

C-RED 1

Firmware release notes

C-RED 1 firmware release notes.docx



Revision history

Issue	Date	Para	Details
001	03/02/2020		Release_4_1_0
002	22/12/2021		Release_4_2_0
003	25/03/2022		Release_4_3_0
004	14/09/2022		Release_4_4_0
005	09/05/2023		Release_4_5_0
006	16/05/2023		Release_4_5_1
007	27/09/2023		Release_4_5_2
008	11/10/2023		Release_4_6_1
009	18/12/2023		Release_4_6_2
010	28/05/2024		Release_4_7_1
011	19/07/2024		Release_4_8_1
012	30/07/2024		Release_4_8_2

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1. Introduction

This document provides a description of the evolution introduced in the latest version of the C-RED One firmware.

2. Firmware version 4.8.2

2.1. Changes

- Changed internal voltage setpoint command format. No impact for user.

3. Firmware version 4.8.1

3.1. New features

- The firmware can now be updated without relying on an external web server. See 'exec uploadfirmware' in the camera user manual for detailed procedure.
- Added new commands 'date' and 'set date' to get / set camera date. See 'date' and 'set date' commands in the camera user manual for precise command syntax.

3.2. Bug fix

- Hardened camera parameter checks to avoid spurious entry in safe mode
- Fixed memory leak during 'firmware version detailed' command processing
- Automatically update fps when mode parameters are changed (fps set to max value).
- No answer was sent when 'set standby on / off' when the requested mode is the same as the current mode.
- Miscellaneous internal changes w/o any user impact (log generation...)

4. Firmware version 4.7.1

4.1. Prominent features

- The sensor is kept in reset state while the gain is increased on the sensor. When the change of the gain is over, the reset is released after a delay of 600ms.
- **For internal use only**, some bias voltages can be set independently (vddop, vdda,vddpix).

4.2. Bug fix

- During a change of mode the over illumination protection could triggered, also a delay is added to avoid this problem.

5. Firmware version 4.6.2

5.1. Bug fix

- Fixes column inversion on some specific hardware revisions.

6. Firmware version 4.6.1

6.1. Prominent features

- Integrates new 7.x.x FPGA bitstream. Thanks to this release, it is possible to adjust some electronic settings. These settings are for Firstlight imaging internal usage, however an upgrade from a previous release to this new release may need a new tuning of the phaseshift setting.

7. Firmware version 4.5.2

7.1. Bug fix

- Fix a possible issue regarding the communication with the pulsetube controller. It fixes spurious cryostat temperature readings that sometimes occurs randomly.

8. Firmware version 4.5.1

8.1. Bug fix

- Fix a possible configuration issue on camera startup. Possibly some settings were badly applied because not set with the camera in the working mode saved in the configuration file.

9. Firmware version 4.5.0

9.1. Prominent features

- Add the support of the external Thales active pulse tube controller CDE7232. This controller is used to minimize the vibrations. In addition to the vibration mitigation commands, a command can be used to monitor the vibration RMS value recorded by the accelerometer.
- This version is still compatible with the Thales passive pulse tube controller XPCDE4865.

9.2. Changes

- The pulse tube working frequency can be changed and saved for both the active and the passive controller.

10. Firmware version 4.4.0

10.1. Prominent features

- Added a protection against over illumination of the sensor, to prevent any potential damage. When an over illumination is detected, the gain is automatically reset to one and the camera status is set to operational/overilluminated.

In this state, the gain can not longer be modified. The over illumination must be acknowledged using the "set overillumination acknowledge" command to allow further gain configuration.

11. Firmware version 4.3.0

11.1. Prominent features

- Replace usage of 2N2222 readout to check the pressure with the lakeshore probe.
- The 2N2222 readout is still available, but for information only now.

12. Firmware version 4.2.0

12.1. Prominent features

- Fix white lines (at the bottom) in IOTA mode when the image is cropped on several bunches of rows.
(Jira SUPEN-49)

12.2. Changes

- Gain 1 -> Vcommon voltage = 1v
- Fix CDS mode issue for some MB / FE pairing.
- Add date and ping commands
- Fix advanced command
- New clock alignment procedure

13. Firmware version 4.1.0

WARNING: Do not update your C-RED 1 firmware without asking Firstlight first.
From previous versions, this update requires an additional step that can only be performed by firstlight staff.

13.1. Prominent features

- Fowler mode implemented for global reset NDR and rolling reset IOTA.
- Optimization of the sensor readout.
- Temperature limitation change to allow the electronic boards and water temperatures to down to -50°C. Below -5°C, ignore Pirani indication. (However, tested up to -15°C only).

13.2. Changes

- Phase shift setting is now available for the customer. After a firmware upgrade, this value may need to be adjusted again.
- For global reset NDR and rolling reset IOTA, equally space the readout based on the total integration time(before reset).
- Max gain still limited by Vcommon > -12v but the gain can be up to 250 (instead of 100 before) depending on the sensor characteristics.
- Camera link 'frame valid' output signal is set low for the full interframe time, not only for a pixel clock time.

13.3. Bug fixes

- Fix fpsMax computation for all the modes and cropping configuration.
- Do nothing for raw off command for mode other than GR_CDS or GR_NDR.
- Bias and flat on the fly correction can be computed at max fps (=3500).

