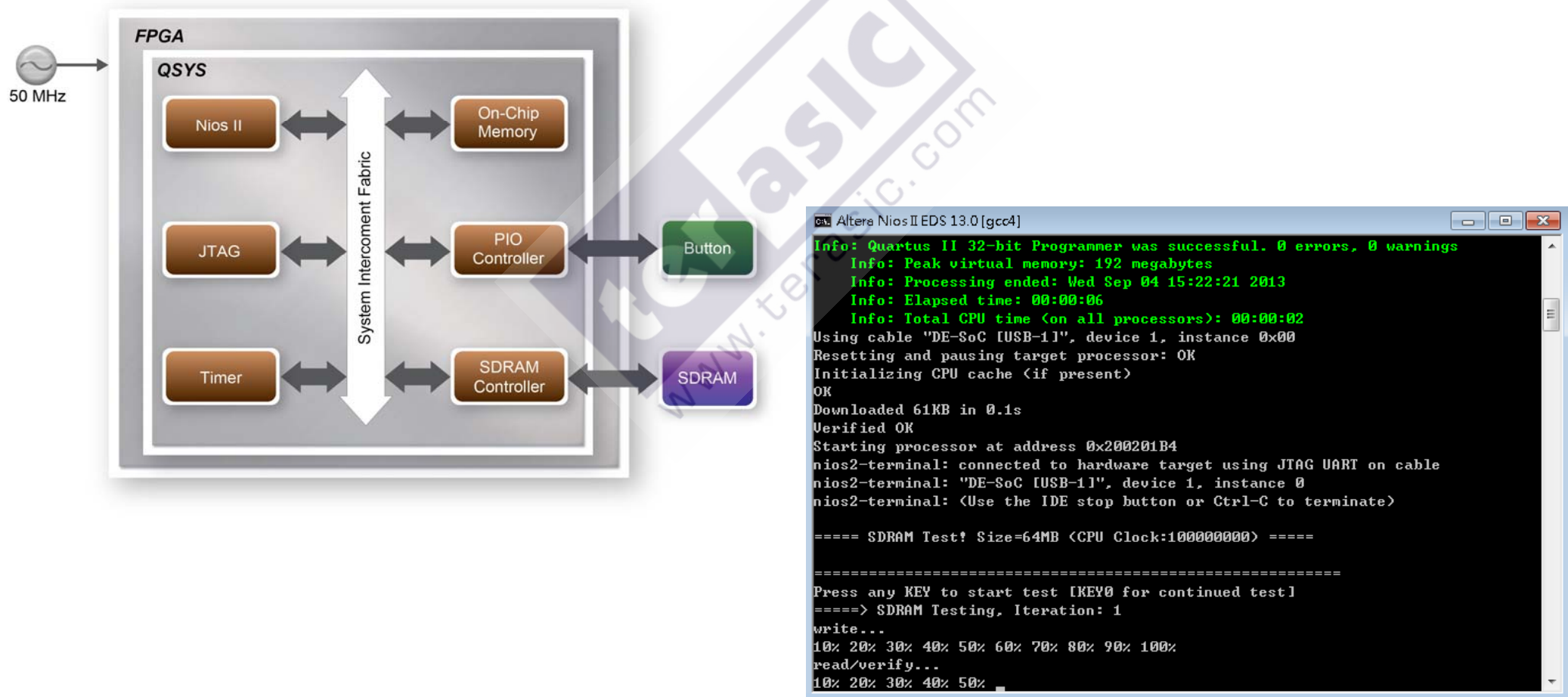


Demo



FPGA Demo

- We describe how the Altera's SDRAM Controller IP is used to access a SDRAM, and how the Nios II processor is used to read and write the SDRAM for hardware verification.



Software Development

- **Development Kits**
- **How to control the controllers in HPS**
- **How to communicate with FPGA**
- **HPS reconfigure FPGA**

