AG35 Series QuecOpen Secure Boot Memory Dump Capture Guide

Automotive Module Series

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About the Document

Revision History

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1 Introduction

In Quectel AG35 series module, a memory dump file is primarily used for identifying a problem or an error within the Linux OS. Typically, such a file provides information about the state of the system at the time of a crash or an abnormal termination. The information consists of memory locations, program state and other related details.

In QuecOpen® solution, AG35 series supports Secure Boot. The memory dump is blocked by default for security when Secure Boot is enabled. To better satisfy your requirements, AG35 series allows you to capture the memory dump even in QuecOpen® solution.

This document introduces how to capture the memory dump of Quectel AG35 series module in QuecOpen® solution when Secure Boot is enabled, with major steps and the test method detailed.

2 Steps to Capture Memory Dump

If the memory dump is required in QuecOpen® solution, the module allows you to capture it by modifying the configuration file in the sighing tool, re-signing the firmware and downloading the re-signed firmware to overwrite the previous one. See the following sections for the illustration of every step.

2.1. Modify Configuration File in the Signing Tool

2.1.1. Read SN of the Chip

Find the chip's SN under the path *cat/sys/devices/soc0/serial_number* in the file system of the module and transfer it into hexadecimal format.

2.1.2. Modify Configuration File in the Signing Tool

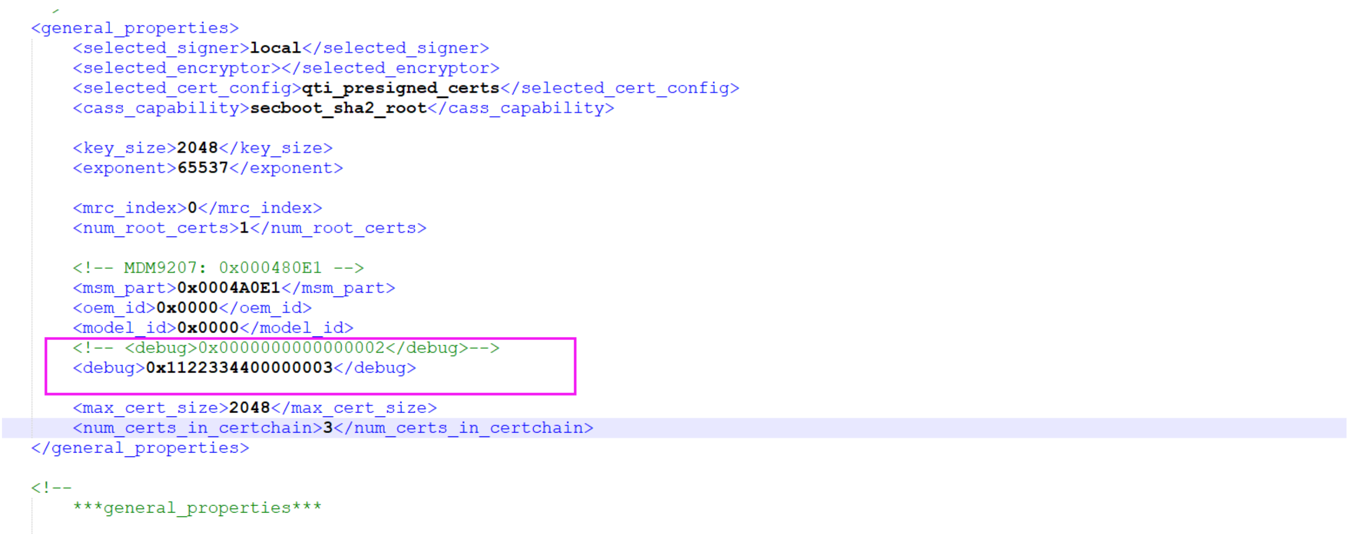
Modify the configuration file in the signing tool, namely to write into it the hexadecimal SN.

The configuration file is located in *common\sectools\config\9x07\9x07_secimage.xml* in the signing tool package.

Take the hexadecimal SN 0x11223344 as an example, the modification of the file is illustrated as below:

