

# **AAC Sirius Product Family Release Notes**

## **Rev. L**

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## Introduction

### Purpose of document

This document explains the changes that have occurred since the last release.  
Any newly discovered errors or removed errata items are documented in the separate errata document [RD2].

### Revision log

| Rev | Date       | Change description        | Prepared      |
|-----|------------|---------------------------|---------------|
| A   | 2016-10-07 | First official release    | E. Zachrisson |
| B   | 2016-11-03 | Update for release 0.7.0  | M. Werner     |
| C   | 2017-01-03 | Update for release 0.8.0  | M. Werner     |
| D   | 2017-02-01 | Update for release 0.9.0  | M. Werner     |
| E   | 2017-02-10 | Update for release 0.9.1  | M. Werner     |
| F   | 2017-03-07 | Update for release 0.10.0 | M. Werner     |
| G   | 2017-04-18 | Update for release 0.11.0 | M. Werner     |
| H   | 2017-08-01 | Update for release 0.11.1 | M. Werner     |
| I   | 2017-10-31 | Update for release 1.0.0  | M. Werner     |
| J   | 2017-12-07 | Update for release 1.0.1  | M. Werner     |
| K   | 2017-12-20 | Update for release 1.0.2  | M. Werner     |
| L   | 2018-03-06 | Update for release 1.1.0  | J. Viketoft   |

### Reference documents

| Rev | Document ref  | Document name                |
|-----|---------------|------------------------------|
| RD1 | 205065, rev H | Sirius Product User Manual   |
| RD2 | 205056, rev H | Sirius Product Family Errata |

## Changes for 0.6.2

| Ref # | What   | Why   | Action to be taken by user                       | Affects           |
|-------|--|---|--|-------------------|
| 1598  | RX FIFO Size increased to 128. Driver API updated        | To prevent buffer overflows                       | Update IOCTL and symbols according to the manual | TCM-S, OBC-S      |
| 1734  | TX output polarity changed on uart 3 and 4               | Previous polarity was wrong                       | Harness polarity must be swapped                 | TCM-S             |
| 1644  | Extended address for outgoing messages corrected to 0xFF | Previous address of 0x00 was wrong                | Any workarounds must be removed                  | TCM-S application |
| 1716  | X-Band pin description added to manual                   | Missing before                                    | None   | TCM-S             |
| 1701  | UART now closes the line driver upon closure             | A line driver should be deactivated when not used | None   | TCM-S, OBC-S      |
| 1704  | TMConfig fields in manual corrected                      | Order differed between implementation and manual  | None   | TCM-S             |
| 1703  | TMBRSet details in manual corrected                      | Old description and example was wrong             | None   | TCM-S             |

## Changes for 0.7.0

| Ref # | What  | Why  | Action to be taken by user   | Affects           |
|-------|---|--|--|-------------------|
| 1514  | Version field extended from 1 byte to 4 bytes in GetHK RMAP reply and modified debug uart startup version printout format | Unification with internal versioning scheme                          | Update RMAP GetHK reply handling according to new format in manual | TCM-S application |
| 1452  | Debug UART no longer corrupts certain characters  | Increased reliability of debug output, especially if machine-parsed. | None   | TCM-S, OBC-S      |
| 1738  | RTEMS updated to latest upstream prerelease version of 4.11   | To benefit from continuous bugfixing done in RTEMS upstream.         | None   | TCM-S, OBC-S      |
| 1545  | Applications utilising the board support package can now compile with C99 compiler standard set.                          | Allows more strict compilation checks.                               | None   | TCM-S, OBC-S      |

