

## **Abstract**

This document describes the Data Model that is used by MicadoWISE. It contains all the information that is automatically generated by the MicadoWISE build script. This information can also be found in the DRLD, CP, and DRLVT.

# MicadoWISE Data Model

January 10, 1971

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## 1 Introduction to MicadoWISE Data Model

The current reason for this document is to make MicadoWISE self-contained.

All the information here is also included in the Data Reduction Library Design (DRLD), the Calibration Plan (CP) and Data Reduction Library Validation and Test plan (DRLVT).

However, it is useful to also have a version in MicadoWISE itself. In due time this document might expand to become proper documentation.

## 2 Data Items

Name	Description	CATG	TECH	TYPE
	DO.CATG / REFLEX.CATG			
I_DARK_RAW	Detector exposure without illumination (via block in pupil filter wheel and field restrictor).	CALIB	IMAGE,SI	DARK
	RAW_DARK			
I_FLAT_RAW	Raw exposure using the flatfield lamp in imaging mode.	CALIB	IMAGE,SI	FLAT,LAMP
	RAW_OPT_FLAT			
I_NONLIN_RAW	Raw exposure using the flatfield lamp in imaging mode for non-linearity correction.	CALIB	IMAGE,SI	NONLIN,LAMP
	RAW_OPT_NONLIN			
I_ILLUM_RAW	Raw Science data for Illumination correction.	CALIB	IMAGE,SI	STD,ILLUM
	RAW_OPT_SKY_ILLUM			
I_STDFIELD_RAW	Raw data for Photometric Zerpoint determination.	CALIB	IMAGE,SI	STD,PHOTOM
	RAW_OPT_SKY_STDFIELD			
I_BKGFIELD_RAW	Raw data for background determination.	CALIB	IMAGE,AI	OBJECT,BCK
	RAW_OPT_SKY_BKGFIELD			
I_SCI_RAW	Raw on-sky exposure.	SCIENCE	IMAGE,SI	OBJECT,SKY
	RAW_OPT_SKY_SKYSIAI_SCIENCE			
I_SCI_CORO_WAFFLE_RAW	Focal plane image of bright star with waffle pattern added.	SCIENCE	CORONOGRAPHY,WAFFLE	OBJECT
	RAW_OPT_SKY_SKYHCI_CORO_SCIENCECOROWAFFLE			
I_CORO_OFFSET_RAW	Image on bright point source with coronagraph in place. Star must be offset from coronagraph.	CALIB	CORONOGRAPHY	STAR
	RAW_OPT_SKY_SKYHCI_CORO_COROOFFSET			

I_SCI_CORO_PUPIL_RAW	Pupil plane mask HCI image.	SCIENCE	CORONOGRAPHY	PUP
	RAW_OPT_SKY_SKYHCI_CORO_SCIENCECOROPUPIL			
I_CORO_BGD_RAW	Background sky image for the science images (and online processing).	CALIB	CORONOGRAPHY	BAC
	RAW_OPT_SKY_SKYHCI_CORO_COROBACKGROUND			
I_SCI_AI_RAW	Raw on-sky exposure for astrometric imaging.	SCIENCE	IMAGE, AI	OBJ
	RAW_OPT_SKY_SKYSIAI_SCIENCEAI			
I_WAM_RAW	Raw warm astrometric mask data for distortion determination.	CALIB	IMAGE, AI	PIN
	RAW_OPT_WAMCAM_WAM			
I_CAM_RAW	Raw cold astrometric mask data for distortion determination. Not used in the automatic pipeline.	CALIB	IMAGE, AI	PIN
	RAW_OPT_WAMCAM_CAM			
I_ASTROMFIELD_RAW	Raw data for distortion determination.	CALIB	IMAGE, SI	STD
	RAW_OPT_SKY_ASTROMFIELD			

Table 1: Summary of all Raw Instrument Data observed in imaging mode. **Name** is the name used in this document to refer to the Data Item. **Description** is a human understandable description. **DO.CATG** / **REFLEX.CATG** are the category assigned through **OCA!** classification rules by the DataOrganizer or Reflex (see Section ??) (NB: these exist transiently in the workflow and are not stored in the FITS file header). **CATG** / **TECH** / **TYPE** are the DPR keywords from which the **OCA!** classification is determined (no other header keywords are used in the classification).

Name	Description
	DO.CATG / REFLEX.CATG / PRO.CATG
I_ASTROM_HDR	Astrometric solution. One per detector.
	HDR_ASTROM
I_BGD_IMG	Background per detector.
	IMG_BACKGROUND
I_MASTER_DARK_IMG	MasterDark calibration image.
	IMG_MASTERDARK
I_MASTER_FLAT_IMG	Flatfield image obtained by combining a series of internal flatfield lamp observations.
	IMG_MASTERFLAT
I_DT_SCI_SI_IMG	Image which has been corrected for instrumental effects, not background subtracted.
	IMG_FNL_CATALOGABLE_DT_DTSIAI_DT
I_DTFNL_SCI_IMG	Image which has been corrected for instrumental effects, and background subtracted.
	IMG_FNL_CATALOGABLE_DTFNL_DTFNLSIAI_DTFNL
I_ILLUM_CORR_HDR	Table with the coefficients of the polynomial describing the large-scale variation in the illumination by the flatfield lamp, and gain (e-/ADU), which is a single number per detector.
	HDR_STATICTABLE_ILLUMCORR
I_PERSISTENCE_IMG	Persistence image.
	IMG_PERSISTENCE

I_PHOTOM_HDR	Zeropoint and extinction coefficient, one pair per detector.
	HDR_PHOTOM
I_SCI_STACK_IMG	Coaddition of calibrated images.
	IMG_STACK
I_DT_SCI_CORO_WAFFLE_IMG	Waffle image which has been corrected for instrumental effects for HCI, and background subtracted.
	IMG_FNL_CATALOGABLE_DT_DTHCI_DTWAFFLE
I_DT_SCI_CORO_PUPIL_IMG	Pupil image which has been corrected for instrumental effects for HCI, and background subtracted.
	IMG_FNL_CATALOGABLE_DT_DTHCI_DTPUPIL
I_STARCENTER_WAFFLE_HDR	Table with the star center during the OB on the detector. The position is in pixel units in the Pixel Grid Coordinate System. Derived from waffle pattern.
	HDR_STARCENTER_STARCENTERWAFFLE
I_STARCENTER_PUPIL_HDR	Table with the star center during the OB on the detector. The position is in pixel units in the Pixel Grid Coordinate System.
	HDR_STARCENTER_STARCENTERPUPIL

Table 2: Summary of all Intermediate and Final Data for imaging. **Name** is the name used in this document to refer to the Data Item. **Description** is a human understandable description. **DO.CATG** / **REFLEX.CATG** are the category assigned through **OCA!** classification rules by the DataOrganizer or Reflex (see Section ??) (NB: these exist transiently in the workflow and are not stored in the FITS file header). **PRO.CATG** is the header keyword giving the OCA classification and thus from which the OCA classification is copied.

Name	Description
	DO.CATG / REFLEX.CATG / PRO.CATG
REF_I_ASTROM_CAT	Catalog with (ra,dec) of on-sky astrometric reference standards. Input surveys: Gaia and Euclid.
	CAT_DISTORTIONREF_ASTROMREF
REF_I_PHOTOM_CAT	Catalog with magnitudes of a photometric reference standards in a series of filters. Input surveys: JWST, Euclid YJH, VISTA surveys. Such catalogs are input for determination of zeropoints and/or illumination correction.
	CAT_PHOTOMREF
REF_I_WAM_CAT	Catalog with reference positions of the warm astrometric mask pinholes.
	CAT_DISTORTIONREF_WAMREF

Table 3: Summary of all External DataItems for imaging. **Name** is the name used in this document to refer to the Data Item. **Description** is a human understandable description. **DO.CATG** / **REFLEX.CATG** are the category assigned through **OCA!** classification rules by the DataOrganizer or Reflex (see Section ??) (NB: these exist transiently in the workflow and are not stored in the FITS file header). **PRO.CATG** is the header keyword giving the OCA classification and thus from which the OCA classification is copied.

## 2.1 Raw Data Items

### 2.1.0.1 I\_ASTROMFIELD\_RAW

Name:	I_ASTROMFIELD_RAW
Description:	Raw data for distortion determination.
CATG/TYPE/TECH	CALIB
:	
	STD,ASTROMETRY
	IMAGE,SI
OCA keywords:	DET.DIT
	DET.READOUT
	INS.FILT <i>i</i> .NAME
	INSTRUME
	MJD-OBS
	TPL.START
DO.CATG:	RAW_OPT_SKY_ASTROMFIELD
Template:	MICADO_img_cal_refstars
Input	for micado_img_detrend
recipe(s):	
	micado_img_detrend_final
	micado_img_distortion
Processing FITS	CTYPEn
keywords:	
	CUNITn
	CRVALn
	CRPIXn
	CDELn
Data item struc- ture:	DATA; once for each detector, so 9 times; <b>DRL!</b> ( <b>DRL!</b> ) structure in 3.3.2

### 2.1.0.2 I\_BKGFIELD\_RAW

Name:	I_BKGFIELD_RAW
Description:	Raw data for background determination.
CATG/TYPE/TECH	CALIB
:	
	OBJECT,BCKGRND
	IMAGE,AI
OCA keywords:	DET.DIT
	DET.READOUT
	INS.FILT <i>i</i> .NAME
	MJD-OBS
	TPL.START

DO.CATG:	RAW_OPT_SKY_BKGFIELD
Template:	MICADO_img_obs[bg]
Input recipe(s):	for micado_img_background
	micado_img_detrend
Processing FITS keywords:	CTYPEn
	CUNITn
	CRVALn
	CRPIXn
	CDELTn
Data item structure:	DATA; once for each detector, so 9 times; <b>DRL!</b> structure in 3.3.4

### 2.1.0.3 I\_CAM\_RAW

Name:	I_CAM_RAW
Description:	Raw cold astrometric mask data for distortion determination. Not used in the automatic pipeline.
CATG/TYPE/TECH :	CALIB
	PINHOLE,CAM
	IMAGE,AI
OCA keywords:	
DO.CATG:	RAW_OPT_WAMCAM_CAM
Template:	MICADO_img_cal_coldmask
Input recipe(s):	for micado_img_detrend
	micado_img_detrend_final
	micado_img_distortion
Processing FITS keywords:	None
Data item structure:	DATA; once for each detector, so 9 times; <b>DRL!</b> structure in 3.3.7

### 2.1.0.4 I\_CORO\_BGD\_RAW

Name:	I_CORO_BGD_RAW
Description:	Background sky image for the science images (and on-line processing).
CATG/TYPE/TECH :	CALIB

	BACKGROUND
	CORONOGRAPHY
OCA keywords:	
DO.CATG:	RAW_OPT_SKY_SKYHCI_CORO_COROBACKGROUND
Template:	MICADO_coro_obs_fpm[bg]
Input for	micado_img_detrend_hci
recipe(s):	
Processing FITS	CTYPEn
keywords:	
	CUNITn
	CRVALn
	CRPIXn
	CDELtn
Data item structure:	DATA; once, for the central detector; <b>DRL!</b> structure in 3.3.8

#### 2.1.0.5 I\_CORO\_OFFSET\_RAW

Name:	I_CORO_OFFSET_RAW
Description:	Image on bright point source with coronagraph in place. Star must be offset from coronagraph.
CATG/TYPE/TECH	CALIB
:	
	STAR
	CORONOGRAPHY
OCA keywords:	
DO.CATG:	RAW_OPT_SKY_SKYHCI_CORO_COROOFFSET
Template:	MICADO_coro_cal_starvisible
Input for	micado_img_detrend_final
recipe(s):	
	micado_img_detrend_hci
	micado_img_star_photom
Processing FITS	CTYPEn
keywords:	
	CUNITn
	CRVALn
	CRPIXn
	CDELtn
Data item structure:	DATA; once, for the central detector; <b>DRL!</b> structure in 3.3.9

#### 2.1.0.6 I\_DARK\_RAW

Name:	I_DARK_RAW
Description:	Detector exposure without illumination (via block in pupil filter wheel and field restrictor).
CATG/TYPE/TECH	CALIB
:	
	DARK
	IMAGE,SI
OCA keywords:	DET.DIT
	DET.READOUT
DO.CATG:	RAW_DARK
Template:	MICADO_img_cal_dark
Input for	micado_det_dark
recipe(s):	
Processing FITS	EXPTIME
keywords:	
Data item structure:	DATA; once for each detector, so 9 times; <b>DRL!</b> structure in 3.3.11

#### 2.1.0.7 I\_FLAT\_RAW

Name:	I_FLAT_RAW
Description:	Raw exposure using the flatfield lamp in imaging mode.
CATG/TYPE/TECH	CALIB
:	
	FLAT,LAMP
	IMAGE,SI
OCA keywords:	DET.DIT
	DET.READOUT
	INS.FILT <sub>i</sub> .NAME
DO.CATG:	RAW_OPT_FLAT
Template:	MICADO_img_cal_flat
Input for	micado_img_flat
recipe(s):	
Processing FITS	None
keywords:	
Data item structure:	DATA; once for each detector, so 9 times; <b>DRL!</b> structure in 3.3.27

#### 2.1.0.8 I\_ILLUM\_RAW

Name:	I_ILLUM_RAW
Description:	Raw Science data for Illumination correction.
CATG/TYPE/TECH	CALIB
:	STD, ILLUM IMAGE, SI
OCA keywords:	DET.DIT DET.READOUT INS.FILT <i>i</i> .NAME MJD-OBS
DO.CATG:	RAW_OPT_SKY_ILLUM
Template:	MICADO_img_tec_illum
Input for recipe(s):	micado_img_detrend micado_img_illum
Processing FITS keywords:	CTYPEn CUNITn CRVALn CRPIXn CDELTn
Data item structure:	DATA; once for each detector, so 9 times; <b>DRL!</b> structure in 3.3.29

#### 2.1.0.9 I\_NONLIN\_RAW

Name:	I_NONLIN_RAW
Description:	Raw exposure using the flatfield lamp in imaging mode for non-linearity correction.
CATG/TYPE/TECH	CALIB
:	NONLIN, LAMP IMAGE, SI
OCA keywords:	DET.READOUT
DO.CATG:	RAW_OPT_NONLIN
Template:	MICADO_img_tec_nonlin
Input for recipe(s):	micado_img_nonlinearity
Processing FITS keywords:	None
Data item structure:	DATA; once for each detector, so 9 times; <b>DRL!</b> structure in 3.3.32

### 2.1.0.10 I\_SCI\_AI\_RAW

Name: I\_SCI\_AI\_RAW  
Description: Raw on-sky exposure for astrometric imaging.  
CATG/TYPE/TECH SCIENCE  
:  
OBJECT,SKY  
IMAGE,AI  
OCA keywords: DET.DIT  
DET.READOUT  
INS.FILT<sub>i</sub>.NAME  
MJD-OBS  
TPL.START  
DO.CATG: RAW\_OPT\_SKY\_SKYSIAI\_SCIENCEAI  
Template: MICADO\_img\_obs\_astrometry  
Input for micado\_img\_detrend  
recipe(s): micado\_img\_detrend\_final  
Processing FITS CTYPE<sub>n</sub>  
keywords: CUNIT<sub>n</sub>  
CRVAL<sub>n</sub>  
CRPIX<sub>n</sub>  
CDEL<sub>Tn</sub>  
Data item structure: DATA; once for each detector, so 9 times; **DRL!** structure in 3.3.37

### 2.1.0.11 I\_SCI\_CORO\_PUPIL\_RAW

Name: I\_SCI\_CORO\_PUPIL\_RAW  
Description: Pupil plane mask HCI image.  
CATG/TYPE/TECH SCIENCE  
:  
PUPIL  
CORONOGRAPHY  
OCA keywords:  
DO.CATG: RAW\_OPT\_SKY\_SKYHCI\_CORO\_SCIENCECOROPUPIL  
Template: MICADO\_coro\_obs\_ppm  
Input for micado\_img\_detrend\_final  
recipe(s): micado\_img\_detrend\_hci  
micado\_img\_starpos\_pupil  
Processing FITS CTYPE<sub>n</sub>  
keywords:

	CUNITn
	CRVALn
	CRPIXn
	CDELn
Data item structure:	DATA; once, for the central detector; <b>DRL!</b> structure in 3.3.39

#### 2.1.0.12 I\_SCI\_CORO\_WAFFLE\_RAW

Name:	I_SCI_CORO_WAFFLE_RAW
Description:	Focal plane image of bright star with waffle pattern added.
CATG/TYPE/TECH	SCIENCE
:	OBJECT CORONOGRAPHY, WAFFLE
OCA keywords:	
DO.CATG:	RAW_OPT_SKY_SKYHCI_CORO_SCIENCECOROWAFFLE
Template:	MICADO_coro_obs_fpm
Input recipe(s):	for micado_img_detrend_final micado_img_detrend_hci micado_img_starpos_waffle
Processing FITS keywords:	CTYPEn
	CUNITn CRVALn CRPIXn CDELn
Data item structure:	DATA; once, for the central detector; <b>DRL!</b> structure in 3.3.40

#### 2.1.0.13 I\_SCI\_RAW

Name:	I_SCI_RAW
Description:	Raw on-sky exposure.
CATG/TYPE/TECH	SCIENCE
:	OBJECT, SKY IMAGE, SI
OCA keywords:	DET.DIT DET.READOUT

		INS.FILT <i>i</i> .NAME
		INSTRUME
		MJD-OBS
		TPL.START
DO.CATG:		RAW_OPT_SKY_SKYSIAI_SCIENCE
Template:		MICADO_img_obs
Input	for	micado_img_detrend
recipe(s):		micado_img_detrend_final
		micado_img_photom
Processing FITS		CTYPEn
keywords:		CUNITn
		CRVALn
		CRPIXn
		CDELTn
Data item struc-		DATA; once for each detector, so 9 times; <b>DRL!</b> struc-
ture:		ture in 3.3.41

#### 2.1.0.14 I\_STDFIELD\_RAW

Name:		I_STDFIELD_RAW
Description:		Raw data for Photometric Zerpoint determination.
CATG/TYPE/TECH		CALIB
:		STD,PHOTOM
		IMAGE,SI
OCA keywords:		DET.DIT
		DET.READOUT
		INS.FILT <i>i</i> .NAME
		MJD-OBS
		TPL.START
DO.CATG:		RAW_OPT_SKY_STDFIELD
Template:		MICADO_img_cal_zeropoint
Input	for	micado_img_detrend
recipe(s):		micado_img_detrend_final
		micado_img_photom
Processing FITS		CTYPEn
keywords:		CUNITn
		CRVALn
		CRPIXn
		CDELTn

Data item structure:	DATA; once for each detector, so 9 times; <b>DRL!</b> structure in 3.3.47
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### 2.1.0.15 I\_WAM\_RAW

Name:	I_WAM_RAW
Description:	Raw warm astrometric mask data for distortion determination.
CATG/TYPE/TECH	CALIB
:	PINHOLE,WAM IMAGE,AI
OCA keywords:	DET.DIT DET.READOUT INS.FILT <i>i</i> .NAME INSTRUME MJD-OBS TPL.START
DO.CATG:	RAW_OPT_WAMCAM_WAM
Template:	MICADO_img_cal_warmmask
Input recipe(s):	for micado_img_detrend  micado_img_detrend_final micado_img_distortion
Processing FITS keywords:	None
Data item structure:	DATA; once for each detector, so 9 times; <b>DRL!</b> structure in 3.3.48

## 2.2 Processed Data Items

### 2.2.0.1 I\_ASTROM\_HDR

Name:	I_ASTROM_HDR
Description:	Determine a polynomial function that maps pixel coordinates (x,y) into (RA,Dec).
OCA keywords:	MJD-OBS
PRO.CATG:	HDR_ASTROM
Produced recipe:	by micado_img_astrom
Input recipe(s):	for micado_img_photom micado_img_calibrate

QC parameters:	<a href="#">QC.DCRVALn</a> <a href="#">QC.RMSDRA</a> <a href="#">QC.RMSDDEC</a>
Processing FITS keywords:	CDn_ms PV1i PV2i
Data item structure:	TAB; once for each detector, so 9 times; <b>DRL!</b> structure in 3.3.1

### 2.2.0.2 I\_BGD\_IMG

Name:	<a href="#">I_BGD_IMG</a>
Description:	Determine the background of all exposures in an observation. Created either from a background field observation offset from the science observation, or directly from the science observation itself.
OCA keywords:	TPL.START
PRO.CATG:	IMG_BACKGROUND
Produced by recipe:	<a href="#">micado_img_background</a>
Input for recipe(s):	<a href="#">micado_img_illum</a> <a href="#">micado_img_detrend_final</a>
QC parameters:	<a href="#">QC.BACKGROUNDMEAn</a> <a href="#">QC.BACKGROUNDMEDn</a> <a href="#">QC.BACKGROUNDSTDn</a>
Processing FITS keywords:	None
Data item structure:	DATA,ERR,DQ; each once for each detector, so 9 times; <b>DRL!</b> structure in 3.3.3

### 2.2.0.3 I\_CALIB\_HCI\_IMG

Name:	<a href="#">I_CALIB_HCI_IMG</a>
Description:	Calculate proper angle.
OCA keywords:	
PRO.CATG:	IMG_CALIBHCI
Produced by recipe:	<a href="#">micado_img_calib_hci</a>
Input for recipe(s):	<a href="#">micado_img_cube_hci</a>
QC parameters:	<a href="#">QC.CALIMEAi</a> <a href="#">QC.CALISTDi</a>

Processing FITS keywords:	None
Data item structure:	DATA,ERR,DQ; each once, for the central detector; <b>DRL!</b> structure in 3.3.5

#### 2.2.0.4 I\_CALIBRATED\_CATALOG\_CAT

Name:	<b>I_CALIBRATED_CATALOG_CAT</b>
Description:	Create a catalog with distortion-corrected source positions for astrometric imaging mode.
OCA keywords:	
PRO.CATG:	CAT_CALIBRATEDCATALOG
Produced by recipe:	<b>micado_img_calibrated_catalog</b>
Input for recipe(s):	None
QC parameters:	<b>QC.CALIBCATNSOURCES</b> <b>QC.CALIBCATRAMEA</b> <b>QC.CALIBCATDECMEA</b> <b>QC.CALIBCATRAMED</b> <b>QC.CALIBCATDECMED</b> <b>QC.CALIBCATRASTD</b> <b>QC.CALIBCATDECSTD</b>
Processing FITS keywords:	None
Data item structure:	CAT; once; <b>DRL!</b> structure in 3.3.6

#### 2.2.0.5 I\_SCI\_CALIBRATED\_IMG

Name:	<b>I_SCI_CALIBRATED_IMG</b>
Description:	Apply the photometric and astrometric solution for exposures to the pixels.
OCA keywords:	DET.DIT INS.FILT <i>i</i> .NAME MJD-OBS TPL.START
PRO.CATG:	IMG_FNL_CATALOGABLE_CALIBRATED
Produced by recipe:	<b>micado_img_calibrate</b>

Input	for	<code>micado_img_regrid</code>
recipe(s):		<code>micado_img_calibrated_catalog</code> <code>micado_img_stack</code>
QC parameters:		<code>QC.CALIMEAi</code> <code>QC.CALISTDi</code>
Processing FITS keywords:		None
Data item structure:		DATA,ERR,DQ; each once for each detector, so 9 times; <b>DRL!</b> structure in 3.3.38

#### 2.2.0.6 I\_CUBE\_HCI\_IMG

Name:		<code>I_CUBE_HCI_IMG</code>
Description:		Combine calibrated HCI exposures into one cube.
OCA keywords:		
PRO.CATG:		IMG_CUBEHCI
Produced by		<code>micado_img_cube_hci</code>
recipe:		
Input	for	None
recipe(s):		
QC parameters:		<code>QC.CUBEMEAi</code> <code>QC.CUBESTDi</code>
Processing FITS keywords:		None
Data item structure:		DATA,ERR,DQ; each once for each exposure; <b>DRL!</b> structure in 3.3.10

#### 2.2.0.7 I\_DT\_SCI\_AI\_IMG

Name:		<code>I_DT_SCI_AI_IMG</code>
Description:		Apply to a raw exposure pixels observed in high-contrast pupil imaging mode the additive and multiplicative factors to correct for detector instrumental fingerprint.
OCA keywords:		DET.DIT DET.READOUT INS.FILT <i>i</i> .NAME MJD-OBS TPL.START
PRO.CATG:		IMG_FNL_CATALOGABLE_DT_DTSIAI_DTAI
Produced by		<code>micado_img_detrend</code>
recipe:		

Input	for	micado_img_detrend_final
recipe(s):		micado_img_background
QC parameters:		QC.DETSMEAN
		QC.DETSMED
		QC.DETSSTD
		QC.DETRENCR
		QC.NPIXNONL
		QC.FPIXNONL
Processing FITS		None
keywords:		
Data item structure:		DATA,ERR,DQ; each once for each detector, so 9 times; <b>DRL!</b> structure in 3.3.19

#### 2.2.0.8 I\_DT\_BKGFIELD\_IMG

Name:		I_DT_BKGFIELD_IMG
Description:		Apply to a raw exposure pixels observed in high-contrast pupil imaging mode the additive and multiplicative factors to correct for detector instrumental fingerprint.
OCA keywords:		DET.DIT DET.READOUT INS.FILT <i>i</i> .NAME MJD-OBS TPL.START
PRO.CATG:		IMG_FNL_CATALOGABLE_DT_DTBKGFIELD
Produced by		micado_img_detrend
recipe:		
Input	for	micado_img_background
recipe(s):		
QC parameters:		QC.DETSMEAN
		QC.DETSMED
		QC.DETSSTD
		QC.DETRENCR
		QC.NPIXNONL
		QC.FPIXNONL
Processing FITS		None
keywords:		
Data item structure:		DATA,ERR,DQ; each once for each detector, so 9 times; <b>DRL!</b> structure in 3.3.15

### 2.2.0.9 I\_DT\_CAM\_IMG

Name: I\_DT\_CAM\_IMG  
Description: None  
OCA keywords:  
PRO.CATG: IMG\_FNL\_CATALOGABLE\_DT\_DTCAM  
Produced by micado\_img\_detrend  
recipe:  
Input for micado\_img\_detrend\_final  
recipe(s):  
QC parameters: QC.DETSMEAN  
QC.DETSMED  
QC.DETSSTD  
QC.DETRENCR  
QC.NPIXNONL  
QC.FPIXNONL  
Processing FITS None  
keywords:  
Data item structure: DATA,ERR,DQ; each once for each detector, so 9 times;  
**DRL!** structure in 3.3.16

### 2.2.0.10 I\_DT\_CORO\_BGD\_IMG

Name: I\_DT\_CORO\_BGD\_IMG  
Description: Apply to a raw exposure pixels observed in high-contrast imaging mode the additive and multiplicative factors to correct for detector instrumental fingerprint.  
OCA keywords:  
PRO.CATG: IMG\_FNL\_CATALOGABLE\_DT\_DTHCI\_DTCOROBACKGROUND  
Produced by micado\_img\_detrend\_hci  
recipe:  
Input for micado\_img\_background  
recipe(s):  
QC parameters: QC.DETSMEAN  
QC.DETSMED  
QC.DETSSTD  
QC.DETRENCR  
QC.NPIXNONL  
QC.FPIXNONL  
Processing FITS None  
keywords:  
Data item structure: DATA,ERR,DQ; each once, for the central detector; **DRL!**  
structure in 3.3.17

### 2.2.0.11 I\_DTFNL\_SCI\_AI\_IMG

Name: I\_DTFNL\_SCI\_AI\_IMG  
Description: Subtract background and apply illumination correction.  
OCA keywords: INS.FILT*i*.NAME  
MJD-OBS  
TPL.START  
PRO.CATG: IMG\_FNL\_CATALOGABLE\_DTFNL\_DTFNLSIAI\_DTFNLAI  
Produced by micado\_img\_detrend\_final  
recipe:  
Input for micado\_img\_astrom  
recipe(s): micado\_img\_calibrate  
QC parameters: None  
Processing FITS None  
keywords:  
Data item structure: DATA,ERR,DQ; each once for each detector, so 9 times;  
**DRL!** structure in 3.3.24

### 2.2.0.12 I\_DTFNL\_ASTROMFIELD\_IMG

Name: I\_DTFNL\_ASTROMFIELD\_IMG  
Description: Subtract background and apply illumination correction.  
OCA keywords: INS.FILT*i*.NAME  
INSTRUME  
MJD-OBS  
TPL.START  
PRO.CATG: IMG\_FNL\_CATALOGABLE\_DTFNL\_DTFNLASTROMFIELD  
Produced by micado\_img\_detrend\_final  
recipe:  
Input for micado\_img\_distortion  
recipe(s):  
QC parameters: None  
Processing FITS None  
keywords:  
Data item structure: DATA,ERR,DQ; each once for each detector, so 9 times;  
**DRL!** structure in 3.3.21

### 2.2.0.13 I\_DTFNL\_CAM\_IMG

Name: I\_DTFNL\_CAM\_IMG  
Description: None  
OCA keywords:  
PRO.CATG: IMG\_FNL\_CATALOGABLE\_DTFNL\_DTFNLCAM  
Produced by micado\_img\_detrend\_final  
recipe:  
Input for micado\_img\_distortion  
recipe(s):  
QC parameters: None  
Processing FITS None  
keywords:  
Data item structure: DATA,ERR,DQ; each once for each detector, so 9 times; **DRL!** structure in 3.3.22

### 2.2.0.14 I\_DTFNL\_CORO\_OFFSET\_IMG

Name: I\_DTFNL\_CORO\_OFFSET\_IMG  
Description: None  
OCA keywords:  
PRO.CATG: IMG\_FNL\_CATALOGABLE\_DTFNL\_DTFNLHCI\_DTFNLHCIOFFSET  
  
Produced by micado\_img\_detrend\_final  
recipe:  
Input for micado\_img\_star\_photom  
recipe(s):  
QC parameters: None  
Processing FITS None  
keywords:  
Data item structure: DATA,ERR,DQ; each once, for the central detector; **DRL!** structure in 3.3.23

### 2.2.0.15 I\_DTFNL\_WAM\_IMG

Name: I\_DTFNL\_WAM\_IMG  
Description: Subtract background and apply illumination correction.  
OCA keywords: INS.FILT<sub>i</sub>.NAME  
INSTRUME  
MJD-OBS  
TPL.START

PRO.CATG:	IMG_FNL_CATALOGABLE_DTFNL_DTFNLWAM
Produced by	<code>micado_img_detrend_final</code>
recipe:	
Input for	<code>micado_img_distortion</code>
recipe(s):	
QC parameters:	None
Processing FITS	None
keywords:	
Data item structure:	DATA,ERR,DQ; each once for each detector, so 9 times; <b>DRL!</b> structure in 3.3.26

#### 2.2.0.16 I\_DTFNL\_SCI\_IMG

Name:	<code>I_DTFNL_SCI_IMG</code>
Description:	Image which has been corrected for instrumental effects, and background subtracted.
OCA keywords:	INS.FILT <i>i</i> .NAME INSTRUME MJD-OBS TPL.START
DO.CATG:	IMG_FNL_CATALOGABLE_DTFNL_DTFNLSIAI_DTFNL
Input for	<code>micado_img_photom</code>
recipe(s):	<code>micado_img_astrom</code> <code>micado_img_calibrate</code>
Processing FITS	TODO
keywords:	
Data item structure:	DATA,ERR,DQ; each once for each detector, so 9 times; <b>DRL!</b> structure in 3.3.25

#### 2.2.0.17 I\_DT\_CORO\_OFFSET\_IMG

Name:	<code>I_DT_CORO_OFFSET_IMG</code>
Description:	Apply to a raw exposure pixels observed in high-contrast imaging mode the additive and multiplicative factors to correct for detector instrumental fingerprint.
OCA keywords:	
PRO.CATG:	IMG_FNL_CATALOGABLE_DT_DTHCI_DTHCIOFFSET
Produced by	<code>micado_img_detrend_hci</code>
recipe:	
Input for	<code>micado_img_detrend_final</code>
recipe(s):	

QC parameters:	<a href="#">QC.DETSMEAN</a> <a href="#">QC.DETSMED</a> <a href="#">QC.DETSSTD</a> <a href="#">QC.DETRENCR</a> <a href="#">QC.NPIXNONL</a> <a href="#">QC.FPIXNONL</a>
Processing FITS keywords:	None
Data item structure:	DATA,ERR,DQ; each once, for the central detector; <b>DRL!</b> structure in 3.3.18

### 2.2.0.18 I\_DT\_SCI\_SI\_IMG

Name:	<a href="#">I_DT_SCI_SI_IMG</a>
Description:	Apply to a raw exposure pixels the additive and multiplicative factors to correct for detector instrumental fingerprint.
OCA keywords:	DET.DIT DET.READOUT INS.FILT <i>i</i> .NAME INSTRUME MJD-OBS TPL.START
PRO.CATG:	IMG_FNL_CATALOGABLE_DT_DTSIAI_DT
Produced by recipe:	<a href="#">micado_img_detrend</a>
Input for recipe(s):	<a href="#">micado_img_detrend_final</a> <a href="#">micado_img_background</a>
QC parameters:	<a href="#">QC.DETSMEAN</a> <a href="#">QC.DETSMED</a> <a href="#">QC.DETSSTD</a> <a href="#">QC.DETRENCR</a> <a href="#">QC.NPIXNONL</a> <a href="#">QC.FPIXNONL</a>
Processing FITS keywords:	None
Data item structure:	DATA,ERR,DQ; each once for each detector, so 9 times; <b>DRL!</b> structure in 3.3.20

### 2.2.0.19 I\_DISTORTION\_CAM\_HDR

Name: I\_DISTORTION\_CAM\_HDR  
Description: None  
OCA keywords:  
PRO.CATG: HDR\_DISTORTION\_DISTORTIONCAM  
Produced by micado\_img\_distortion  
recipe:  
Input for None  
recipe(s):  
QC parameters: QC.DISTORTXMIN  
QC.DISTORTXMAX  
QC.DISTORTXMEDIAN  
QC.DISTORTXMEAN  
QC.DISTORTYMIN  
QC.DISTORTYMAX  
QC.DISTORTYMEDIAN  
QC.DISTORTYMEAN  
Processing FITS None  
keywords:  
Data item structure: TAB; once, spanning all detectors; **DRL!** structure in 3.3.12

### 2.2.0.20 I\_DISTORTION\_ELT\_HDR

Name: I\_DISTORTION\_ELT\_HDR  
Description: Determine the correction for the geometric distortion in the optical path from top of atmosphere to the warm astrometric mask.  
OCA keywords: INSTRUME  
PRO.CATG: HDR\_DISTORTION\_DISTORTIONELT  
Produced by micado\_img\_distortion  
recipe:  
Input for micado\_img\_astrom  
recipe(s):  
QC parameters: QC.DISTORTXMIN  
QC.DISTORTXMAX  
QC.DISTORTXMEDIAN  
QC.DISTORTXMEAN  
QC.DISTORTYMIN  
QC.DISTORTYMAX  
QC.DISTORTYMEDIAN  
QC.DISTORTYMEAN

Processing FITS keywords:	None
Data item structure:	TAB; once, spanning all detectors; <b>DRL!</b> structure in 3.3.13

#### 2.2.0.21 I\_DISTORTION\_WAM\_HDR

Name:	I_DISTORTION_WAM_HDR
Description:	Determine the distortion occurring in the optical path from warm astrometric mask to the detector array as a function of derotator angle.
OCA keywords:	INSTRUME
PRO.CATG:	HDR_DISTORTION_DISTORTIONWAM
Produced by recipe:	micado_img_distortion
Input for recipe(s):	micado_img_astrom
QC parameters:	QC.DISTORTXMIN QC.DISTORTXMAX QC.DISTORTXMEDIAN QC.DISTORTXMEAN QC.DISTORTYMIN QC.DISTORTYMAX QC.DISTORTYMEDIAN QC.DISTORTYMEAN
Processing FITS keywords:	None
Data item structure:	TAB; once, spanning all detectors; <b>DRL!</b> structure in 3.3.14

#### 2.2.0.22 I\_ILLUM\_CORR\_HDR

Name:	I_ILLUM_CORR_HDR
Description:	Determine spatial variation in illumination by flatlamp over detector array
OCA keywords:	INS.FILT <sub>i</sub> .NAME
PRO.CATG:	HDR_STATICTABLE_ILLUMCORR
Produced by recipe:	micado_img_illum
Input for recipe(s):	micado_img_detrend_final

QC parameters:	<a href="#">QC.ILLUNMAT</a> <a href="#">QC.ILLSNRMD</a>
Processing FITS keywords:	ICCOEF00 ICCOEF10 ICCOEF11 ICCOEF20 ICCOEF21 ICCOEF22 ICCOEF30 ICCOEF31 ICCOEF32 ICCOEF33 ICCOEF40 ICCOEF41 ICCOEF42 ICCOEF43 ICCOEF44
Data item structure:	TAB; once for each detector, so 9 times; <b>DRL!</b> structure in 3.3.28

#### 2.2.0.23 I\_MASTER\_DARK\_IMG

Name:	<a href="#">I_MASTER_DARK_IMG</a>
Description:	Determine the dark current and flag hot pixels.
OCA keywords:	DET.DIT DET.READOUT
PRO.CATG:	IMG_MASTERDARK
Produced by	<a href="#">micado_det_dark</a>
recipe:	
Input for	<a href="#">micado_img_flat</a>
recipe(s):	<a href="#">micado_img_detrend</a> <a href="#">micado_img_detrend_hci</a>
QC parameters:	<a href="#">QC.DARKMEAN</a> <a href="#">QC.DARKMED</a> <a href="#">QC.DARKSTD</a> <a href="#">QC.NPIXSAT</a> <a href="#">QC.FPIXSAT</a>
Processing FITS keywords:	None
Data item structure:	DATA,ERR,DQ; each once for each detector, so 9 times; <b>DRL!</b> structure in 3.3.30

