Embedded Linux Porting (C2)

Organised & Supported by **RuggedBOARD**

Agenda

- Board Boot Options
- Setting up TFT
- Flashing Bootloader & Linux Kernel on Board
- Running Application on Board
- Toolchain & its components
- How to build toolchain

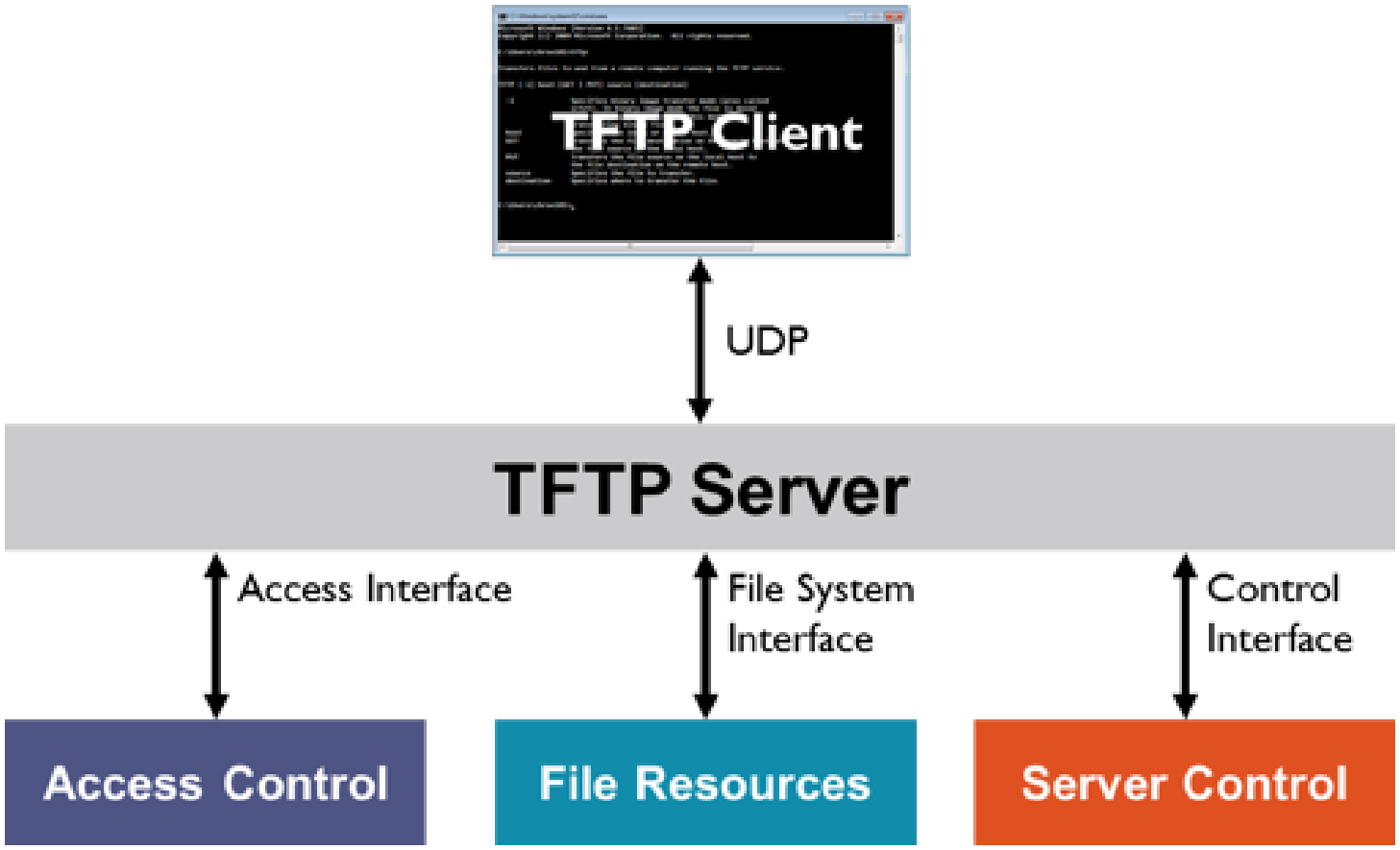
Boot Options

Boot Mode of SOC:
- Boot Config Pins
- Boot Config Registers

Common Bootmodes:
1. Serial Bootmodes
2. SDCard Bootmodes
3. USB Bootmode (DFU)
4. Ethernet Bootmode

RuggedBOARD support boot from
1. NOR Flash
2. SDCARD
3. Serial Boot Mode for flashing image's using SAM-BA PC Tool.

