

Effective Date: 03/18/2024
Expiration Date: 03/18/2029

XRISM/ Resolve
CMO
03/18/2024
RELEASED

INSTRUMENT CALIBRATION REPORT

LOG OF RESOLVE DETECTOR THRESHOLDS AND OPTIMAL FILTER TEMPLATES

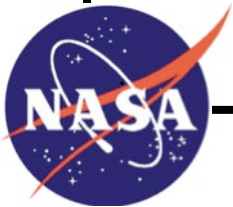
RESOLVE-SCI-RPT-0058

REVISION (B)

XRISM-RESOLVE-CALDB-CONFTHRE-217

X-ray Imaging and Spectroscopy Mission (XRISM) Project

NASA/GSFC Code 461



Goddard Space Flight Center
Greenbelt, Maryland

National Aeronautics and
Space Administration

Check <https://ipdtdms.gsfc.nasa.gov>
to verify that this is the correct version prior to use

Log of Resolve Detector Thresholds and Optimal Filter Templates Signature/Approval Page

Prepared by: M.E. Eckart and the Resolve Instrument Team

Reviewers/Approvers:

Maurice Leutenegger
Tahir Yaqoob
Michael Loewenstein
Caroline Kilbourne
Megan Eckart

Approved by:

Megan Eckart

***** Electronic signatures are available on-line at: <https://ipdtdms.gsfc.nasa.gov>*****

Preface

This document is an XRISM Project signature-controlled document. Changes to this document require prior approval of the applicable Product Design Lead (PDL) or designee. Proposed changes shall be submitted in the Technical Data Management System (TDMS) via a Signature Control Request (SCoRe) along with supportive material justifying the proposed change. Changes to this document will be made by complete revision.

All of the requirements in this document assume the use of the word "shall" unless otherwise stated.

Questions or comments concerning this document should be addressed to:
XRISM Configuration Management Office
Mail Stop: 461
Goddard Space Flight Center
Greenbelt, Maryland 20771

NOTE to editors: The document name will be XRISM-CAL-RPT-XXXX, where XXXX is assigned by the TDMS system. The document will be cross-referenced in TDMS to the filename in the format XRISM-XXX-CALDB-FILEDESC-NN where XXX is the instrument or component (e.g. RESOLVE), FILEDESC refers to a specific calibration report (e.g., rmfparams) and NN the corresponding number assigned to that report by the SDC. For example the calibration report addressing the Resolve LSF calibration may be assigned XRISM-RESOLVE-CALDB-RMFPARAMS-01, that addressing the Resolve gain calibration XRISM-RESOLVE-GAINPIX-CALDB-02, etc. (where the numbers are to be provided by the SDC).

These documents are updated as needed, e.g. when the relevant CalDB files, or the relevant calibration data analysis, is revised. The document version will be assigned by the TDMS system. The tracking tool should be used to record changes.

This document must include the CalDB file name, an explanation of how the data were collected and the analysis conducted and, if using standard Ftools, the software version number. All revisions are consolidated into the same document to maintain a full record of all changes.

Table of Contents

1	Introduction.....	1
1.1	Purpose.....	1
1.2	Scientific Impact	1
1.3	Report organization.....	1
2	First Delivery – 20190329	1
2.1	File delivered to the SDC.....	1
2.2	CalDB FITS file created by the SDC.....	3
2.3	Procedure for updating the confthre file	3
2.4	Final remarks.....	3
3	Revision 20220520A	4
3.1	File delivered to the SDC.....	4
3.2	CalDB FITS file created by the SDC and procedure for updating file	4
3.3	Changes from previous version.....	4
4	Revision 20220520B.....	5
4.1	File delivered to the SDC.....	5
4.2	CalDB FITS file created by the SDC and procedure for updating file	5
4.3	Changes from previous versions	5
5	Revision 20231201	6
5.1	File delivered to the SDC.....	6
5.2	CalDB FITS file created by the SDC and procedure for updating file	6
5.3	Changes from previous versions	6
6	References.....	7

1 Introduction

1.1 Purpose

This document describes the format and content of the “confthre” CalDB file, which provides a detailed log of the Resolve detector array trigger thresholds, anti-co trigger thresholds, and optimal filter templates that are used by the Resolve Pulse Shape Processor (PSP).