#### 2.2.0.24 I\_MASTER\_FLAT\_IMG

Name: **I\_MASTER\_FLAT\_IMG**  
Description: Determine pixelsensitivity variation at scale of few pixels and flag cold pixels.  
OCA keywords: DET.DIT  
DET.READOUT  
INS.FILT<sub>i</sub>.NAME  
PRO.CATG: IMG\_MASTERFLAT  
Produced by micado\_img\_flat  
recipe:  
Input for micado\_img\_detrend  
recipe(s): micado\_img\_detrend\_hci  
QC parameters: QC.FLATMEAN  
QC.FLATMED  
QC.FLATSTD  
QC.NPIXHOT  
QC.FPIXHOT  
Processing FITS keywords: None  
Data item structure: DATA,ERR,DQ; each once for each detector, so 9 times;  
**DRL!** structure in 3.3.31

#### 2.2.0.25 I\_NONLINEARITY\_IMG

Name: **I\_NONLINEARITY\_IMG**  
Description: Determine the non-linear response, gain and readnoise of the MICADO detector pixels.  
OCA keywords: DET.READOUT  
PRO.CATG: IMG\_NONLINEARITY  
Produced by micado\_img\_nonlinearity  
recipe:  
Input for micado\_img\_flat  
recipe(s): micado\_img\_detrend  
micado\_img\_detrend\_hci  
QC parameters: QC.FITSTD  
QC.NITER  
Processing FITS keywords: None  
Data item structure: DATA<sub>n</sub>,CHI2,DOF; each once for each detector, so 9 times;  
**DRL!** structure in 3.3.33

### 2.2.0.26 I\_PERSISTENCE\_IMG

Name: **I\_PERSISTENCE\_IMG**  
Description: Determine the persistence correction for an exposure.  
OCA keywords: MJD-OBS  
PRO.CATG: IMG\_PERSISTENCE  
Produced by **micado\_det\_persistence**  
recipe:  
Input for **micado\_img\_detrend**  
recipe(s): **micado\_img\_detrend\_hci**  
QC parameters: None  
Processing FITS: None  
keywords:  
Data item structure: DATA,ERR,DQ; each once for each detector, so 1 or 9 times; **DRL!** structure in 3.3.34

### 2.2.0.27 I\_PHOTOM\_SCI\_HDR

Name: **I\_PHOTOM\_SCI\_HDR**  
Description: Determine the scalar zeropoint that converts fluxes (in units of ADUs) into magnitudes at the top of the atmosphere.  
Use the stars in the science field itself.  
OCA keywords: MJD-OBS  
PRO.CATG: HDR\_PHOTOM\_PHOTOMSCIENCE  
Produced by **micado\_img\_photom**  
recipe:  
Input for **micado\_img\_calibrate**  
recipe(s): **micado\_img\_star\_photom**  
QC parameters: **QC.ZPTSTD<sub>i</sub>**  
**QC.NMATCH<sub>i</sub>**  
Processing FITS: ZEROPNT  
keywords: EXTING  
Data item structure: TAB; once for each detector, so 9 times; **DRL!** structure in 3.3.35

### 2.2.0.28 I\_PHOTOM\_STDFIELD\_HDR

Name: **I\_PHOTOM\_STDFIELD\_HDR**

Description:	Determine the scalar zeropoint that converts fluxes (in units of ADUs) into magnitudes at the top of the atmosphere.
OCA keywords:	MJD-OBS
PRO.CATG:	HDR_PHOTOM_PHOTOMSTDFIELD
Produced by	micado_img_photom
recipe:	
Input for	micado_img_calibrate
recipe(s):	micado_img_star_photom
QC parameters:	QC.ZPTSTD <sub>i</sub> QC.NMATCH <sub>i</sub>
Processing FITS keywords:	ZEROPNT EXTINCT
Data item structure:	TAB; once for each detector, so 9 times; <b>DRL!</b> structure in 3.3.36

#### 2.2.0.29 I\_SCI\_REGRID\_IMG

Name:	I_SCI_REGRID_IMG
Description:	Regrid the science exposure.
OCA keywords:	
PRO.CATG:	IMG_REGRID
Produced by	micado_img_regrid
recipe:	
Input for	None
recipe(s):	
QC parameters:	QC.REGRID_M QC.REGRID_S
Processing FITS keywords:	None
Data item structure:	DATA,ERR,DQ; each once for each detector, so 9 times; <b>DRL!</b> structure in 3.3.42

#### 2.2.0.30 I\_SCI\_STACK\_IMG

Name:	I_SCI_STACK_IMG
Description:	Combine calibrated exposures into one stack.
OCA keywords:	TPL.START
PRO.CATG:	IMG_STACK
Produced by	micado_img_stack
recipe:	

Input	for	None
recipe(s):		
QC parameters:		<a href="#">QC.STACK_ME</a> <a href="#">QC.STACK_ST</a>
Processing FITS		None
keywords:		
Data item structure:		DATA,ERR,DQ; each once, spanning all detectors; <b>DRL!</b> structure in 3.3.43

### 2.2.0.31 I\_STARCENTER\_PUPIL\_HDR

Name:		<a href="#">I_STARCENTER_PUPIL_HDR</a>
Description:		Determine the target star center when using the pupil imager.
OCA keywords:		
PRO.CATG:		HDR_STARCENTER_STARCENTERPUPIL
Produced	by	<a href="#">micado_img_starpos_pupil</a>
recipe:		
Input	for	<a href="#">micado_img_calib_hci</a>
recipe(s):		
QC parameters:		<a href="#">QC.STARPOS.SNRMINi</a> <a href="#">QC.STARPOS.SNRMAXi</a> <a href="#">QC.STARPOS.SNRMEDi</a> <a href="#">QC.STARPOS.SNRMEANi</a>
Processing FITS		None
keywords:		
Data item structure:		TAB; once, for the central detector; <b>DRL!</b> structure in 3.3.44

### 2.2.0.32 I\_STARCENTER\_WAFFLE\_HDR

Name:		<a href="#">I_STARCENTER_WAFFLE_HDR</a>
Description:		Determine the position of the central bright star (in pixel units) when blocked by the focal plane mask in order to provide a reference input for frame derotation.
OCA keywords:		
PRO.CATG:		HDR_STARCENTER_STARCENTERWAFFLE
Produced	by	<a href="#">micado_img_starpos_waffle</a>
recipe:		
Input	for	<a href="#">micado_img_calib_hci</a>
recipe(s):		

QC parameters:	<a href="#">QC.STARPOS.SNRMINi</a> <a href="#">QC.STARPOS.SNRMAXi</a> <a href="#">QC.STARPOS.SNRMEDi</a> <a href="#">QC.STARPOS.SNRMEANi</a>
Processing FITS keywords:	None
Data item structure:	TAB; once, for the central detector; <b>DRL!</b> structure in 3.3.45

### 2.2.0.33 I\_STAROFFSET\_HDR

Name:	<a href="#">I_STAROFFSET_HDR</a>
Description:	Determine zeropoint and centroid of the central bright star.
OCA keywords:	
PRO.CATG:	HDR_STAROFFSET
Produced by	<a href="#">micado_img_star_photom</a>
recipe:	
Input for	<a href="#">micado_img_calib_hci</a>
recipe(s):	
QC parameters:	<a href="#">QC.STAROFFSETSNNRMINn</a> <a href="#">QC.STAROFFSETSNNRMAXn</a> <a href="#">QC.STAROFFSETSNNRMEDn</a> <a href="#">QC.STAROFFSETSNNRMEAn</a>
Processing FITS keywords:	None
Data item structure:	TAB; once, for the central detector; <b>DRL!</b> structure in 3.3.46

## 2.3 External Data Items

### 2.3.0.1 REF\_I\_ASTROM\_CAT

Name:	<a href="#">REF_I_ASTROM_CAT</a>
Description:	Catalog with (ra,dec) of on-sky astrometric reference standards. Input surveys: Gaia and Euclid.
OCA keywords:	
DO.CATG:	CAT_DISTORTIONREF_ASTROMREF
Input for	<a href="#">micado_img_astrom</a>
recipe(s):	<a href="#">micado_img_distortion</a>

Processing FITS	TODO
keywords:	
Data item structure:	CAT; once; <b>DRL!</b> structure in 3.3.50

### 2.3.0.2 REF\_I\_PHOTOM\_CAT

Name:	REF_I_PHOTOM_CAT
Description:	Catalog with magnitudes of a photometric reference standards in a series of filters. Input surveys: JWST, Euclid YJH, VISTA surveys. Such catalogs are input for determination of zeropoints and/or illumination correction.
OCA keywords:	
DO.CATG:	CAT_PHOTOMREF
Input recipe(s):	for micado_img_illum micado_img_photom
Processing FITS	TODO
keywords:	
Data item structure:	CAT; once; <b>DRL!</b> structure in 3.3.51

### 2.3.0.3 REF\_I\_WAM\_CAT

Name:	REF_I_WAM_CAT
Description:	Catalog with reference positions of the warm astrometric mask pinholes.
OCA keywords:	
DO.CATG:	CAT_DISTORTIONREF_WAMREF
Input recipe(s):	for micado_img_distortion
Processing FITS	TODO
keywords:	
Data item structure:	CAT; once; <b>DRL!</b> structure in 3.3.52

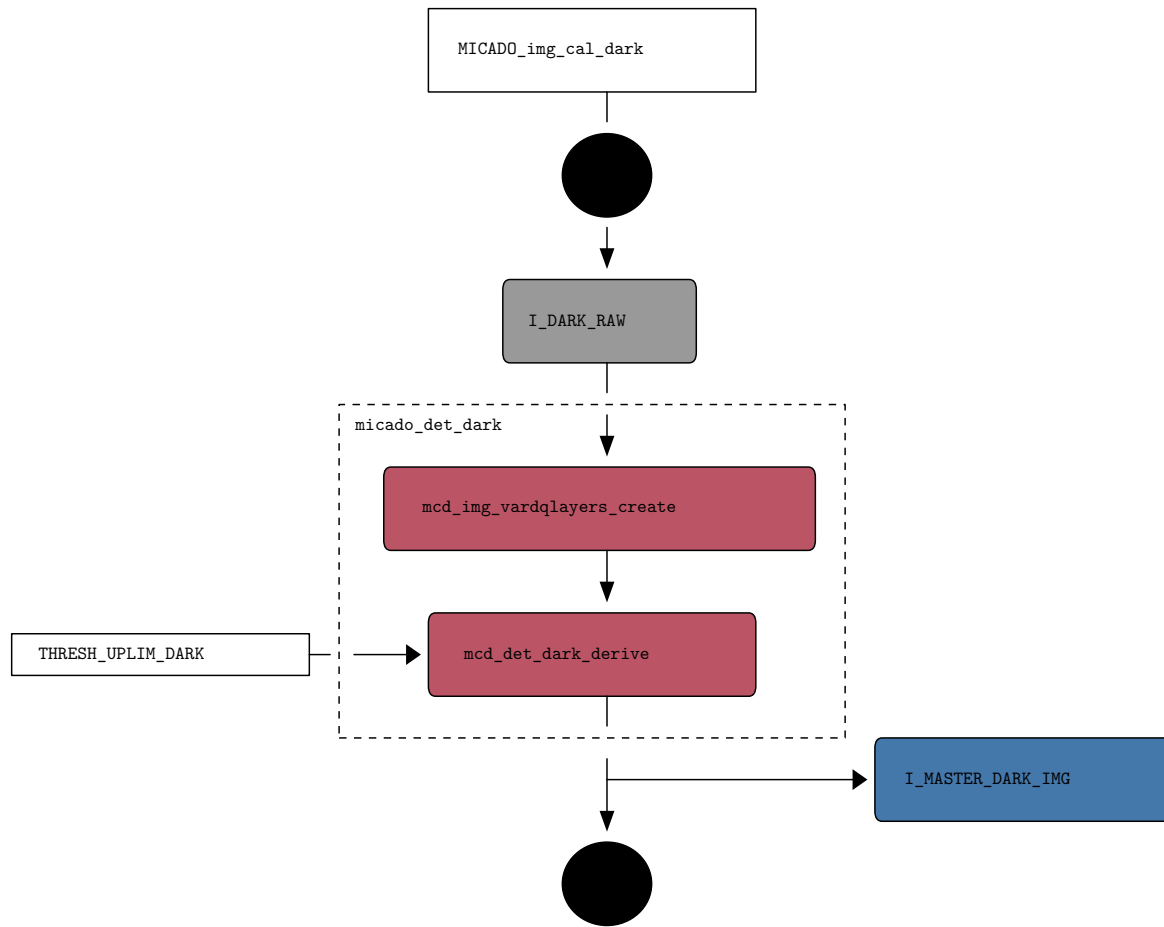
## 3 CPL

### 3.1 CPL Recipes

#### 3.1.1 micado\_det\_dark

Used in pipelines: Standard Imaging (Figure ??), Astrometric Imaging (Figure 17), High Contrast Imaging (Figure 11).

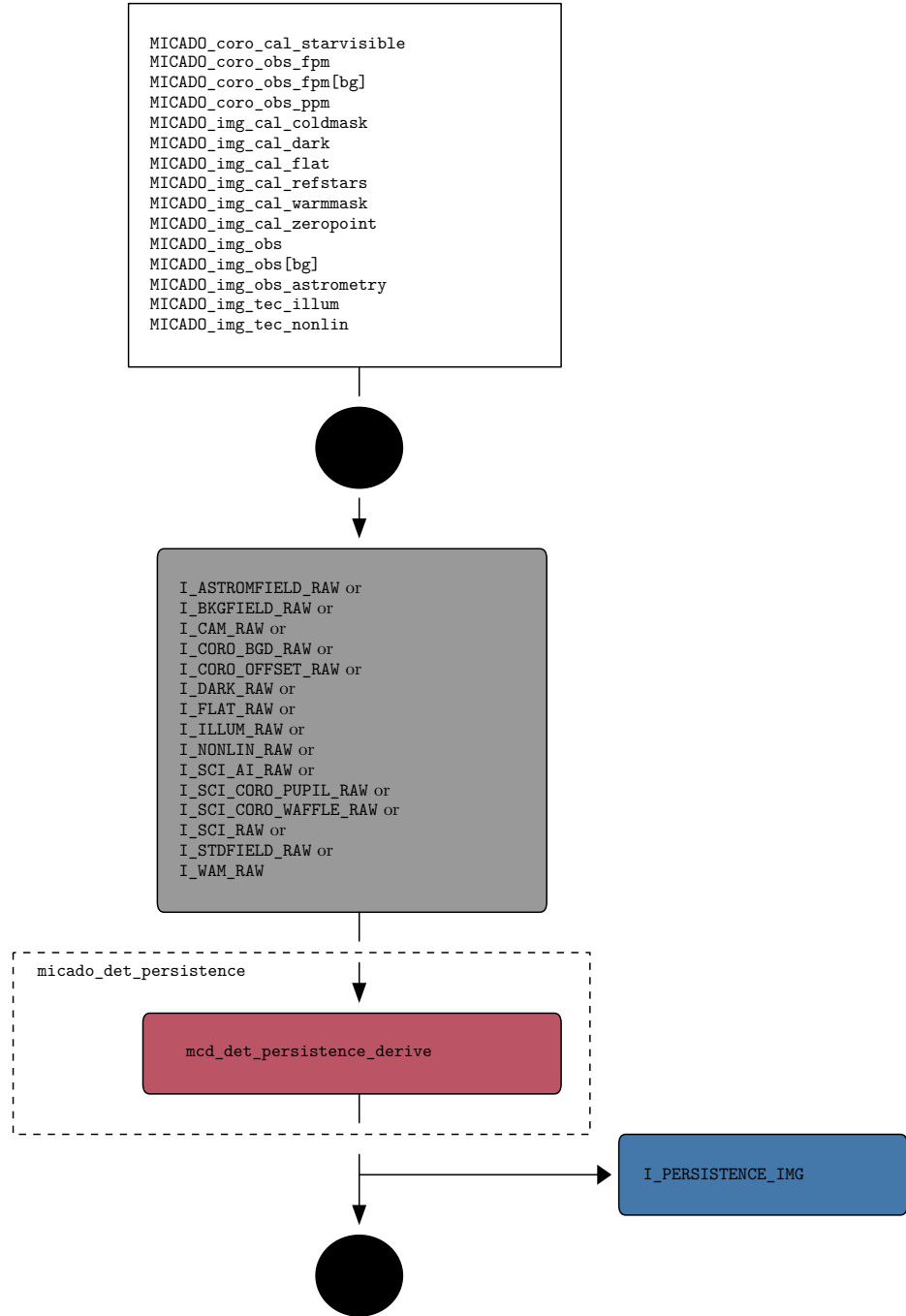
Recipe name:	micado_det_dark
Type:	Calibration
Purpose:	Determine the dark current and flag hot pixels.
Input data:	I_DARK_RAW
Output products:	I_MASTER_DARK_IMG
QC parameters:	QC.DARKMEAN QC.DARKMED QC.DARKSTD QC.NPIXSAT QC.FPIXSAT
User Parameters:	REC DARK THRESUP (0.0)
Procedure:	See Figure 3.1.1.
DRL Functions:	mcd_det_dark_derive mcd_img_vardqlayers_create
Error conditions:	None
Remarks:	It is expected that dark current is independent of read option. Baseline is to limit all science exposures to a finite set of exposure times. This ensures the darks, with the same finite set of exposure times, can be taken before a night instead of following it: mitigates persistence in the raw darks.



### 3.1.2 micado\_det\_persistence

Used in pipelines: None.

Recipe name:	micado_det_persistence
Type:	Calibration
Purpose:	Determine the persistence correction for an exposure.
Input data:	RAW
Output products:	I_PERSISTENCE_IMG
QC parameters:	None
User Parameters:	None
Procedure:	See Figure 3.1.2.
DRL Functions:	mcd_det_persistence_derive
Error conditions:	None
Remarks:	Currently under development by ESO. This recipe will be primarily be ran by ESO since it requires all previous data (up till a certain time in the past), including proprietary data. It can also be ran by users after the proprietary period is over.

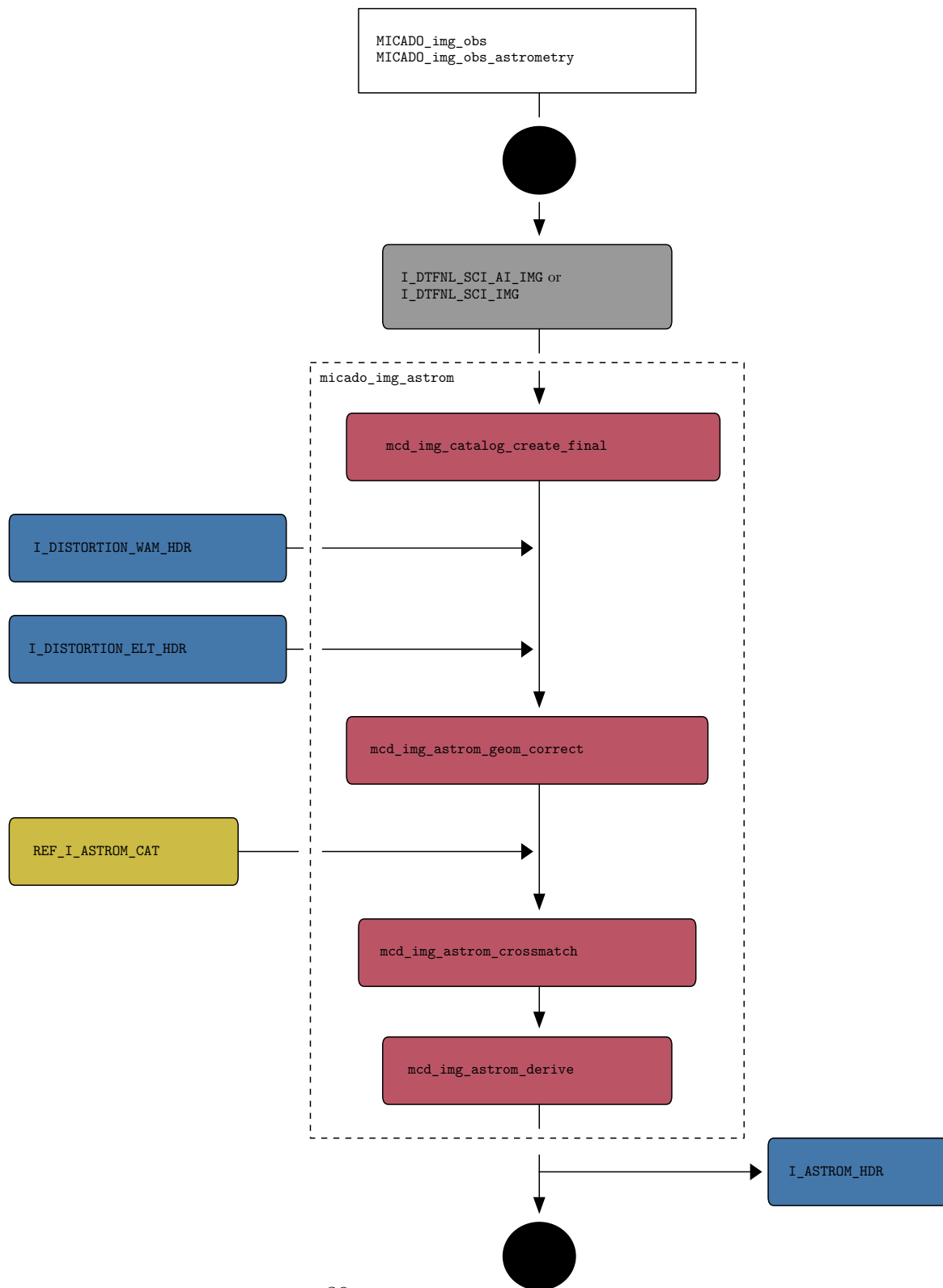


### 3.1.3 micado\_img\_astrom

Used in pipelines: Standard Imaging (Figure ??), Astrometric Imaging (Figure 17).

Recipe name:	micado_img_astrom
Type:	Science
Purpose:	Determine a polynomial function that maps pixel coordinates (x,y) into (RA,Dec).
Input data:	I_DTFNL_SIAI_IMG (I_DTFNL_SCI_AI_IMG or I_DTFNL_SCI_IMG) I_DISTORTION_WAM_HDR I_DISTORTION_ELT_HDR REF_I_ASTROM_CAT
Output products:	I_ASTROM_HDR
QC parameters:	QC.DCRVALn QC.DCRVALn QC.RMSDRA QC.RMSDDEC
User Parameters:	None
Procedure:	See Figure 3.1.3.
DRL Functions:	mcd_img_astrom_derive mcd_img_astrom_crossmatch mcd_img_astrom_geom_correct mcd_img_catalog_create_final
Error conditions:	None
Remarks:	The plan is to use Gaia and Euclid catalogs to construct the astrometric reference catalog (ASTROM-REF_CAT).

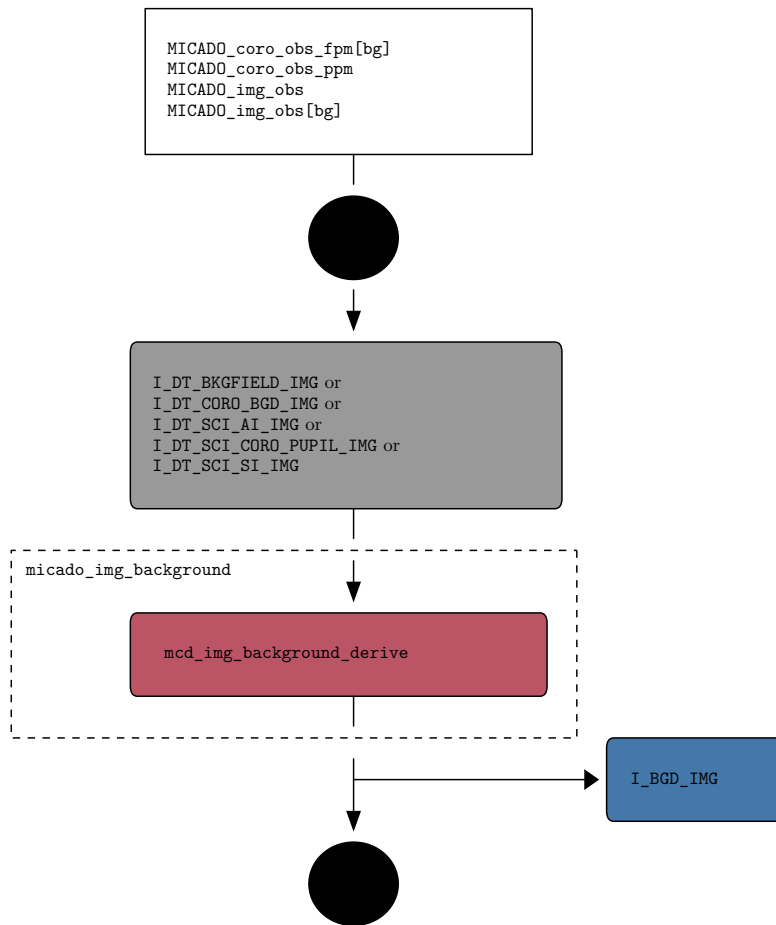




### 3.1.4 micado\_img\_background

Used in pipelines: Standard Imaging (Figure ??), Astrometric Imaging (Figure 17), High Contrast Imaging (Figure 11).

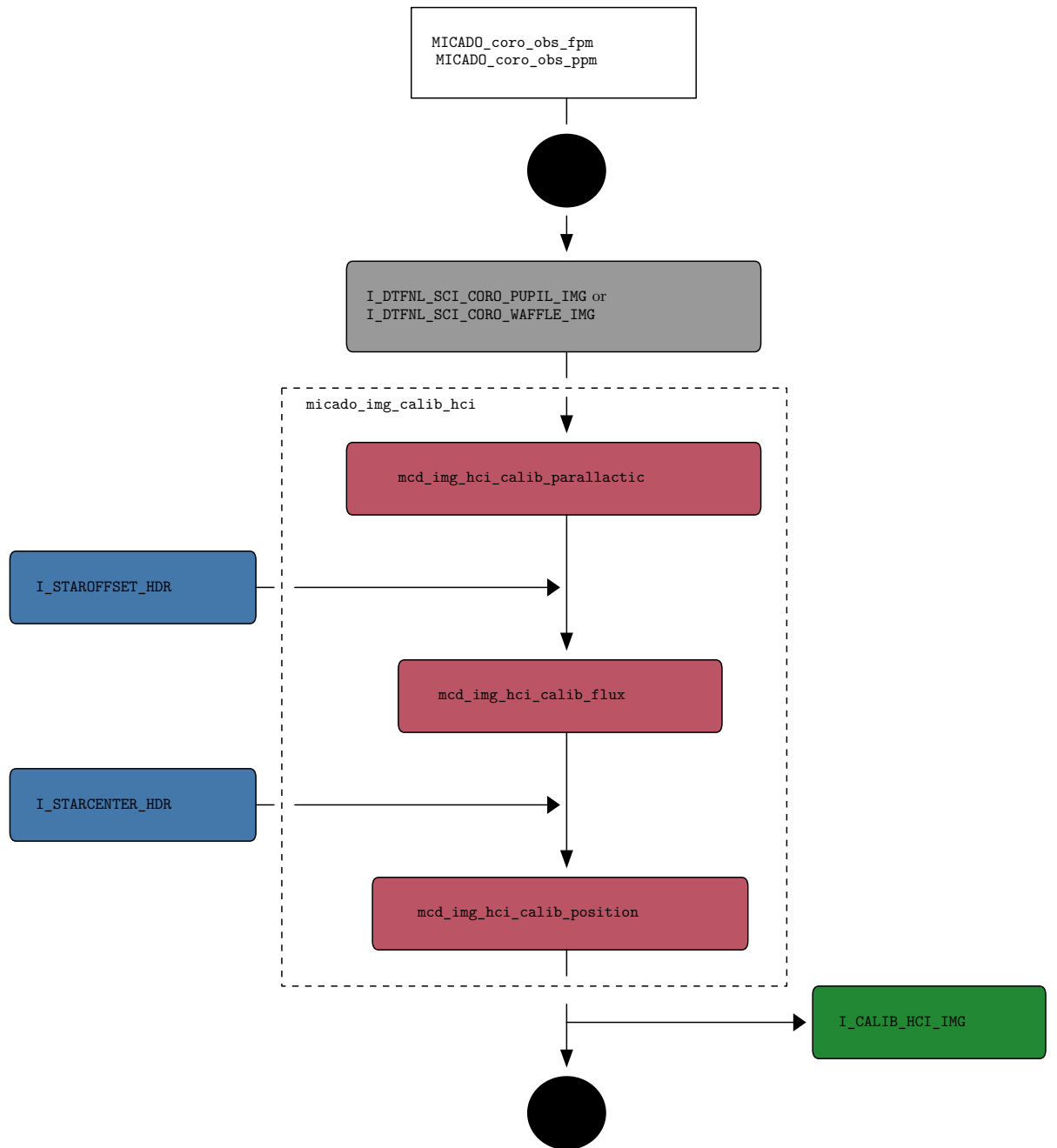
Recipe name:	micado_img_background
Type:	Calibration
Purpose:	Determine the background of all exposures in an observation. Created either from a background field observation offset from the science observation, or directly from the science observation itself.
Input data:	I_DT_BKGFIELD_IMG (I_DT_BKGFIELD_IMG or I_DT_CORO_BGD_IMG or I_DT_SCI_AI_IMG or I_DT_SCI_CORO_PUPIL_IMG or I_DT_SCI_SI_IMG )
Output products:	I_BGD_IMG
QC parameters:	QC.BACKGROUNDMEAN QC.BACKGROUNDMEDIAN QC.BACKGROUNDSTDDEV
User Parameters:	None
Procedure:	See Figure 3.1.4.
DRL Functions:	mcd_img_background_derive
Error conditions:	None
Remarks:	None



### 3.1.5 micado\_img\_calib\_hci

Used in pipelines: High Contrast Imaging (Figure 11).

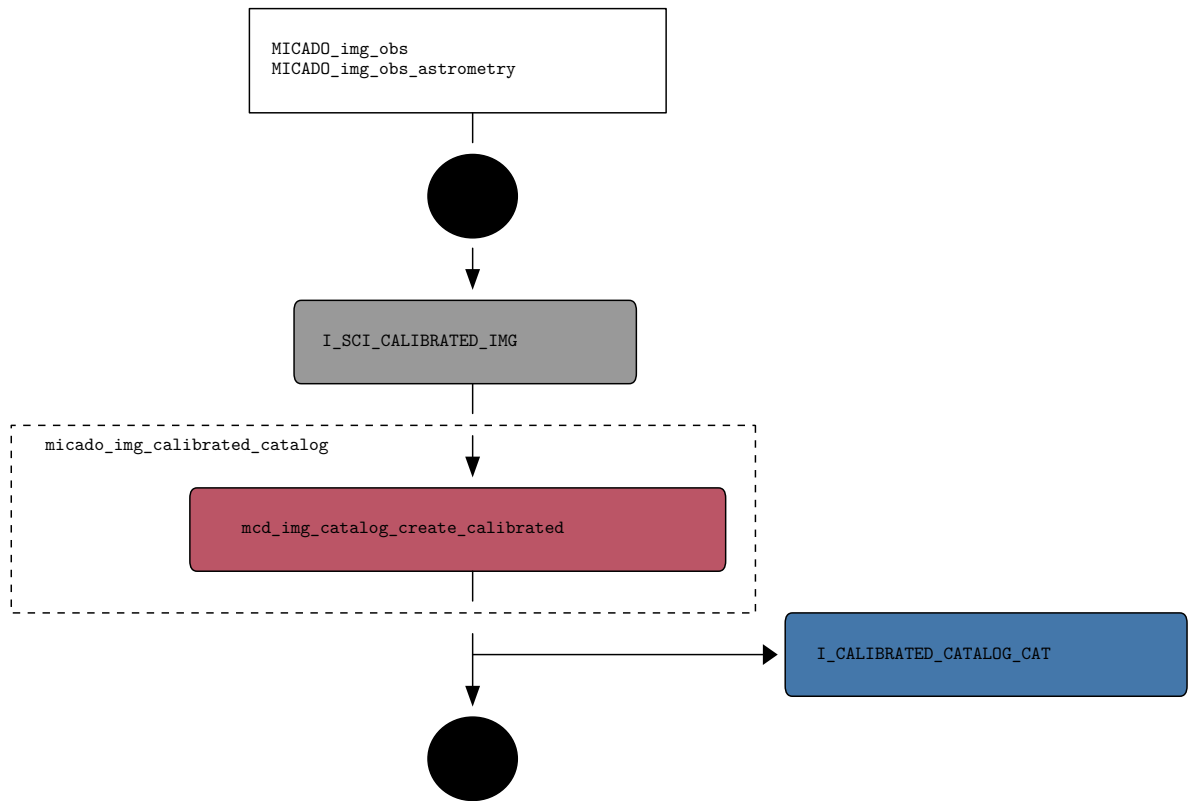
Recipe name:	micado_img_calib_hci
Type:	Science/Calibration
Purpose:	Calculate proper angle.
Input data:	I_DTFNL_HCI_SCI_IMG (I_DTFNL_SCI_CORO_PUPIL_IMG or I_DTFNL_SCI_CORO_WAFFLE_IMG) I_STAROFFSET_HDR I_STARCENTER_HDR (I_STARCENTER_PUPIL_HDR or I_STARCENTER_WAFFLE_HDR) I_CALIB_HCI_IMG
Output products:	
QC parameters:	QC.CALIMEAi QC.CALISTDi
User Parameters:	None
Procedure:	See Figure 3.1.5.
DRL Functions:	mcd_img_hci_calib_position mcd_img_hci_calib_flux mcd_img_hci_calib_parallactic
Error conditions:	None
Remarks:	None



### 3.1.6 micado\_img\_calibrated\_catalog

Used in pipelines: Astrometric Imaging (Figure 17).

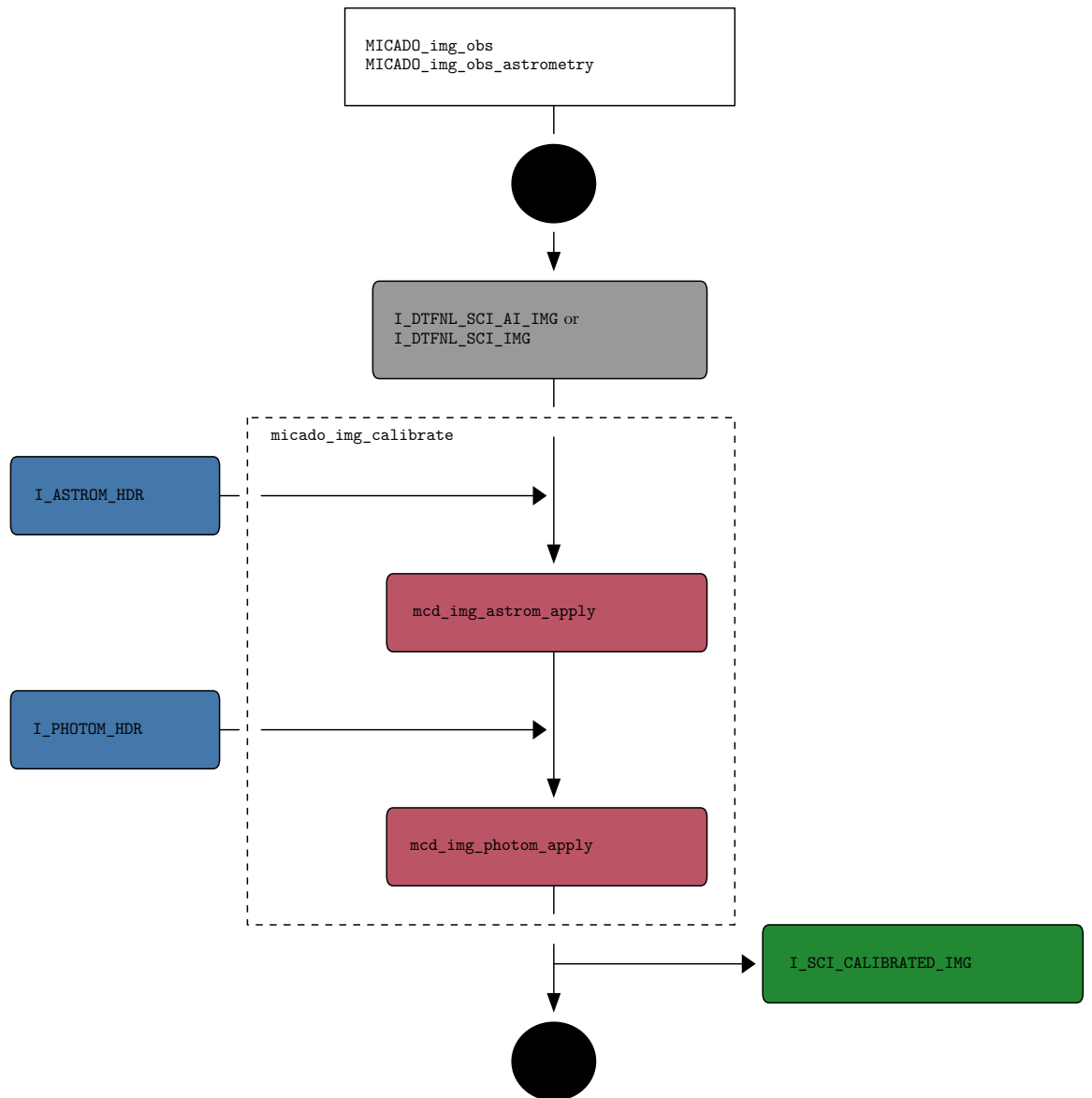
Recipe name:	micado_img_calibrated_catalog
Type:	Science
Purpose:	Create a catalog with distortion-corrected source positions for astrometric imaging mode.
Input data:	I_SCI_CALIBRATED_IMG
Output products:	I_CALIBRATED_CATALOG_CAT
QC parameters:	QC.CALIBCATNSOURCES QC.CALIBCATRAMEA QC.CALIBCATDECMEA QC.CALIBCATRAMED QC.CALIBCATDECMED QC.CALIBCATRASTD QC.CALIBCATDECSTD
User Parameters:	None
Procedure:	See Figure 3.1.6.
DRL Functions:	mcd_img_catalog_create_calibrated
Error conditions:	None
Remarks:	None



### 3.1.7 micado\_img\_calibrate

Used in pipelines: Standard Imaging (Figure ??), Astrometric Imaging (Figure 17).

