Baseband Boot Time Optimization User Guide

Calterah Semiconductor

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CHAPTER

ONE

INTRODUCTION

The purpose of this document is to optimize boot time by reducing time consumed by baseband initialization process. The method can be used in some scenarios where the boot time is critical to the whole system. Please note that this document only applies to Alps and Rhine series.

The normal boot procedure of baseband usually contains these three steps, including

1. Reading radar parameters from configuration files (.hxx)
2. Execute sub-functions to interpret readable radar parameters to register values
3. Write to the requisite registers with certain values

These steps will be followed each time the board is powered on. Instead, Calterah provide a method to optimize the boot procedure by generating register settings for the first run and then directly write to registers for the second and subsequent run assuming that radar parameters remain unchanged.

The optimized boot procedure of baseband consist of two phases, preparation phase and optimization phase. In preparation phase, baseband boots as normal but output register settings for the specific radar parameters into header file in addition. Preparation phase is usually the first run after changing the radar parameters. In optimization phase, baseband skips reading and interpreting radar parameter configuration files (.hxx), and directly write to the requisite registers, which optimize the boot time of baseband.

CHAPTER

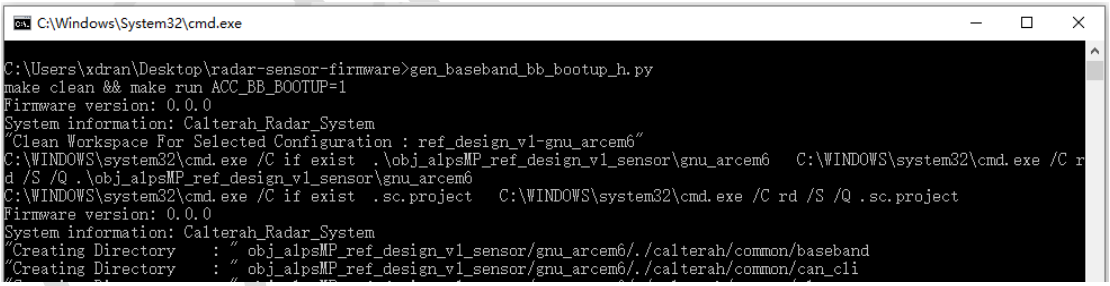
TWO

BOOT OPTIMIZATION

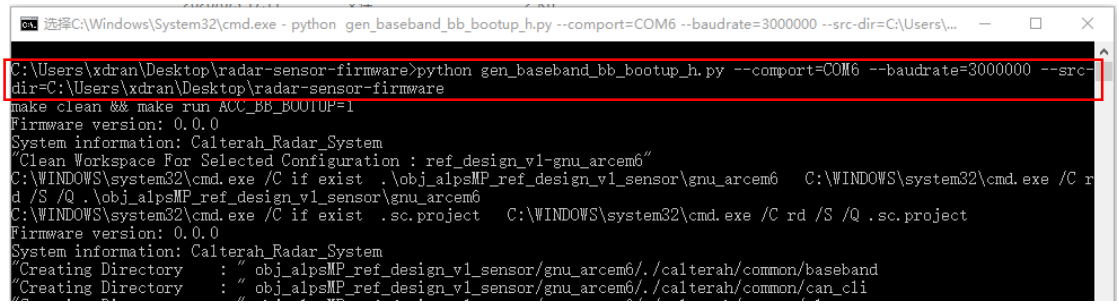
2.1 Preparation Phase

As is mentioned in Chapter 1, preparation phase generates boot optimization header in the directory of /radar-sensor-firmware/calterah/common/baseband/baseband_bb_bootup.h. A Python script can be used to auto-generate this header file.

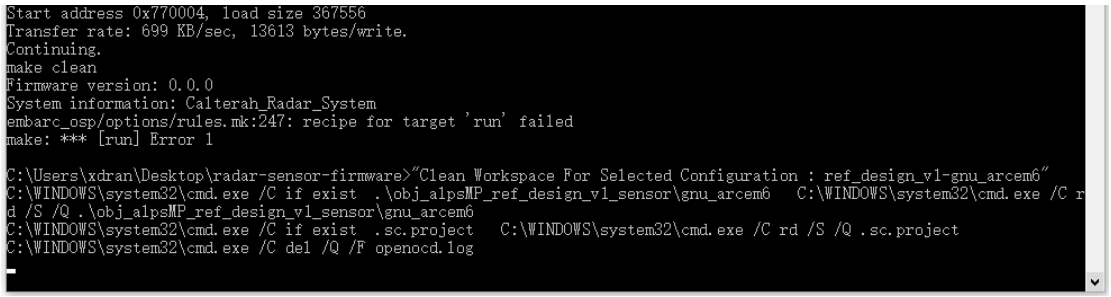
1. Download and install **Python 3.6.5 or higher**
2. Install pyserial library using the following command
   pip install pyserial
3. Plug in Calterah RDP board
4. Open command line in radar-sensor-firmware folder
5. Execute **gen_baseband_bb_bootup_h.py**. The script will automatically identify COM port of Calterah RDP board, set Baudrate to 3000000, and redirect to current working directory to current working folder.