TFTP for Flashing Images & Binaries



Flashing Images using JTAG / Serial is a traditional method on MCU but MPU Linux based systems provide high speed communication ports like Ethernet & USB which are fast and simple to use.

Trivial File Transfer Protocol (TFTP) is a standard network protocol used to transfer files from one host to another over a TCP-based network.

TFTP Setup

TFTP Server Setup Steps:

1. Install the TFTPD & TFT Client packages

2. Create a tftd-config file /etc/

Port

Location

Permission

3. Configure tftd service to be started by Network Service Manager.

4. Test tftp on local host

Additional Resources:

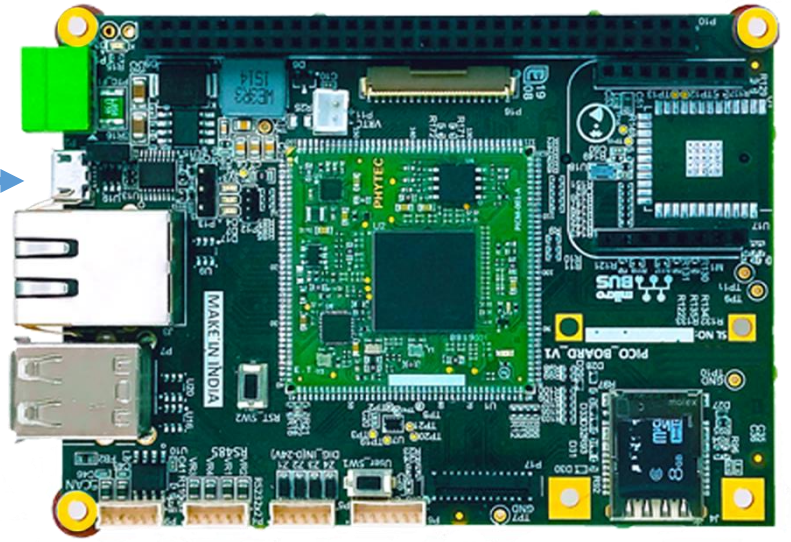
Procedure to Setup TFTP Server: Link …

TFTP Server for Windows use TFTPD64 Tool : Link…

Flashing Images on RB-A5D2x (Serial)

Power on board in serial download mode by pressing the boot switch

Serial Comm



Serial Boot Mode

U-boot Flashing on RB-A5D2x (SDCARD)

Power on board and stop at bootlaoder prompt

#check mmc card info

u-boot$ mmcinfo

init serial flash

u-boot$ sf probe

#copy uboot image from mmc to RAM

u-boot$ fatload mmc 1 0x21FF0000 NOR/u-boot.bin

#erase serial flash(NOR) u-boot partition

u-boot$ sf erase 0x20000 0x80000

copy uboot image from RAM to NOR Flash

u-boot$ sf write 0x21FF0000 0x20000 0x80000.

U-boot Flashing on RB-A5D2x (TFTP)

Power on board and stop at bootlaoder prompt

#check network connection by pining host PC

u-boot$ ping <serverip>

Download uboot image from PC to Board RAM

u-boot$ tftp 0x21FF0000 u-boot.bin

#erase serial flash(NOR) u-boot partition

u-boot$ sf erase 0x20000 0x80000

copy from uboot image from RAM to NOR Flash

u-boot$ sf write 0x21FF0000 0x20000 0x80000

Running Applications on RB

RuggedBOARD-A5D2x BSP by default support Applications in C & Python.