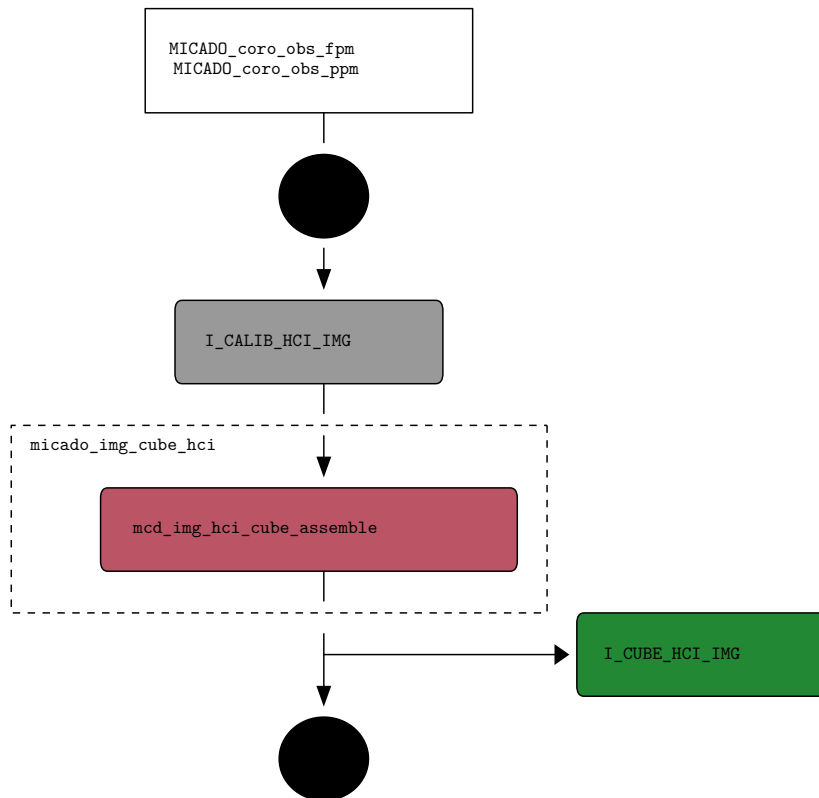
Recipe name:	micado_img_calibrate		
Type:	Science		
Purpose:	Apply the photometric and astrometric solution for exposures to the pixels.		
Input data:	I_DTFNL_SIAI_IMG	(I_DTFNL_SCI_AI_IMG	or
	I_DTFNL_SCI_IMG)		
	I_ASTROM_HDR		
	I_PHOTOM_HDR	(I_PHOTOM_SCI_HDR	or
	I_PHOTOM_STDFIELD_HDR)		
Output products:	I_SCI_CALIBRATED_IMG		
QC parameters:	QC.CALIMEAi		
	QC.CALISTDi		
User Parameters:	None		
Procedure:	See Figure 3.1.7.		
DRL Functions:	mcd_img_photom_apply		
	mcd_img_astrom_apply		
Error conditions:	None		
Remarks:	None		



### 3.1.8 micado\_img\_cube\_hci

Used in pipelines: High Contrast Imaging (Figure 11).

Recipe name:	micado_img_cube_hci
Type:	Science
Purpose:	Combine calibrated HCI exposures into one cube.
Input data:	I_CALIB_HCI_IMG
Output products:	I_CUBE_HCI_IMG
QC parameters:	QC.CUBEMEAi QC.CUBESTDi
User Parameters:	None
Procedure:	See Figure 3.1.8.
DRL Functions:	mcd_img_hci_cube_assemble
Error conditions:	None
Remarks:	None

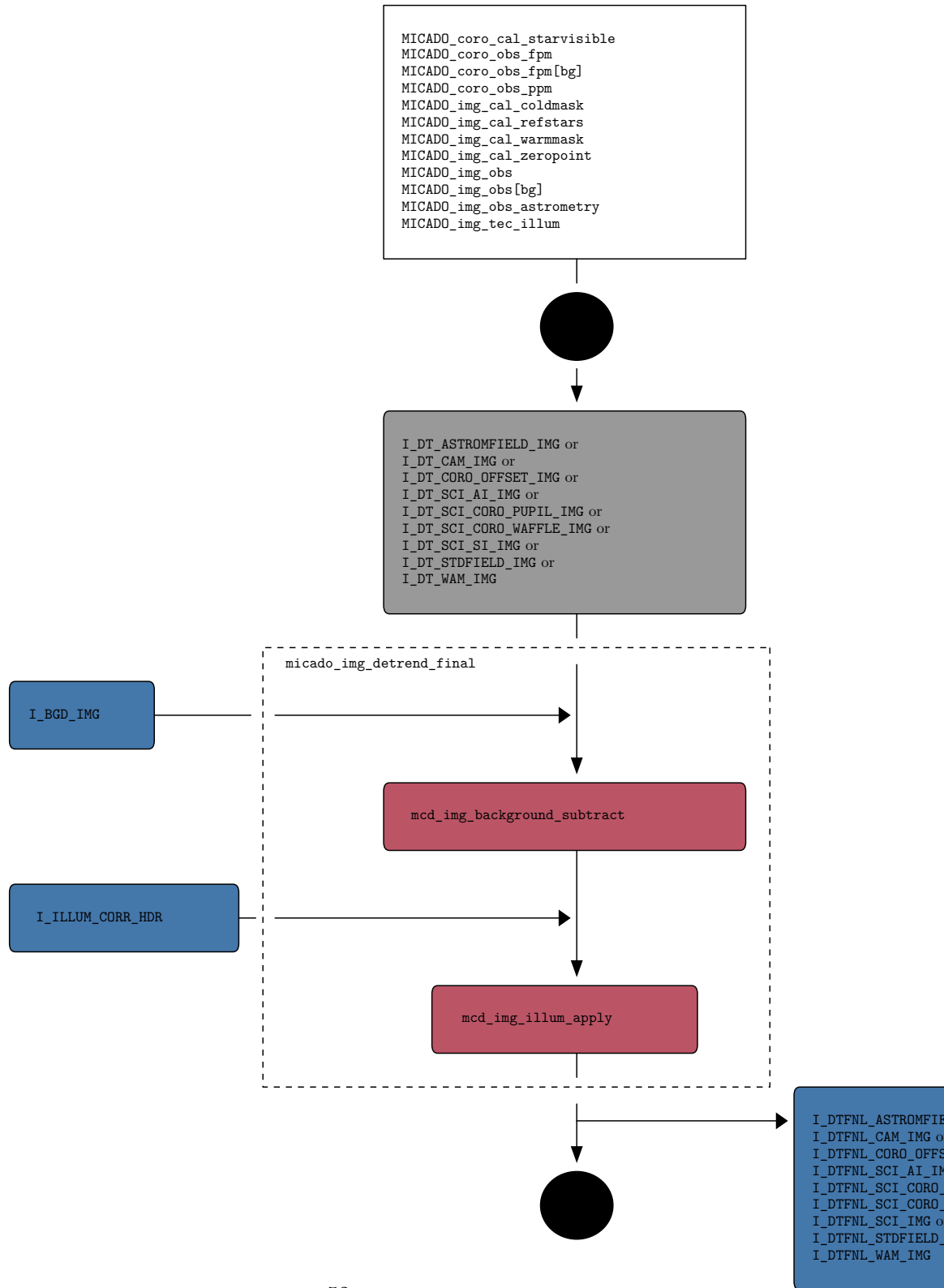


### 3.1.9 micado\_img\_detrend\_final

Used in pipelines: Standard Imaging (Figure ??), Astrometric Imaging (Figure 17), High Contrast Imaging (Figure 11).

Recipe name:	micado_img_detrend_final
Type:	Science/Calibration
Purpose:	Subtract background and apply illumination correction.
Input data:	I_DT_IMG (I_DT_ASTROMFIELD_IMG or I_DT_CAM_IMG or I_DT_CORO_OFFSET_IMG or I_DT_SCI_AI_IMG or I_DT_SCI_CORO_PUPIL_IMG or I_DT_SCI_CORO_WAFFLE_IMG or I_DT_SCI_SI_IMG or I_DT_STDFIELD_IMG or I_DT_WAM_IMG) I_BGD_IMG I_ILLUM_CORR_HDR
Output products:	I_DTFNL_IMG (I_DTFNL_ASTROMFIELD_IMG or I_DTFNL_CAM_IMG or I_DTFNL_CORO_OFFSET_IMG or I_DTFNL_SCI_AI_IMG or I_DTFNL_SCI_CORO_PUPIL_IMG or I_DTFNL_SCI_CORO_WAFFLE_IMG or I_DTFNL_SCI_IMG or I_DTFNL_STDFIELD_IMG or I_DTFNL_WAM_IMG)
QC parameters:	None
User Parameters:	None
Procedure:	See Figure 3.1.9.
DRL Functions:	mcd_img_illum_apply mcd_img_background_subtract
Error conditions:	None
Remarks:	None



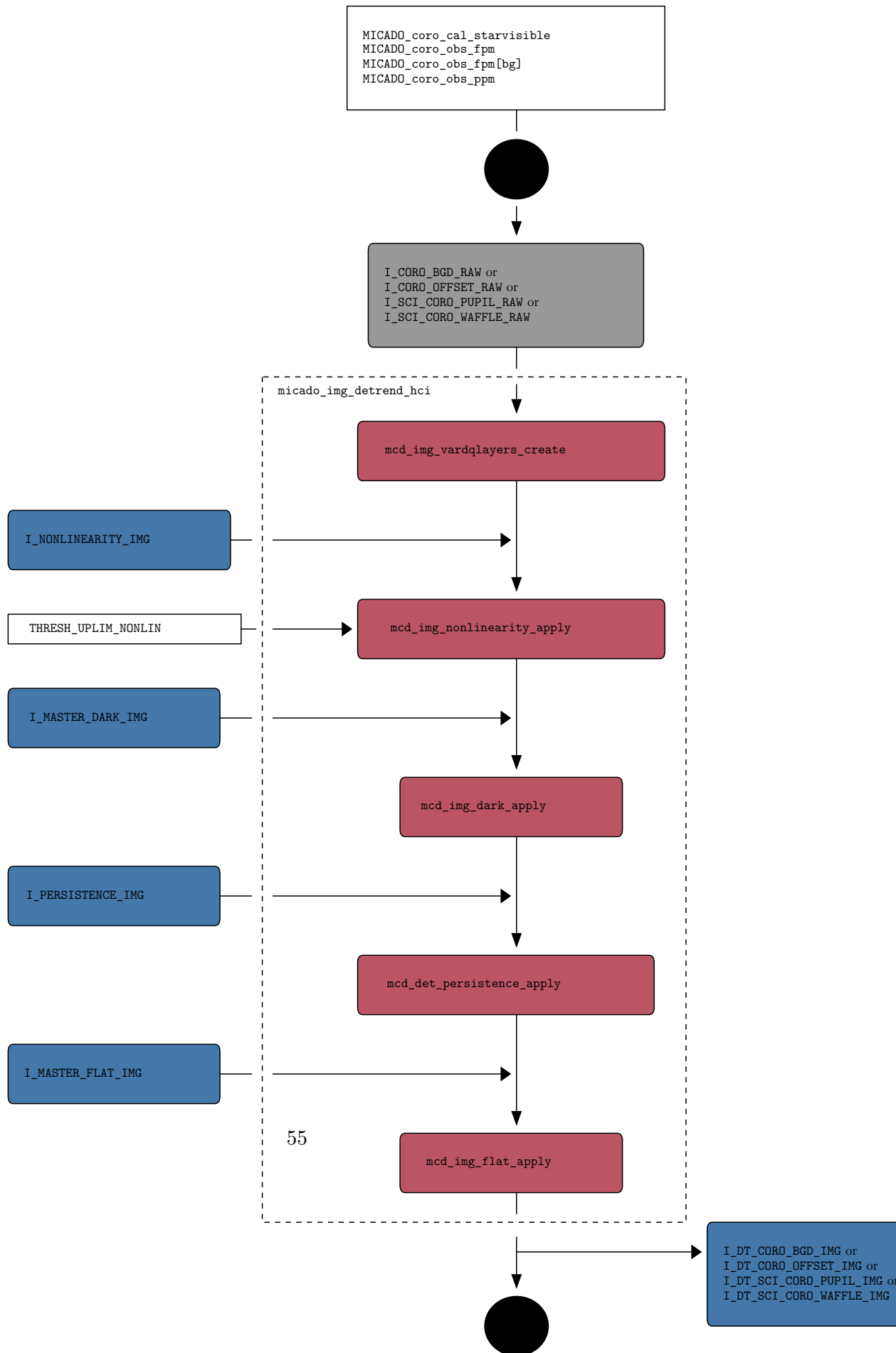


### 3.1.10 micado\_img\_detrend\_hci

Used in pipelines: High Contrast Imaging (Figure 11).

Recipe name:	micado_img_detrend_hci
Type:	Science
Purpose:	Apply to a raw exposure pixels observed in high-contrast imaging mode the additive and multiplicative factors to correct for detector instrumental fingerprint.
Input data:	I_CORO_RAW (I_CORO_BGD_RAW or I_CORO_OFFSET_RAW or I_SCI_CORO_PUPIL_RAW or I_SCI_CORO_WAFFLE_RAW) I_NONLINEARITY_IMG I_MASTER_DARK_IMG I_PERSISTENCE_IMG I_MASTER_FLAT_IMG
Output products:	I_DT_HCI_IMG (I_DT_CORO_BGD_IMG or I_DT_CORO_OFFSET_IMG or I_DT_SCI_CORO_PUPIL_IMG or I_DT_SCI_CORO_WAFFLE_IMG)
QC parameters:	QC.DETSMEAN QC.DETSMED QC.DETSSTD QC.DETRENCR QC.NPIXNONL QC.FPIXNONL
User Parameters:	REC NONLIN THRESUP (1.0)
Procedure:	See Figure 3.1.10.
DRL Functions:	mcd_img_flat_apply mcd_det_persistence_apply mcd_img_dark_apply mcd_img_nonlinearity_apply mcd_img_varqlayers_create
Error conditions:	None
Remarks:	None





### 3.1.11 micado\_img\_detrend

Used in pipelines: Standard Imaging (Figure ??), Astrometric Imaging (Figure 17), High Contrast Imaging (Figure 11).

Recipe name:	micado_img_detrend		
Type:	Science/Calibration		
Purpose:	Apply to a raw exposure pixels the additive and multiplicative factors to correct for detector instrumental fingerprint.		
Input data:	I_OPT_RAW (I_ASTROMFIELD_RAW or I_BKGFIELD_RAW or I_CAM_RAW or I_ILLUM_RAW or I_SCI_AI_RAW or I_SCI_RAW or I_STDFIELD_RAW or I_WAM_RAW) I_NONLINEARITY_IMG I_MASTER_DARK_IMG I_PERSISTENCE_IMG I_MASTER_FLAT_IMG		
Output products:	I_DT_IMG	(I_DT_ASTROMFIELD_IMG or I_DT_BKGFIELD_IMG or I_DT_CAM_IMG or I_DT_ILLUM_IMG or I_DT_SCI_AI_IMG or I_DT_SCI_SI_IMG or I_DT_STDFIELD_IMG or I_DT_WAM_IMG)	
QC parameters:	QC.DETSMEAN QC.DETSMED QC.DETSSTD QC.DETRENCR QC.NPIXNONL QC.FPIXNONL		
User Parameters:	REC NONLIN THRESUP (1.0)		
Procedure:	See Figure 3.1.11.		
DRL Functions:	mcd_img_flat_apply mcd_det_persistence_apply mcd_img_dark_apply mcd_img_nonlinearity_apply mcd_img_vardqlayers_create		
Error conditions:	None		
Remarks:	None		



MICADO\_coro\_cal\_starvisible  
MICADO\_coro\_obs\_fpm  
MICADO\_coro\_obs\_fpm[bg]  
MICADO\_coro\_obs\_ppm  
MICADO\_img\_cal\_coldmask  
MICADO\_img\_cal\_refstars  
MICADO\_img\_cal\_warmmask  
MICADO\_img\_cal\_zeropoint  
MICADO\_img\_obs  
MICADO\_img\_obs[bg]  
MICADO\_img\_obs\_astrometry  
MICADO\_img\_tec\_illum



I\_ASTROMFIELD\_RAW or  
I\_BKGFIELD\_RAW or  
I\_CAM\_RAW or  
I\_CORO\_BGD\_RAW or  
I\_CORO\_OFFSET\_RAW or  
I\_ILLUM\_RAW or  
I\_SCI\_AI\_RAW or  
I\_SCI\_CORO\_PUPIL\_RAW or  
I\_SCI\_CORO\_WAFFLE\_RAW or  
I\_SCI\_RAW or  
I\_STDFIELD\_RAW or  
I\_WAM\_RAW

micado\_img\_detrend

mcd\_img\_vardqlayers\_create

I\_NONLINEARITY\_IMG

THRESH\_UPLIM\_NONLIN

mcd\_img\_nonlinearity\_apply

I\_MASTER\_DARK\_IMG

mcd\_img\_dark\_apply

I\_PERSISTENCE\_IMG

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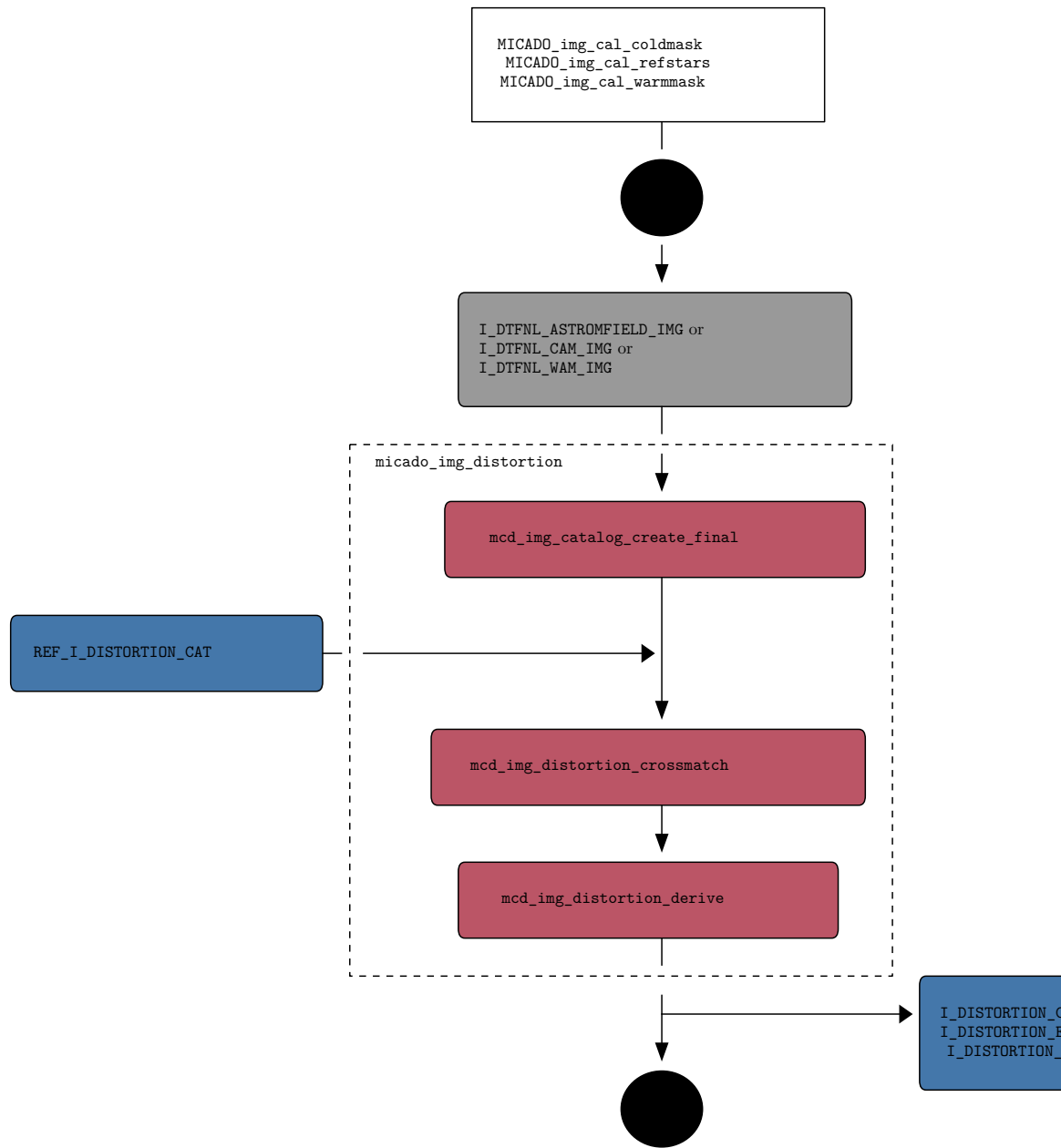
mcd\_det\_persistence\_apply

I\_MASTER\_FLAT\_IMG

### 3.1.12 micado\_img\_distortion

Used in pipelines: Astrometric Imaging (Figure 17).

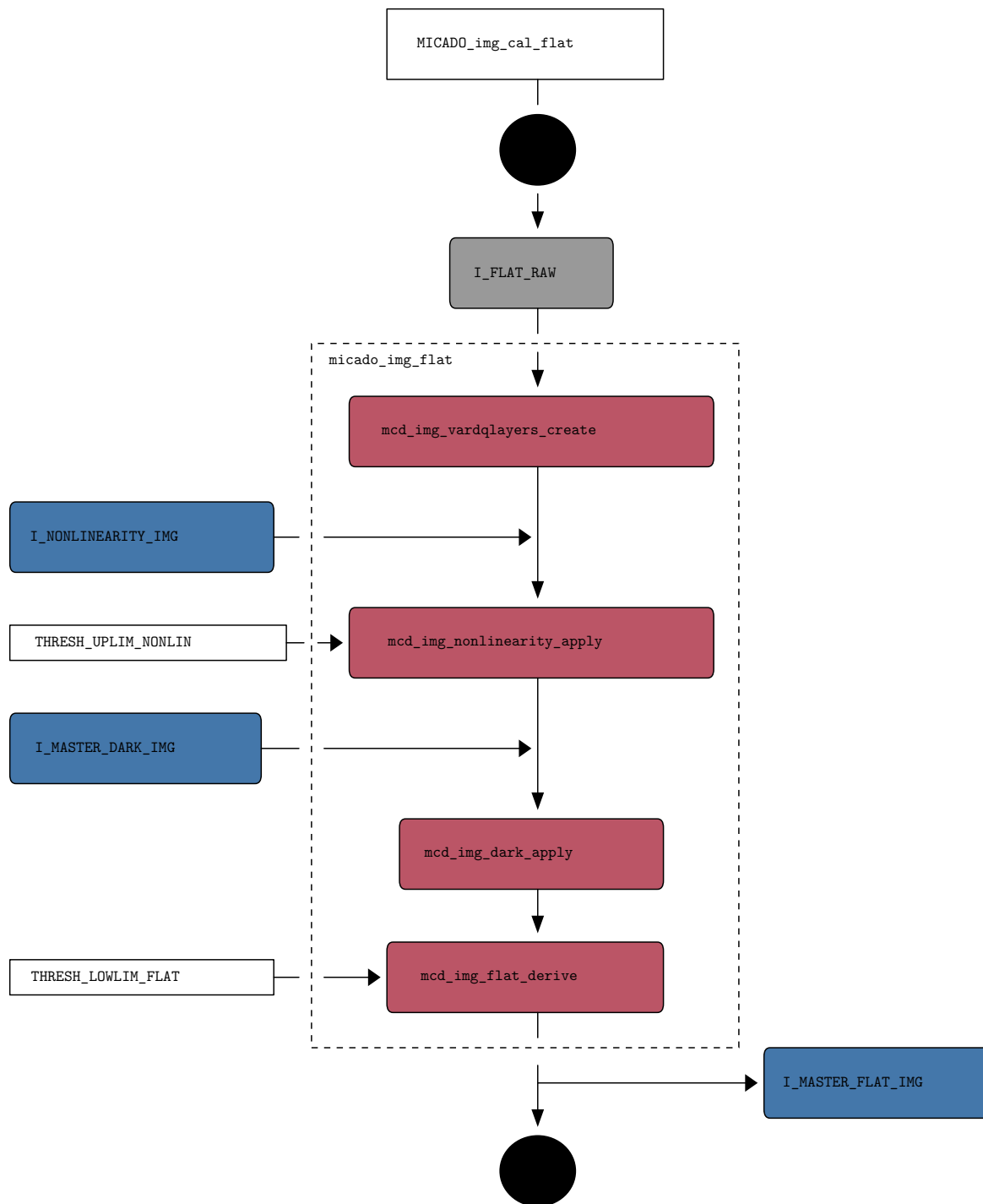
Recipe name:	micado_img_distortion		
Type:	Calibration		
Purpose:	None		
Input data:	I_DTFNL_IMG	(I_DTFNL_AstromFIELD_IMG or I_DTFNL_WAM_IMG)	
	REF_I_DISTORTION_CAT	(REF_I_Astrom_CAT or REF_I_CAM_CAT or REF_I_WAM_CAT)	
Output products:	I_DISTORTION_HDR	(I_DISTORTION_CAM_HDR or I_DISTORTION_ELT_HDR or I_DISTORTION_WAM_HDR)	
QC parameters:	QC.DISTORTXMIN QC.DISTORTXMAX QC.DISTORTXMEDIAN QC.DISTORTXMEAN QC.DISTORTYMIN QC.DISTORTYMAX QC.DISTORTYMEDIAN QC.DISTORTYMEAN		
User Parameters:	None		
Procedure:	See Figure 3.1.12.		
DRL Functions:	mcd_img_distortion_derive mcd_img_distortion_crossmatch mcd_img_catalog_create_final		
Error conditions:	None		
Remarks:	None		



### 3.1.13 micado\_img\_flat

Used in pipelines: Standard Imaging (Figure ??), Astrometric Imaging (Figure 17), High Contrast Imaging (Figure 11).

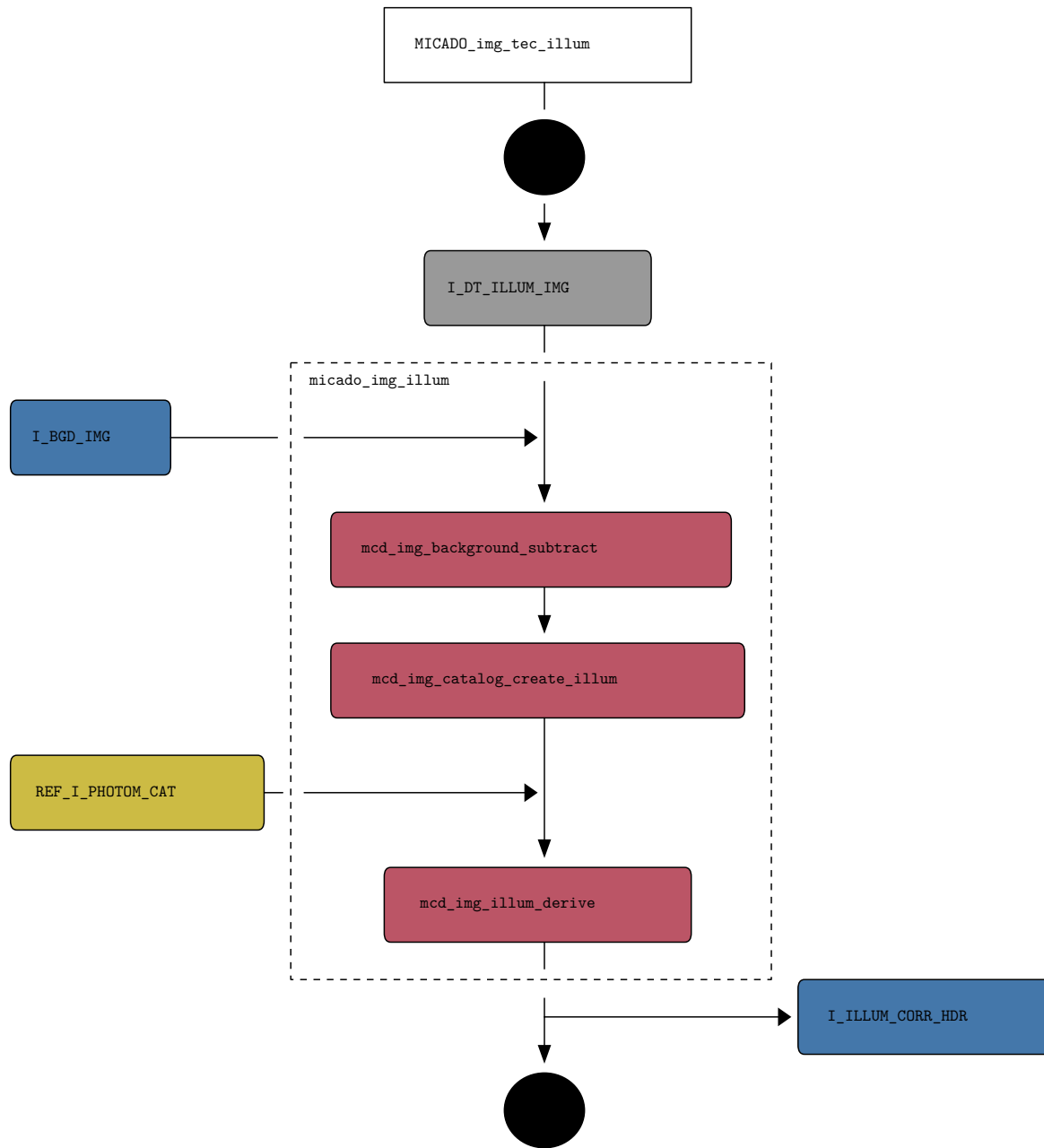
Recipe name:	micado_img_flat
Type:	Calibration
Purpose:	Determine pixelsensitivity variation at scale of few pixels and flag cold pixels.
Input data:	I_FLAT_RAW I_NONLINEARITY_IMG I_MASTER_DARK_IMG I_MASTER_FLAT_IMG
Output products:	
QC parameters:	QC.FLATMEAN QC.FLATMED QC.FLATSTD QC.NPIXHOT QC.FPIXHOT
User Parameters:	REC FLAT THRESLOW (0.0) REC NONLIN THRESUP (1.0)
Procedure:	See Figure 3.1.13.
DRL Functions:	mcd_img_flat_derive mcd_img_dark_apply mcd_img_nonlinearity_apply mcd_img_vardqlayers_create
Error conditions:	None
Remarks:	None



### 3.1.14 micado\_img\_illum

Used in pipelines: None.

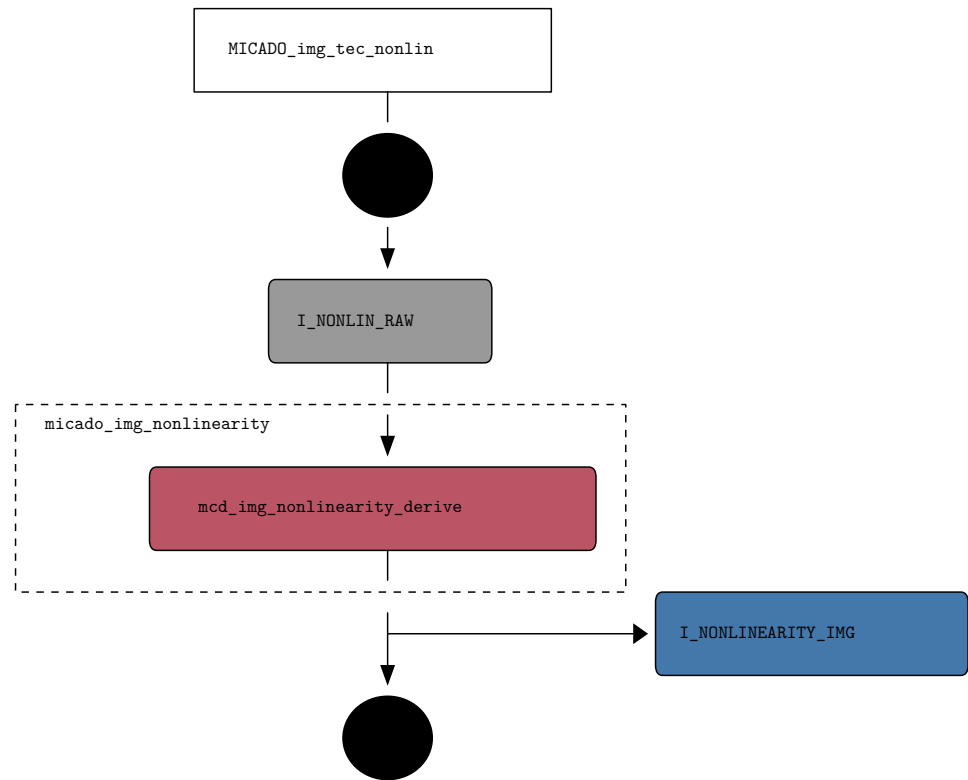
Recipe name:	micado_img_illum
Type:	Calibration
Purpose:	Determine spatial variation in illumination by flatlamp over detector array
Input data:	I_DT_ILLUM_IMG I_BGD_IMG REF_I_PHOTOM_CAT
Output products:	I_ILLUM_CORR_HDR
QC parameters:	QC.ILLUNMAT QC.ILLSNRMD
User Parameters:	None
Procedure:	See Figure 3.1.14.
DRL Functions:	mcd_img_illum_derive mcd_img_catalog_create_illum mcd_img_background_subtract
Error conditions:	None
Remarks:	These observations are on the Large Magellanic Cloud Reference Field. The reference magnitudes have accuracies of 1% or better. This calibration task assumes a polynomial behavior of the illumination variation.



### 3.1.15 micado\_img\_nonlinearity

Used in pipelines: None.

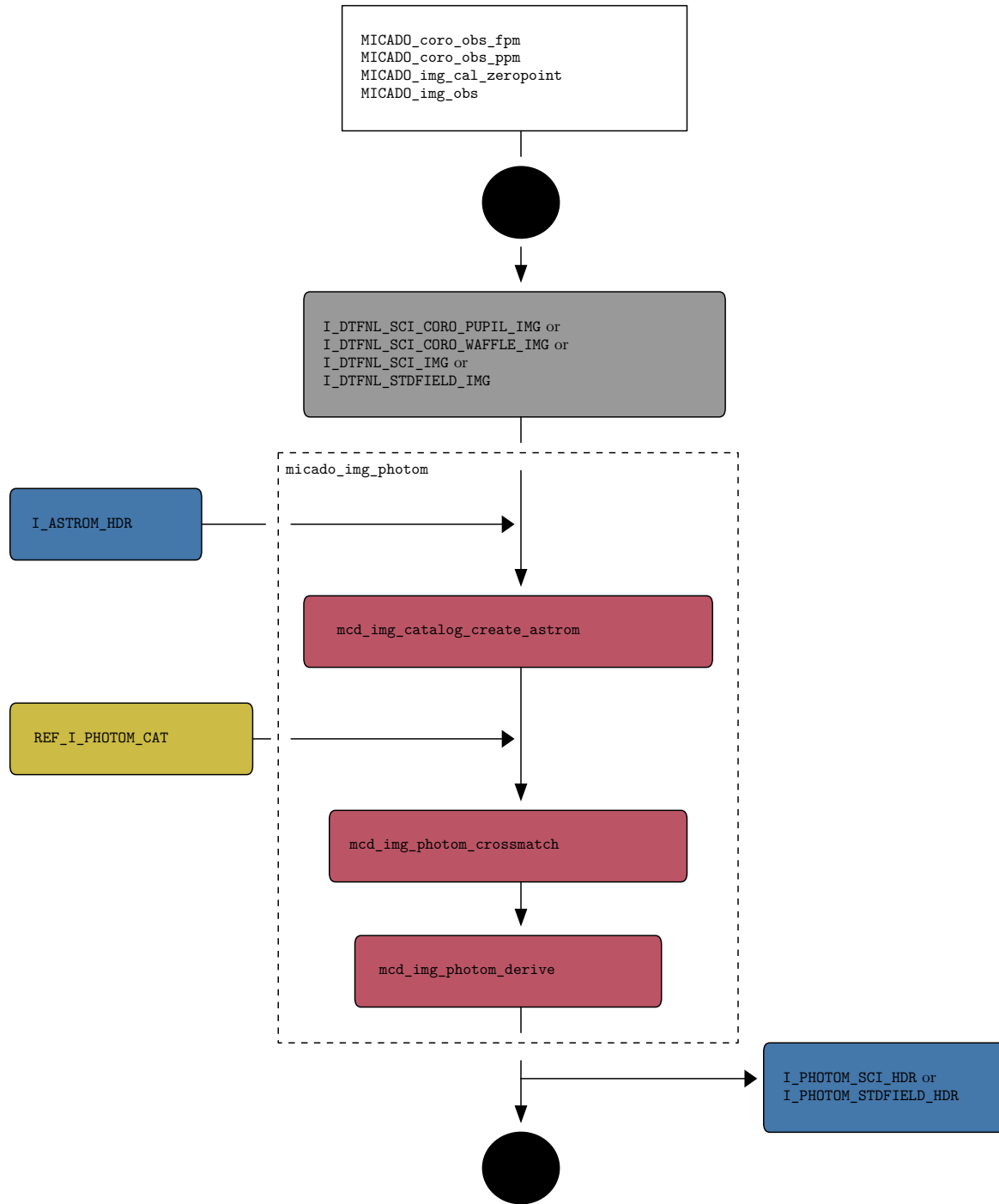
Recipe name:	micado_img_nonlinearity
Type:	Calibration
Purpose:	Determine the non-linear response, gain and readnoise of the MICADO detector pixels.
Input data:	I_NONLIN_RAW
Output products:	I_NONLINEARITY_IMG
QC parameters:	QC.FITSTD QC.NITER
User Parameters:	None
Procedure:	See Figure 3.1.15.
DRL Functions:	mcd_img_nonlinearity_derive
Error conditions:	None
Remarks:	The first time the non-linearity will be determined on Armazones is during commissioning, using the above described set of data which is of similar type of data as obtained in the lab for non-linearity determination as specified in Section 5.7 of [?]. Such a set will be observed for all 3 read-out modes (CDS, RRR and TLI). Then we use the two methods, one for CDS/RRR and other for TLI, as specified in Section 5 of [?] to derive the non-linearity correction and the gain and the readnoise. This can be compared to results in the lab. Same procedure and comparison to be repeated after each instrument intervention.