6. You can also assign COM port, Baudrate and firmware directory manually if the default value is not correct in your project. You may need to use the following parameter.
   --comport: COM port of Calterah RDP board
   --baudrate: Baudrate of serial communication
   --src-dir: Absolute path of Radar-sensor-firmware



7. When you see the following screen with on-board LED blinking, it means firmware are compiled and executed in RAM through JTAG, and header file *baseband_bb_bootup.h* are generated in */radar-sensor-firmware/calterah/common/baseband/*.



2.2 Optimization Phase

Since baseband_bb_bootup.h are generated, add the macro "**ACC_BB_BOOTUP=2**" to the compiling command.

make clean && make bin ACC_BB_BOOTUP=2

For the procedure of firmware compiling and downloading, please refer to **Calterah Flash Downloader User Guide.**

CHAPTER

THREE

EXCEPTIONS

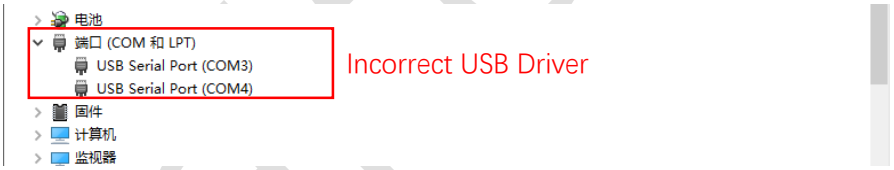
This chapter describe the exceptions and solutions of the Python optimization script.

Exception 1: Can't find device

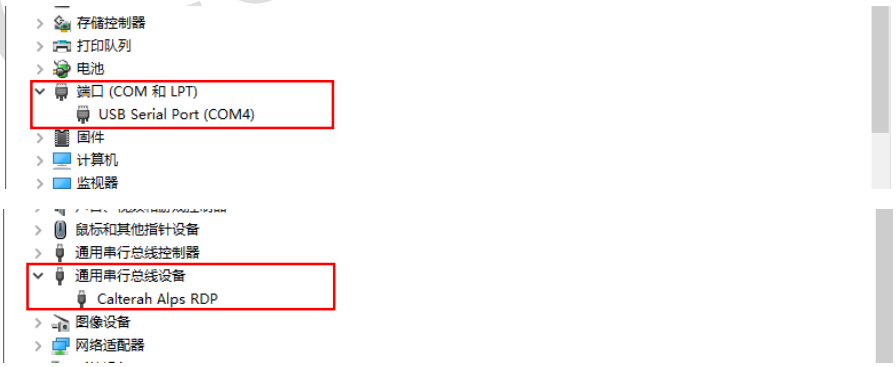
```
C:\Users\xdran\Desktop\radar-sensor-firmware>python gen_baseband_bb_bootup_h.py --comport=COM6 --baudrate=3000000 --src-
dir=C:\Users\xdran\Desktop\radar-sensor-firmware
Traceback (most recent call last):
  File "gen_baseband_bb_bootup_h.py", line 105, in <module>
    parser.add_argument('--comport', default=find_available_comport())
  File "gen_baseband_bb_bootup_h.py", line 54, in find_available_comport
    raise Exception("Can't find device.")
Exception: Can't find device.
```

Description: Wrong serial port is assigned to the script, or USB driver is not installed correctly.
Solution: Go to Windows Device Management. Check the number of serial port when Calterah RDP board is plugged in.

If it shows two different serial ports as below, please open Calterah Radar GUI. It will automatically install USB driver for Calterah RDP board. (If failed, please disable Driver Signature Enforcement on Windows, and try again.)



If USB driver is installed properly, it will show **one Serial Port** and **one Universal Serial Bus Device** (Calterah Alps RDP).



Assign COM4 to Python script and try again.