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| Ref # | What   | Why   | Action to be taken by user   | Affects           |
|-------|--|---|--|-------------------|
| 1555  | tcm core app, when partition is full ENOSPC should be returned                                 | ENOSPC is returned when partition is full. If data to be written does not fit, ENOSPC will be returned and no data will be written. | Check status value of RMAP reply to see if write-access is successful                    | TCM-S application |
| 1695  | Clarified argument type as pointer to uint32_t for GPIO IOCTL calls in manual                  | Previously incorrect argument type  | None   | TCM-S,<br>OBC-S   |
| 1712  | Adjust CCSDS clock divisor to generate exactly 1 Mbps  | Did not previously generate correct rate  | None   | TCM-S application |
| 1737  | RTEMS timecount function modified to use "simple" timecounter implementation instead           | Reduces timecounter overhead.   | None   | TCM-S,<br>OBC-S   |
| 1786  | NVRAM configuration example now included in board support package                              | Allows customization of NVRAM configuration   | None   | TCM-S application |
| 1460  | ADC supported sample rate and clock divisor combinations documentation extended and clarified. | Previous limitation documentation was inaccurately conservative.  | None   | TCM-S, OBC-S      |
| 1926  | Errno aliases are used in the manual without numerical translation                             | A table is added in user manual to clarify numerical translation.   | None   | TCM-S application |
| 1785  | Mass memory download does not work   | Handling of partition pointers after power-cycle was not correct. Setting of write pointers for partitions was not correct.         | User has to read errata so that first 3 blocks are not used when configuring partitions. | TCM-S application |
| 1790  | Spacewire mode handling corrected  | Changing mode previously caused spacewire link error  | None   | TCM-S, OBC-S      |
| 1781  | Error handling and status handling updated in spacewire RTEMS driver                           | Previously incorrect/incomplete status from spacewire transmission sequence   | Update status and error handling according to manual                                     | TCM-S, OBC-S      |
| 1505  | Handling of read buffer overflow updated in spacewire  | Spacewire driver previously triggering overflow reject if read size was insufficient for incoming packet                            | None   | TCM-S, OBC-S      |
| 1864  | Corrected transmission sequence in spacewire   | Fixes spacewire lockup after failed transmission  | None   | TCM-S, OBC-S      |

## Changes for 0.8.0

| Ref # | What  | Why   | Action to be taken by user  | Affects           |
|-------|---|---|---|-------------------|
| 1360  | Mass memory DMA added   | Performance increase in conjunction with massmem read/write operations.                 | None  | TCM-S             |
| 1497  | O3 optimisation enabled by default  | Increased performance.  | None  | TCM-S, OBC-S      |
| 1680  | SCET now supports syncing subsecond to external PPS source                  | Old implementation did not meet requirements.   | None  | TCM-S, OBC-S      |
| 2034  | SCET driver has an updated API  | Old implementation did not meet requirements and had multiple ways of doing operations. | Check ioctl/read/write operations and ensure the application uses the updated API | TCM-S, OBC-S      |
| 1796  | CLCW fields "NoRfAvailable" and "NoBitLock" now reports correct status      | Previously these fields were constant.  | None  | TCM-S             |
| 1797  | Missing RMAP message for TC_VALID and CA_LOCK                               | Requirement. Solved in conjunction with #1796   | None  | TCM-S application |
| 1798  | New TCM RMAP command for configuration and reading of VC0 timestamps        | Requirement   | None  | TCM-S application |
| 1900  | TCM Core App tasks synchronised at initialisation                           | Avoids risk of passing data to a task not ready from init                               | None  | TCM-S application |
| 1953  | TCM Core App stability when reading/writing to mass memory via SpW improved | Previously caused application lockup.   | None  | TCM-S application |
| 1980  | SpW communication no longer stops after packet to invalid logical address   | Previously caused application lockup.   | None  | OBC-S, TCM-S      |
| 2017  | TMTSControl RMAP command reply size changed from 6 to 1                     | Previous command reply size was incorrect, and included garbage data.                   | None  | TCM-S application |
| 2018  | VC0 interrupt no longer prints debug output                                 | Output was not intended for release build.  | None  | TMC-S application |