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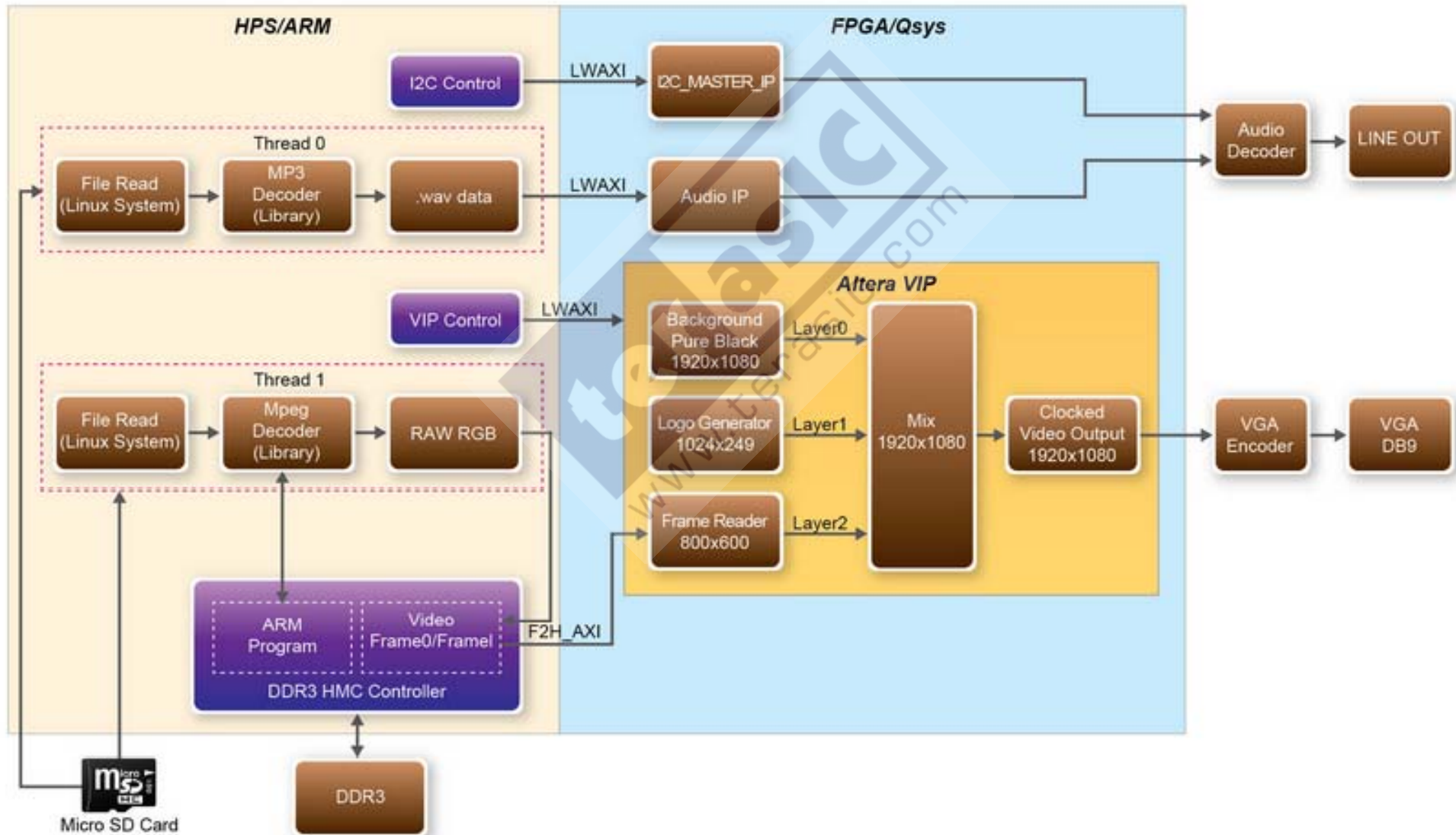
Linux Demo