1. Modify the <debug> parameter.

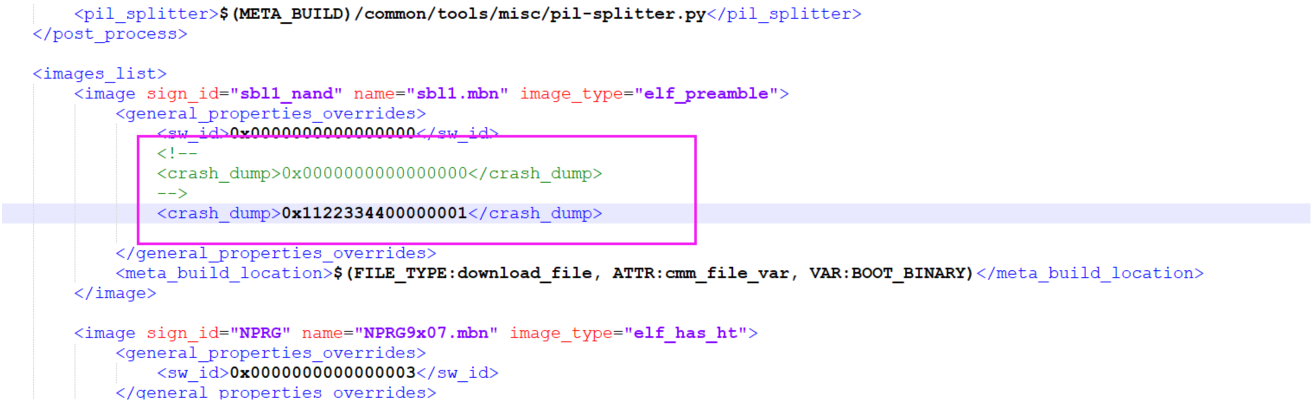
Replace the high byte in **<debug>** with the hexadecimal SN and the low byte with the number 3. In this case, the modified parameter should be 0x1122334400000003.



```
<general_properties>
    <selected_signer>local</selected_signer>
    <selected_encryptor></selected_encryptor>
    <selected_cert_config>qti_presigned_certs</selected_cert_config>
    <cass_capability>secboot_sha2_root</cass_capability>

    <key_size>2048</key_size>
    <exponent>65537</exponent>

    <mrc_index>0</mrc_index>
    <num_root_certs>1</num_root_certs>

    <!-- MDM9207: 0x000480E1 -->
    <msm_part>0x0004A0E1</msm_part>
    <oem_id>0x0000</oem_id>
    <model_id>0x0000</model_id>
    <!-- <debug>0x0000000000000002</debug>-->
    <debug>0x1122334400000003</debug>

    <max_cert_size>2048</max_cert_size>
    <num_certs_in_certchain>3</num_certs_in_certchain>
</general_properties>

<!--
    ***general_properties***
```

2. Modify the <crash dump> parameter.

Replace the high byte in **<crash dump>** with the hexadecimal SN and the low byte with the number 1. In this case, the modified parameter should be 0x1122334400000001.



```
    <pil_splitter>$(META_BUILD)/common/tools/misc/pil-splitter.py</pil_splitter>
</post_process>

<images_list>
    <image sign_id="sbl1_nand" name="sbl1.mbn" image_type="elf_preamble">
        <general_properties_overrides>
            <sw_id>0x0000000000000000</sw_id>
            <!--
            <crash_dump>0x0000000000000000</crash_dump>
            -->
            <crash_dump>0x1122334400000001</crash_dump>

        </general_properties_overrides>
        <meta_build_location>$(FILE_TYPE:download_file, ATTR:cmm_file_var, VAR:BOOT_BINARY)</meta_build_location>
    </image>

    <image sign_id="NPRG" name="NPRG9x07.mbn" image_type="elf_has_ht">
        <general_properties_overrides>
            <sw_id>0x0000000000000003</sw_id>
        </general_properties_overrides>
```

2.2. Re-sign Firmware

Re-sign the firmware after modifying the configuration file.

This step entails the using of a signing tool released by Quectel. For further guidance on this step, see the user guide provided along with the signing tool which you can get from Quectel Technical Support (support@quectel.com).

2.3. Download Firmware

Download the newly signed firmware to the module to overwrite the previously signed one. Contact Quectel Technical Support (support@quectel.com) for the firmware downloading tool.

2.4. Test and Capture

After downloading the re-signed firmware, you can test whether the configurations are correct – whether the memory dump capture mode is enterable – by executing the following commands in Linux system:

```
echo 0 > /sys/bus/msm_subsys/devices/subsys1/system_reset_mode
echo   system >   /sys/bus/msm_subsys/devices/subsys1/restart_level
echo c > /proc/sysrq-trigger
```

Of these three commands, the first and second ones configure the system to enter into memory dump mode in the case of an exception; the third one is used to trigger a panic.

If the configurations mentioned in previous steps are correct and the re-signed firmware is downloaded successfully, the module will reserve only one DM USB virtual serial port through which the memory dump information can be captured after connecting the module with QPST. Contact Quectel Technical Support (support@quectel.com) for QPST.

3 Appendix A References

Table 1: Terms and Abbreviations

Abbreviation	Description
DM	Device Manager
QPST	Qualcomm Product Support Tool
SN	Serial Number
USB	Universal Serial Bus