### 3.1.16 micado\_img\_photom

Used in pipelines: Standard Imaging (Figure ??), Astrometric Imaging (Figure 17).

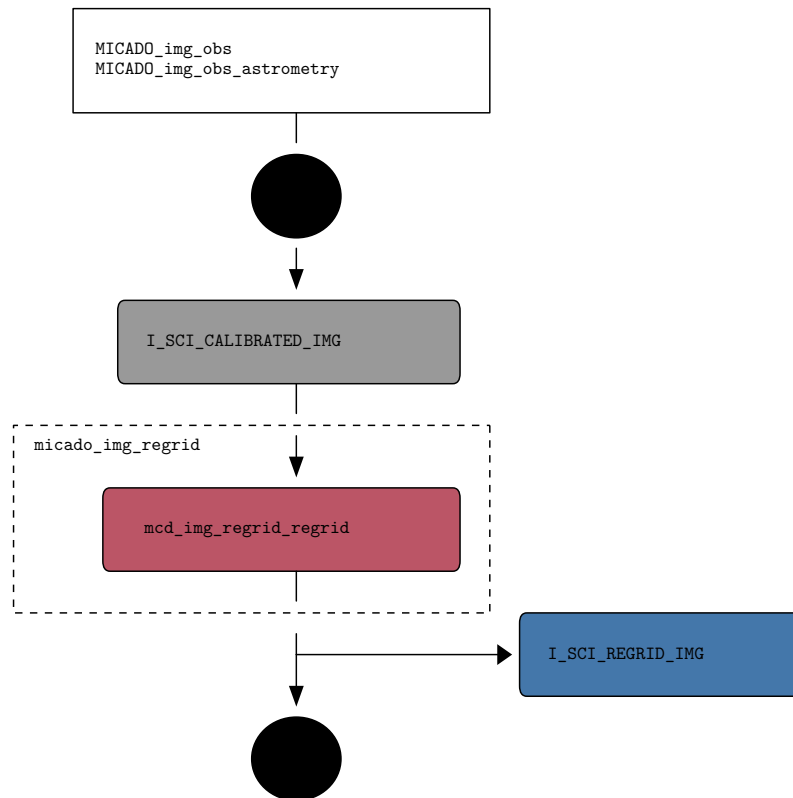
Recipe name:	micado_img_photom
Type:	Calibration
Purpose:	Determine the scalar zeropoint that converts fluxes (in units of ADUs) into magnitudes at the top of the atmosphere.
Input data:	I_DTFNL_IMG (I_DTFNL_AstromFIELD_IMG or I_DTFNL_CAM_IMG or I_DTFNL_CORO_OFFSET_IMG or I_DTFNL_SCI_AI_IMG or I_DTFNL_SCI_CORO_PUPIL_IMG or I_DTFNL_SCI_CORO_WAFFLE_IMG or I_DTFNL_SCI_IMG or I_DTFNL_STDFIELD_IMG or I_DTFNL_WAM_IMG) I_ASTROM_HDR REF_I_PHOTOM_CAT
Output products:	I_PHOTOM_HDR (I_PHOTOM_SCI_HDR or I_PHOTOM_STDFIELD_HDR)
QC parameters:	QC.ZPTSTD <i>i</i> QC.NMATCH <i>i</i>
User Parameters:	None
Procedure:	See Figure 3.1.16.
DRL Functions:	mcd_img_photom_derive mcd_img_photom_crossmatch mcd_img_catalog_create_astrom
Error conditions:	None
Remarks:	PHOTOM_TAB table contains zeropoint and extinction coefficient, one pair per detector. No user defined parameters by default. User can manually optimize source extraction parameters (e.g., aperture, SNR threshold reference sources). The photometric reference catalog is planned to be constructed from existing near-IR standard catalogs plus Euclid YJH catalogs and/or VISTA surveys.



### 3.1.17 micado\_img\_regrid

Used in pipelines: Astrometric Imaging (Figure 17).

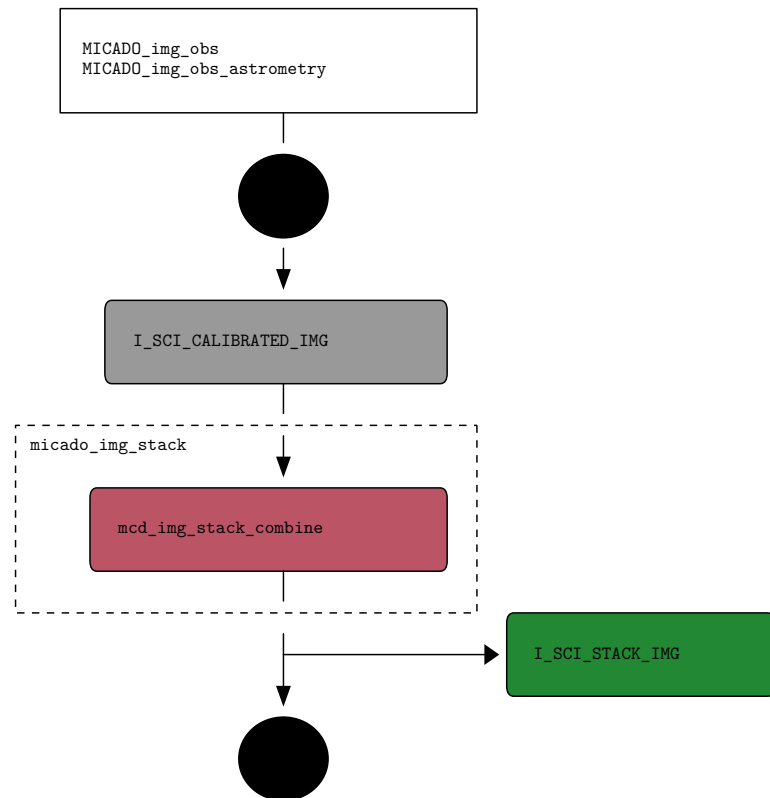
Recipe name:	micado_img_regrid
Type:	Science
Purpose:	Regrid the science exposure.
Input data:	I_SCI_CALIBRATED_IMG
Output products:	I_SCI_REGRID_IMG
QC parameters:	REGRID_M REGRID_S REGRID_M
User Parameters:	None
Procedure:	See Figure 3.1.17.
DRL Functions:	mcd_img_regrid_regrid
Error conditions:	None
Remarks:	None



### 3.1.18 micado\_img\_stack

Used in pipelines: Standard Imaging (Figure ??).

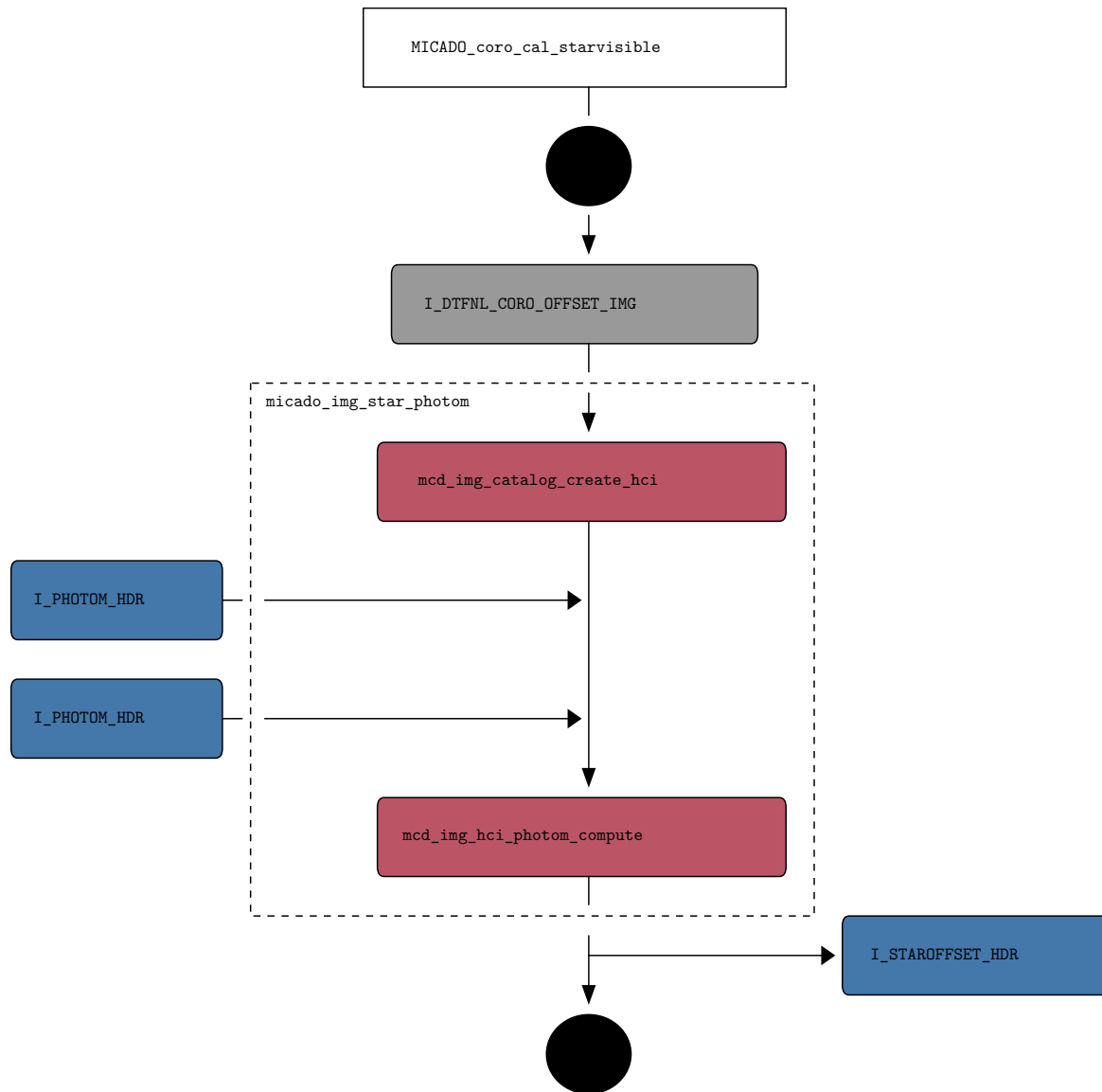
Recipe name:	micado_img_stack
Type:	Science
Purpose:	Combine calibrated exposures into one stack.
Input data:	I_SCI_CALIBRATED_IMG
Output products:	I_SCI_STACK_IMG
QC parameters:	STACK_ME STACK_ST STACK_ME
User Parameters:	None
Procedure:	See Figure 3.1.18.
DRL Functions:	mcd_img_stack_combine
Error conditions:	None
Remarks:	TODO: User defined parameters: Projection point for stack. For stacking: weighting scheme in coaddition.



### 3.1.19 micado\_img\_star\_photom

Used in pipelines: High Contrast Imaging (Figure 11).

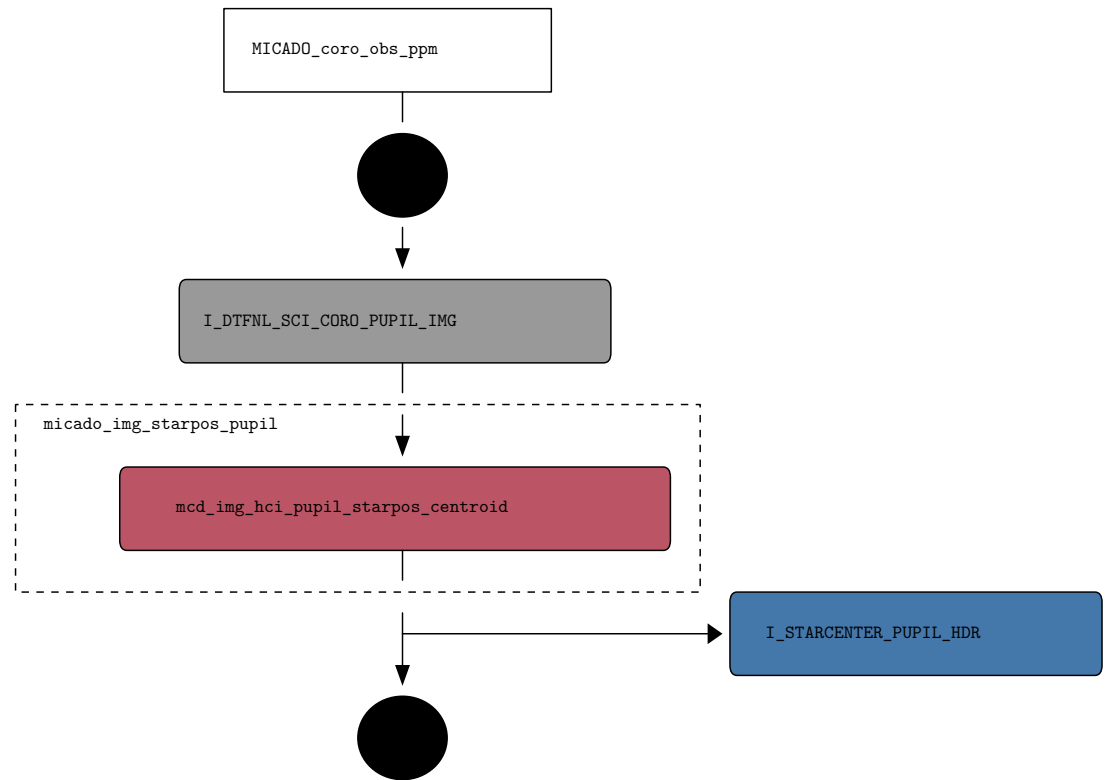
Recipe name:	micado_img_star_photom		
Type:	Calibration		
Purpose:	Determine zeropoint and centroid of the central bright star.		
Input data:	I_DTFNL_CORO_OFFSET_IMG I_PHOTOM_HDR (I_PHOTOM_SCI_HDR or I_PHOTOM_STDFIELD_HDR) I_PHOTOM_HDR (I_PHOTOM_SCI_HDR or I_PHOTOM_STDFIELD_HDR) I_STAROFFSET_HDR		
Output products:			
QC parameters:	QC.STAROFFSETS NRMINn QC.STAROFFSETS NRMAXn QC.STAROFFSETS NRMEDn QC.STAROFFSETS NRMEAn		
User Parameters:	None		
Procedure:	See Figure 3.1.19.		
DRL Functions:	mcd_img_hci_photom_compute mcd_img_catalog_create_hci		
Error conditions:	None		
Remarks:	See Section 5 in [?] for details of procedure and algorithm.		



### 3.1.20 micado\_img\_starpos\_pupil

Used in pipelines: High Contrast Imaging (Figure 11).

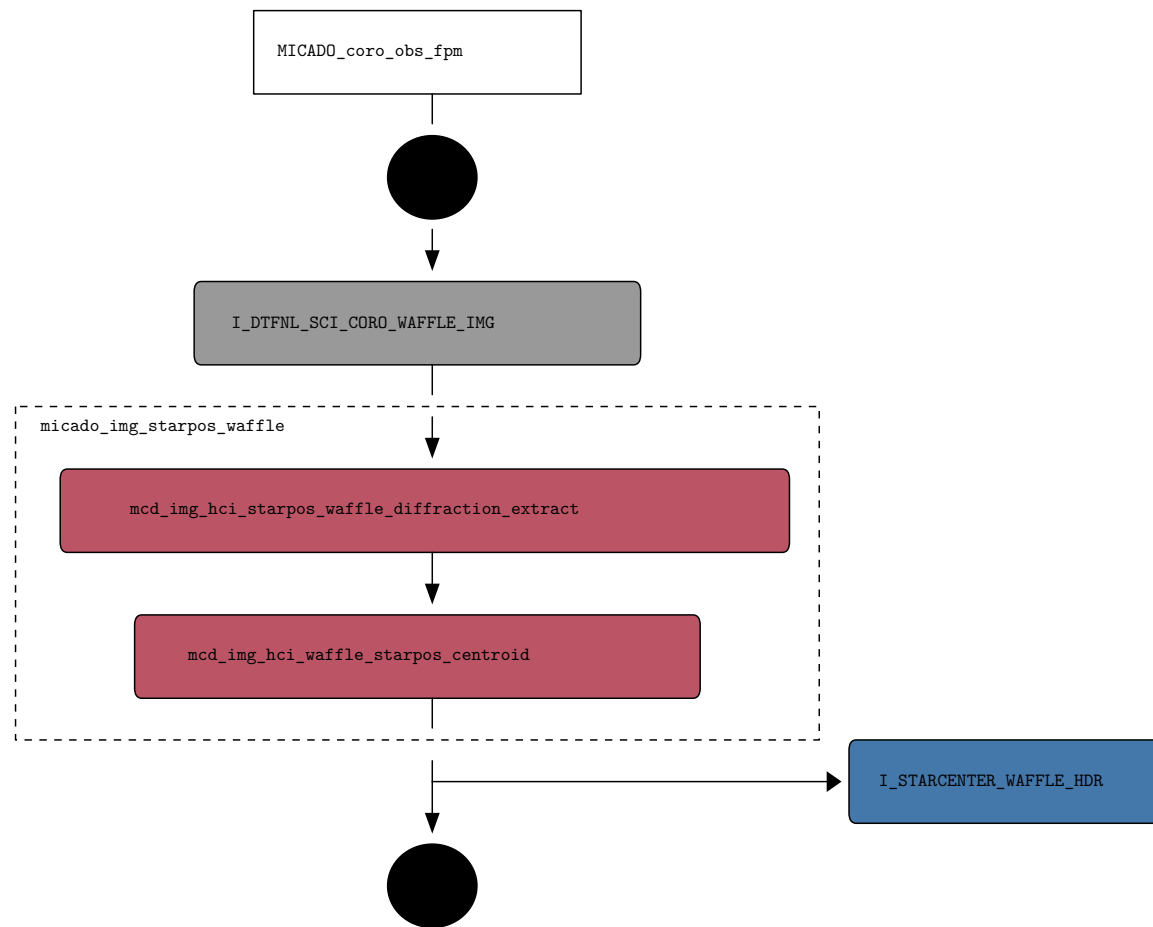
Recipe name:	micado_img_starpos_pupil
Type:	Science
Purpose:	Determine the target star center when using the pupil imager.
Input data:	I_DTFNL_SCI_CORO_PUPIL_IMG
Output products:	I_STARCENTER_PUPIL_HDR
QC parameters:	QC.STARPOS.SNRMINi QC.STARPOS.SNRMAXi QC.STARPOS.SNRMEDi QC.STARPOS.SNRMEANi
User Parameters:	None
Procedure:	See Figure 3.1.20.
DRL Functions:	mcd_img_hci_pupil_starpos_centroid
Error conditions:	None
Remarks:	None.



### 3.1.21 micado\_img\_starpos\_waffle

Used in pipelines: High Contrast Imaging (Figure 11).

Recipe name:	micado_img_starpos_waffle
Type:	Science
Purpose:	Determine the position of the central bright star (in pixel units) when blocked by the focal plane mask in order to provide a reference input for frame derotation.
Input data:	I_DTFNL_SCI_CORO_WAFFLE_IMG
Output products:	I_STARCENTER_WAFFLE_HDR
QC parameters:	QC.STARPOS.SNRMINi QC.STARPOS.SNRMAXi QC.STARPOS.SNRMEDi QC.STARPOS.SNRMEANi
User Parameters:	None
Procedure:	See Figure 3.1.21.
DRL Functions:	mcd_img_hci_waffle_starpos_centroid mcd_img_hci_starpos_waffle_diffraction_extract
Error conditions:	None
Remarks:	TBD if it is really needed. Shifts could occur because of VIS/NIR difference SCAO and image, mechanical drift etc.. See <a href="http://adsabs.harvard.edu/abs/2006ApJ...647..612M">http://adsabs.harvard.edu/abs/2006ApJ...647..612M</a> , <a href="http://adsabs.harvard.edu/abs/2013aoel.confE..63L">http://adsabs.harvard.edu/abs/2013aoel.confE..63L</a> and <a href="http://cdsads.u-strasbg.fr/abs/2016ApJ...820...40A">http://cdsads.u-strasbg.fr/abs/2016ApJ...820...40A</a> for a description of this approach. TBD whether all exposures shall be done with waffle or all exposures without waffle, or partially with and without. Decide this on residuals.

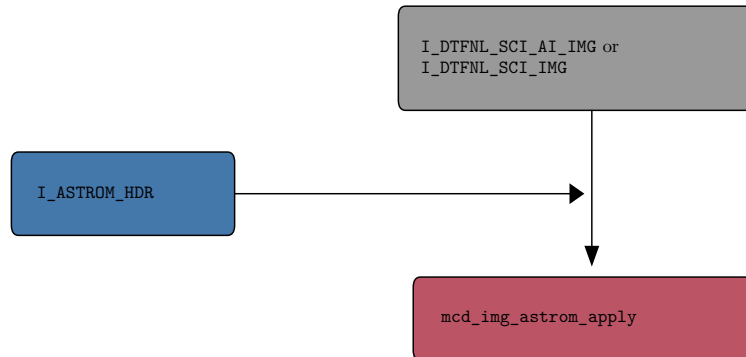


## 3.2 DRL Functions

CPL Recipe	DRL Function
<code>micado_img_nonlinearity</code> (5.0.6)	<code>mcd_img_nonlinearity_derive</code> (3.2.29)
<code>micado_det_dark</code> (5.0.4)	<code>mcd_det_dark_derive</code> (3.2.27) <code>mcd_img_vardqlayers_create</code> (3.2.22)
<code>micado_det_persistence</code> (3.1.2)	<code>mcd_det_persistence_derive</code> (3.2.30)
<code>micado_img_flat</code> (5.0.5)	<code>mcd_img_flat_derive</code> (3.2.28) <code>mcd_img_dark_apply</code> (3.2.3) <code>mcd_img_nonlinearity_apply</code> (3.2.5) <code>mcd_img_vardqlayers_create</code> (3.2.22)
<code>micado_img_detrend</code> (3.1.11)	<code>mcd_img_flat_apply</code> (3.2.4) <code>mcd_det_persistence_apply</code> (3.2.6) <code>mcd_img_dark_apply</code> (3.2.3) <code>mcd_img_nonlinearity_apply</code> (3.2.5) <code>mcd_img_vardqlayers_create</code> (3.2.22)
<code>micado_img_background</code> (3.1.4)	<code>mcd_img_background_derive</code> (3.2.24)
<code>micado_img_illum</code> (5.0.3)	<code>mcd_img_illum_derive</code> (3.2.26) <code>mcd_img_catalog_create_illum</code> (3.2.21) <code>mcd_img_background_subtract</code> (3.2.37)
<code>micado_img_detrend_final</code> (3.1.9)	<code>mcd_img_illum_apply</code> (3.2.2) <code>mcd_img_background_subtract</code> (3.2.37)
<code>micado_img_detrend_hci</code> (3.1.10)	<code>mcd_img_flat_apply</code> (3.2.4) <code>mcd_det_persistence_apply</code> (3.2.6) <code>mcd_img_dark_apply</code> (3.2.3) <code>mcd_img_nonlinearity_apply</code> (3.2.5) <code>mcd_img_vardqlayers_create</code> (3.2.22)
<code>micado_img_distortion</code> (5.0.2)	<code>mcd_img_distortion_derive</code> (3.2.25) <code>mcd_img_distortion_crossmatch</code> (3.2.34) <code>mcd_img_catalog_create_final</code> (3.2.19)
<code>micado_img_astrom</code> (3.1.3)	<code>mcd_img_astrom_derive</code> (3.2.23) <code>mcd_img_astrom_crossmatch</code> (3.2.36) <code>mcd_img_astrom_geom_correct</code> (3.2.15) <code>mcd_img_catalog_create_final</code> (3.2.19)
<code>micado_img_photom</code> (5.0.7)	<code>mcd_img_photom_derive</code> (3.2.31) <code>mcd_img_photom_crossmatch</code> (3.2.35) <code>mcd_img_catalog_create_astrom</code> (3.2.17)
<code>micado_img_calibrate</code> (3.1.7)	<code>mcd_img_photom_apply</code> (3.2.7) <code>mcd_img_astrom_apply</code> (3.2.1)
<code>micado_img_star_photom</code> (5.0.8)	<code>mcd_img_hci_photom_compute</code> (3.2.13) <code>mcd_img_catalog_create_hci</code> (3.2.20)
<code>micado_img_calib_hci</code> (3.1.5)	<code>mcd_img_hci_calib_position</code> (3.2.16) <code>mcd_img_hci_calib_flux</code> (3.2.14) <code>mcd_img_hci_calib_parallactic</code> (3.2.9)
<code>micado_img_regrid</code> (3.1.17)	<code>mcd_img_regrid_regrid</code> (3.2.33)
<code>micado_img_calibrated_catalog</code> (3.1.6)	<code>mcd_img_catalog_create_calibrated</code> (3.2.18)
<code>micado_img_stack</code> (3.1.18)	<code>mcd_img_stack_combine</code> (3.2.10)
<code>micado_img_cube_hci</code> (3.1.8)	<code>mcd_img_hci_cube_assemble</code> (3.2.8)
<code>micado_img_starpos_waffle</code> (3.1.21)	<code>mcd_img_hci_waffle_starpos_centroid</code> (3.2.12) <code>mcd_img_hci_starpos_waffle_diffraction_extract</code> (3.2.10)
<code>micado_img_starpos_pupil</code> (3.1.20)	<code>mcd_img_hci_pupil_starpos_centroid</code> (3.2.11)

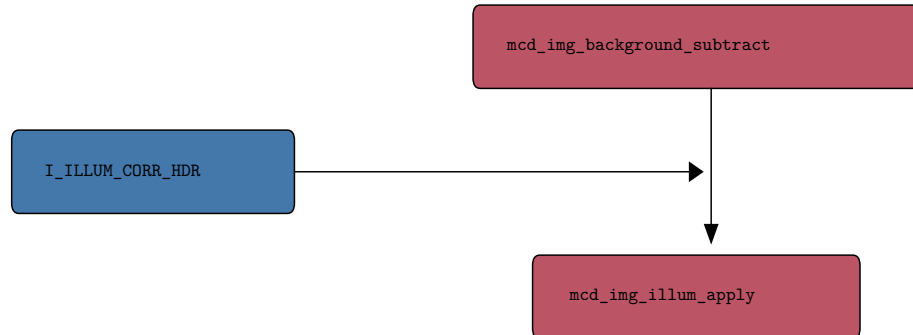
Table 76: Decomposition of imaging CPL Recipes into DRL Functions.

### 3.2.1 mcd\_img\_astrom\_apply



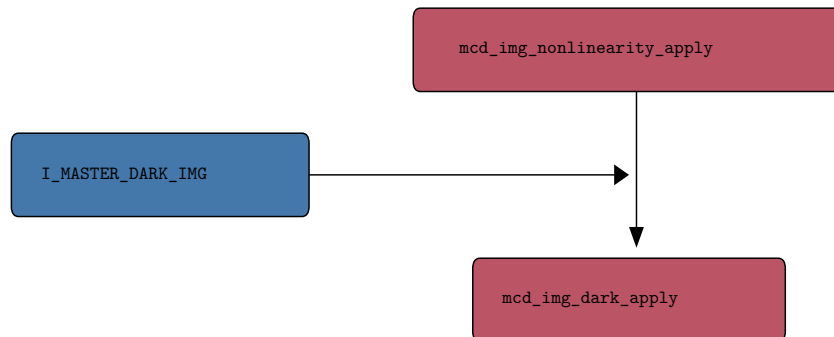
Name:	mcd_img_astrom_apply
Purpose:	Apply Astrometric Solution.
Used in recipes:	<code>micado_img_calibrate</code>
Working re- marks:	None
Function Param- eters:	None
Inputs:	<pre>const micado_i_dtfnl_sci_img * progenitor const micado_i_astrom_hdr * astrom micado_img * product</pre>
Other outputs:	<code>cpl_error_code</code>
General descrip- tion:	Apply the astrometric solution to each detector. Only header values are updated.
Mathematical description:	Copy the headers <code>detrendfinal_header</code> and <code>detrendfinal_extheaders</code> into the empty <code>apply_astrom_header</code> and <code>apply_astrom_extheaders</code> , and copy the astrometric solution from <code>astrom_header</code> .
Quality assess- ment:	Through QC parameters
Error conditions:	See [?].
Unit tests:	See [?].

### 3.2.2 mcd\_img\_illum\_apply



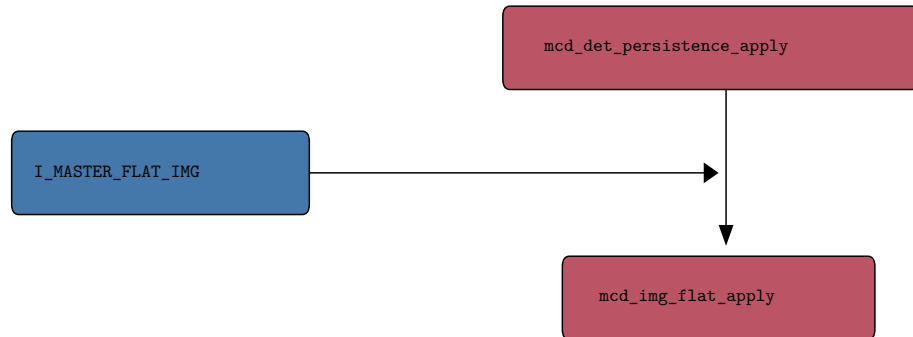
Name:	<code>mcd_img_illum_apply</code>
Purpose:	Apply Illumination Correction.
Used in recipes:	<code>micado_img_detrend_final</code>
Working re- marks:	None
Function Param- eters:	None
Inputs:	<code>const micado_img * progenitor</code> <code>const micado_i_illum_corr_hdr * illum</code> <code>micado_i_dtfnl_img * product</code>
Other outputs:	<code>cpl_error_code</code>
General descrip- tion:	For each detector: * Convert illumination correction parametrization into an image following the boundaries of the detector. * Multiply image with the illumination correction. * Propagate discrete detector offset.
Mathematical description:	For each detector: * Generate a <code>hdrl_image</code> with the illumination correction and associated uncertainty. No bad pixels. * Update the header with the discrete detector offset. Adapt the extensions as follows: * DATA: Multiply with the DATA layer of the illumination correction image. * ERR: Propagate the ERR layer of of the illumination image assuming uncorrelated uncertainties.
Quality assess- ment:	Through QC parameters
Error conditions:	See [?].
Unit tests:	See [?].

### 3.2.3 mcd\_img\_dark\_apply



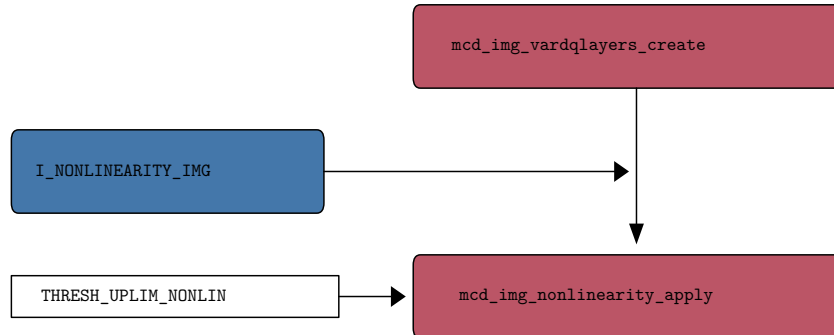
Name:	<code>mcd_img_dark_apply</code>
Purpose:	Apply MasterDark Correction.
Used in recipes:	<code>micado_img_flat</code> <code>micado_img_detrend</code> <code>micado_img_detrend_hci</code>
Working re- marks:	None
Function Param- eters:	None
Inputs:	<code>const micado_img * progenitor</code> <code>const micado_i_master_dark_img * masterdark</code> <code>micado_img * product</code>
Other outputs:	<code>cpl_error_code</code>
General descrip- tion:	Subtract the MasterDark.
Mathematical description:	For each detector adapt the extensions as follows: * DATA: Subtract the DATA layer of the MasterDark image. * ERR: Propagate the ERR layer of of the MasterDark image assuming uncorrelated uncertainties. * DQ: XOR with the DQ layer of the MasterDark image. For each header copy the QC parameters from the masterdark header.
Quality assess- ment:	Through QC parameters
Error conditions:	See [?].
Unit tests:	See [?].

### 3.2.4 mcd\_img\_flat\_apply



Name:	<code>mcd_img_flat_apply</code>
Purpose:	Apply MasterFlat Correction.
Used in recipes:	<code>micado_img_detrend</code> <code>micado_img_detrend_hci</code>
Working re- marks:	None
Function Param- eters:	None
Inputs:	<code>const micado_img * progenitor</code> <code>const micado_i_master_flat_img * masterflat</code> <code>micado_i_dt_img * product</code>
Other outputs:	<code>cpl_error_code</code>
General descrip- tion:	Divide by the MasterFlat.
Mathematical description:	For each detector adapt the extensions as follows: * DATA: Divide with the DATA layer of the MasterFlat image. * ERR: Propagate the ERR layer of of the MasterFlat image assuming uncorrelated uncertainties. * DQ: XOR with the DQ layer of the MasterFlat image. For each header copy the QC parameters from the masterdark header.
Quality assess- ment:	Through QC parameters
Error conditions:	See [?].
Unit tests:	See [?].

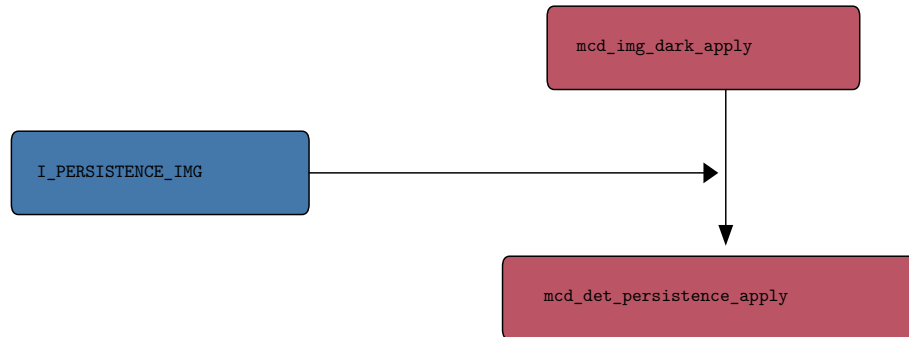
### 3.2.5 mcd\_img\_nonlinearity\_apply



Name:	mcd_img_nonlinearity_apply
Purpose:	Apply Non-linearity Correction.
Used in recipes:	<code>micado_img_flat</code> <code>micado_img_detrend</code> <code>micado_img_detrend_hci</code>
Working re- marks:	None
Function Param- eters:	Name: <code>THRESH_UPLIM_NONLIN</code> Type: float Unit: None Default: 1.0 Description: Upper threshold of non-linearity as per- centage of flux
Inputs:	<code>const micado_img * progenitor</code> <code>const micado_i_nonlinearity_img * nonlinearity</code> <code>micado_img * product</code>
Other outputs:	<code>cpl_error_code</code>
General descrip- tion:	The exposure data is corrected for non-linearity by ap- plying the fitted polynomials to the pixel values. The non linear flag will be set for pixels that exceed the linearity limit.
Mathematical description:	For each detector adapt the extensions as follows: * DATA: Apply the polynomials to the pixel values. * ERR: Propagate the uncertainty, taking confidence of the fit into account. * DQ: Set the non linear flag where applicable. For each header copy the QC parameters from the non- linearity headers.