- **Decode MP3/MPG and Play**
- **Linux with X-Windows**
- **Android**

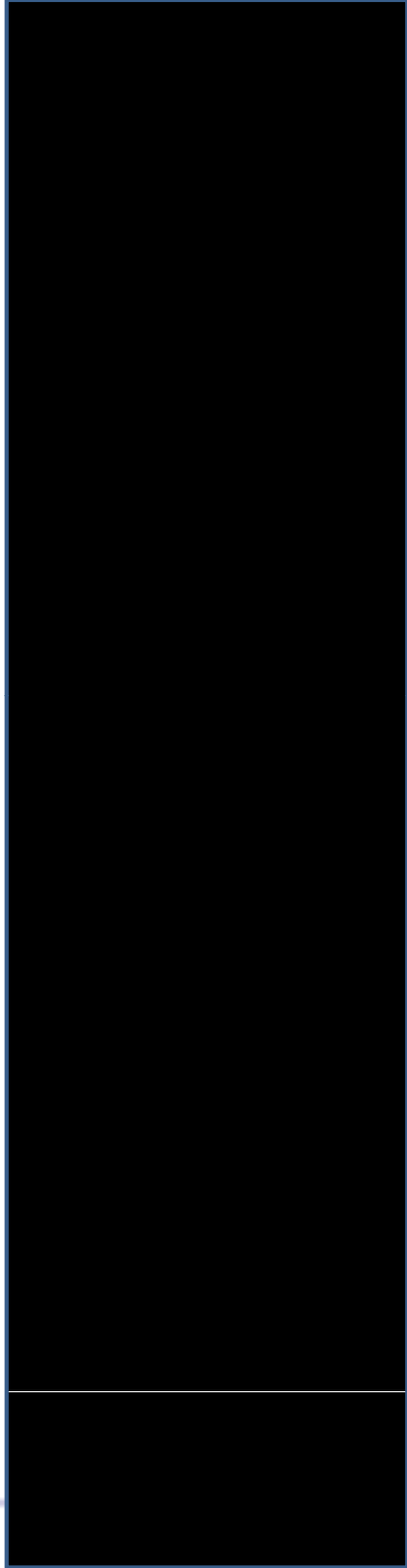


HPS-FPGA Demo on DE1-SoC

- Play MP3 and MPEG File



Coming

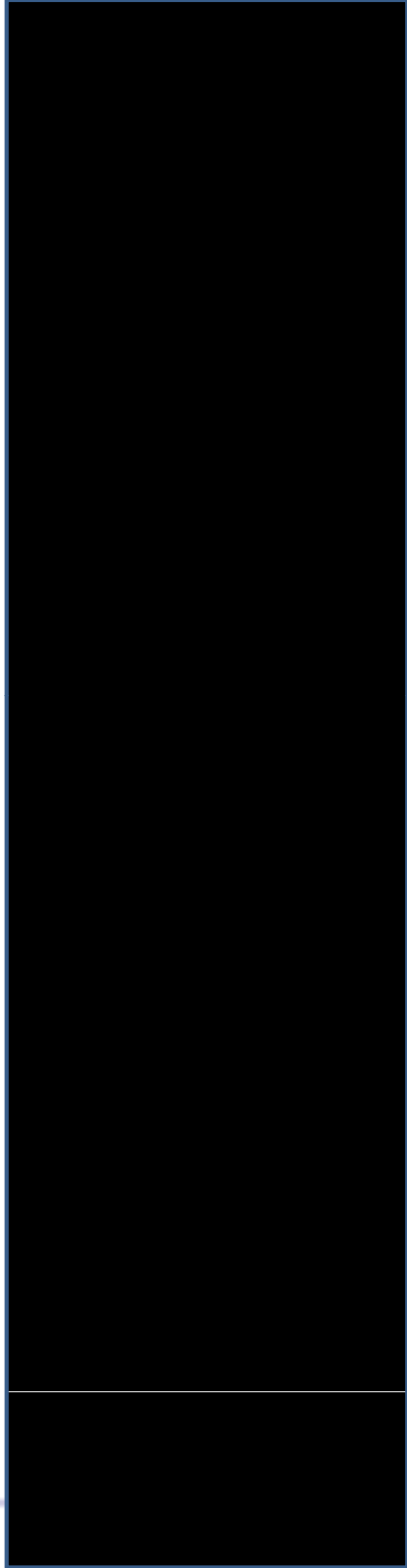


Android Supporting

- Fujisoft company provides the Graphics Accelerator IP Core needed to run Android OS smoothly.
- AUP in U.T are working on porting Android too.