1.2 Scientific Impact

This CalDB file is not used by the pipeline software but is included in the CalDB to ensure there is a detailed record of these key instrument operating parameters.

1.3 Report organization

The description of the information contained in the confthre file is given in subsections 2.1 and 2.2. The procedure for updates to the confthre file is specified in subsection 2.3, and the details of any such updates will be documented in subsequent sections.

2 First Delivery – 20190329

CalDB Filename	Validity date	File as delivered	Delivery date	Comment
xa_rsl_confthre_20190101v002.fits	20180913 00:00 UT	Resolve_thresh_tmpl_description_v1.0.txt	20190329	

2.1 File delivered to the SDC

Table 1 shows the data delivered to the SDC by the instrument team.

- The start and end rows describe the start- and end-times for which this set of trigger thresholds and optimal filter templates are valid.
- The DEVPTHRE_value is a short string ID representing the set of detector and anti-co thresholds. This keyword is contained in all “pixel” event files and all anti-co event files. Table 2 gives examples of DEVPTHRE_value that can be used for various sets of thresholds. The keyword value is limited to 8 characters in length.
- DEVPTHRE_description is a brief description of the set of thresholds. Again, see Table 2 for further examples.
- DEVPTHRE_array provides the PSP trigger threshold for all 36 detector pixels.

2.2 CalDB FITS file created by the SDC

Extension 1 in the confthre CalDB file has 8 columns. The extension name is RSLTHRES.

- The first four columns present the date/time start/stop values. For stop date and stop time specified in the instrument team delivery file as “present” (e.g., see Table 1), the values are set to `datestop = 21000101` and `timestop=000000`.
- The next two columns present `DEVPTHRE` and `SHPTEMPL`, and contain the `DEVPTHRE_value` and `SHPTEMPL_value`, respectively, as supplied by the instrument team. Note that for `SHPTEMPL` the hyphens are removed, e.g., this version reads “20180913” instead of “2018-09-13.”
- The final two columns include arrays with the anti-co thresholds (`DEVPTHAC`) and pixel thresholds (`DEVPTHPIX`), as specified by the instrument team with `DEVPTHRE_antico` and `DEVPTHRE_array`.

The header for Extension 1 includes the `DEVPTHRE_description` and `SHPTMPL_description`, as well as a record of the filename used for the original delivery from the instrument team to the SDC.

2.3 Procedure for updating the confthre file

When an update to the confthre file is needed, a new text file, with the same content as described in Section 2.1, shall be submitted to the SDC. The SDC will create a new FITS file, with an additional row that contains the updated information for the new start/stop period. The new start/stop period takes precedence over the earlier submissions (e.g., an original 20180913 to present submission will be modified to 20180913 to 20190813 if the updated file has a start/stop period of 20190814 to present). The Extension 1 header in the updated FITS file will contain the `DEVPTHRE_description` and `SHPTMPL_description` information from the full suite of submissions, retaining the original information and adding the new information.

2.4 Final remarks

This is the first release of this CalDB file, created primarily to establish the file and header formats. The `SHPTEMPL_value` is consistent with the gain curves created using detector-system calibration data [2]. The data related to the detector and anti-co thresholds (`DEVPTHRE_array` and `_antico`) are dummy values that were set to match values used for Astro-H SXS.

6 References

[1] M. Sawada, C. Kilbourne, M. Tsujimoto, et al., *Instrument Calibration Report, Resolve Timing Coefficients, XRISM-RESOLVE-CALDB-COEFTIME-207*, (2019).

[2] M.E. Eckart, et al. *Instrument Calibration Report, Resolve Detector Gain, XRISM-RESOLVE-CALDB-GAINPIX-214*, in prep. (2023).

[3] M.A. Leutenegger, et al. *Instrument Calibration Report, Resolve Response Matrix File (RMF) Parameters, XRISM-RESOLVE-CALDB-RMFPARAM-203*, in prep. (2023).