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| Ref # | What  | Why  | Action to be taken by user  | Affects           |
|-------|---|--|---|-------------------|
| 2060  | TM Pseudo Randomizer is now default enabled   | Requirement. In previous release, the TM Pseudo Randomizer was disabled default. | Might affect settings/configuration in ground-station equipment   | TCM-S application |
| 2092  | CCSDS detect signals must now be connected for proper operations of CCSDS interface | Hardware difference.   | When using FM boards the UMBI/TRX1/TRX2 detect signals in the pigtail needs to be grounded for correct operation.<br>E. g. if the TRX1 interface is to be used, the detect pin 24 must be grounded (active low) | TCM-S             |
| 1548  | MMStatus RMAP command reply size and content corrected                              | Previous size and data was incorrect   | None  | TCM-S application |

## Changes for 0.9.0

| Ref # | What  | Why  | Action to be taken by user   | Affects         |
|-------|---|--|--|-----------------|
| 1750  | TCM FM UART3 is now connected to XBAND and UART4 to SBAND   | Different hardware implementation between Bread board and FM board                     | nv_config configuration must be updated to swap UART 3 with UART 4 | TCM-S           |
| 1774  | The selected telecommand clock, data and enable signals are now forwarded through the mux to the BCH decoder, rejecting data and clock on inactive data paths | Old implementation did not allow for connecting both the umbilical and radio interface | None   | TCM-S           |
| 2144  | UART software queue overflow warning has been lowered in severity   | Avoid excessive warnings on debug output   | None   | TCM-S,<br>OBC-S |

## Changes for 0.9.1

This release only included updated SoC designs, the BSP was not updated.

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| Ref # | What  | Why  | Action to be taken by user | Affects         |
|-------|---|--|----------------------------|-----------------|
| 2250  | System-on-Chip asynchronous FIFO implementation updated | Previously caused stability issues for high-throughput spacewire and mass memory read/write operations | None                       | TCM-S,<br>OBC-S |

## Changes for 0.10.0

| Ref # | What   | Why   | Action to be taken by user | Affects         |
|-------|--|---|----------------------------|-----------------|
| 2103  | Bootrom now correctly utilises all available software images | Previous bug caused bootrom to skip all remaining images except the last safe image if an error was found | None                       | TCM-S,<br>OBC-S |

## Changes for 0.11.0

| Ref # | What  | Why   | Action to be taken by user  | Affects                |
|-------|---|---|---|------------------------|
| 1873  | CCSDS TM performance is greatly improved                      | Previous performance did not meet requirements. | PUS packets sent to the TCM-S for storage and subsequent download must follow certain rules. Download RMAP command has an updated API.<br>See RD1 for detailed information. | TCM-S core application |
| 2102  | Removed from RD2 errata                                       | Root cause has been fixed                       | None  | TCM-S core application |
| 2153  | MM Download is now able to read more data while TM is sending | Increased downlink performance.                 | PUS packets sent to the TCM-S for storage and subsequent download must follow certain rules. Download RMAP command has an updated API.<br>See RD1 for detailed information. | TCM-S core application |

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| Ref # | What   | Why  | Action to be taken by user  | Affects                |
|-------|--|--|---|------------------------|
| 2176  | Time synchronisation support added. SCET time is no longer possible to set directly                                | In order to support time synchronization against a time master.<br><br>Current slave-only configuration for time sync does not allow syncing time without qualified PPS. | Time synchronisation needs PPS input and SCETTime messages, see RD1 for detailed information. | TCM-S core application |
| 2291  | Added to RD2 errata  | Issue has been detected  | None  | TCM-S core application |
| 2292  | Removed from RD2 errata  | Root cause has been fixed  | None  | TCM-S core application |
| 2334  | UART RS422/RS485 driver circuits are now enabled for a longer time after a transmission. Erratum has been removed. | The last bytes of an UART transmission in RS485 mode may get truncated due to premature disabling.   | None  | TCM-S FM,<br>OBC-S FM  |
| 2345  | Download command implementation changed to use 4-byte length (from previous 8).                                    | Previous implementation did not match API design.  | Download commands needs to be changed to use 4-byte length.                                   | TCM-S core application |
| 2361  | Watchdog is now disabled during system image programming   | If the watchdog was enabled there was a risk of failing the flash procedure due to a watchdog reboot   | None  | TCM-S,<br>OBC-S        |
| 2364  | Watchdog is now disabled during NVRAM programming  | If the watchdog was enabled there was a risk of failing the NVRAM update due to a watchdog reboot  | None  | TCM-S,<br>OBC-S        |
| 2365  | Telecommand and telemetry configuration from NVRAM   | Previously many configurations were hard coded in the TCM-S core application, now they are configurable in the NVRAM   | Updated NVRAM configuration must be reviewed and flashed onto the TCM-S FM board.             | TCM-S core application |
| 2370  | Memory scrubber is now enabled after error manager driver initialization   | Previously the error manager initialization function disabled the memory scrubber.   | None  | TCM-S,<br>OBC-S        |