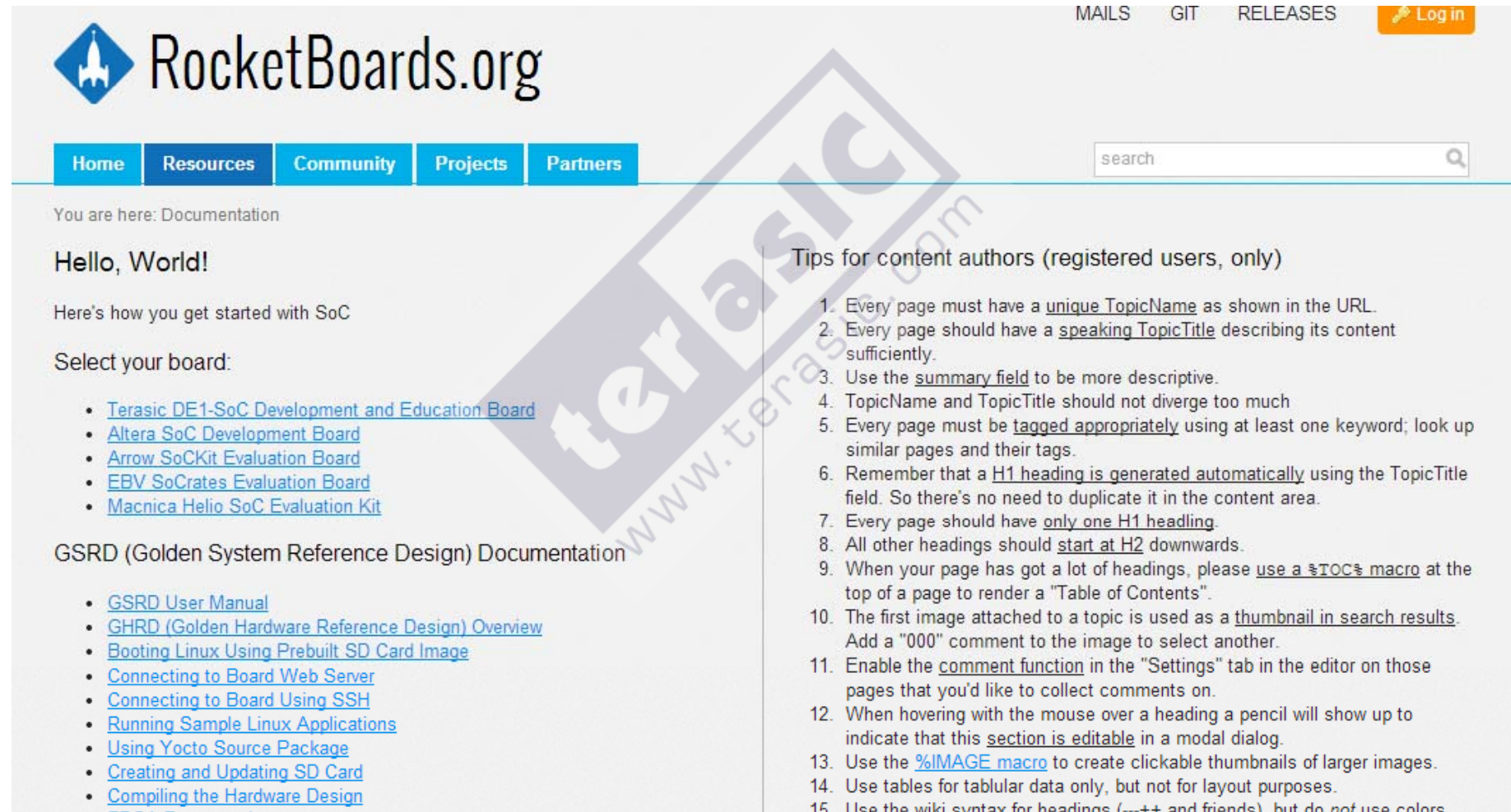


More Resources



More Resources on Rockbaord.org

- Vist : <http://www.rocketboards.org/foswiki/Main/WebHome>



The screenshot shows the RocketBoards.org website interface. At the top right, there are links for "MAILS", "GIT", "RELEASES", and a "Log in" button. The main navigation bar includes "Home", "Resources", "Community", "Projects", and "Partners". A search bar is located on the right side of the navigation bar. Below the navigation bar, the page content is divided into several sections. On the left, there is a "Hello, World!" message and a "Select your board:" section with a list of links to various development boards. Below that is a "GSRD (Golden System Reference Design) Documentation" section with a list of links. On the right, there is a "Tips for content authors (registered users, only)" section with a list of 15 numbered tips. A large, semi-transparent watermark for "terasic.com" is overlaid diagonally across the center of the page.

MAILS GIT RELEASES Log in

RocketBoards.org

Home Resources Community Projects Partners

search

You are here: Documentation

Hello, World!

Here's how you get started with SoC

Select your board:

- [Terasic DE1-SoC Development and Education Board](#)
- [Altera SoC Development Board](#)
- [Arrow SoCKit Evaluation Board](#)
- [EBV SoCrates Evaluation Board](#)
- [Macnica Helio SoC Evaluation Kit](#)

GSRD (Golden System Reference Design) Documentation

- [GSRD User Manual](#)
- [GHRD \(Golden Hardware Reference Design\) Overview](#)
- [Bootling Linux Using Prebuilt SD Card Image](#)
- [Connecting to Board Web Server](#)
- [Connecting to Board Using SSH](#)
- [Running Sample Linux Applications](#)
- [Using Yocto Source Package](#)
- [Creating and Updating SD Card](#)
- [Compiling the Hardware Design](#)

Tips for content authors (registered users, only)

1. Every page must have a unique TopicName as shown in the URL.
2. Every page should have a speaking TopicTitle describing its content sufficiently.
3. Use the summary field to be more descriptive.
4. TopicName and TopicTitle should not diverge too much
5. Every page must be tagged appropriately using at least one keyword; look up similar pages and their tags.
6. Remember that a H1 heading is generated automatically using the TopicTitle field. So there's no need to duplicate it in the content area.
7. Every page should have only one H1 heading.
8. All other headings should start at H2 downwards.
9. When your page has got a lot of headings, please use a `§TOC§` macro at the top of a page to render a "Table of Contents".
10. The first image attached to a topic is used as a thumbnail in search results. Add a "000" comment to the image to select another.
11. Enable the comment function in the "Settings" tab in the editor on those pages that you'd like to collect comments on.
12. When hovering with the mouse over a heading a pencil will show up to indicate that this section is editable in a modal dialog.
13. Use the %IMAGE macro to create clickable thumbnails of larger images.
14. Use tables for tabular data only, but not for layout purposes.
15. Use the wiki syntax for headings (`--++` and friends). but do *not* use colors