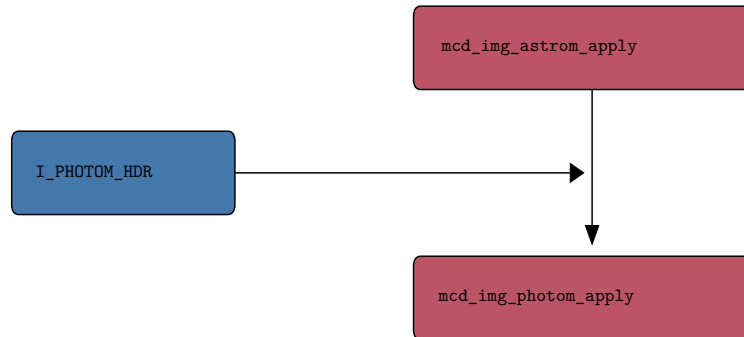
Quality assessment:	Through QC parameters
Error conditions:	See [?].
Unit tests:	See [?].

### 3.2.6 mcd\_det\_persistence\_apply



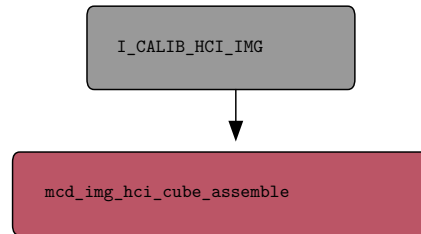
Name:	<code>mcd_det_persistence_apply</code>
Purpose:	Apply Persistence Correction.
Used in recipes:	<code>micado_img_detrend</code> <code>micado_img_detrend_hci</code>
Working re- marks:	None
Function Param- eters:	None
Inputs:	<code>const micado_img * progenitor</code> <code>const micado_i_persistence_img * persistence</code> <code>micado_img * product</code>
Other outputs:	<code>cpl_error_code</code>
General descrip- tion:	Subtract the Persistence.
Mathematical description:	For each detector adapt the extensions as follows: * DATA: Subtract the DATA layer of the Persistence image. * ERR: Propagate the ERR layer of of the Persistence image assuming uncorrelated uncertainties. * DQ: XOR with the DQ layer of the Persistence image. * PRS: Optionally create a layer with the persistence image itself. For each header copy the QC parameters from the non-linearity headers.
Quality assess- ment:	Through QC parameters
Error conditions:	See [?].
Unit tests:	See [?].

### 3.2.7 mcd\_img\_photom\_apply



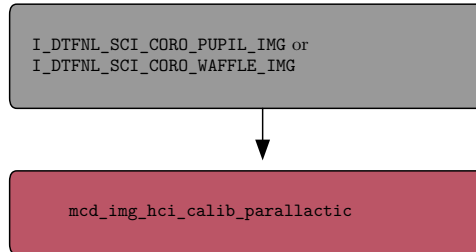
Name:	<code>mcd_img_photom_apply</code>
Purpose:	Apply Photometric Solution.
Used in recipes:	<code>micado_img_calibrate</code>
Working remarks:	None
Function Parameters:	None
Inputs:	<code>const micado_img * progenitor</code> <code>const micado_i_photom_hdr * photom</code> <code>micado_i_sci_calibrated_img * product</code>
Other outputs:	<code>cpl_error_code</code>
General description:	Apply the photometric solution to each detector. Only header values are updated.
Mathematical description:	Copy the photometric zeropoint for each detector into the image headers.
Quality assessment:	Through QC parameters
Error conditions:	See [?].
Unit tests:	See [?].

### 3.2.8 mcd\_img\_hci\_cube\_assemble



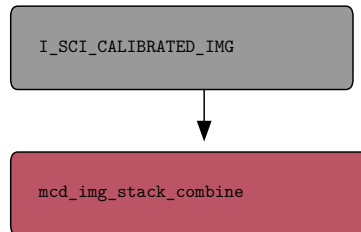
Name:	mcd_img_hci_cube_assemble
Purpose:	Assemble Cube with HCI images.
Used in recipes:	<code>micado_img_cube_hci</code>
Working re- marks:	None
Function Param- eters:	None
Inputs:	<code>const micado_i_calib_hci_img * progenitor</code> <code>micado_i_cube_hci_img * product</code>
Other outputs:	<code>cpl_error_code</code>
General descrip- tion:	Collect all detrended High Contrast Images and create cube.
Mathematical description:	Combine all input <code>hdrl_image</code> into a single <code>hdrl_imagelist</code> . Each image and extension header is copied without alteration.
Quality assess- ment:	Through QC parameters
Error conditions:	See [?].
Unit tests:	See [?].

### 3.2.9 mcd\_img\_hci\_calib\_parallactic



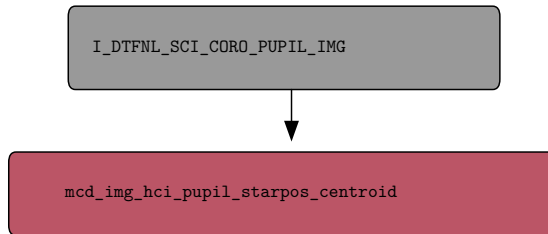
Name:	mcd_img_hci_calib_parallactic
Purpose:	Calculate the parallactic angle of each exposure.
Used in recipes:	<code>micado_img_calib_hci</code>
Working re- marks:	None
Function Param- eters:	None
Inputs:	<code>const micado_i_dtfnl_hci_sci_img * progenitor micado_img * product</code>
Other outputs:	<code>cpl_error_code</code>
General descrip- tion:	Calculate the parallactic angle of each exposure from the begin and end position in the primary header. Calculation is entirely in header-space, no pixels are used.
Mathematical description:	The parallactic angle is calculated through a linear in- terpolation.
Quality assess- ment:	Through QC parameters
Error conditions:	See [?].
Unit tests:	See [?].

### 3.2.10 mcd\_img\_stack\_combine



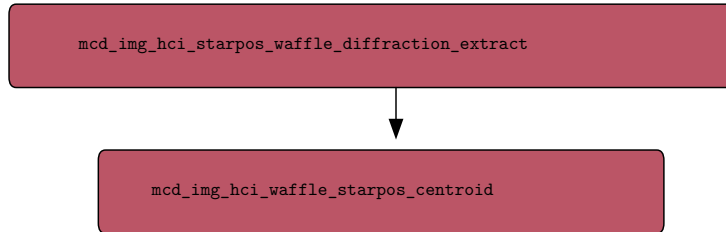
Name:	mcd_img_stack_combine
Purpose:	Stack all calibratade exposures of an observation.
Used in recipes:	<a href="#">micado_img_stack</a>
Working re- marks:	None
Function Param- eters:	None
Inputs:	<pre>const micado_i_sci_calibrated_img * progenitor micado_i_sci_stack_img * product</pre>
Other outputs:	cpl_error_code
General descrip- tion:	Stack all calibratade exposures of an observation using <code>hdrl_imagelist_combine()</code> .
Mathematical description:	<p>Create a new image with the footprint of all the other images combined.</p> <p>For each pixel set the layers as follows:</p> <ul style="list-style-type: none"> <li>* DATA: Sum the fraction contribution of each pixel in the calibrated images that contributes to this pixel.</li> <li>* ERR: Create a weighted average of the uncertainty the calibrated pixels assuming uncorrelated uncertainties between pixels.</li> <li>* DQ: OR each calibrated pixel data quality value that affects this pixel.</li> </ul>
Quality assess- ment:	Through QC parameters
Error conditions:	See [?].
Unit tests:	See [?].

### 3.2.11 mcd\_img\_hci\_pupil\_starpos\_centroid



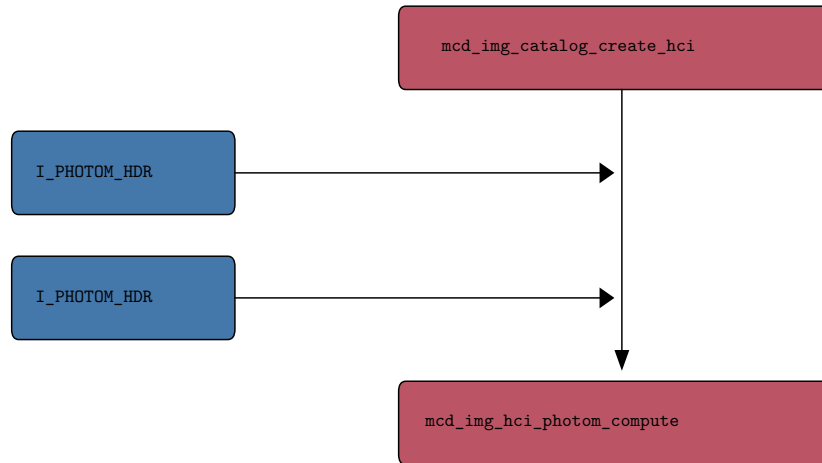
Name:	mcd_img_hci_pupil_starpos_centroid
Purpose:	Compute the centroid of the pupil mode image.
Used in recipes:	<a href="#">micado_img_starpos_pupil</a>
Working remarks:	Only applicable to vAPP exposures, does nothing for SAM exposures.
Function Parameters:	None
Inputs:	<code>const micado_i_dtfnl_sci_img * progenitor</code> <code>micado_i_starcenter_pupil_hdr * product</code>
Other outputs:	<code>cpl_error_code</code>
General description:	None
Mathematical description:	The center of gravity is determined for the pixel values. Stored as STARCENTERPUPIL_HDR.
Quality assessment:	Through QC parameters
Error conditions:	See [?].
Unit tests:	See [?].

### 3.2.12 mcd\_img\_hci\_waffle\_starpos\_centroid



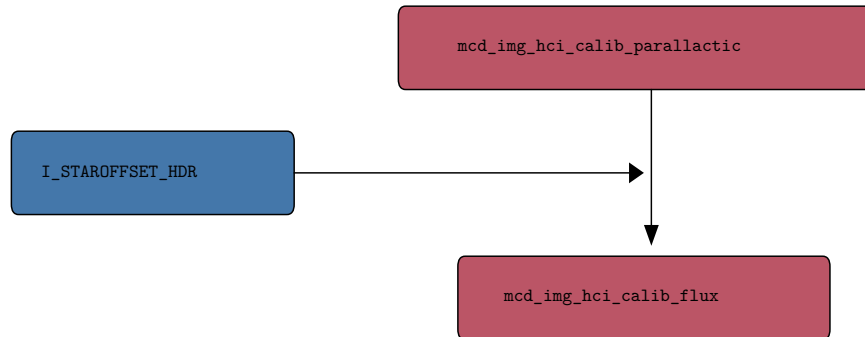
Name:	<code>mcd_img_hci_waffle_starpos_centroid</code>
Purpose:	Compute the centroid of the 4 peaks of the waffle PSF.
Used in recipes:	<code>micado_img_starpos_waffle</code>
Working re- marks:	None
Function Param- eters:	None
Inputs:	<code>const micado_img * progenitor</code> <code>micado_i_starcenter_waffle_hdr * product</code>
Other outputs:	<code>cpl_error_code</code>
General descrip- tion:	Compute the center of gravity of the four PSF peaks.
Mathematical description:	Compute the center of gravity of the four PSF peaks.
Quality assess- ment:	Through QC parameters
Error conditions:	See [?].
Unit tests:	See [?].

### 3.2.13 mcd\_img\_hci\_photom\_compute



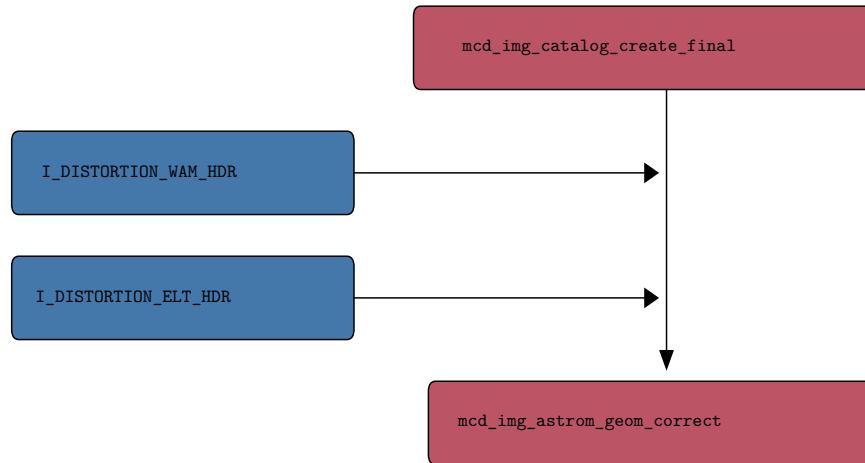
Name:	<code>mcd_img_hci_photom_compute</code>
Purpose:	Determine zeropoint and centroid of the central bright star.
Used in recipes:	<code>micado_img_star_photom</code>
Working re- marks:	None
Function Param- eters:	None
Inputs:	<code>const micado_img * progenitor</code> <code>const micado_i_photom_hdr * zpt_calib</code> <code>const micado_i_photom_hdr * zpt_science</code> <code>micado_i_staroffset_hdr * product</code>
Other outputs:	<code>cpl_error_code</code>
General descrip- tion:	None
Mathematical description:	Determine zeropoint and centroid of the central bright star.
Quality assess- ment:	Through QC parameters
Error conditions:	See [?].
Unit tests:	See [?].

### 3.2.14 mcd\_img\_hci\_calib\_flux



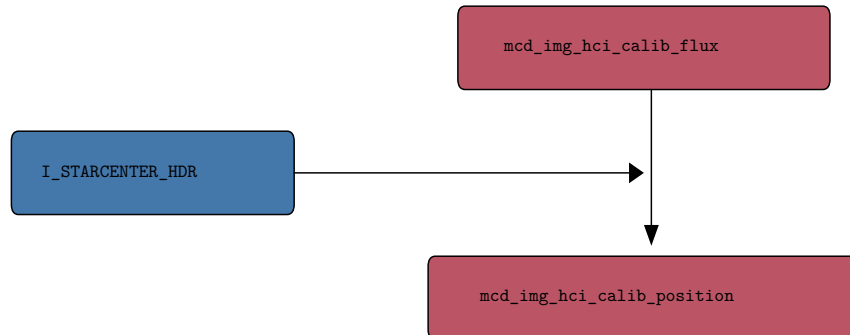
Name:	<code>mcd_img_hci_calib_flux</code>
Purpose:	Add the zeropoint to the image header.
Used in recipes:	<code>micado_img_calib_hci</code>
Working re- marks:	None
Function Param- eters:	None
Inputs:	<code>const micado_img * progenitor</code> <code>const micado_i_staroffset_hdr * staroffset</code> <code>micado_img * product</code>
Other outputs:	<code>cpl_error_code</code>
General descrip- tion:	None
Mathematical description:	Copy the zeropoint to the header.
Quality assess- ment:	Through QC parameters
Error conditions:	See [?].
Unit tests:	See [?].

### 3.2.15 mcd\_img\_astrom\_geom\_correct



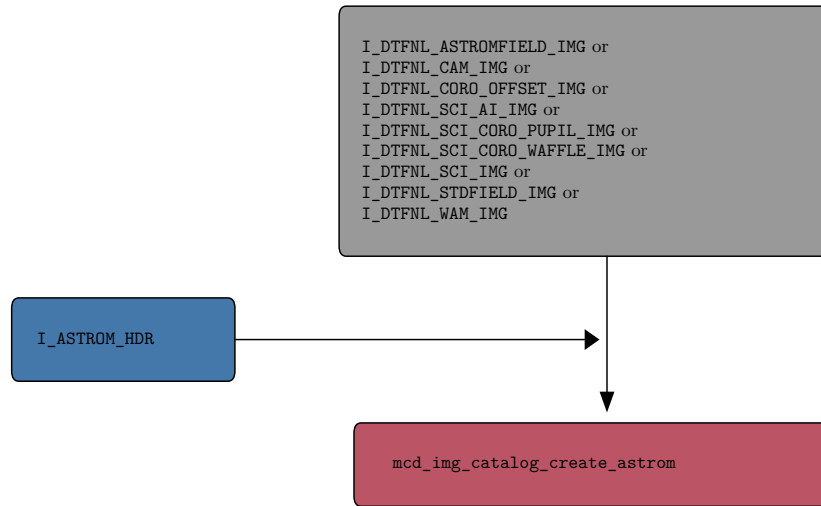
Name:	<code>mcd_img_astrom_geom_correct</code>
Purpose:	Correct Geometric Distortion.
Used in recipes:	<code>micado_img_astrom</code>
Working re-	None
marks:	
Function Param-	None
eters:	
Inputs:	<code>const micado_img * progenitor</code> <code>const micado_i_distortion_wam_hdr * distortion_wam</code> <code>const micado_i_distortion_elt_hdr * distortion_elt</code> <code>cpl_table * product</code>
Other outputs:	<code>cpl_error_code</code>
General descrip-	Correct Geometric Distortion.
tion:	
Mathematical	Copy the distortion coefficients as PV matrix to the
description:	headers of the image.
Quality assess-	Through QC parameters
ment:	
Error conditions:	See [?].
Unit tests:	See [?].

### 3.2.16 mcd\_img\_hci\_calib\_position



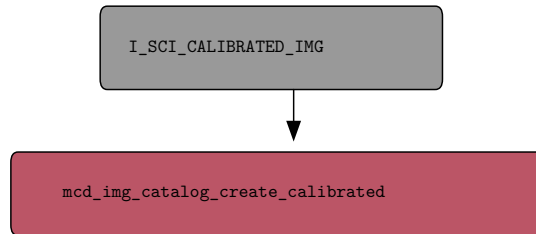
Name:	<code>mcd_img_hci_calib_position</code>
Purpose:	Propagate offset of star to header of the image.
Used in recipes:	<code>micado_img_calib_hci</code>
Working re- marks:	None
Function Param- eters:	None
Inputs:	<code>const micado_img * progenitor</code> <code>const micado_i_starcenter_hdr * starcenter</code> <code>micado_i_calib_hci_img * product</code>
Other outputs:	<code>cpl_error_code</code>
General descrip- tion:	Copy the header of STARCENTER_HDR into the header of the image.
Mathematical description:	Copy the header of STARCENTER_HDR into the header of the image.
Quality assess- ment:	Through QC parameters
Error conditions:	See [?].
Unit tests:	See [?].

### 3.2.17 mcd\_img\_catalog\_create\_astrom



Name:	mcd_img_catalog_create_astrom
Purpose:	Create Source Catalog for Astrometric Calibration.
Used in recipes:	<a href="#">micado_img_photom</a>
Working remarks:	None
Function Parameters:	None
Inputs:	<pre>const micado_i_dtfnl_img * progenitor const micado_i_astrom_hdr * astrom cpl_table * product</pre>
Other outputs:	cpl_error_code
General description:	Create source catalog for each detector with astrometric solution using <code>hdrl_catalogue_compute()</code> .
Mathematical description:	For each detector: * Get correct <code>hdrl_image</code> and <code>cpl_propertylist</code> from input and headers. * Convert <code>hdrl_image</code> to <code>cpl_image</code> <code>image_</code> and <code>confidence_map</code> . * Convert <code>cpl_propertylist</code> to <code>cpl_wcs</code> . * Call <code>hdrl_catalogue_compute</code> . * Collect resulting <code>cpl_table</code> catalogues into output.
Quality assessment:	Through QC parameters
Error conditions:	See [?].
Unit tests:	See [?].

### 3.2.18 mcd\_img\_catalog\_create\_calibrated



Name:	mcd_img_catalog_create_calibrated
Purpose:	Create Source Catalog from fully calibrated image.
Used in recipes:	<code>micado_img_calibrated_catalog</code>
Working remarks:	None
Function Parameters:	None
Inputs:	<pre>const micado_i_sci_calibrated_img * progenitor micado_i_calibrated_catalog_cat * product</pre>
Other outputs:	<code>cpl_error_code</code>
General description:	Create source catalog for each detector using <code>hdrl_catalogue_compute()</code> .
Mathematical description:	<p>For each detector:</p> <ul style="list-style-type: none"> <li>* Get correct <code>hdrl_image</code> and <code>cpl_propertylist</code> from input and headers.</li> <li>* Convert <code>hdrl_image</code> to <code>cpl_image</code> <code>image_</code> and <code>confidence_map</code>.</li> <li>* Convert <code>cpl_propertylist</code> to <code>cpl_wcs</code>.</li> <li>* Call <code>hdrl_catalogue_compute</code>.</li> <li>* Collect resulting <code>cpl_table</code> catalogues into output.</li> </ul>
Quality assessment:	Through QC parameters
Error conditions:	See [?].
Unit tests:	See [?].

### 3.2.19 mcd\_img\_catalog\_create\_final

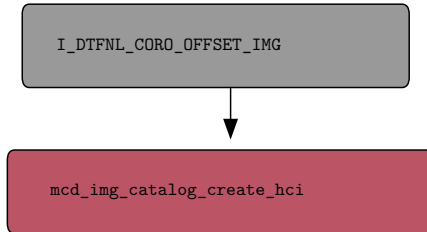
I\_DTFNL\_ASTROMFIELD\_IMG or  
 I\_DTFNL\_CAM\_IMG or  
 I\_DTFNL\_CORO\_OFFSET\_IMG or  
 I\_DTFNL\_SCI\_AI\_IMG or  
 I\_DTFNL\_SCI\_CORO\_PUPIL\_IMG or  
 I\_DTFNL\_SCI\_CORO\_WAFFLE\_IMG or  
 I\_DTFNL\_SCI\_IMG or  
 I\_DTFNL\_STDFIELD\_IMG or  
 I\_DTFNL\_WAM\_IMG



mcd\_img\_catalog\_create\_final

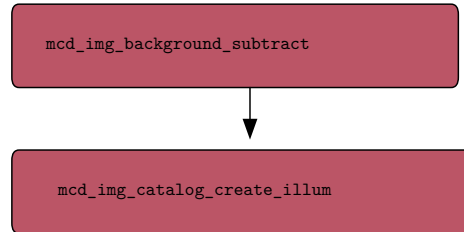
Name:	mcd_img_catalog_create_final
Purpose:	Create Source Catalog from fully detrended image.
Used in recipes:	<a href="#">micado_img_distortion</a> <a href="#">micado_img_astrom</a>
Working remarks:	None
Function Parameters:	None
Inputs:	<code>const micado_i_dtfnl_img * progenitor</code> <code>cpl_table * product</code>
Other outputs:	<code>cpl_error_code</code>
General description:	Create source catalog for each detector using <code>hdlr_catalogue_compute()</code> .
Mathematical description:	For each detector: * Get correct <code>hdlr_image</code> and <code>cpl_propertylist</code> from input and headers. * Convert <code>hdlr_image</code> to <code>cpl_image</code> <code>image_</code> and <code>confidence_map</code> . * Convert <code>cpl_propertylist</code> to <code>cpl_wcs</code> . * Call <code>hdlr_catalogue_compute</code> . * Collect resulting <code>cpl_table</code> catalogues into output.
Quality assessment:	Through QC parameters
Error conditions:	See [?].
Unit tests:	See [?].

### 3.2.20 mcd\_img\_catalog\_create\_hci



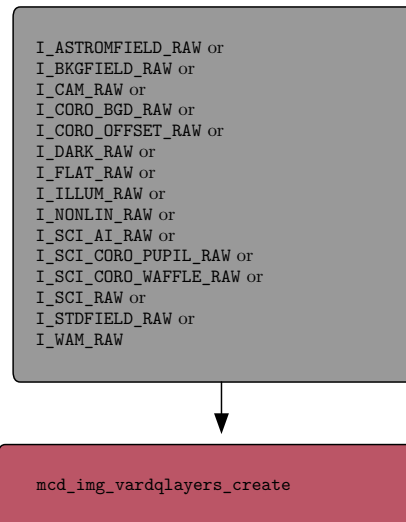
Name:	mcd_img_catalog_create_hci
Purpose:	Create Source Catalog from high contrast imaging image where star is visible.
Used in recipes:	<code>micado_img_star_photom</code>
Working remarks:	None
Function Parameters:	None
Inputs:	<code>const micado_i_dtfnl_coro_offset_img *</code> <code>progenitor</code> <code>cpl_table * product</code>
Other outputs:	<code>cpl_error_code</code>
General description:	Create source catalog for central detector using <code>hdlr_catalogue_compute()</code> .
Mathematical description:	For central detector: * Get correct <code>hdlr_image</code> and <code>cpl_propertylist</code> from input and headers. * Convert <code>hdlr_image</code> to <code>cpl_image</code> <code>image_</code> and <code>confidence_map</code> . * Convert <code>cpl_propertylist</code> to <code>cpl_wcs</code> . * Call <code>hdlr_catalogue_compute</code> . * Collect resulting <code>cpl_table</code> catalogues into output.
Quality assessment:	Through QC parameters
Error conditions:	See [?].
Unit tests:	See [?].

### 3.2.21 mcd\_img\_catalog\_create\_illum



Name:	mcd_img_catalog_create_illum
Purpose:	Create Source Catalog for Illumination Correction.
Used in recipes:	<code>micado_img_illum</code>
Working remarks:	None
Function Parameters:	None
Inputs:	<code>const micado_img * progenitor</code> <code>cpl_table * product</code>
Other outputs:	<code>cpl_error_code</code>
General description:	Create source catalog for each detector to use in illumination correction derivation using <code>hdrl_catalogue_compute()</code> .
Mathematical description:	For each detector: * Get correct <code>hdrl_image</code> and <code>cpl_propertylist</code> from input and headers. * Convert <code>hdrl_image</code> to <code>cpl_image</code> <code>image_</code> and <code>confidence_map</code> . * Convert <code>cpl_propertylist</code> to <code>cpl_wcs</code> . * Call <code>hdrl_catalogue_compute</code> . * Collect resulting <code>cpl_table</code> catalogues into output.
Quality assessment:	Through QC parameters
Error conditions:	See [?].
Unit tests:	See [?].

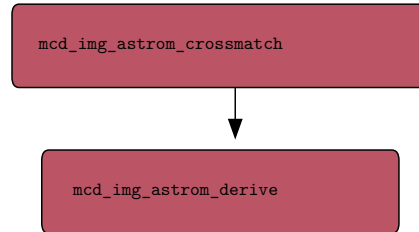
### 3.2.22 mcd\_img\_vardqlayers\_create



Name:	mcd_img_vardqlayers_create
Purpose:	Create variance and data quality layers.
Used in recipes:	micado_det_dark micado_img_flat micado_img_detrend micado_img_detrend_hci
Working remarks:	None
Function Parameters:	None
Inputs:	const micado_img * progenitor micado_img * product
Other outputs:	cpl_error_code
General description:	Create variance and data quality layers.
Mathematical description:	Add two extensions for each image extension in the input raw: * A variance layer called 'ERR' with the square root of the image pixels. * A 32-bit data quality layer called 'DQ' with all zeros. The original extension is called the 'DATA' extension.
Quality assessment:	Through QC parameters
Error conditions:	See [?].

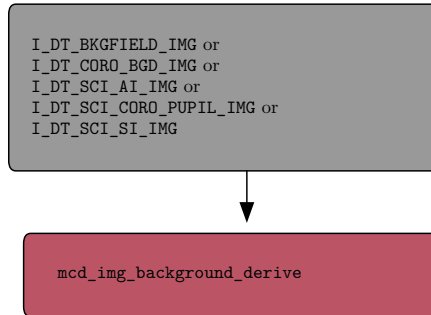
Unit tests:      See [?].

### 3.2.23 mcd\_img\_astrom\_derive



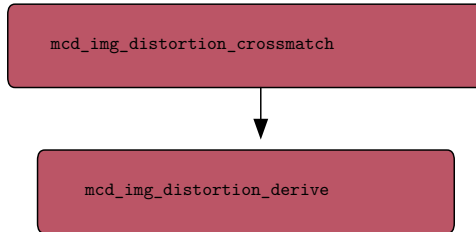
Name:	mcd_img_astrom_derive
Purpose:	Derive Astrometric Solution.
Used in recipes:	<code>micado_img_astrom</code>
Working re- marks:	None
Function Param- eters:	None
Inputs:	<code>const micado_img * progenitor</code> <code>micado_i_astrom_hdr * product</code>
Other outputs:	<code>cpl_error_code</code>
General descrip- tion:	Derive an astrometric solution for each detector based on the spatial crossmatch with the reference catalog.
Mathematical description:	Calculate the PV matrix by fitting a polynomial.
Quality assess- ment:	Through QC parameters
Error conditions:	See [?].
Unit tests:	See [?].

### 3.2.24 mcd\_img\_background\_derive



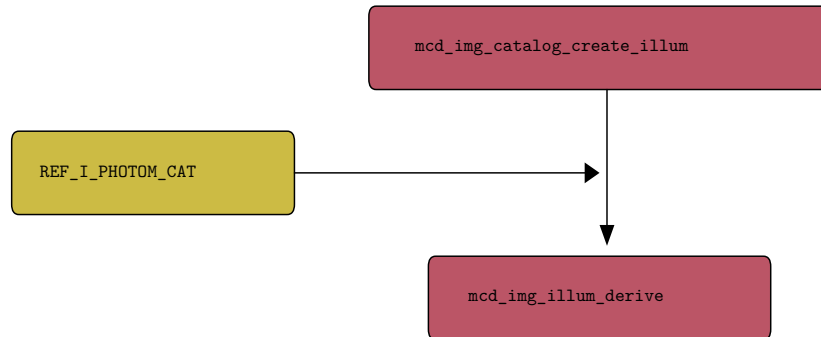
Name:	<code>mcd_img_background_derive</code>
Purpose:	Derive Background.
Used in recipes:	<code>micado_img_background</code>
Working re- marks:	None
Function Param- eters:	None
Inputs:	<code>const micado_i_dt_bkgfield_img * progenitor</code> <code>micado_i_bgd_img * product</code>
Other outputs:	<code>cpl_error_code</code>
General descrip- tion:	Derive the Background.
Mathematical description:	Create a new Background image, with the background for each detector. * DATA: Background of the science data. <code>hdlr_collapse_imagelist_to_image_sigclip</code> will be used. * ERR: Standard error of the data. * DQ: Data quality.
Quality assess- ment:	Through QC parameters
Error conditions:	See [?].
Unit tests:	See [?].

### 3.2.25 mcd\_img\_distortion\_derive



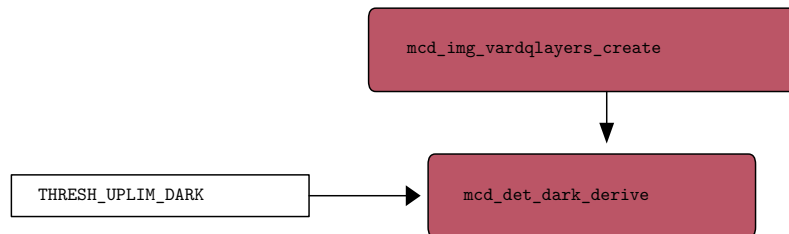
Name:	mcd_img_distortion_derive
Purpose:	Derive Distortion Model.
Used in recipes:	<a href="#">micado_img_distortion</a>
Working remarks:	None
Function Parameters:	None
Inputs:	<code>const micado_img * progenitor</code> <code>micado_i_distortion_hdr * product</code>
Other outputs:	<code>cpl_error_code</code>
General description:	Derive the distortion model using the MASCADO algorithm.
Mathematical description:	See Section ?? for mathematical description and Section ?? for prototype implementation.
Quality assessment:	Through QC parameters
Error conditions:	See [?].
Unit tests:	See [?].

### 3.2.26 mcd\_img\_illum\_derive



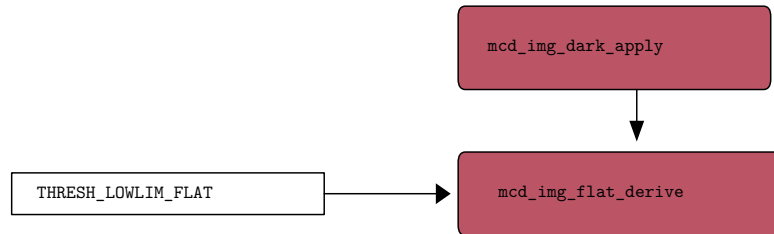
Name:	<code>mcd_img_illum_derive</code>
Purpose:	Derive Illumination Correction.
Used in recipes:	<code>micado_img_illum</code>
Working remarks:	None
Function Parameters:	None
Inputs:	<code>const micado_img * progenitor</code> <code>const micado_ref_i_photom_cat * photomref</code> <code>micado_i_illum_corr_hdr * product</code>
Other outputs:	<code>cpl_error_code</code>
General description:	Derive the Illumination Correction.
Mathematical description:	TODO
Quality assessment:	Through QC parameters
Error conditions:	See [?].
Unit tests:	See [?].

### 3.2.27 mcd\_det\_dark\_derive



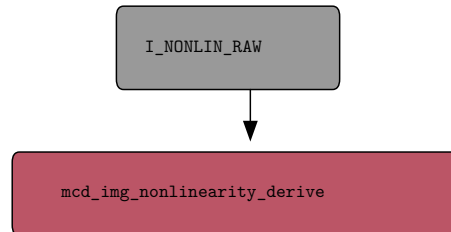
Name:	mcd_det_dark_derive
Purpose:	Derive MasterDark Correction.
Used in recipes:	<code>micado_det_dark</code>
Working re- marks:	None
Function Param- eters:	Name: <code>THRESH_UPLIM_DARK</code> Type: float Unit: adu Default: 0.0 Description: Upper threshold of dark values
Inputs:	<code>const micado_img * progenitor</code> <code>micado_i_master_dark_img * product</code>
Other outputs:	<code>cpl_error_code</code>
General descrip- tion:	Derive the MasterDark.
Mathematical description:	Create a new MasterDark image with the following ex- tensions (for each detector): * DATA: Median of the input raw dark DATA exten- sions. * ERR: Root of the mean of the squared input raw dark ERR extensions. * DQ: XOR of input raw dark DQ extensions XORed with the hot pixel mask. <code>hdrl_imagelist_collapse</code> is used to compute the Mas- terDark.
Quality assess- ment:	Through QC parameters
Error conditions:	See [?].
Unit tests:	See [?].

### 3.2.28 mcd\_img\_flat\_derive



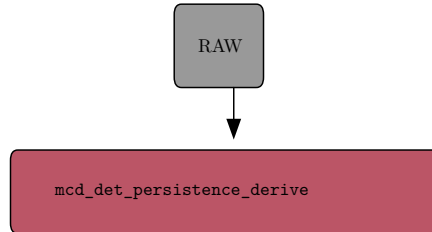
Name:	mcd_img_flat_derive
Purpose:	Derive MasterFlat Correction.
Used in recipes:	<code>micado_img_flat</code>
Working re- marks:	None
Function Param- eters:	Name: <code>THRESH_LOWLIM_FLAT</code> Type: float Unit: adu Default: 0.0 Description: Lower threshold of flat values
Inputs:	<code>const micado_img * progenitor</code> <code>micado_i_master_flat_img * product</code>
Other outputs:	<code>cpl_error_code</code>
General descrip- tion:	Derive the MasterFlat.
Mathematical description:	Create a new MasterFlat image with the following ex- tensions (for each detector): * DATA: Median of the input raw flat DATA exten- sions. * ERR: Root of the mean of the squared input raw flat ERR extensions. * DQ: XOR of input raw flat DQ extensions XORed with the cold pixel mask. <code>hdr1_flat_compute</code> is used to compute the MasterFlat.
Quality assess- ment:	Through QC parameters
Error conditions:	See [?].
Unit tests:	See [?].

### 3.2.29 mcd\_img\_nonlinearity\_derive



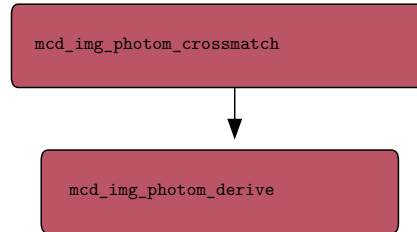
Name:	mcd_img_nonlinearity_derive
Purpose:	Derive Non-linearity Correction.
Used in recipes:	<code>micado_img_nonlinearity</code>
Working remarks:	None
Function Parameters:	None
Inputs:	<code>const micado_i_nonlin_raw * progenitor</code> <code>micado_i_nonlinearity_img * product</code>
Other outputs:	<code>cpl_error_code</code>
General description:	Derive the Nonlinearity.
Mathematical description:	For several raw flatfield images with different exposure times, fit the flux level as function of exposure time as a third order polynomial to each pixel, using <code>hdrl_fit_polynomial_imagelist</code> . Create a new Nonlinearity image with the following extensions. For each detector and each coefficient: * <code>DATAN</code> : Best fit value of this coefficient. Once for each detector: * <code>CHI2</code> : Chi-square of the fit. * <code>DOF</code> : Degrees of freedom.
Quality assessment:	Through QC parameters
Error conditions:	See [?].
Unit tests:	See [?].

### 3.2.30 mcd\_det\_persistence\_derive



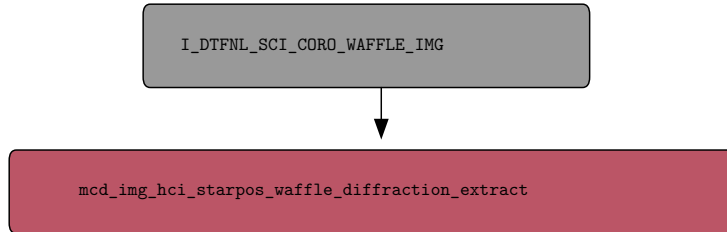
Name:	mcd_det_persistence_derive
Purpose:	Derive Persistence Correction.
Used in recipes:	<code>micado_det_persistence</code>
Working re- marks:	None
Function Param- eters:	None
Inputs:	<code>const micado_img * progenitor</code> <code>micado_i_persistence_img * product</code>
Other outputs:	<code>cpl_error_code</code>
General descrip- tion:	This is a thin wrapper around <code>hdlr_persistence_compute()</code> .
Mathematical description:	Create a new Persistence image with the following ex- tensions (for each detector): * DATA: Persistence correction. * ERR: Standard error of the persistence correction. * DQ: Data quality.
Quality assess- ment:	Through QC parameters
Error conditions:	See [?].
Unit tests:	See [?].