## Changes for 0.11.1

This release only included updated BSPs; the SoC designs were not updated.

| Ref # | What | Why | Action to be taken by user | Affects |
|-------|------|-----|----------------------------|---------|
|-------|------|-----|----------------------------|---------|



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| Ref # | What                                       | Why  | Action to be taken by user | Affects         |
|-------|--|--|----------------------------|-----------------|
| 2396  | UART driver write synchronisation improved | Previous implementation could result in undefined behaviour in case of frequent and/or erroneous input traffic in combination with output. | None                       | TCM-S,<br>OBC-S |

## Changes for 1.0.0

| Ref # | What   | Why   | Action to be taken by user   | Affects                |
|-------|--|---|--|------------------------|
| 2346  | Mass memory driver now exposes functionality for writing mass memory page spare areas. | Functionality is needed to allow metadata writing in new TCM core app massmem handler implementation.   | None.  | TCM-S                  |
| 1591  | Mass memory handler in TCM core app has been redesigned.                               | New implementation handles discovered bad blocks during operation, implements direct and circular mode partitions.                              | Storage to, download from, and partition configuration of the mass memory on the TCM core app needs to be updated to follow new API and behaviour. See RD1 for detailed information. | TCM-S core application |
| 1763  | Telemetry user interface robustness improved.  | In previous implementation, no check was done if TM was enabled prior to sending which could lead to hanging application.                       | None   | TCM-S core application |
| 2416  | RMAP write reply address handling corrected.   | Previous implementation could cause RMAP reply messages with certain path lengths to be invalid and therefore not sent correctly.               | None   | TCM-S core application |
| 2471  | Spacewire pass-through traffic is now always propagated.                               | Previous implementation blocked pass-through spacewire traffic through the spacewire router unless the spacewire driver was opened by software. | None   | TCM-S,<br>OBC-S        |
| 2426  | System flash driver has been redesigned.   | Harmonized driver API for system flash with the mass memory flash driver, including better support for application bad block management.        | Application code using the system flash driver needs to be updated to follow the new API. See RD1 for detailed information.  | TCM-S,<br>OBC-S        |

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| Ref #  | What   | Why  | Action to be taken by user   | Affects                          |
|--|--|--|--|----------------------------------|
| 1788<br>1589<br>1816<br>1839<br>2143<br>2288<br>2294<br>2382<br>1889         | Removed from RD2 errata.   | Root causes have been fixed.   | None   | TCM-S core application           |
| 2431<br>2488<br>2493 2495  | Added to RD2 errata  | Issue has been detected  | See RD2.   | TCM-S core application           |
| 1529<br>2295<br>2383<br>2343<br>2363<br>2398<br>2406<br>2408<br>2409<br>2411 | Stability of CCSDS telecommands and telemetry handling improved. | Previous implementation exhibited several stability and consistency problems in various telecommand and telemetry scenarios. | None   | TCM-S,<br>TCM-S core application |
| 1447<br>1543<br>2356   | Cleanup/corrections of CCSDS driver.                             | Removal of duplicate definitions in bare-metal and RTEMS-driver. Adaptions to new RTL.                                       | Application code using the CCSDS driver needs to be updated to follow the new API. See RD1 for detailed information. | TCM-S                            |