#Use hello_world binary from Images folder or download it from rb-github
#Copy the helo_world binary to /var/lib/tftpboot dir on Host
#make sure tftpserver is running on Host PC

#Boot RB-A5D2x to Linux Shell prompt
#Change dir to /data on board
$cd /data
#Get hello_world binay using tftp –r <file_name> -g <serer_ip>
$ tftp –r hello_world –g 192.168.1.12

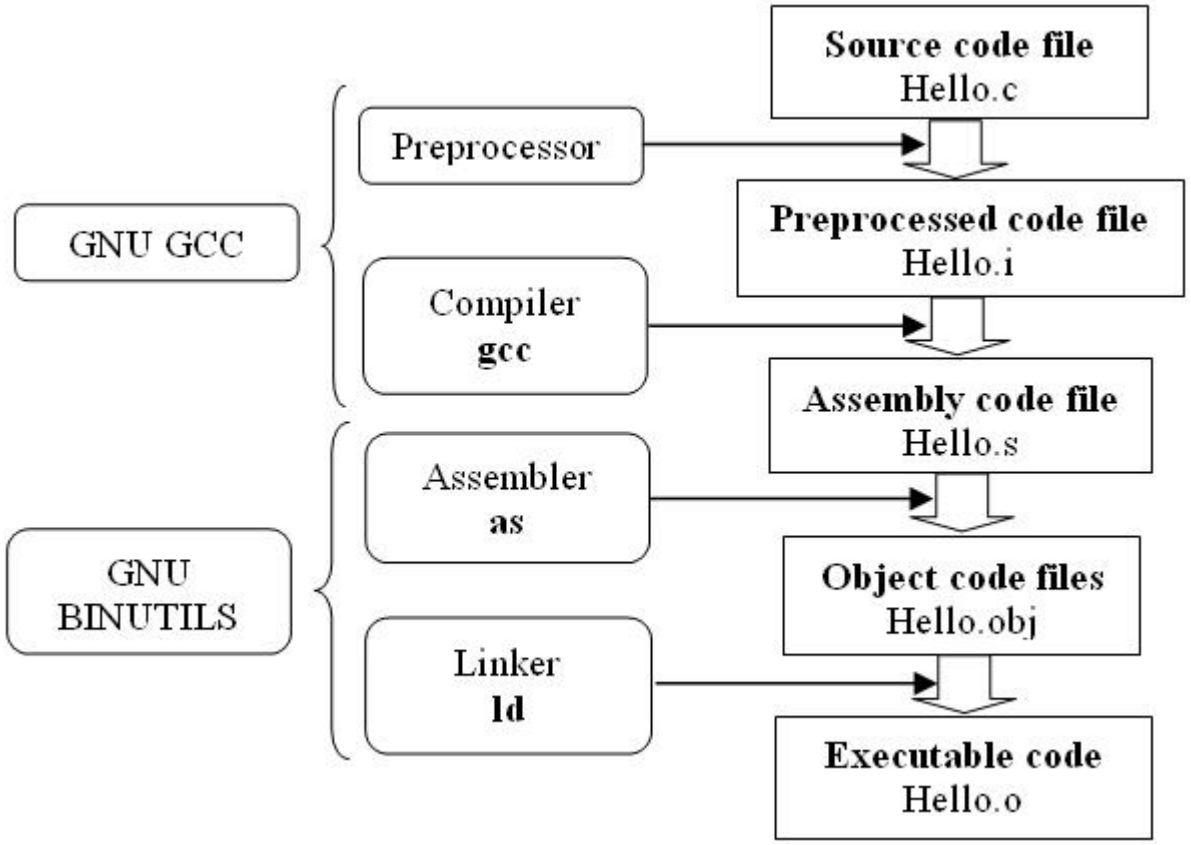
#Change the file permission to make it executable
$chmod +x hello_world
$./hello

Components of Toolchain

Bins
- **Compiler**
- **Assembler**
- **Linker**
- **Format Convertor**

Libs
- **C Library**
- **pTherad Lib**
- **Other …**

Tools
- **Debugging tools**



12 GNU Binutils Tools

Steps to Install Toolchain for RuggedBOARD link …

GDB
The GNU Project Debugger

Experiments

1. Boot mode (NOR, SD & Serial)
2. TFTP Server Installation & Testing on Host
3. Flash using Serial SAM-BA Tool
4. Run Sample Apps on Board use TFTP to transfer the Binaries from Host
5. Erase Kernel Image on Board and capture the console Log
6. Erase Bootloader Image on Board and capture the console Log
7. Flash pre-built bootloader Image using TFTP
8. Flash pre-built Kernel Image using TFTP
9. Flash pre-built bootloader Image using SD-Card
10. Flash pre-built Kernel Image using SD-Card

Open Discussions

Connect-us