### 3.2.31 mcd\_img\_photom\_derive



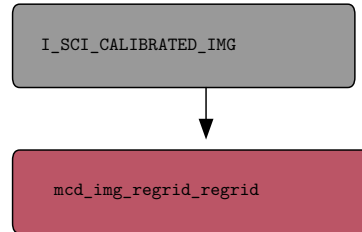
Name:	mcd_img_photom_derive
Purpose:	Derive Photometric Solution.
Used in recipes:	<code>micado_img_photom</code>
Working re- marks:	None
Function Param- eters:	None
Inputs:	<code>const micado_img * progenitor</code> <code>micado_i_photom_hdr * product</code>
Other outputs:	<code>cpl_error_code</code>
General descrip- tion:	Derive an photometric solution for each detector based on the spatial crossmatch with the reference catalog.
Mathematical description:	Calculate the zeropoint and extinction per detector from the crossmatched catalog..
Quality assess- ment:	Through QC parameters
Error conditions:	See [?].
Unit tests:	See [?].

### 3.2.32 mcd\_img\_hci\_starpos\_waffle\_diffraction\_extract



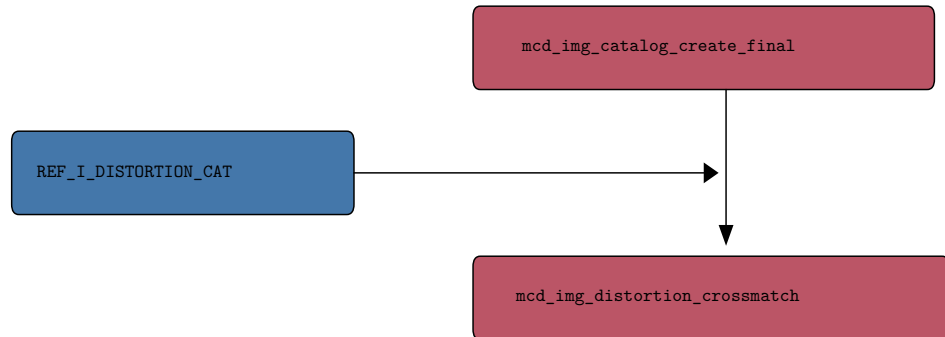
Name:	mcd_img_hci_starpos_waffle_diffraction_extract
Purpose:	Extract diffraction peaks produced by the waffle in the four corners of the image.
Used in recipes:	micado_img_starpos_waffle
Working re- marks:	None
Function Param- eters:	None
Inputs:	const micado_i_dtfnl_sci_img * progenitor cpl_table * product
Other outputs:	cpl_error_code
General descrip- tion:	Create source catalog for central detector using hdrl_catalogue_compute().
Mathematical description:	For central detector: * Get correct hdrl_image and cpl_propertylist from in- put and headers. * Convert hdrl_image to cpl_image image_ and con- fidence_map. * Convert cpl_propertylist to cpl_wcs. * Call hdrl_catalogue_compute. * Collect resulting cpl_table catalogues into output.
Quality assess- ment:	Through QC parameters
Error conditions:	See [?].
Unit tests:	See [?].

### 3.2.33 mcd\_img\_regrid\_regrid



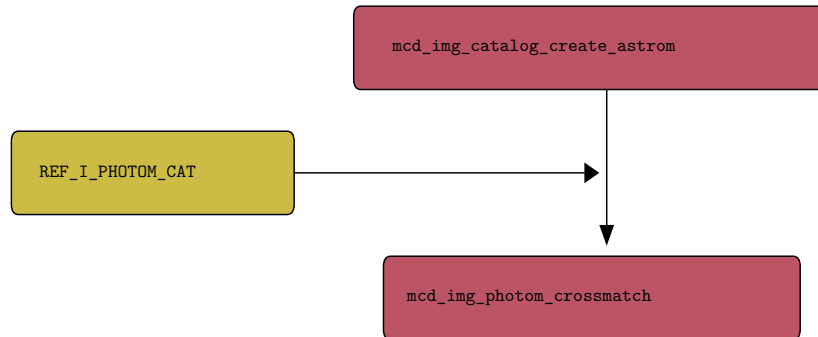
Name:	mcd_img_regrid_regrid
Purpose:	Regrid the input image.
Used in recipes:	<code>micado_img_regrid</code>
Working re- marks:	None
Function Param- eters:	None
Inputs:	<code>const micado_i_sci_calibrated_img * progenitor micado_i_sci_regrid_img * product</code>
Other outputs:	<code>cpl_error_code</code>
General descrip- tion:	Uses the full distortion information in the headers to regrid the image. Note that this will probably create an image with a larger footprint.
Mathematical description:	For each detector adapt the extensions as follows: * DATA: Spread each pixel to the surrounding pixels it affects according to the distortion information. Expand the image if the affected pixels are outside the frame. * ERR: Propagate the ERR layer of of the pixels as- suming uncorrelated uncertainties between pixels. * DQ: OR each pixel with all the other pixels it affects.
Quality assess- ment:	Through QC parameters
Error conditions:	See [?].
Unit tests:	See [?].

### 3.2.34 mcd\_img\_distortion\_crossmatch



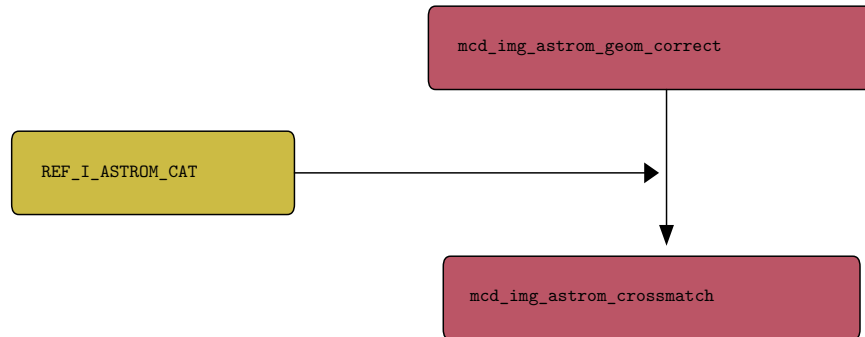
Name:	<code>mcd_img_distortion_crossmatch</code>
Purpose:	Create source catalog that is a spatial crossmatch of input with astrometric reference catalog.
Used in recipes:	<code>micado_img_distortion</code>
Working re- marks:	None
Function Param- eters:	None
Inputs:	<pre>const micado_img * progenitor const micado_ref_i_distortion_cat * distortionref cpl_table * product cpl_error_code</pre>
Other outputs:	<code>cpl_error_code</code>
General descrip- tion:	Create source catalog that is a spatial crossmatch of input with astrometric reference catalog.
Mathematical description:	<p>For each detector:</p> <ul style="list-style-type: none"> <li>* Get correct <code>cpl_table</code> and <code>cpl_propertylist</code> from catalogs and headers.</li> <li>* Filter table to include only sources suitable for finding photometric solution.</li> <li>* Match input <code>cpl_table</code> with <code>photomref</code>.</li> <li>* Create cross match catalog.</li> <li>* Collect resulting <code>cpl_table</code> catalogues into cross-match.</li> </ul>
Quality assess- ment:	Through QC parameters
Error conditions:	See [?].
Unit tests:	See [?].

### 3.2.35 mcd\_img\_photom\_crossmatch



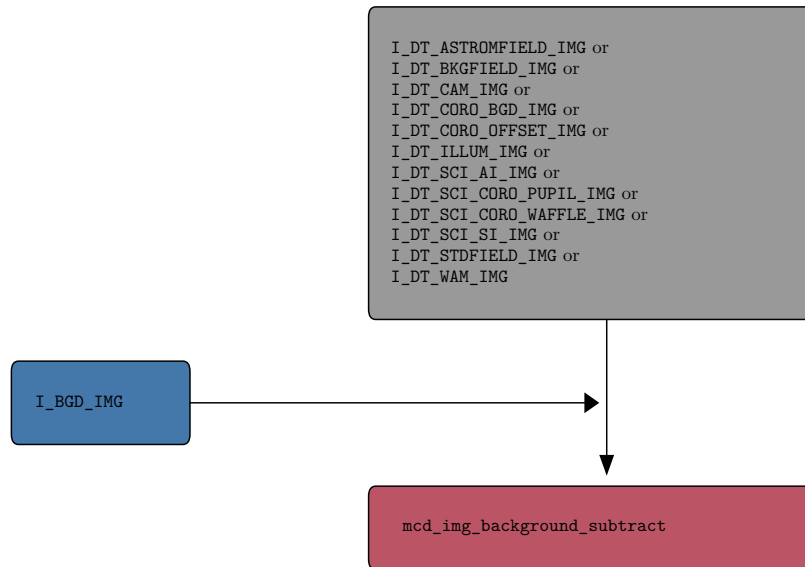
Name:	mcd_img_photom_crossmatch
Purpose:	Create source catalog that is a spatial crossmatch of input with photometric reference catalog.
Used in recipes:	<a href="#">micado_img_photom</a>
Working remarks:	None
Function Parameters:	None
Inputs:	<pre>const micado_img * progenitor const micado_ref_i_photom_cat * photomref cpl_table * product</pre>
Other outputs:	cpl_error_code
General description:	Create source catalog that is a spatial crossmatch of input with photometric reference catalog.
Mathematical description:	<p>For each detector:</p> <ul style="list-style-type: none"> <li>* Get correct cpl_table and cpl_propertylist from catalogs and headers.</li> <li>* Filter table to include only sources suitable for finding photometric solution.</li> <li>* Match input cpl_table with photomref.</li> <li>* Create cross match catalog.</li> <li>* Collect resulting cpl_table catalogues into crossmatch.</li> </ul>
Quality assessment:	Through QC parameters
Error conditions:	See [?].
Unit tests:	See [?].

### 3.2.36 mcd\_img\_astrom\_crossmatch



Name:	<code>mcd_img_astrom_crossmatch</code>
Purpose:	Create source catalog that is a spatial crossmatch of input with reference catalog.
Used in recipes:	<code>micado_img_astrom</code>
Working re- marks:	None
Function Param- eters:	None
Inputs:	<pre>const micado_img * progenitor const micado_ref_i_astrom_cat * astromref cpl_table * product cpl_error_code</pre>
Other outputs:	<code>cpl_error_code</code>
General descrip- tion:	Create source catalog that is a spatial crossmatch of input with reference catalog.
Mathematical description:	<p>For each detector:</p> <ul style="list-style-type: none"> <li>* Get correct <code>cpl_table</code> and <code>cpl_propertylist</code> from catalogs and headers.</li> <li>* Filter table to include only sources suitable for finding astrometric solution.</li> <li>* Match input <code>cpl_table</code> with <code>astromref</code>.</li> <li>* Create cross match catalog.</li> <li>* Collect resulting <code>cpl_table</code> catalogues into cross-match.</li> </ul>
Quality assess- ment:	Through QC parameters
Error conditions:	See [?].
Unit tests:	See [?].

### 3.2.37 mcd\_img\_background\_subtract



Name:	mcd_img_background_subtract
Purpose:	Subtract background and optionally add background Layer.
Used in recipes:	<code>micado_img_illum</code> <code>micado_img_detrend_final</code>
Working remarks:	None
Function Parameters:	None
Inputs:	<code>const micado_i_dt_img * progenitor</code> <code>const micado_i_bgd_img * background</code> <code>micado_img * product</code>
Other outputs:	<code>cpl_error_code</code>
General description:	Subtract background from the science image. Optionally add a new layer called 'BG' to the image.

Mathematical description:	For each detector adapt the extensions as follows: * DATA: Subtract the DATA layer of the Background image. * ERR: Propagate the ERR layer of of the Background image assuming uncorrelated uncertainties. * DQ: XOR with the DQ layer of the cropped Background image. * BG: Optionally new layer with DATA layer of the cropped Background image.
Quality assessment:	Through QC parameters
Error conditions:	See [?].
Unit tests:	See [?].

### 3.3 DRL Data Structures

#### 3.3.1 micado\_i\_astrom\_hdr

This structure represents all contents of a **I\_ASTROM\_HDR**. The fields are:

1. `cpl_propertylist * keywords:` Primary keywords (MJD-OBS)
2. `cpl_propertylist ** extkeywords:` Extension keywords (CDn\_ms PV11i PV22i)

#### 3.3.2 micado\_i\_astromfield\_raw

This structure represents all contents of a **I\_ASTROMFIELD\_RAW**. The fields are:

1. `cpl_propertylist * keywords:` Primary keywords (MJD-OBS ID ANGLE GAIN pixel\_size X\_CEN Y\_CEN X\_SIZE Y\_SIZE INSTRUME INS.MODE DPR.CATG DPR.TECH DPR.TYPE OBS.RA OBS.DEC INS.FILT1.NAME INS.FILT2.NAME INS.OPTI6.NAME INS.DROT INS.READMODE DET.DIT DET.NDIT)
2. `hdr1_imagelist * images:` Images
3. `cpl_propertylist ** extkeywords:` Extension keywords (ID ANGLE GAIN pixel\_size X\_CEN Y\_CEN X\_SIZE Y\_SIZE)

#### 3.3.3 micado\_i\_bgd\_img

This structure represents all contents of a **I\_BGD\_IMG**. The fields are:

1. `cpl_propertylist * keywords:` Primary keywords (INSTRUME)
2. `hdr1_imagelist * images:` Images
3. `cpl_propertylist ** extkeywords:` Extension keywords

#### 3.3.4 micado\_i\_bkgfield\_raw

This structure represents all contents of a **I\_BKGFIELD\_RAW**. The fields are:

1. `cpl_propertylist * keywords:` Primary keywords (MJD-OBS ID ANGLE GAIN pixel\_size X\_CEN Y\_CEN X\_SIZE Y\_SIZE INSTRUME INS.MODE DPR.CATG DPR.TECH DPR.TYPE INS.READMODE DET.DIT DET.NDIT)
2. `hdr1_imagelist * images:` Images
3. `cpl_propertylist ** extkeywords:` Extension keywords (ID ANGLE GAIN pixel\_size X\_CEN Y\_CEN X\_SIZE Y\_SIZE)

### 3.3.5 micado\_i\_calib\_hci\_img

This structure represents all contents of a `I_CALIB_HCI_IMG`. The fields are:

1. `cpl_propertylist * keywords:` Primary keywords (INSTRUME)
2. `hdr1_image * image:` Image
3. `cpl_propertylist * extkeywords:` Extension keywords

### 3.3.6 micado\_i\_calibrated\_catalog\_cat

This structure represents all contents of a `I_CALIBRATED_CATALOG_CAT`. The fields are:

1. `cpl_propertylist * keywords:` Primary keywords (MJD-OBS)
2. `cpl_propertylist * extkeywords:` Extension keywords
3. `cpl_table * catalog:` Catalog

### 3.3.7 micado\_i\_cam\_raw

This structure represents all contents of a `I_CAM_RAW`. The fields are:

1. `cpl_propertylist * keywords:` Primary keywords (MJD-OBS ID ANGLE GAIN pixel\_size X\_CEN Y\_CEN X\_SIZE Y\_SIZE INSTRUME INS.MODE DPR.CATG DPR.TECH DPR.TYPE INS.FILT1.NAME INS.FILT2.NAME INS.OPTI6.NAME INS.DROT INS.READMODE DET.DIT DET.NDIT)
2. `hdr1_imagelist * images:` Images
3. `cpl_propertylist ** extkeywords:` Extension keywords (ID ANGLE GAIN pixel\_size X\_CEN Y\_CEN X\_SIZE Y\_SIZE)

### 3.3.8 micado\_i\_coro\_bgd\_raw

This structure represents all contents of a `I_CORO_BGD_RAW`. The fields are:

1. `cpl_propertylist * keywords:` Primary keywords (MJD-OBS ID ANGLE GAIN pixel\_size X\_CEN Y\_CEN X\_SIZE Y\_SIZE INSTRUME INS.MODE DPR.CATG DPR.TECH DPR.TYPE OBS.RA OBS.DEC INS.FILT1.NAME INS.FILT2.NAME INS.OPTI6.NAME INS.DROT INS.READMODE DET.DIT DET.NDIT)
2. `hdr1_image * image:` Image
3. `cpl_propertylist * extkeywords:` Extension keywords (ID ANGLE GAIN pixel\_size X\_CEN Y\_CEN X\_SIZE Y\_SIZE)

### 3.3.9 micado\_i\_coro\_offset\_raw

This structure represents all contents of a **I\_CORO\_OFFSET\_RAW**. The fields are:

1. `cpl_propertylist * keywords:` Primary keywords (MJD-OBS ID ANGLE GAIN pixel\_size X\_CEN Y\_CEN X\_SIZE Y\_SIZE INSTRUME DPR.CATG DPR.TECH DPR.TYPE INS.MODE OBS.RA OBS.DEC INS.FILT1.NAME INS.FILT2.NAME INS.OPTI6.NAME INS.DROT INS.READMODE DET.DIT DET.NDIT)
2. `hdr1_image * image:` Image
3. `cpl_propertylist * extkeywords:` Extension keywords (ID ANGLE GAIN pixel\_size X\_CEN Y\_CEN X\_SIZE Y\_SIZE)

### 3.3.10 micado\_i\_cube\_hci\_img

This structure represents all contents of a **I\_CUBE\_HCI\_IMG**. The fields are:

1. `cpl_propertylist * keywords:` Primary keywords (INSTRUME)
2. `hdr1_imagelist * images:` Images
3. `cpl_propertylist ** extkeywords:` Extension keywords

### 3.3.11 micado\_i\_dark\_raw

This structure represents all contents of a **I\_DARK\_RAW**. The fields are:

1. `cpl_propertylist * keywords:` Primary keywords (MJD-OBS ID ANGLE GAIN pixel\_size X\_CEN Y\_CEN X\_SIZE Y\_SIZE INSTRUME INS.MODE DPR.CATG DPR.TECH DPR.TYPE INS.READMODE DET.DIT DET.NDIT)
2. `hdr1_imagelist * images:` Images
3. `cpl_propertylist ** extkeywords:` Extension keywords (ID ANGLE GAIN pixel\_size X\_CEN Y\_CEN X\_SIZE Y\_SIZE)

### 3.3.12 micado\_i\_distortion\_cam\_hdr

This structure represents all contents of a **I\_DISTORTION\_CAM\_HDR**. The fields are:

1. `cpl_propertylist * keywords:` Primary keywords (INSTRUME)
2. `cpl_propertylist * extkeywords:` Extension keywords

### 3.3.13 micado\_i\_distortion\_elt\_hdr

This structure represents all contents of a **I\_DISTORTION\_ELT\_HDR**. The fields are:

1. `cpl_propertylist * keywords:` Primary keywords (INSTRUME)
2. `cpl_propertylist * extkeywords:` Extension keywords

### 3.3.14 micado\_i\_distortion\_wam\_hdr

This structure represents all contents of a **I\_DISTORTION\_WAM\_HDR**. The fields are:

1. `cpl_propertylist * keywords:` Primary keywords (INSTRUME)
2. `cpl_propertylist * extkeywords:` Extension keywords

### 3.3.15 micado\_i\_dt\_bkgfield\_img

This structure represents all contents of a `I_DT_BKGFIELD_IMG`. The fields are:

1. `cpl_propertylist * keywords:` Primary keywords (MJD-OBS INSTRUME)
2. `hdr1_imagelist * images:` Images
3. `cpl_propertylist ** extkeywords:` Extension keywords

### 3.3.16 micado\_i\_dt\_cam\_img

This structure represents all contents of a `I_DT_CAM_IMG`. The fields are:

1. `cpl_propertylist * keywords:` Primary keywords (MJD-OBS INSTRUME)
2. `hdr1_imagelist * images:` Images
3. `cpl_propertylist ** extkeywords:` Extension keywords

### 3.3.17 micado\_i\_dt\_coro\_bgd\_img

This structure represents all contents of a `I_DT_CORO_BGD_IMG`. The fields are:

1. `cpl_propertylist * keywords:` Primary keywords (MJD-OBS INSTRUME)
2. `hdr1_image * image:` Image
3. `cpl_propertylist * extkeywords:` Extension keywords

### 3.3.18 micado\_i\_dt\_coro\_offset\_img

This structure represents all contents of a `I_DT_CORO_OFFSET_IMG`. The fields are:

1. `cpl_propertylist * keywords:` Primary keywords (MJD-OBS INSTRUME)
2. `hdr1_image * image:` Image
3. `cpl_propertylist * extkeywords:` Extension keywords

### 3.3.19 micado\_i\_dt\_sci\_ai\_img

This structure represents all contents of a `I_DT_SCI_AI_IMG`. The fields are:

1. `cpl_propertylist * keywords:` Primary keywords (MJD-OBS INSTRUME)
2. `hdr1_imagelist * images:` Images
3. `cpl_propertylist ** extkeywords:` Extension keywords

### 3.3.20 micado\_i\_dt\_sci\_si\_img

This structure represents all contents of a `I_DT_SCI_SI_IMG`. The fields are:

1. `cpl_propertylist * keywords:` Primary keywords (MJD-OBS INSTRUME)
2. `hdr1_imagelist * images:` Images
3. `cpl_propertylist ** extkeywords:` Extension keywords

### 3.3.21 micado\_i\_dtfnl\_astromfield\_img

This structure represents all contents of a `I_DTFNL_ASTROMFIELD_IMG`. The fields are:

1. `cpl_propertylist * keywords:` Primary keywords (MJD-OBS INSTRUME)
2. `hdr1_imagelist * images:` Images
3. `cpl_propertylist ** extkeywords:` Extension keywords

### 3.3.22 micado\_i\_dtfnl\_cam\_img

This structure represents all contents of a `I_DTFNL_CAM_IMG`. The fields are:

1. `cpl_propertylist * keywords:` Primary keywords (MJD-OBS INSTRUME)
2. `hdr1_imagelist * images:` Images
3. `cpl_propertylist ** extkeywords:` Extension keywords

### 3.3.23 micado\_i\_dtfnl\_coro\_offset\_img

This structure represents all contents of a `I_DTFNL_CORO_OFFSET_IMG`. The fields are:

1. `cpl_propertylist * keywords:` Primary keywords (MJD-OBS INSTRUME)
2. `hdr1_image * image:` Image
3. `cpl_propertylist * extkeywords:` Extension keywords

### 3.3.24 micado\_i\_dtfnl\_sci\_ai\_img

This structure represents all contents of a `I_DTFNL_SCI_AI_IMG`. The fields are:

1. `cpl_propertylist * keywords:` Primary keywords (MJD-OBS INSTRUME)
2. `hdr1_imagelist * images:` Images
3. `cpl_propertylist ** extkeywords:` Extension keywords

### 3.3.25 micado\_i\_dtfnl\_sci\_img

This structure represents all contents of a `I_DTFNL_SCI_IMG`. The fields are:

1. `cpl_propertylist * keywords:` Primary keywords (MJD-OBS INSTRUME)
2. `hdr1_imagelist * images:` Images
3. `cpl_propertylist ** extkeywords:` Extension keywords

### 3.3.26 micado\_i\_dtfnl\_wam\_img

This structure represents all contents of a `I_DTFNL_WAM_IMG`. The fields are:

1. `cpl_propertylist * keywords:` Primary keywords (MJD-OBS INSTRUME)
2. `hdr1_imagelist * images:` Images
3. `cpl_propertylist ** extkeywords:` Extension keywords

### 3.3.27 micado\_i\_flat\_raw

This structure represents all contents of a **I\_FLAT\_RAW**. The fields are:

1. cpl\_propertylist \* keywords: Primary keywords (MJD-OBS ID ANGLE GAIN pixel\_size X\_CEN Y\_CEN X\_SIZE Y\_SIZE INSTRUME INS.MODE DPR.CATG DPR.TECH DPR.TYPE INS.FILT1.NAME INS.FILT2.NAME INS.OPTI6.NAME INS.DROT INS.READMODE DET.DIT DET.NDIT)
2. hdr1\_imagelist \* images: Images
3. cpl\_propertylist \*\* extkeywords: Extension keywords (ID ANGLE GAIN pixel\_size X\_CEN Y\_CEN X\_SIZE Y\_SIZE)

### 3.3.28 micado\_i\_illum\_corr\_hdr

This structure represents all contents of a **I\_ILLUM\_CORR\_HDR**. The fields are:

1. cpl\_propertylist \* keywords: Primary keywords (ICCOEF00 ICCOEF10 ICCOEF11 ICCOEF20 ICCOEF21 ICCOEF22 ICCOEF30 ICCOEF31 ICCOEF32 ICCOEF33 ICCOEF40 ICCOEF41 ICCOEF42 ICCOEF43 ICCOEF44)
2. cpl\_propertylist \*\* extkeywords: Extension keywords (GAIN)

### 3.3.29 micado\_i\_illum\_raw

This structure represents all contents of a **I\_ILLUM\_RAW**. The fields are:

1. cpl\_propertylist \* keywords: Primary keywords (MJD-OBS ID ANGLE GAIN pixel\_size X\_CEN Y\_CEN X\_SIZE Y\_SIZE INSTRUME INS.MODE DPR.CATG DPR.TECH DPR.TYPE INS.READMODE DET.DIT DET.NDIT)
2. hdr1\_imagelist \* images: Images
3. cpl\_propertylist \*\* extkeywords: Extension keywords (ID ANGLE GAIN pixel\_size X\_CEN Y\_CEN X\_SIZE Y\_SIZE)

### 3.3.30 micado\_i\_master\_dark\_img

This structure represents all contents of a **I\_MASTER\_DARK\_IMG**. The fields are:

1. cpl\_propertylist \* keywords: Primary keywords (INSTRUME)
2. hdr1\_imagelist \* images: Images
3. cpl\_propertylist \*\* extkeywords: Extension keywords

### 3.3.31 micado\_i\_master\_flat\_img

This structure represents all contents of a **I\_MASTER\_FLAT\_IMG**. The fields are:

1. cpl\_propertylist \* keywords: Primary keywords (INSTRUME)
2. hdr1\_imagelist \* images: Images
3. cpl\_propertylist \*\* extkeywords: Extension keywords

### 3.3.32 micado\_i\_nonlin\_raw

This structure represents all contents of a **I\_NONLIN\_RAW**. The fields are:

1. cpl\_propertylist \* keywords: Primary keywords (MJD-OBS ID ANGLE GAIN pixel\_size X\_CEN Y\_CEN X\_SIZE Y\_SIZE INSTRUME INS.MODE DPR.CATG DPR.TECH DPR.TYPE INS.FILT1.NAME INS.FILT2.NAME INS.OPTI6.NAME INS.DROT INS.READMODE DET.DIT DET.NDIT)
2. hdr1\_imagelist \* images: Images
3. cpl\_propertylist \*\* extkeywords: Extension keywords (ID ANGLE GAIN pixel\_size X\_CEN Y\_CEN X\_SIZE Y\_SIZE)

### 3.3.33 micado\_i\_nonlinearity\_img

This structure represents all contents of a **I\_NONLINEARITY\_IMG**. The fields are:

1. cpl\_propertylist \* keywords: Primary keywords (INSTRUME)
2. cpl\_propertylist \*\* extkeywords: Extension keywords

### 3.3.34 micado\_i\_persistence\_img

This structure represents all contents of a **I\_PERSISTENCE\_IMG**. The fields are:

1. cpl\_propertylist \* keywords: Primary keywords (MJD-OBS INSTRUME)
2. hdr1\_imagelist \* images: Images
3. cpl\_propertylist \*\* extkeywords: Extension keywords

### 3.3.35 micado\_i\_photom\_sci\_hdr

This structure represents all contents of a **I\_PHOTOM\_SCI\_HDR**. The fields are:

1. cpl\_propertylist \* keywords: Primary keywords (MJD-OBS)
2. cpl\_propertylist \*\* extkeywords: Extension keywords (ZEROPNT EXTINGT )

### 3.3.36 micado\_i\_photom\_stdfield\_hdr

This structure represents all contents of a **I\_PHOTOM\_STDFIELD\_HDR**. The fields are:

1. cpl\_propertylist \* keywords: Primary keywords (MJD-OBS)
2. cpl\_propertylist \*\* extkeywords: Extension keywords (ZEROPNT EXTINGT )

### 3.3.37 micado\_i\_sci\_ai\_raw

This structure represents all contents of a **I\_SCI\_AI\_RAW**. The fields are:

1. cpl\_propertylist \* keywords: Primary keywords (MJD-OBS ID ANGLE GAIN pixel\_size X\_CEN Y\_CEN X\_SIZE Y\_SIZE INSTRUME INS.MODE DPR.CATG DPR.TECH DPR.TYPE OBS.RA OBS.DEC INS.FILT1.NAME INS.FILT2.NAME INS.OPTI6.NAME INS.DROT INS.READMODE DET.DIT DET.NDIT)

2. `hdr1_imagelist * images:` Images
3. `cpl_propertylist ** extkeywords:` Extension keywords (ID ANGLE GAIN pixel\_size X\_CEN Y\_CEN X\_SIZE Y\_SIZE)

### 3.3.38 micado\_\_i\_sci\_calibrated\_img

This structure represents all contents of a `I_SCI_CALIBRATED_IMG`. The fields are:

1. `cpl_propertylist * keywords:` Primary keywords (MJD-OBS INSTRUME)
2. `hdr1_imagelist * images:` Images
3. `cpl_propertylist ** extkeywords:` Extension keywords

### 3.3.39 micado\_\_i\_sci\_coro\_pupil\_raw

This structure represents all contents of a `I_SCI_CORO_PUPIL_RAW`. The fields are:

1. `cpl_propertylist * keywords:` Primary keywords (MJD-OBS ID ANGLE GAIN pixel\_size X\_CEN Y\_CEN X\_SIZE Y\_SIZE INSTRUME DPR.CATG DPR.TECH DPR.TYPE INS.MODE OBS.RA OBS.DEC INS.FILT1.NAME INS.FILT2.NAME INS.OPTI6.NAME INS.DROT INS.READMODE DET.DIT DET.NDIT)
2. `hdr1_image * image:` Image
3. `cpl_propertylist * extkeywords:` Extension keywords (ID ANGLE GAIN pixel\_size X\_CEN Y\_CEN X\_SIZE Y\_SIZE)

### 3.3.40 micado\_\_i\_sci\_coro\_waffle\_raw

This structure represents all contents of a `I_SCI_CORO_WAFFLE_RAW`. The fields are:

1. `cpl_propertylist * keywords:` Primary keywords (MJD-OBS ID ANGLE GAIN pixel\_size X\_CEN Y\_CEN X\_SIZE Y\_SIZE INSTRUME DPR.CATG DPR.TECH DPR.TYPE INS.MODE OBS.RA OBS.DEC INS.FILT1.NAME INS.FILT2.NAME INS.OPTI6.NAME INS.DROT INS.READMODE DET.DIT DET.NDIT)
2. `hdr1_image * image:` Image
3. `cpl_propertylist * extkeywords:` Extension keywords (ID ANGLE GAIN pixel\_size X\_CEN Y\_CEN X\_SIZE Y\_SIZE)

### 3.3.41 micado\_\_i\_sci\_raw

This structure represents all contents of a `I_SCI_RAW`. The fields are:

1. `cpl_propertylist * keywords:` Primary keywords (MJD-OBS ID ANGLE GAIN pixel\_size X\_CEN Y\_CEN X\_SIZE Y\_SIZE INSTRUME INS.MODE DPR.CATG DPR.TECH DPR.TYPE OBS.RA OBS.DEC INS.FILT1.NAME INS.FILT2.NAME INS.OPTI6.NAME INS.DROT INS.READMODE DET.DIT DET.NDIT)
2. `hdr1_imagelist * images:` Images
3. `cpl_propertylist ** extkeywords:` Extension keywords (ID ANGLE GAIN pixel\_size X\_CEN Y\_CEN X\_SIZE Y\_SIZE)

### 3.3.42 micado\_i\_sci\_regrid\_img

This structure represents all contents of a **I\_SCI\_REGRID\_IMG**. The fields are:

1. cpl\_propertylist \* keywords: Primary keywords (MJD-OBS INSTRUME)
2. hdr1\_imagelist \* images: Images
3. cpl\_propertylist \*\* extkeywords: Extension keywords

### 3.3.43 micado\_i\_sci\_stack\_img

This structure represents all contents of a **I\_SCI\_STACK\_IMG**. The fields are:

1. cpl\_propertylist \* keywords: Primary keywords (INSTRUME)
2. hdr1\_image \* image: Image
3. cpl\_propertylist \* extkeywords: Extension keywords

### 3.3.44 micado\_i\_starcenter\_pupil\_hdr

This structure represents all contents of a **I\_STARCENTER\_PUPIL\_HDR**. The fields are:

1. cpl\_propertylist \* keywords: Primary keywords
2. cpl\_propertylist \* extkeywords: Extension keywords

### 3.3.45 micado\_i\_starcenter\_waffle\_hdr

This structure represents all contents of a **I\_STARCENTER\_WAFFLE\_HDR**. The fields are:

1. cpl\_propertylist \* keywords: Primary keywords
2. cpl\_propertylist \* extkeywords: Extension keywords

### 3.3.46 micado\_i\_staroffset\_hdr

This structure represents all contents of a **I\_STAROFFSET\_HDR**. The fields are:

1. cpl\_propertylist \* keywords: Primary keywords
2. cpl\_propertylist \* extkeywords: Extension keywords

### 3.3.47 micado\_i\_stdfield\_raw

This structure represents all contents of a **I\_STDFIELD\_RAW**. The fields are:

1. cpl\_propertylist \* keywords: Primary keywords (MJD-OBS ID ANGLE GAIN pixel\_size X\_CEN Y\_CEN X\_SIZE Y\_SIZE INSTRUME INS.MODE DPR.CATG DPR.TECH DPR.TYPE OBS.RA OBS.DEC INS.FILT1.NAME INS.FILT2.NAME INS.OPTI6.NAME INS.DROT INS.READMODE DET.DIT DET.NDIT)
2. hdr1\_imagelist \* images: Images
3. cpl\_propertylist \*\* extkeywords: Extension keywords (ID ANGLE GAIN pixel\_size X\_CEN Y\_CEN X\_SIZE Y\_SIZE)

### 3.3.48 micado\_i\_wam\_raw

This structure represents all contents of a **I\_WAM\_RAW**. The fields are:

1. `cpl_propertylist * keywords:` Primary keywords (MJD-OBS ID ANGLE GAIN pixel\_size X\_CEN Y\_CEN X\_SIZE Y\_SIZE INSTRUME INS.MODE DPR.CATG DPR.TECH DPR.TYPE INS.FILT1.NAME INS.FILT2.NAME INS.OPTI6.NAME INS.DROT INS.READMODE DET.DIT DET.NDIT)
2. `hdr1_imagelist * images:` Images
3. `cpl_propertylist ** extkeywords:` Extension keywords (ID ANGLE GAIN pixel\_size X\_CEN Y\_CEN X\_SIZE Y\_SIZE)

### 3.3.49 micado\_img

This structure represents all contents of a **IMG**. The fields are:

1. `cpl_propertylist * keywords:` Primary keywords (INSTRUME)
2. `hdr1_imagelist * images:` Images
3. `cpl_propertylist ** extkeywords:` Extension keywords

### 3.3.50 micado\_ref\_i\_astrom\_cat

This structure represents all contents of a **REF\_I\_ASTROM\_CAT**. The fields are:

1. `cpl_propertylist * keywords:` Primary keywords
2. `cpl_propertylist * extkeywords:` Extension keywords
3. `cpl_table * catalog:` Catalog

### 3.3.51 micado\_ref\_i\_photom\_cat

This structure represents all contents of a **REF\_I\_PHOTOM\_CAT**. The fields are:

1. `cpl_propertylist * keywords:` Primary keywords
2. `cpl_propertylist * extkeywords:` Extension keywords
3. `cpl_table * catalog:` Catalog

### 3.3.52 micado\_ref\_i\_wam\_cat

This structure represents all contents of a **REF\_I\_WAM\_CAT**. The fields are:

1. `cpl_propertylist * keywords:` Primary keywords
2. `cpl_propertylist * extkeywords:` Extension keywords
3. `cpl_table * catalog:` Catalog

## 4 MicadoWISE specific

Classes that are part of MicadoWISE but that are not included in the ESO documentation.

## 4.1 Raw Data

### 4.1.0.1 I\_CORO\_RAW

Name: I\_CORO\_RAW  
Description: Base Coronagraphy image.  
CATG/TYPE/TECH NODEFAULT  
:  
  
OCA keywords:  
DO.CATG: RAW\_OPT\_SKY\_SKYHCI\_CORO  
Template: MCD\_img\_sci\_object\_hci\_base  
Input for micado\_img\_detrend\_hci  
recipe(s):  
Processing FITS CTYPEn  
keywords:  
CUNITn  
CRVALn  
CRPIXn  
CDELn  
Data item structure: DATA; once, for the central detector; **DRL!** structure in 4.6.12

### 4.1.0.2 RAW

Name: RAW  
Description: A Raw DataItem.  
CATG/TYPE/TECH NODEFAULT  
:  
  
OCA keywords: MJD-OBS  
DO.CATG: RAW  
Template: template  
Input for micado\_det\_persistence  
recipe(s):  
Processing FITS None  
keywords:  
Data item structure: DATA; once for each detector, so 1 or 9 times; **DRL!** structure in ??

