

BeagleBone Black project

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Tasks

- **Compile embedded Linux for BeagleBone Black**
- **Develop C application which uses**
 - **TCS34725 RGB colour sensor**
 - **L3GD20H 3-axis gyroscope**

Compiling Linux

■ Buildroot

- custom Linux kernel 3.12 with patches for Texas Instruments SoCs
- U-Boot 2016.03
- gdbserver for remote debugging
- openssh for remote connection
- set of elementary programs BusyBox

Files

- FAT32 boot partition
 - X-Loader - MLO
 - U-boot binary - u-boot.bin
 - Linux kernel - zImage
- Linux partition
 - filesystem - rootfs.ext2

Configuration

- Allowed remote login for root user using password
 - /etc/ssh/sshd_config
 - PermitRootLogin yes
 - otherwise turn off!!!
- Set static IP address
 - /etc/network/interfaces
 - iface eth0 inet static
address 192.168.1.2
netmask 255.255.255.0

Development

- IDE Eclipse Oxygen from October 2017
- remote debugging
- both devices in 192.168.1.0 subnet
- root user

Cross-Compilation Configuration

- Adding a line for cross-compiling tools to the PATH variable in the file “.profile”:
PATH="/home/jaroslav/buildroot-2016-05/buildroot/output/host/usr/bin:\$PATH"
- Creation of C/C++ project: gyroRGB
- Set the toolchain: Cross GCC
- Configuration: Debug [Activate]
- Prefix: arm-buildroot-linux-uclibcgnueabihf-
- Path: /home/jaroslav/buildroot-2016.05/output/host/usr/bin

The compiling process is made in Linux x86 machine and the execution in ARM architecture (BBB)!

Development III

Run **Debug Configuration**

Open a new **C/C++ Remote Application** and the code of the program to be debugged

- Project name
- Build Configuration: Use Active
- C/C++ Application: browse executable
- Remote Absolute File Path for C/C++ Application
- Commands to execute before application: chmod +x location path of the application
- **GDB Debugger:** Location path of the **gdb**
- **GDB Command:** Location path of the **.gdbinit** file
- **Debugger Options:** Gdbserver Settings / Port number

Sensors



(a) TCS34725 RGB colour sensor



(b) L3GD20H 3-axis gyroscope

Soldering

Figure: BeagleBone Black with HAT with sensors



Introduction

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