## Changes for 1.0.1

This release only included an updated TCM-S core application. The SoC designs and the BSPs was not updated.

| Ref # | What  | Why   | Action to be taken by user | Affects                |
|-------|---|---|----------------------------|------------------------|
| 2514  | <b>MMDownloadStatus command is now available.</b>   | Previously this command was unavailable due to an invalid command definition.   | None                       | TCM-S core application |
| 2511  | <b>Ensure download handles telemetry being disabled, or simultaneous reconfiguration.</b> | Previously, a lockup could be triggered either when download was attempted when telemetry was disabled, or when a reconfiguration was initiated during on-going download. | None                       | TCM-S core application |

## Changes for 1.0.2

This release only included an updated TCM-S core application. The SoC designs and the BSPs was not updated.

| Ref # | What  | Why   | Action to be taken by user | Affects                |
|-------|---|---|----------------------------|------------------------|
| 2519  | <b>A workaround has been added in the TCM-S core application which sets the RMAP data CRC byte of received command to zero after it has been checked.</b> | An issue has been discovered in the CCSDS IP where a 0xF5 idle padding byte after the PUS telemetry packet would cause telemetry inconsistencies and software lockups. This provides a workaround for this issue. | None                       | TCM-S core application |

## Changes for 1.1.0

| Ref # | What | Why | Action to be taken by user | Affects |
|-------|------|-----|----------------------------|---------|
|-------|------|-----|----------------------------|---------|

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| Ref # | What  | Why  | Action to be taken by user  | Affects                                    |
|-------|---|--|---|--|
| 2477  | BSP example code updated.   | Now includes more examples for AAC-specific BSP drivers.   | None.   | TCM-S,<br>OBC-S                            |
| 2519  | CCSDS telemetry handling of padding bytes improved, workaround from 1.0.2 removed.  | Previous implementation could cause issues when padding bytes (0xF5) appeared at certain locations in telemetry.   | None.   | TCM-S,<br>TCM-S core application           |
| 2510  | Documentation for TMConfig, TMBRControl RMAP reply format updated.  | Previous documentation specified incorrect size for bitrate (was 1 octet, should be 2), and incorrect location for OCF flag.   | Make sure reply handling for TMConfig, TMBRControl expects correct format.            | TCM-S core application                     |
| 2553  | Documentation for partition config format updated.  | Previous documentation specified incorrect numeric values for partition types.   | Make sure reply handling for MMPartitionConfig RMAP command expects correct format.   | TCM-S core application                     |
| 2521  | Mass memory handling for MMFree commands has been updated.  | Previous implementation caused free operations in unused data which was supposed to do nothing to report failures or potentially mark some previously freed data as used.                          | None.   | TCM-S core application                     |
| 2520  | Telemetry handling updated.   | Previous implementation could block the MMStopDownloadData reply from being sent, and telemetry reconfiguration from being initiated, if incoming telemetry fully saturated the telemetry handler. | None.   | TCM-S core application                     |
| 2217  | Unlocking write protection of the protected area in the SPI RAM "NVRAM" is now done when the debugger is connected, instead of via an ioctl() call. | Ensure strict protection during flight.  | Adapt non-flight code to avoid issuing unlock memory ioctl() calls.                   | TCM-S,<br>OBC-S,<br>TCM-S core application |
| 2243  | ADC driver temperature conversion helper functions updated to use 32bit type.   | Previous implementation used a 16bit signed type to store temperature in milli-Celsius, which limited the range to circa -33 to +33 C.   | Update code using the ADC driver temperature conversion helper to follow the new API. | TCM-S,<br>OBC_S                            |
| 2243  | HKData RMAP reply format changed.   | Type extension of the ADC temperature value (see above), and reordering to ensure type alignment.  | Update replay handling for HKData RMAP commands to expect new format.                 | TCM-S core application                     |