#### 4.1.0.3 I\_SKY\_SIAI\_RAW

Name:	I_SKY_SIAI_RAW
Description:	Standard Imaging or Astrometric Imaging exposure.
CATG/TYPE/TECH	SCIENCE
:	
OCA keywords:	IMAGE DET.DIT INS.FILT <sub>i</sub> .NAME MJD-OBS TPL.START
DO.CATG:	RAW_OPT_SKY_SKYSIAI
Template:	MCD_img_obs_siai_base
Input recipe(s):	for micado_img_astrom  micado_img_calibrate micado_img_calibrated_catalog micado_img_detrend micado_img_detrend_final micado_img_regrid micado_img_stack
Processing FITS keywords:	CTYPEn  CUNITn CRVALn CRPIXn CDELTn
Data item structure:	DATA; once for each detector, so 9 times; <b>DRL!</b> structure in 4.6.14

## 4.2 Processed Data

#### 4.2.0.1 I\_DEPERSISTED\_IMG

Name:	I_DEPERSISTED_IMG
Description:	None
OCA keywords:	
PRO.CATG:	IMG_DP
Produced by recipe:	micado_det_depersist
Input recipe(s):	for None
QC parameters:	None

Processing FITS keywords:	None
Data item structure:	DATA,ERR,DQ; each once for each detector, so 1 or 9 times; <b>DRL!</b> structure in 4.6.2

#### 4.2.0.2 I\_DEPERSISTED\_DARK\_IMG

Name:	I_DEPERSISTED_DARK_IMG
Description:	None
OCA keywords:	
PRO.CATG:	IMG_DP_DPDARK
Produced by	micado_det_depersist
recipe:	
Input for	None
recipe(s):	
QC parameters:	None
Processing FITS keywords:	EXPTIME
Data item structure:	DATA,ERR,DQ; each once for each detector, so 1 or 9 times; <b>DRL!</b> structure in 4.6.1

#### 4.2.0.3 I\_DT\_IMG

Name:	I_DT_IMG
Description:	Apply to a raw exposure pixels the additive and multiplicative factors to correct for detector instrumental fingerprint.
OCA keywords:	DET.DIT INS.FILT <sub>i</sub> .NAME
PRO.CATG:	IMG_FNL_CATALOGABLE_DT
Produced by	micado_img_detrend
recipe:	
Input for	micado_img_illum
recipe(s):	micado_img_detrend_final micado_img_background
QC parameters:	QC.DETSMEAN QC.DETSMED QC.DETSSTD QC.DETRENCR QC.NPIXNONL QC.FPIXNONL

Processing FITS keywords:	None
Data item structure:	DATA,ERR,DQ; each once for each detector, so 9 times; <b>DRL!</b> structure in 4.6.5

#### 4.2.0.4 I\_DTFNL\_IMG

Name:	I_DTFNL_IMG
Description:	Subtract background and apply illumination correction.
OCA keywords:	DET.DIT INS.FILT <i>i</i> .NAME
PRO.CATG:	IMG_FNL_CATALOGABLE_DTFNL
Produced by recipe:	micado_img_detrend_final
Input for recipe(s):	micado_img_distortion micado_img_astrom micado_img_photom micado_img_calibrate micado_img_star_photom micado_img_calib_hci micado_img_starpos_waffle micado_img_starpos_pupil
QC parameters:	None
Processing FITS keywords:	None
Data item structure:	DATA,ERR,DQ; each once for each detector, so 9 times; <b>DRL!</b> structure in 4.6.9

#### 4.2.0.5 I\_DTFNL\_HCI\_IMG

Name:	I_DTFNL_HCI_IMG
Description:	None
OCA keywords:	
PRO.CATG:	IMG_FNL_CATALOGABLE_DTFNL_DTFNLHCI
Produced by recipe:	micado_img_detrend_final
Input for recipe(s):	micado_img_star_photom micado_img_calib_hci micado_img_starpos_waffle micado_img_starpos_pupil
QC parameters:	None

Processing FITS keywords:	None
Data item structure:	DATA,ERR,DQ; each once, for the central detector; <b>DRL!</b> structure in 4.6.7

#### 4.2.0.6 I\_DTFNL\_HCI\_SCI\_IMG

Name:	I_DTFNL_HCI_SCI_IMG
Description:	None
OCA keywords:	
PRO.CATG:	IMG_FNL_CATALOGABLE_DTFNL_DTFNLHCI_DTFNLHCISCIENCE
Produced by recipe:	micado_img_detrend_final
Input for recipe(s):	micado_img_calib_hci micado_img_starpos_waffle micado_img_starpos_pupil
QC parameters:	None
Processing FITS keywords:	None
Data item structure:	DATA,ERR,DQ; each once, for the central detector; <b>DRL!</b> structure in 4.6.8

#### 4.2.0.7 I\_DTFNL\_SIAI\_IMG

Name:	I_DTFNL_SIAI_IMG
Description:	None
OCA keywords:	DET.DIT INS.FILT <i>i</i> .NAME MJD-OBS TPL.START
PRO.CATG:	IMG_FNL_CATALOGABLE_DTFNL_DTFNLSIAI
Produced by recipe:	micado_img_detrend_final
Input for recipe(s):	micado_img_calibrate micado_img_astrom micado_img_photom
QC parameters:	None
Processing FITS keywords:	None
Data item structure:	DATA,ERR,DQ; each once for each detector, so 9 times; <b>DRL!</b> structure in 4.6.10

#### 4.2.0.8 I\_DT\_HCI\_IMG

Name: I\_DT\_HCI\_IMG  
Description: Apply to a raw exposure pixels observed in high-contrast imaging mode the additive and multiplicative factors to correct for detector instrumental fingerprint.

OCA keywords:  
PRO.CATG: IMG\_FNL\_CATALOGABLE\_DT\_DTHCI  
Produced by micado\_img\_detrend\_hci  
recipe:  
Input for micado\_img\_detrend\_final  
recipe(s):  
QC parameters: QC.DETSMEAN  
QC.DETSMED  
QC.DETSSTD  
QC.DETRENCR  
QC.NPIXNONL  
QC.FPIXNONL

Processing FITS keywords: None  
Data item structure: DATA,ERR,DQ; each once, for the central detector; **DRL!** structure in 4.6.4

#### 4.2.0.9 I\_DT\_SIAI\_IMG

Name: I\_DT\_SIAI\_IMG  
Description: None  
OCA keywords: DET.DIT  
INS.FILT<sub>i</sub>.NAME  
MJD-OBS  
TPL.START

PRO.CATG: IMG\_FNL\_CATALOGABLE\_DT\_DTSIAI  
Produced by micado\_img\_detrend  
recipe:  
Input for micado\_img\_detrend\_final  
recipe(s):  
QC parameters: QC.DETSMEAN  
QC.DETSMED  
QC.DETSSTD  
QC.DETRENCR  
QC.NPIXNONL  
QC.FPIXNONL

Processing FITS keywords: None

Data item structure:	DATA,ERR,DQ; each once for each detector, so 9 times; <b>DRL!</b> structure in 4.6.6
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#### 4.2.0.10 I\_DISTORTION\_HDR

Name:	I_DISTORTION_HDR
Description:	None.
OCA keywords:	
DO.CATG:	HDR_DISTORTION
Input for recipe(s):	micado_img_astrom
Processing FITS keywords:	TODO
Data item structure:	TAB; once, spanning all detectors; <b>DRL!</b> structure in 4.6.3

#### 4.2.0.11 I\_PHOTOM\_HDR

Name:	I_PHOTOM_HDR
Description:	Zeropoint and extinction coefficient, one pair per detector.
OCA keywords:	DET.DIT INS.FILT <i>i</i> .NAME
DO.CATG:	HDR_PHOTOM
Input for recipe(s):	micado_img_calibrate micado_img_star_photom
Processing FITS keywords:	TODO
Data item structure:	TAB; once for each detector, so 9 times; <b>DRL!</b> structure in 4.6.11

#### 4.2.0.12 IMG

Name:	IMG
Description:	An Img DataItem, that is, a processed image.
OCA keywords:	
DO.CATG:	IMG
Input for recipe(s):	micado_img_flat

	micado_img_detrend
	micado_img_background
	micado_img_illum
	micado_img_detrend_final
	micado_img_detrend_hci
	micado_img_distortion
	micado_img_astrom
	micado_img_photom
	micado_img_calibrate
	micado_img_star_photom
	micado_img_calib_hci
	micado_img_regrid
	micado_img_calibrated_catalog
	micado_img_stack
	micado_img_cube_hci
	micado_img_starpos_waffle
	micado_img_starpos_pupil
Processing FITS	TODO
keywords:	
Data item structure:	DATA,ERR,DQ; each once for each detector, so 9 times; <b>DRL!</b> structure in 3.3.49

#### 4.2.0.13 I\_OPT\_RAW

Name:	<b>I_OPT_RAW</b>
Description:	An exposure that goes through the optics.
CATG/TYPE/TECH	NODEFAULT
:	
OCA keywords:	DET.DIT INS.FILT <i>i</i> .NAME
DO.CATG:	RAW_OPT
Template:	<b>template</b>
Input for recipe(s):	micado_img_calib_hci  micado_img_cube_hci micado_img_detrend micado_img_detrend_final micado_img_distortion micado_img_photom
Processing FITS	None
keywords:	
Data item structure:	DATA; once for each detector, so 9 times; <b>DRL!</b> structure in 4.6.13

#### 4.2.0.14 I\_STARCENTER\_HDR

Name: **I\_STARCENTER\_HDR**  
Description: Table with the star center during the OB on the detector. The position is in pixel units in the Pixel Grid Coordinate System.  
OCA keywords:  
DO.CATG: HDR\_STARCENTER  
Input for **micado\_img\_calib\_hci**  
recipe(s):  
Processing FITS TODO  
keywords:  
Data item structure: TAB; once, for the central detector; **DRL!** structure in 4.6.15

### 4.3 External Data

#### 4.3.0.1 REF\_I\_DISTORTION\_CAT

Name: **REF\_I\_DISTORTION\_CAT**  
Description: Reference catalog for astrometric calibration.  
OCA keywords:  
DO.CATG: CAT\_DISTORTIONREF  
Input for **micado\_img\_distortion**  
recipe(s):  
**micado\_img\_astrom**  
Processing FITS TODO  
keywords:  
Data item structure: CAT; once; **DRL!** structure in 4.6.16

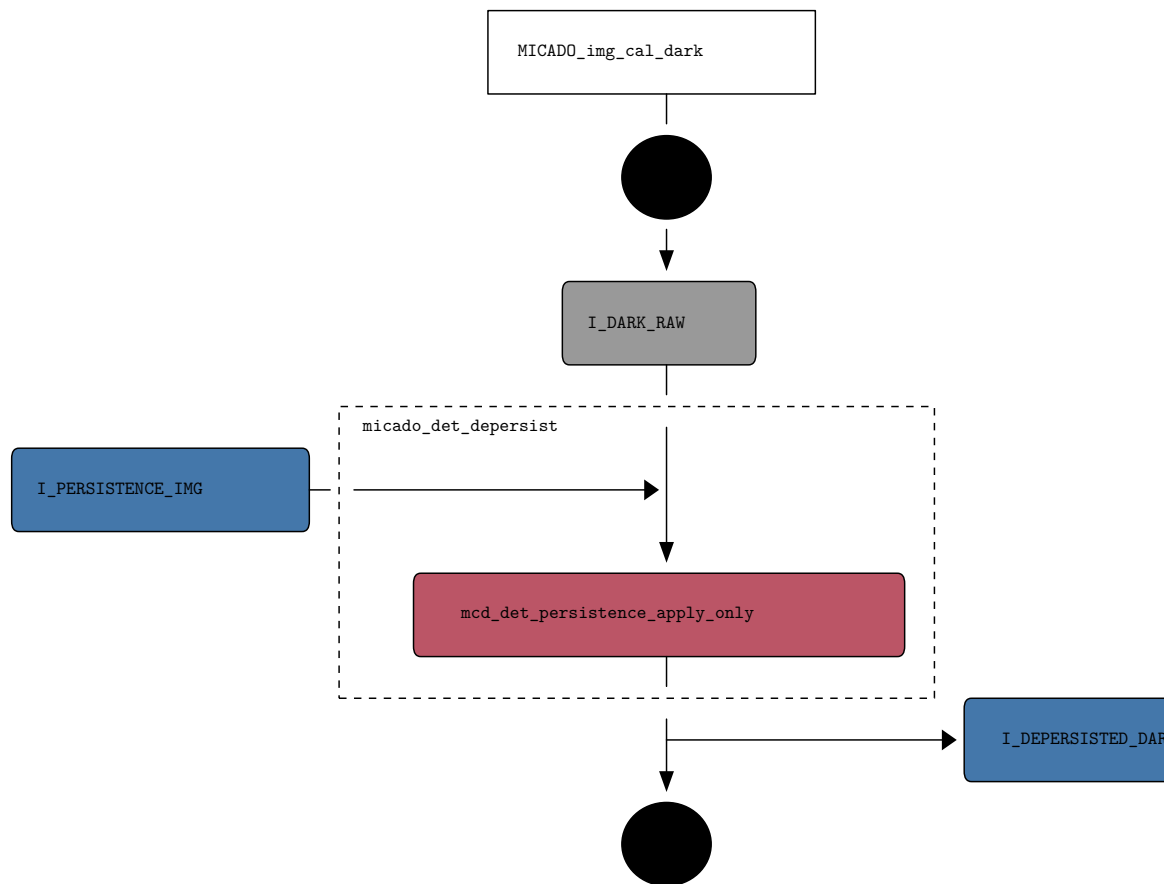
### 4.4 Recipes

#### 4.4.1 micado\_det\_depersist

Used in pipelines: None.

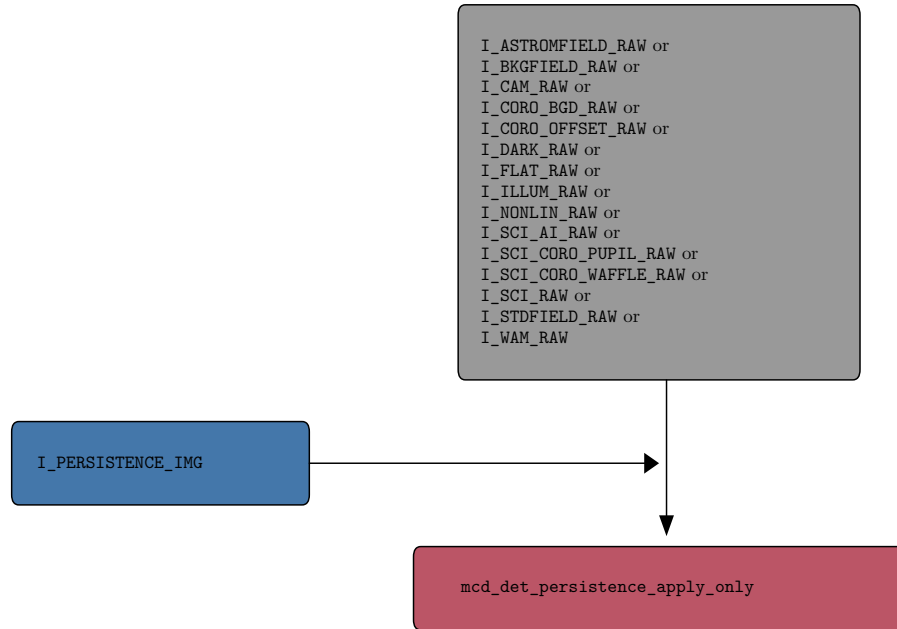
Recipe name: **micado\_det\_depersist**  
Type: For internal testing only  
Purpose: None

Input data:	RAW (I_ASTROMFIELD_RAW or I_BKGFIELD_RAW or I_CAM_RAW or I_CORO_BGD_RAW or I_CORO_OFFSET_RAW or I_DARK_RAW or I_DPSICS_OPT_RAW or I_FLAT_RAW or I_ILLUM_RAW or I_NONLIN_RAW or I_SCI_AI_RAW or I_SCI_CORO_PUPIL_RAW or I_SCI_CORO_WAFFLE_RAW or I_SCI_RAW or I_STDFIELD_RAW or I_WAM_RAW)
Output products:	I_PERSISTENCE_IMG I_DEPERSISTED_IMG (I_DEPERSISTED_DARK_IMG)
QC parameters:	None
User Parameters:	None
Procedure:	See Figure 4.4.1.
DRL Functions:	mcd_det_persistence_apply_only
Error conditions:	None
Remarks:	None



## 4.5 RecipeSteps / DRL Functions

#### 4.5.1 mcd\_det\_persistence\_apply\_only



Name:	mcd_det_persistence_apply_only
Purpose:	Apply Persistence Correction.
Used in recipes:	<code>micado_det_depersist</code>
Working remarks:	None
Function Parameters:	None
Inputs:	<pre>const micado_img * progenitor const micado_i_persistence_img * persistence micado_i_depersisted_img * product</pre>
Other outputs:	<code>cpl_error_code</code>
General description:	Subtract the Persistence.

Mathematical description:	<p>For each detector adapt the extensions as follows:</p> <ul style="list-style-type: none"> <li>* DATA: Subtract the DATA layer of the Persistence image.</li> <li>* ERR: Propagate the ERR layer of of the Persistence image assuming uncorrelated uncertainties.</li> <li>* DQ: XOR with the DQ layer of the Persistence image.</li> <li>* PRS: Optionally create a layer with the persistence image itself.</li> </ul> <p>For each header copy the QC parameters from the non-linearity headers.</p>
Quality assessment:	Through QC parameters
Error conditions:	See [?].
Unit tests:	See [?].

## 4.6 DRL Data Structures

### 4.6.1 micado\_i\_depersisted\_dark\_img

This structure represents all contents of a **I\_DEPERSISTED\_DARK\_IMG**. The fields are:

1. `cpl_propertylist * keywords:` Primary keywords (MJD-OBS INSTRUME)
2. `hdr1_imagelist * images:` Images
3. `cpl_propertylist ** extkeywords:` Extension keywords

### 4.6.2 micado\_i\_depersisted\_img

This structure represents all contents of a **I\_DEPERSISTED\_IMG**. The fields are:

1. `cpl_propertylist * keywords:` Primary keywords (MJD-OBS INSTRUME)
2. `hdr1_imagelist * images:` Images
3. `cpl_propertylist ** extkeywords:` Extension keywords

### 4.6.3 micado\_i\_distortion\_hdr

This structure represents all contents of a **I\_DISTORTION\_HDR**. The fields are:

1. `cpl_propertylist * keywords:` Primary keywords (INSTRUME)
2. `cpl_propertylist * extkeywords:` Extension keywords

### 4.6.4 micado\_i\_dt\_hci\_img

This structure represents all contents of a **I\_DT\_HCI\_IMG**. The fields are:

1. `cpl_propertylist * keywords:` Primary keywords (MJD-OBS INSTRUME)
2. `hdr1_image * image:` Image
3. `cpl_propertylist * extkeywords:` Extension keywords

#### 4.6.5 micado\_i\_dt\_img

This structure represents all contents of a **I\_DT\_IMG**. The fields are:

1. cpl\_propertylist \* keywords: Primary keywords (MJD-OBS INSTRUME)
2. hdr1\_imagelist \* images: Images
3. cpl\_propertylist \*\* extkeywords: Extension keywords

#### 4.6.6 micado\_i\_dt\_siai\_img

This structure represents all contents of a **I\_DT\_SIAI\_IMG**. The fields are:

1. cpl\_propertylist \* keywords: Primary keywords (MJD-OBS INSTRUME)
2. hdr1\_imagelist \* images: Images
3. cpl\_propertylist \*\* extkeywords: Extension keywords

#### 4.6.7 micado\_i\_dtfnl\_hci\_img

This structure represents all contents of a **I\_DTFNL\_HCI\_IMG**. The fields are:

1. cpl\_propertylist \* keywords: Primary keywords (MJD-OBS INSTRUME)
2. hdr1\_image \* image: Image
3. cpl\_propertylist \* extkeywords: Extension keywords

#### 4.6.8 micado\_i\_dtfnl\_hci\_sci\_img

This structure represents all contents of a **I\_DTFNL\_HCI\_SCI\_IMG**. The fields are:

1. cpl\_propertylist \* keywords: Primary keywords (MJD-OBS INSTRUME)
2. hdr1\_image \* image: Image
3. cpl\_propertylist \* extkeywords: Extension keywords

#### 4.6.9 micado\_i\_dtfnl\_img

This structure represents all contents of a **I\_DTFNL\_IMG**. The fields are:

1. cpl\_propertylist \* keywords: Primary keywords (MJD-OBS INSTRUME)
2. hdr1\_imagelist \* images: Images
3. cpl\_propertylist \*\* extkeywords: Extension keywords

#### 4.6.10 micado\_i\_dtfnl\_siai\_img

This structure represents all contents of a **I\_DTFNL\_SIAI\_IMG**. The fields are:

1. cpl\_propertylist \* keywords: Primary keywords (MJD-OBS INSTRUME)
2. hdr1\_imagelist \* images: Images
3. cpl\_propertylist \*\* extkeywords: Extension keywords

#### 4.6.11 micado\_i\_photom\_hdr

This structure represents all contents of a **I\_PHOTOM\_HDR**. The fields are:

1. cpl\_propertylist \* keywords: Primary keywords (MJD-OBS)
2. cpl\_propertylist \*\* extkeywords: Extension keywords (ZEROPNT EXTINGUISHED)

#### 4.6.12 micado\_i\_coro\_raw

This structure represents all contents of a **I\_CORO\_RAW**. The fields are:

1. cpl\_propertylist \* keywords: Primary keywords (MJD-OBS ID ANGLE GAIN pixel\_size X\_CEN Y\_CEN X\_SIZE Y\_SIZE INSTRUME INS.MODE DPR.CATG DPR.TECH DPR.TYPE OBS.RA OBS.DEC INS.FILT1.NAME INS.FILT2.NAME INS.OPTI6.NAME INS.DROT INS.READMODE DET.DIT DET.NDIT)
2. hdr1\_image \* image: Image
3. cpl\_propertylist \* extkeywords: Extension keywords (ID ANGLE GAIN pixel\_size X\_CEN Y\_CEN X\_SIZE Y\_SIZE)

#### 4.6.13 micado\_i\_opt\_raw

This structure represents all contents of a **I\_OPT\_RAW**. The fields are:

1. cpl\_propertylist \* keywords: Primary keywords (MJD-OBS ID ANGLE GAIN pixel\_size X\_CEN Y\_CEN X\_SIZE Y\_SIZE INSTRUME DPR.CATG DPR.TECH DPR.TYPE INS.READMODE DET.DIT DET.NDIT)
2. hdr1\_imagelist \* images: Images
3. cpl\_propertylist \*\* extkeywords: Extension keywords

#### 4.6.14 micado\_i\_sky\_siai\_raw

This structure represents all contents of a **I\_SKY\_SIAI\_RAW**. The fields are:

1. cpl\_propertylist \* keywords: Primary keywords (MJD-OBS ID ANGLE GAIN pixel\_size X\_CEN Y\_CEN X\_SIZE Y\_SIZE INSTRUME INS.MODE DPR.CATG DPR.TECH DPR.TYPE OBS.RA OBS.DEC INS.FILT1.NAME INS.FILT2.NAME INS.OPTI6.NAME INS.DROT INS.READMODE DET.DIT DET.NDIT)
2. hdr1\_imagelist \* images: Images
3. cpl\_propertylist \*\* extkeywords: Extension keywords

#### 4.6.15 micado\_i\_starcenter\_hdr

This structure represents all contents of a **I\_STARCENTER\_HDR**. The fields are:

1. cpl\_propertylist \* keywords: Primary keywords
2. cpl\_propertylist \* extkeywords: Extension keywords

#### 4.6.16 micado\_ref\_i\_distortion\_cat

This structure represents all contents of a [REF\\_I\\_DISTORTION\\_CAT](#). The fields are:

1. `cpl_propertylist * keywords:` Primary keywords
2. `cpl_propertylist * extkeywords:` Extension keywords
3. `cpl_table * catalog:` Catalog

## 5 Calibration Plan

Sections for the Calibration Plan.

### 5.0.1 Distortion correction ELT

Name:	Distortion correction ELT
Objective:	Determine the correction for the geometric distortion in the optical path from top of atmosphere to the warm astrometric mask.
Responsible:	Science Operations
Phase:	Nighttime
MICADO Set-up:	* Acquire on-sky the LMC Reference Field * Do 9 exposures, one with field centered on each detector. * Repeat for Y, J, H and K filter. * Repeat for high and low resolution imager.
Calibration Unit setup:	Not active.
Observing Template:	<a href="#">MICADO_img_cal_refstars</a>
Template parameters:	<a href="#">INS.MODE</a> <a href="#">OBS.RA</a> <a href="#">OBS.DEC</a> <a href="#">INS.FILT1.NAME</a> <a href="#">INS.FILT2.NAME</a> <a href="#">INS.OPTI6.NAME</a> <a href="#">INS.DROT</a> <a href="#">INS.READMODE</a> <a href="#">DET.DIT</a> <a href="#">DET.NDIT</a> <a href="#">INSTRUME</a>
Observing Block:	<a href="#">MICADO_img_cal_refstars</a>
Frequency:	Once at commissioning and after each instrument intervention.
Duration estimate [s]:	4567

Prerequisites:	None
Instrument data:	<code>I_ASTROMFIELD_RAW</code>
Software recipe:	<code>micado_img_distortion</code>
Processed data:	<code>I_DISTORTION_ELT_HDR</code>
QC parameters:	<code>QC.DISTORTXMIN</code> <code>QC.DISTORTXMAX</code> <code>QC.DISTORTXMEDIAN</code> <code>QC.DISTORTXMEAN</code> <code>QC.DISTORTYMIN</code> <code>QC.DISTORTYMAX</code> <code>QC.DISTORTYMEDIAN</code> <code>QC.DISTORTYMEAN</code>
Accuracy:	Validatd in simulated images: source centroiding precision= $20\mu\text{as}$ at $S/N > 250$ . And distortion recovery accurate to $\text{RMS}=50\mu\text{as}$ .
Remarks:	These observations are on the Large Magellanic Cloud Reference Field (described in Section ??). The reference positions have accuracies of 1mas or better. Note: smaller time-dependent distortions in ELT with an amplitude of $100\mu\text{as}$ over 10arcsec are expected to occur due to shifting mirrors ([?]). These must be captured using self-calibration of the science data as mirrors shift with each re-acquisition of a field.
ReqID:	DPS-distortionELT
Parent ReqID:	R-MCD-116

Table 134

### 5.0.2 Distortion correction AO+MICADO

Name:	Distortion correction AO+MICADO
Objective:	Determine the distortion occuring in the optical path from warm astrometric mask to the detector array as a function of derotator angle.
Responsible:	Science Operations
Phase:	Daytime
MICADO Set-up:	<ul style="list-style-type: none"> <li>* Set observing mode to standard imaging</li> <li>* Select warm astrometric mask</li> <li>* Put flatfield lamp in Calibration Unit into optical path</li> <li>* For each 10 degrees of derotator angle: create exposure</li> <li>* Repeat exposore for high resolution imager and low resolution imager</li> <li>* Repeat for Y, J, H and K filter.</li> </ul>
Calibration Unit setup:	Flat field lamp ON
Observing Template:	MICADO_img_cal_warmmask
Template parameters:	INS.MODE INS.FILT1.NAME INS.FILT2.NAME INS.OPTI6.NAME INS.DROT INS.READMODE DET.DIT DET.NDIT INSTRUME
Observing Block:	MICADO_img_cal_warmmask
Frequency:	During commissioning and once after each instrument intervention.
Duration estimate [s]:	3243
Prerequisites:	None.
Instrument data:	I_WAM_RAW
Software recipe:	micado_img_distortion
Processed data:	I_DISTORTION_WAM_HDR

QC parameters:	<a href="#">QC.DISTORTXMIN</a> <a href="#">QC.DISTORTXMAX</a> <a href="#">QC.DISTORTXMEDIAN</a> <a href="#">QC.DISTORTXMEAN</a> <a href="#">QC.DISTORTYMIN</a> <a href="#">QC.DISTORTYMAX</a> <a href="#">QC.DISTORTYMEDIAN</a> <a href="#">QC.DISTORTYMEAN</a>
Accuracy:	Pinhole source centroiding precision= 10 $\mu$ mas at S/N > 250. Distortion recovery accurate to RMS=50 $\mu$ as, validated in simulated data.
Remarks:	Users can specify in their phase 2 preparation additional warm astrometric mask observations through their science filter at one or more derotator angles close to their science observations to obtain highest possible accuracy on astrometric distortion calibration.
ReqID:	DPS-AOplusMICADOdistortion
Parent ReqID:	R-MCD-116

Table 135

### 5.0.3 Flatlamp illumination correction

Name:	Flatlamp illumination correction
Objective:	Determine spatial variation in illumination by flatlamp over detector array
Responsible:	Science Operations
Phase:	Nighttime
MICADO Set-up:	<ul style="list-style-type: none"> <li>* Acquire LMC Reference Field</li> <li>* Do 3 dithered exposures.</li> <li>* Repeat for Y, J, H and K filter.</li> <li>* Repeat for high and low resolution imager.</li> </ul>
Calibration Unit setup:	Not active.
Observing Template:	<code>MICADO_img_tec_illum</code>
Template parameters:	<code>INS.MODE</code> <code>INS.READMODE</code> <code>DET.DIT</code> <code>DET.NDIT</code> <code>INSTRUME</code>
Observing Block:	<code>MICADO_img_tec_illum</code>
Frequency:	During commissioning and after each instrument intervention.
Duration estimate [s]:	2050
Prerequisites:	Photometric observing conditions.
Instrument data:	<code>I_ILLUM_RAW</code>
Software recipe:	<code>micado_img_illum</code>
Processed data:	<code>I_ILLUM_CORR_HDR</code>
QC parameters:	<code>QC.ILLUNMAT</code> <code>QC.ILLSNRMD</code>
Accuracy:	Measurement precision of 1% and accuracy of 10% on value of illumination variation value over full FoV. So if true illumination variation is 20% we want an accuracy of 20% +/-2%.
Remarks:	These observations are on the Large Magellanic Cloud Reference Field (described in Section ??). The reference magnitudes have accuracies of 1% or better. This calibration task assumes a polynomial behavior of the illumination variation.
ReqID:	DPS-illumcorr
Parent ReqID:	R-MCD-100

Table 136

#### 5.0.4 Master Dark

Name:	Master Dark
Objective:	Determine the dark current and flag hot pixels.
Responsible:	Science Operations
Phase:	Daytime
MICADO Set-up:	<ul style="list-style-type: none"> <li>* 1. Ensure calibration Unit off</li> <li>* 2. Set wheel with blocking filter in right position</li> <li>* 3. Take 5 exposures</li> <li>4. Repeat for 3 detector usage modes and for 5 pre-defined exposure times.</li> </ul>
Calibration Unit setup:	Not active
Observing Template:	MICADO_img_cal_dark
Template parameters:	INS.MODE INS.READMODE DET.DIT DET.NDIT INSTRUME
Observing Block:	MICADO_img_cal_dark
Frequency:	daily
Duration estimate [s]:	4654
Prerequisites:	None
Instrument data:	I_DARK_RAW
Software recipe:	micado_det_dark
Processed data:	I_MASTER_DARK_IMG
QC parameters:	QC.DARKMEAN QC.DARKMED QC.DARKSTD QC.NPIXSAT QC.FPIXSAT
Accuracy:	Dark current measurement uncertainty 10%. Systematic error 10% as inferred from simulated data. 90% hot pixels flagged.
Remarks:	It is expected that dark current is independent of read option. Baseline is to limit all science exposures to a finite set of exposure times. This ensures the darks, with the same finite set of exposure times, can be taken before a night instead of following it: mitigates persistence in the raw darks.
ReqID:	DPS-masterdark
Parent ReqID:	R-MCD-100

Table 137

### **5.0.5 Master Flat**

Name:	Master Flat
Objective:	Determine pixelsensitivity variation at scale of few pixels and flag cold pixels.
Responsible:	Science Operations
Phase:	Daytime
MICADO Set-up:	<ul style="list-style-type: none"> <li>* Set observing mode to standard imaging</li> <li>* Set ADC + wheel into right position</li> <li>* Put flatfield lamp in Calibration Unit into optical path</li> <li>* Set detector readout mode to TLI</li> <li>* Do 5 flatfield exposures with identical exposure time</li> <li>* Repeat for Y, J, H and K</li> </ul>
Calibration Unit setup:	Flat field lamp ON
Observing Template:	MICADO_img_cal_flat
Template parameters:	INS.MODE INS.FILT1.NAME INS.FILT2.NAME INS.OPTI6.NAME INS.DROT INS.READMODE DET.DIT DET.NDIT INSTRUME
Observing Block:	MICADO_img_cal_flat
Frequency:	daily
Duration estimate [s]:	254
Prerequisites:	Normal instrumental conditions.
Instrument data:	I_FLAT_RAW
Software recipe:	micado_img_flat
Processed data:	I_MASTER_FLAT_IMG
QC parameters:	QC.FLATMEAN QC.FLATMED QC.FLATSTD QC.NPIXHOT QC.FPIXHOT
Accuracy:	0.5% precision on pixel sensitivity, validated on simulated data. 90% cold pixels flagged.
Remarks:	None
ReqID:	DPS-flatfield
Parent ReqID:	R-MCD-100

Table 138

### 5.0.6 Non Linearity Correction Coefficients

Name:	Non Linearity Correction Coefficients
Objective:	Determine the non-linear response, gain and readnoise of the MICADO detector pixels.
Responsible:	Science Operations
Phase:	Daytime
MICADO Set-up:	<ul style="list-style-type: none"> <li>* 1. Set observing mode to standard imaging</li> <li>* 2. Set ADC + wheel into right position</li> <li>* 3. Put flatfield lamp in Calibration Unit into optical path</li> <li>* 4. Insert J filter</li> <li>* 5. do 10 exposures each at a different DIT exposure time, homogeneously spread in the range from approximately 5% to 100% of full well in ADU.</li> <li>* 6. Repeat step 5 for the 3 detector read-out modes</li> </ul>
Calibration Unit setup:	Flat field lamp ON
Observing Template:	<code>MICADO_img_tec_nonlin</code>
Template parameters:	<code>INS.MODE</code> <code>INS.FILT1.NAME</code> <code>INS.FILT2.NAME</code> <code>INS.OPTI6.NAME</code> <code>INS.DROT</code> <code>INS.READMODE</code> <code>DET.DIT</code> <code>DET.NDIT</code> <code>INSTRUME</code>
Observing Block:	<code>MICADO_img_tec_nonlin</code>
Frequency:	During commissioning and once after each instrument intervention
Duration estimate [s]:	338
Prerequisites:	Normal instrumental conditions.
Instrument data:	<code>I_NONLIN_RAW</code>
Software recipe:	<code>micado_img_nonlinearity</code>
Processed data:	<code>I_NONLINEARITY_IMG</code>
QC parameters:	<code>QC.FITSTD</code> <code>QC.NITER</code>
Accuracy:	To make non-linearity a negligible contributor to the error budget to meet the goal of 10mmag (i.e., 1%) local relative photometry, we determine the non-linearity with an accuracy of 0.2%.

Remarks:	The first time the non-linearity will be determined on Armazones is during commissioning, using the above described set of data which is of similar type of data as obtained in the lab for non-linearity determination as specified in Section 5.7 of [?]. Such a set will be observed for all 3 read-out modes (CDS, RRR and TLI). Then we use the two methods, one for CDS/RRR and other for TLI, as specified in Section 5 of [?] to derive the non-linearity correction and the gain and the readnoise. This can be compared to results in the lab. Same procedure and comparison to be repeated after each instrument intervention.
ReqID:	DPS-nonlinear
Parent ReqID:	R-MCD-100

Table 139

### 5.0.7 Photometric solution

Name:	Photometric solution
Objective:	Determine the scalar zeropoint that converts fluxes (in units of ADUs) into magnitudes at the top of the atmosphere.
Responsible:	User
Phase:	Nighttime
MICADO Set-up:	* Acquire on-sky photometric standard field * Other settings identical to corresponding science observation
Calibration Unit setup:	Not active.
Observing Template:	MICADO_img_cal_zeropoint
Template parameters:	INS.MODE OBS.RA OBS.DEC INS.FILT1.NAME INS.FILT2.NAME INS.OPTI6.NAME INS.DROT INS.READMODE DET.DIT DET.NDIT INSTRUME
Observing Block:	MICADO_img_cal_zeropoint
Frequency:	The User decides whether this Observing Block is added to its phase 2 set to derive the zeropoint independent from the science observations. By default the zeropoint is determined using reference stars inside the science images.
Duration estimate [s]:	247 (for 1 filter)
Prerequisites:	Photometric conditions.
Instrument data:	I_STDFIELD_RAW
Software recipe:	micado_img_photom
Processed data:	I_PHOTOM_STDFIELD_HDR
QC parameters:	QC.ZPTSTD <sub>i</sub> QC.NMATCH <sub>i</sub>
Accuracy:	1% measurement precision, 5% accuracy
Remarks:	PHOTOMSTDFIELD_HDR contains zeropoint and extinction coefficient, one pair per detector. No user defined parameters by default. User can manually optimize source extraction parameters (e.g., aperture, SNR threshold reference sources).

ReqID:	DPS-photomstandardfield
Parent ReqID:	R-MCD-100

Table 140

### 5.0.8 Coronagraphic star zeropoint and centroid

Name:	Coronagraphic star zeropoint and centroid
Objective:	Determine zeropoint and centroid of the central bright star.
Responsible:	User
Phase:	Nighttime
MICADO Set-up:	<ul style="list-style-type: none"> <li>* Move central star relative to the coronagraph such that it is not blocked anymore by the latter</li> <li>* insert neutral density filter if user requested it</li> <li>* other configurations identical to science observations for which the calibration is used</li> </ul>
Calibration Unit setup:	Not active.
Observing Template:	<b>MICADO_coro_cal_starvisible</b>
Template parameters:	INS.MODE OBS.RA OBS.DEC INS.FILT1.NAME INS.FILT2.NAME INS.OPTI6.NAME INS.DROT INS.READMODE DET.DIT DET.NDIT INSTRUME
Observing Block:	this observing Template is part of the science Observing Block
Frequency:	The User decides the number of observing Templates instances added to its phase 2 Observing Blocks.
Duration estimate [s]:	252 (per observing Template in this case)
Prerequisites:	None
Instrument data:	<b>I_CORO_OFFSET_RAW</b>
Software recipe:	<b>micado_img_star_photom</b>
Processed data:	<b>I_STAROFFSET_HDR</b>
QC parameters:	<b>QC.STAROFFSETS NRMIN<sub>n</sub></b> <b>QC.STAROFFSETS NRMAX<sub>n</sub></b> <b>QC.STAROFFSETS NRMED<sub>n</sub></b> <b>QC.STAROFFSETS NRMEAN<sub>n</sub></b>
Accuracy:	Accuracy of algorithm is a zeropoint better than 1% and a centroid better than 0.1 pixel in each dimension.
Remarks:	See Section 5 in [?] for details of procedure and algorithm.
ReqID:	DPS-corostarzpandcentroid
Parent ReqID:	R-MCD-119

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Table 141

## 6 Observing Templates

### 6.1 Imaging Templates

#### 6.1.1 MICADO\_coro\_cal\_starvisible

Name	MICADO_coro_cal_starvisible
Description	Measures the star flux in ADU/s in order to estimate the contrast between the central star and a close companion for coronagraphy.
CATG	CALIB
TYPE	STAR
TECH	CORONOGRAPHY
Parameters	INS.MODE OBS.RA OBS.DEC INS.FILT1.NAME INS.FILT2.NAME INS.OPTI6.NAME INS.DROT INS.READMODE DET.DIT DET.NDIT INSTRUME
Main Dataitem	I_CORO_OFFSET_RAW

Regular-operations calibration observations summary						
(1) Calibration task name	(2) observing Template name	(3) Execution time Template (s)	(4) Exposure duration / 24hrs (s)	(5) Raw data type	(6) Triggered recipe	(7) Output data items
Master Dark	MICADO_img_cal_dark	4654	4654 (d)	I_DARK_RAW	micado_det_dark	I_MASTER_DARK_IMG
Master Flat	MICADO_img_cal_flat	254	254 (d)	I_FLAT_RAW	micado_img_flat	I_MASTER_FLAT_IMG
Photometric solution	MICADO_img_cal_zeropoint	247	81 (n)	I_STDFIELD_RAW	micado_img_photom	I_PHOTOM_STDFIELD_HDR
Coronagraphic star zero-point and centroid	MICADO_coro_cal_starvisible	252	83 (n)	I_CORO_OFFSET_RAW	micado_img_star_photom	I_STAROFFSET_HDR
Non Linearity Correction Coefficients	MICADO_img_tec_nonlin	338 (d)	I_NONLIN_RAW	micado_img_nonlinearity	I_NONLINEARITY_IMG	
Flatlamp illumination correction	MICADO_img_tec_illum	2050 (n)	I_ILLUM_RAW	micado_img_illum	I_ILLUM_CORR_HDR	
Distortion correction AO+MICADO	MICADO_img_cal_varmask	3243 (d)	I_WAM_RAW	micado_img_distortion	I_DISTORTION_WAM_HDR	
Distortion correction ELT	MICADO_img_cal_refstars	4567 (n)	I_ASTRONOMIC_REFSTARS	micado_img_distortion	I_DISTORTION_ELT_HDR	
Dummy	...	...	...	...	...	...
Average duration / 24hr for night time calibrations: 296 s. Average duration / 24hr for day time calibrations: 5949 seconds						

Table 142: Summary.

### 6.1.2 MICADO\_coro\_obs\_fpm

Name	MICADO_coro_obs_fpm
Description	Science exposures in high-contrast imaging mode using a focal plane mask. No offset can be given; star centered in the mask with QACITS-like centering algorithm. Only the central detector is used, and the numbers of rows read can be reduced.
CATG	SCIENCE
TYPE	OBJECT
TECH	CORONOGRAPHY, WAFFLE
Parameters	INS.MODE OBS.RA OBS.DEC INS.FILT1.NAME INS.FILT2.NAME INS.OPTI6.NAME INS.DROT INS.READMODE DET.DIT DET.NDIT INSTRUME
Main Dataitem	I_SCI_CORO_WAFFLE_RAW

### 6.1.3 MICADO\_coro\_obs\_fpm[bg]

Name	MICADO_coro_obs_fpm[bg]
Description	This is not an actual template, but part of MICADO_coro_obs_fpm. It is listed in the document to represent the sky image for the calibration of the science images (and for online tracking), which have their own DPR keywords.
CATG	CALIB
TYPE	BACKGROUND
TECH	CORONOGRAPHY
Parameters	INS.MODE OBS.RA OBS.DEC INS.FILT1.NAME INS.FILT2.NAME INS.OPTI6.NAME INS.DROT INS.READMODE DET.DIT DET.NDIT INSTRUME
Main Dataitem	I_CORO_BGD_RAW

#### 6.1.4 MICADO\_coro\_obs\_ppm

Name	MICADO_coro_obs_ppm
Description	Science exposures in high-contrast imaging mode using a pupil plane mask. An offset can be given, for sky or photometric observations. No centering algorithm is being used. Only the central detector is used, and the numbers of rows read can be reduced.
CATG	SCIENCE
TYPE	PUPIL
TECH	CORONOGRAPHY
Parameters	INS.MODE OBS.RA OBS.DEC INS.FILT1.NAME INS.FILT2.NAME INS.OPTI6.NAME INS.DROT INS.READMODE DET.DIT DET.NDIT INSTRUME
Main Dataitem	I_SCI_CORO_PUPIL_RAW

### 6.1.5 MICADO\_img\_cal\_coldmask

Name	MICADO_img_cal_coldmask
Description	Provide calibration frames for the determination of the distortion due to the instrument
CATG	CALIB
TYPE	PINHOLE,CAM
TECH	IMAGE,AI
Parameters	INS.MODE INS.FILT1.NAME INS.FILT2.NAME INS.OPTI6.NAME INS.DROT INS.READMODE DET.DIT DET.NDIT INSTRUME
Main Dataitem	I_CAM_RAW

### 6.1.6 MICADO\_img\_cal\_dark

Name	MICADO_img_cal_dark
Description	Provides calibration frames for the determination of detector dark current determination.
CATG	CALIB
TYPE	DARK
TECH	IMAGE,SI
Parameters	INS.MODE INS.READMODE DET.DIT DET.NDIT INSTRUME
Main Dataitem	I_DARK_RAW

### 6.1.7 MICADO\_img\_cal\_flat

Name	MICADO_img_cal_flat
Description	Provides calibration frames for the determination of detector pixel-to- pixel sensitivity variations in imaging mode using an internal calibration lamp.
CATG	CALIB
TYPE	FLAT,LAMP
TECH	IMAGE,SI
Parameters	INS.MODE INS.FILT1.NAME INS.FILT2.NAME INS.OPTI6.NAME INS.DROT INS.READMODE DET.DIT DET.NDIT INSTRUME
Main Dataitem	I_FLAT_RAW

### 6.1.8 MICADO\_img\_cal\_refstars

Name	MICADO_img_cal_refstars
Description	Template for astrometric standard field observation.
CATG	CALIB
TYPE	STD,ASTROMETRY
TECH	IMAGE,SI
Parameters	INS.MODE OBS.RA OBS.DEC INS.FILT1.NAME INS.FILT2.NAME INS.OPTI6.NAME INS.DROT INS.READMODE DET.DIT DET.NDIT INSTRUME
Main Dataitem	I_ASTROMFIELD_RAW

### 6.1.9 MICADO\_img\_cal\_warmmask

Name	MICADO_img_cal_warmmask
Description	Provide calibration frames for the determination of the distortion due to the instrument
CATG	CALIB
TYPE	PINHOLE,WAM
TECH	IMAGE,AI
Parameters	INS.MODE INS.FILT1.NAME INS.FILT2.NAME INS.OPTI6.NAME INS.DROT INS.READMODE DET.DIT DET.NDIT INSTRUME
Main Dataitem	I_WAM_RAW

#### 6.1.10 MICADO\_img\_cal\_zeropoint

Name	MICADO_img_cal_zeropoint
Description	Enables zeropoint calibration by taking calibration frames from photometric standard stars of known magnitude.
CATG	CALIB
TYPE	STD,PHOTOM
TECH	IMAGE,SI
Parameters	INS.MODE OBS.RA OBS.DEC INS.FILT1.NAME INS.FILT2.NAME INS.OPTI6.NAME INS.DROT INS.READMODE DET.DIT DET.NDIT INSTRUME
Main Dataitem	I_STDFIELD_RAW

#### 6.1.11 MICADO\_img\_obs

Name	MICADO_img_obs
Description	Generic template for standard imaging mode.
CATG	SCIENCE
TYPE	OBJECT,SKY
TECH	IMAGE,SI
Parameters	INS.MODE OBS.RA OBS.DEC INS.FILT1.NAME INS.FILT2.NAME INS.OPTI6.NAME INS.DROT INS.READMODE DET.DIT DET.NDIT INSTRUME
Main Dataitem	I_SCI_RAW

### 6.1.12 MICADO\_img\_obs[bg]

Name	MICADO_img_obs[bg]
Description	Virtual template for background determination, part of MICADO_img_obs or MICADO_img_obs_astrometry
CATG	CALIB
TYPE	OBJECT,BCKGRND
TECH	IMAGE,AI
Parameters	INS.MODE INS.READMODE DET.DIT DET.NDIT INSTRUME
Main Dataitem	I_BKGFIELD_RAW

### 6.1.13 MICADO\_img\_obs\_astrometry

Name	MICADO_img_obs_astrometry
Description	Generic template for astrometric imaging mode. Similar to that for standard imaging, but pipeline needs to know that astrometric processing should be done.
CATG	SCIENCE
TYPE	OBJECT,SKY
TECH	IMAGE,AI
Parameters	INS.MODE OBS.RA OBS.DEC INS.FILT1.NAME INS.FILT2.NAME INS.OPTI6.NAME INS.DROT INS.READMODE DET.DIT DET.NDIT INSTRUME
Main Dataitem	I_SCI_AI_RAW

#### 6.1.14 MICADO\_img\_tec\_illum

Name	MICADO_img_tec_illum
Description	Observes a photometric reference field in order to determine the illumination correction.
CATG	CALIB
TYPE	STD, ILLUM
TECH	IMAGE, SI
Parameters	INS.MODE INS.READMODE DET.DIT DET.NDIT INSTRUME
Main Dataitem	I_ILLUM_RAW

#### 6.1.15 MICADO\_img\_tec\_nonlin

Name	MICADO_img_tec_nonlin
Description	Provides calibration frames for the determination of detector non- linearity using an internal calibration lamp.
CATG	CALIB
TYPE	NONLIN,LAMP
TECH	IMAGE,SI
Parameters	INS.MODE INS.FILT1.NAME INS.FILT2.NAME INS.OPTI6.NAME INS.DROT INS.READMODE DET.DIT DET.NDIT INSTRUME
Main Dataitem	I_NONLIN_RAW

## 7 DRLVT

This section contains information for the DRLVT.

### 7.1 QC Parameters per Recipe

Recipe	QC parameter	Info
<code>micado_img_astrom</code>	QC.DCRVALn QC.RMSDRA QC.RMSDDEC	
<code>micado_img_background</code>	QC.BACKGROUNDMEAn QC.BACKGROUNDMEDn QC.BACKGROUNDSTDn	
<code>micado_img_calib_hci</code>	QC.CALIMEAi QC.CALISTDi	
<code>micado_img_calibrate</code>	QC.CALIMEAi QC.CALISTDi	
<code>micado_img_calibrated_catalog</code>	QC.CALIBCATNSOURCES QC.CALIBCATRAMEA QC.CALIBCATDECMEA QC.CALIBCATRAMEd QC.CALIBCATDECMED QC.CALIBCATRASTD QC.CALIBCATDECSTD	
<code>micado_img_cube_hci</code>	QC.CUBEMEAi QC.CUBESTDi	
<code>micado_det_depersist</code>		
<code>micado_img_detrend</code>	QC.DETSMEAN QC.DETSMED QC.DETSSTD QC.DETRENCR QC.NPIXNONL QC.FPIXNONL	
<code>micado_img_detrend_hci</code>	QC.DETSMEAN QC.DETSMED QC.DETSSTD QC.DETRENCR QC.NPIXNONL QC.FPIXNONL	
<code>micado_img_detrend_final</code>		
<code>micado_img_distortion</code>	QC.DISTORTXMIN QC.DISTORTXMAX QC.DISTORTXMEDIAN QC.DISTORTXMEAN QC.DISTORTYMIN QC.DISTORTYMAX QC.DISTORTYMEDIAN	

	QC.DISTORTYMEAN	
micado_img_illum	QC.ILLUNMAT QC.ILLSNRMD	
micado_det_dark	QC.DARKMEAN QC.DARKMED QC.DARKSTD QC.NPIXSAT QC.FPIXSAT	
micado_img_flat	QC.FLATMEAN QC.FLATMED QC.FLATSTD QC.NPIXHOT QC.FPIXHOT	
micado_img_nonlinearity	QC.FITSTD QC.NITER	
micado_det_persistence		
micado_img_photom	QC.ZPTSTD <sub>i</sub> QC.NMATCH <sub>i</sub>	
micado_img_regrid	REGRID_M REGRID_S	
micado_img_stack	STACK_ME STACK_ST	
micado_img_starpos_pupil	QC.STARPOS.SNRMIN <sub>i</sub> QC.STARPOS.SNRMAX <sub>i</sub> QC.STARPOS.SNRMED <sub>i</sub> QC.STARPOS.SNRMEAN <sub>i</sub>	
micado_img_starpos_waffle	QC.STARPOS.SNRMIN <sub>i</sub> QC.STARPOS.SNRMAX <sub>i</sub> QC.STARPOS.SNRMED <sub>i</sub> QC.STARPOS.SNRMEAN <sub>i</sub>	
micado_img_star_photom	QC.STAROFFSETS <sub>NRMINn</sub> QC.STAROFFSETS <sub>NRMAXn</sub> QC.STAROFFSETS <sub>NRMEDn</sub> QC.STAROFFSETS <sub>NRMEAn</sub>	

Table 159: Recipes with the QC parameters they produce.

## 8 FITS Keywords

### 8.1 Essential Raw Keywords

- CDELT<sub>n</sub>
- CRPIX<sub>n</sub>
- CRVAL<sub>n</sub>
- CTYPE<sub>n</sub>
- CUNIT<sub>n</sub>
- DET.DIT

- DET.READOUT
- DPR.CATG
- DPR.TECH
- DPR.TYPE
- EXPTIME
- INS.FILT<sub>i</sub>.NAME
- INS.OPTI<sub>6</sub>.NAME
- INSTRUME
- MJD-OBS
- OBS.TPLNO
- OCS.PXSCALE
- TPL.EXPNO
- TPL.START

## 8.2 Keywords Data Items Imaging

### 8.2.1 DATAITEM

Primary:

- SIMPLE
- BITPIX
- NAXIS

### 8.2.2 I\_ASTROM\_HDR

All headers from DATAITEM.

Primary:

- MJD-OBS
- QC.DCRVAL<sub>n</sub>
- QC.RMSDRA
- QC.RMSDDEC

Extensions:

- CD<sub>n</sub>\_ms
- PV11<sub>i</sub>
- PV22<sub>i</sub>
- XTENSION
- BITPIX
- NAXIS

### 8.2.3 I\_CALIBRATED\_CATALOG\_CAT

All headers from DATAITEM.

Primary:

- DET.DIT
- INS.FILT.NAME

- MJD-OBS
- TPL.START
- OBS.RA
- OBS.DEC
- QC.CALIBCATNSOURCES
- QC.CALIBCATRAMEA
- QC.CALIBCATDECMEA
- QC.CALIBCATRAMED
- QC.CALIBCATDECMED
- QC.CALIBCATRASTD
- QC.CALIBCATDECSTD

#### 8.2.4 I\_DISTORTION\_BASE\_HDR

All headers from DATAITEM.

Primary:

- INSTRUME
- QC.DISTORTXMIN
- QC.DISTORTXMAX
- QC.DISTORTXMEDIAN
- QC.DISTORTXMEAN
- QC.DISTORTYMIN
- QC.DISTORTYMAX
- QC.DISTORTYMEDIAN
- QC.DISTORTYMEAN

#### 8.2.5 I\_ILLUM\_CORR\_HDR

All headers from DATAITEM.

Primary:

- INS.FILT.NAME
- ICCOEF00
- ICCOEF10
- ICCOEF11
- ICCOEF20
- ICCOEF21
- ICCOEF22
- ICCOEF30
- ICCOEF31
- ICCOEF32
- ICCOEF33
- ICCOEF40
- ICCOEF41
- ICCOEF42
- ICCOEF43
- ICCOEF44
- QC.ILLUNMAT
- QC.ILLSNRMD

Extensions:

- GAIN
- XTENSION
- BITPIX
- NAXIS

### 8.2.6 I\_PHOTOM\_BASE\_HDR

All headers from DATAITEM.

Primary:

- DET.DIT
- INS.FILT.NAME
- MJD-OBS
- TPL.START
- QC.ZPTSTD<sub>i</sub>
- QC.NMATCH<sub>i</sub>

Extensions:

- ZEROPNT
- EXTING
- XTENSION
- BITPIX
- NAXIS

### 8.2.7 I\_STARCENTER\_BASE\_HDR

All headers from DATAITEM.

Primary:

- QC.STARPOS.SNRMIN<sub>i</sub>
- QC.STARPOS.SNRMAX<sub>i</sub>
- QC.STARPOS.SNRMED<sub>i</sub>
- QC.STARPOS.SNRMEAN<sub>i</sub>

### 8.2.8 I\_STAROFFSET\_HDR

All headers from DATAITEM.

Primary:

- QC.STAROFFSETS<sub>SNRMINn</sub>
- QC.STAROFFSETS<sub>SNRMAXn</sub>
- QC.STAROFFSETS<sub>SNRMEDn</sub>
- QC.STAROFFSETS<sub>SNRMEAn</sub>

### 8.2.9 REF\_I\_ASTROM\_CAT

All headers from DATAITEM.

### 8.2.10 REF\_I\_PHOTOM\_CAT

All headers from DATAITEM.

### 8.2.11 REF\_I\_WAM\_CAT

All headers from DATAITEM.

### 8.2.12 I\_BGD\_IMG

All headers from FRAME.

Primary:

- INS.FILT.NAME
- TPL.START
- QC.BACKGROUNDMEAn
- QC.BACKGROUNDMEDn
- QC.BACKGROUNDSTDn

Extensions:

- NAXIS1
- NAXIS2
- EXTNAME
- INHERIT
- XTENSION
- BITPIX
- NAXIS

### 8.2.13 I\_CALIB\_HCI\_IMG

All headers from FRAME.

Primary:

- QC.CALIMEAi
- QC.CALISTDi

### 8.2.14 I\_CUBE\_HCI\_IMG

All headers from FRAME.

Primary:

- QC.CUBEMEAi
- QC.CUBESTDi

### 8.2.15 I\_DEPERSISTED\_BASE\_IMG

All headers from FRAME.

Primary:

- DET.DIT
- DET.READOUT
- MJD-OBS

- TPL.START
- TPL.EXPNO
- OBS.TPLNO

Extensions:

- NAXIS1
- NAXIS2
- EXTNAME
- INHERIT
- XTENSION
- BITPIX
- NAXIS

#### **8.2.16 I\_DISTORTION\_CAM\_HDR**

All headers from I\_DISTORTION\_BASE\_HDR.

#### **8.2.17 I\_DISTORTION\_ELT\_HDR**

All headers from I\_DISTORTION\_BASE\_HDR.

#### **8.2.18 I\_DISTORTION\_WAM\_HDR**

All headers from I\_DISTORTION\_BASE\_HDR.

#### **8.2.19 I\_DTFNL\_BASE\_IMG**

All headers from FRAME.

Primary:

- DET.DIT
- INS.FILT.NAME
- MJD-OBS
- TPL.START
- OBS.RA
- OBS.DEC

Extensions:

- NAXIS1
- NAXIS2
- EXTNAME
- INHERIT
- XTENSION
- BITPIX
- NAXIS

#### **8.2.20 I\_DT\_BASE\_IMG**

All headers from FRAME.

Primary:

- MJD-OBS
- DET.DIT
- DET.READOUT
- INS.FILT.NAME
- TPL.START
- OBS.RA
- OBS.DEC
- QC.DETSMEAN
- QC.DETSMED
- QC.DETSSTD
- QC.DETRENCR
- QC.NPIXNONL
- QC.FPIXNONL
- REC.NONLIN.THRESUP

Extensions:

- NAXIS1
- NAXIS2
- EXTNAME
- INHERIT
- XTENSION
- BITPIX
- NAXIS

#### **8.2.21 I\_MASTER\_DARK\_IMG**

All headers from FRAME.

Primary:

- DET.DIT
- DET.READOUT
- QC.DARKMEAN
- QC.DARKMED
- QC.DARKSTD
- QC.NPIXSAT
- QC.FPIXSAT
- REC.DARK.THRESUP

Extensions:

- NAXIS1
- NAXIS2
- EXTNAME
- INHERIT
- XTENSION
- BITPIX
- NAXIS

#### **8.2.22 I\_MASTER\_FLAT\_IMG**

All headers from FRAME.

Primary:

- DET.DIT
- DET.READOUT
- INS.FILT.NAME
- QC.FLATMEAN
- QC.FLATMED
- QC.FLATSTD
- QC.NPIXHOT
- QC.FPIXHOT
- REC.FLAT.THRESLOW
- REC.NONLIN.THRESUP

Extensions:

- NAXIS1
- NAXIS2
- EXTNAME
- INHERIT
- XTENSION
- BITPIX
- NAXIS

### 8.2.23 I\_NONLINEARITY\_IMG

All headers from FRAME.

Primary:

- DET.READOUT
- QC.FITSTD
- QC.NITER

Extensions:

- NAXIS1
- NAXIS2
- EXTNAME
- INHERIT
- XTENSION
- BITPIX
- NAXIS

### 8.2.24 I\_PERSISTENCE\_IMG

All headers from FRAME.

Primary:

- MJD-OBS

Extensions:

- NAXIS1
- NAXIS2
- EXTNAME
- INHERIT

- XTENSION
- BITPIX
- NAXIS

#### **8.2.25 I\_PHOTOM\_SCI\_HDR**

All headers from I\_PHOTOM\_BASE\_HDR.

#### **8.2.26 I\_PHOTOM\_STDFIELD\_HDR**

All headers from I\_PHOTOM\_BASE\_HDR.

#### **8.2.27 I\_SCI\_CALIBRATED\_IMG**

All headers from FRAME.

Primary:

- DET.DIT
- INS.FILT.NAME
- MJD-OBS
- TPL.START
- OBS.RA
- OBS.DEC
- QC.CALIMEAi
- QC.CALISTDi

Extensions:

- NAXIS1
- NAXIS2
- EXTNAME
- INHERIT
- XTENSION
- BITPIX
- NAXIS

#### **8.2.28 I\_SCI\_REGRID\_IMG**

All headers from FRAME.

Primary:

- DET.DIT
- INS.FILT.NAME
- MJD-OBS
- TPL.START
- OBS.RA
- OBS.DEC
- QC.REGRID\_M
- QC.REGRID\_S

Extensions:

- NAXIS1

- NAXIS2
- EXTNAME
- INHERIT
- XTENSION
- BITPIX
- NAXIS

### **8.2.29 I\_SCI\_STACK\_IMG**

All headers from FRAME.

Primary:

- INS.FILT.NAME
- TPL.START
- QC.STACK\_ME
- QC.STACK\_ST

### **8.2.30 I\_STARCENTER\_PUPIL\_HDR**

All headers from I\_STARCENTER\_BASE\_HDR.

### **8.2.31 I\_STARCENTER\_WAFFLE\_HDR**

All headers from I\_STARCENTER\_BASE\_HDR.

### **8.2.32 RAW**

All headers from FRAME.

Primary:

- DET.DIT
- MJD-OBS
- TPL.START
- DET.READOUT
- TPL.EXPNO
- OBS.TPLNO
- OBS.NAME
- OBS.TARGET
- OBS.INSTRUME
- DPR.CATG
- DPR.TECH
- DPR.TYPE
- INS.READMODE
- DET.NDIT
- OBS.TPLi.INSTRUME
- TPL.INSTRUME
- DET.NAME
- DET.IMAGE\_PL
- DET.TEMPERAT
- ID

- ANGLE
- GAIN
- pixel\_size
- X\_CEN
- Y\_CEN
- X\_SIZE
- Y\_SIZE
- DET.DAR.VALUE
- DET.SHO.STATE
- DET.EXP.STATE
- DET.REA.NOISESTD
- DET.REA.NCHANNEL
- DET.REF.ALL

### **8.2.33 I\_DARK\_RAW**

All headers from RAW.

Primary:

- INS.MODE

Extensions:

- ID
- ANGLE
- GAIN
- pixel\_size
- X\_CEN
- Y\_CEN
- X\_SIZE
- Y\_SIZE
- NAXIS1
- NAXIS2
- EXTNAME
- INHERIT
- XTENSION
- BITPIX
- NAXIS

### **8.2.34 I\_DEPERSISTED\_DARK\_IMG**

All headers from I\_DEPERSISTED\_BASE\_IMG.

### **8.2.35 I\_DTFNL\_AstromField\_IMG**

All headers from I\_DTFNL\_BASE\_IMG.

### **8.2.36 I\_DTFNL\_CAM\_IMG**

All headers from I\_DTFNL\_BASE\_IMG.

#### **8.2.37 I\_DTFNL\_CORO\_OFFSET\_IMG**

All headers from I\_DTFNL\_BASE\_IMG.

#### **8.2.38 I\_DTFNL\_HCI\_BASE\_IMG**

All headers from I\_DTFNL\_BASE\_IMG.

#### **8.2.39 I\_DTFNL\_HCI\_SCI\_BASE\_IMG**

All headers from I\_DTFNL\_BASE\_IMG.

#### **8.2.40 I\_DTFNL\_SCI\_AI\_IMG**

All headers from I\_DTFNL\_BASE\_IMG.

#### **8.2.41 I\_DTFNL\_SCI\_IMG**

All headers from I\_DTFNL\_BASE\_IMG.

#### **8.2.42 I\_DTFNL\_SIAI\_BASE\_IMG**

All headers from I\_DTFNL\_BASE\_IMG.

#### **8.2.43 I\_DTFNL\_WAM\_IMG**

All headers from I\_DTFNL\_BASE\_IMG.

#### **8.2.44 I\_DT\_BKGFIELD\_IMG**

All headers from I\_DT\_BASE\_IMG.

#### **8.2.45 I\_DT\_CAM\_IMG**

All headers from I\_DT\_BASE\_IMG.

#### **8.2.46 I\_DT\_CORO\_BGD\_IMG**

All headers from I\_DT\_BASE\_IMG.

#### **8.2.47 I\_DT\_CORO\_OFFSET\_IMG**

All headers from I\_DT\_BASE\_IMG.

#### **8.2.48 I\_DT\_HCI\_BASE\_IMG**

All headers from I\_DT\_BASE\_IMG.

#### **8.2.49 I\_DT\_SCI\_AI\_IMG**

All headers from I\_DT\_BASE\_IMG.

#### **8.2.50 I\_DT\_SCI\_SI\_IMG**

All headers from I\_DT\_BASE\_IMG.

#### **8.2.51 I\_DT\_SIAI\_BASE\_IMG**

All headers from I\_DT\_BASE\_IMG.

#### **8.2.52 I\_OPT\_RAW**

All headers from RAW.

Primary:

- INS.FILT.NAME
- INS.NAME
- INS.TEMPERAT
- INS.OCS.PXSCALE
- INS.PLATE\_SC
- INS.DROT
- INS.FILT<sub>i</sub>.NAME
- INS.FILT<sub>i</sub>.MINIMUM\_
- INS.FILT<sub>i</sub>.OUTER
- INS.OPTI6.NAME
- INS.OPTI6.MINIMUM\_
- INS.OPTI6.OUTER
- INS.STA.SUR<sub>i</sub>.NAME
- INS.STA.SUR<sub>i</sub>.OUTER
- INS.STA.SUR<sub>i</sub>.INNER
- INS.STA.SUR<sub>i</sub>.ANGLE
- INS.STA.SUR<sub>i</sub>.TEMPERAT
- REL.SUR.SUR<sub>i</sub>.NAME
- REL.SUR.SUR<sub>i</sub>.OUTER
- REL.SUR.SUR<sub>i</sub>.INNER
- REL.SUR.SUR<sub>i</sub>.ANGLE
- REL.SUR.SUR<sub>i</sub>.TEMPERAT

#### **8.2.53 I\_CAM\_RAW**

All headers from I\_OPT\_RAW.

Primary:

- INS.MODE
- INS.FILT1.NAME
- INS.FILT2.NAME

Extensions:

- ID

- ANGLE
- GAIN
- pixel\_size
- X\_CEN
- Y\_CEN
- X\_SIZE
- Y\_SIZE
- NAXIS1
- NAXIS2
- EXTNAME
- INHERIT
- XTENSION
- BITPIX
- NAXIS

#### 8.2.54 I\_FLAT\_RAW

All headers from I\_OPT\_RAW.

Primary:

- INS.MODE
- INS.FILT1.NAME
- INS.FILT2.NAME

Extensions:

- ID
- ANGLE
- GAIN
- pixel\_size
- X\_CEN
- Y\_CEN
- X\_SIZE
- Y\_SIZE
- NAXIS1
- NAXIS2
- EXTNAME
- INHERIT
- XTENSION
- BITPIX
- NAXIS

#### 8.2.55 I\_NONLIN\_RAW

All headers from I\_OPT\_RAW.

Primary:

- INS.MODE
- INS.FILT1.NAME
- INS.FILT2.NAME

Extensions:

- ID
- ANGLE
- GAIN
- pixel\_size
- X\_CEN
- Y\_CEN
- X\_SIZE
- Y\_SIZE
- NAXIS1
- NAXIS2
- EXTNAME
- INHERIT
- XTENSION
- BITPIX
- NAXIS

#### 8.2.56 I\_WAM\_RAW

All headers from I\_OPT\_RAW.

Primary:

- INS.MODE
- INS.FILT1.NAME
- INS.FILT2.NAME

Extensions:

- ID
- ANGLE
- GAIN
- pixel\_size
- X\_CEN
- Y\_CEN
- X\_SIZE
- Y\_SIZE
- NAXIS1
- NAXIS2
- EXTNAME
- INHERIT
- XTENSION
- BITPIX
- NAXIS

#### 8.2.57 I\_ASTROMFIELD\_RAW

All headers from I\_SKY\_RAW.

Primary:

- INS.MODE
- INS.FILT1.NAME
- INS.FILT2.NAME

Extensions:

- ID
- ANGLE
- GAIN
- pixel\_size
- X\_CEN
- Y\_CEN
- X\_SIZE
- Y\_SIZE
- NAXIS1
- NAXIS2
- EXTNAME
- INHERIT
- XTENSION
- BITPIX
- NAXIS

### 8.2.58 I\_BKGFIELD\_RAW

All headers from I\_SKY\_RAW.

Primary:

- INS.MODE

Extensions:

- ID
- ANGLE
- GAIN
- pixel\_size
- X\_CEN
- Y\_CEN
- X\_SIZE
- Y\_SIZE
- NAXIS1
- NAXIS2
- EXTNAME
- INHERIT
- XTENSION
- BITPIX
- NAXIS

### 8.2.59 I\_CORO\_BASE\_RAW

All headers from I\_SKY\_RAW.

Primary:

- INS.MODE
- INS.FILT1.NAME
- INS.FILT2.NAME

Extensions:

- ID
- ANGLE
- GAIN
- pixel\_size
- X\_CEN
- Y\_CEN
- X\_SIZE
- Y\_SIZE
- NAXIS1
- NAXIS2
- EXTNAME
- INHERIT
- XTENSION
- BITPIX
- NAXIS

#### **8.2.60 I\_ILLUM\_RAW**

All headers from I\_SKY\_RAW.

Primary:

- INS.MODE

Extensions:

- ID
- ANGLE
- GAIN
- pixel\_size
- X\_CEN
- Y\_CEN
- X\_SIZE
- Y\_SIZE
- NAXIS1
- NAXIS2
- EXTNAME
- INHERIT
- XTENSION
- BITPIX
- NAXIS

#### **8.2.61 I\_SKY\_HCI\_ONLINE\_RAW**

All headers from I\_SKY\_RAW.

Primary:

- INS.MODE

#### **8.2.62 I\_SKY\_SIAI\_BASE\_RAW**

All headers from I\_SKY\_RAW.

Primary:

- INS.MODE
- INS.FILT1.NAME
- INS.FILT2.NAME

### 8.2.63 I\_STDFIELD\_RAW

All headers from I\_SKY\_RAW.

Primary:

- INS.MODE
- INS.FILT1.NAME
- INS.FILT2.NAME

Extensions:

- ID
- ANGLE
- GAIN
- pixel\_size
- X\_CEN
- Y\_CEN
- X\_SIZE
- Y\_SIZE
- NAXIS1
- NAXIS2
- EXTNAME
- INHERIT
- XTENSION
- BITPIX
- NAXIS

### 8.2.64 I\_CORO\_BGD\_RAW

All headers from I\_CORO\_BASE\_RAW.

### 8.2.65 I\_CORO\_OFFSET\_RAW

All headers from I\_CORO\_BASE\_RAW.

### 8.2.66 I\_SCI\_AI\_RAW

All headers from I\_SKY\_SIAI\_BASE\_RAW.

Extensions:

- ID
- ANGLE
- GAIN
- pixel\_size
- X\_CEN
- Y\_CEN
- X\_SIZE
- Y\_SIZE

- NAXIS1
- NAXIS2
- EXTNAME
- INHERIT
- XTENSION
- BITPIX
- NAXIS

#### 8.2.67 I\_SCI\_CORO\_PUPIL\_RAW

All headers from I\_CORO\_BASE\_RAW.

#### 8.2.68 I\_SCI\_CORO\_WAFFLE\_RAW

All headers from I\_CORO\_BASE\_RAW.

#### 8.2.69 I\_SCI\_RAW

All headers from I\_SKY\_SIAI\_BASE\_RAW.

Extensions:

- ID
- ANGLE
- GAIN
- pixel\_size
- X\_CEN
- Y\_CEN
- X\_SIZE
- Y\_SIZE
- NAXIS1
- NAXIS2
- EXTNAME
- INHERIT
- XTENSION
- BITPIX
- NAXIS

### 8.3 All Keywords Imaging

#### 8.3.1 CDELTn

Name	CDELTn
Class	header
Context	FITS
Type	double
Value	%.8f
Unit	

Comment	Increment in <axis direction>
Default	None
Range	None
Description	Increment of coordinate specified by CTYPE <sub>n</sub> for each pixel step at CRPIX <sub>n</sub> . Possible values for <axis direction> are: rows (1), columns (2), frame(3) For RA and DEC the unit is degree. In this case, the comment field includes the value expressed in seconds of arc. In the proposed WCS system it should be replaced by CD <sub>n_m</sub>

### 8.3.2 CD<sub>n\_ms</sub>

Name	CD <sub>n_ms</sub>
Class	header
Context	FITS
Type	double
Value	%f
Unit	
Comment	Coordinate translation matrix element
Default	None
Range	None
Description	Gives the translation from array axis n to coordinate axis m. For images the comment should read SS.ss arcsec per pixel

### 8.3.3 CRPIX<sub>n</sub>

Name	CRPIX <sub>n</sub>
Class	header
Context	FITS
Type	double
Value	%.1f
Unit	
Comment	Ref pixel in <axis direction>
Default	None
Range	None
Description	Pixel position of the reference point in axis n. Possible values for <axis direction> are: rows (1), columns (2), frame (3) By convention the center of the pixel is pix.0, pix.5 gives the right edge of the pixel. Reference pixel is also used to identify the pointing centre (with respect to the WCS transformation, i.e. the optical axis).

#### 8.3.4 CRVALn

Name	CRVALn
Class	header
Context	FITS
Type	double
Value	%.5f
Unit	
Comment	Coordinate at reference pixel in <axis direction>
Default	None
Range	None
Description	Coordinate value as specified by CTYPEn at reference pixel CRPIXn. Possible values for <axis direction> are: rows (1), columns (2), frame (3) If world coordinates are used (i.e. CTYPEn is either RA—TAN and DEC—TAN), the comment field includes the value expressed in hours, minutes and seconds (RA) or degrees, minutes, and seconds (DEC). The unit has to be degrees, if RA and DEC are used as world coordinates.

#### 8.3.5 CTYPEn

Name	CTYPEn
Class	header
Context	FITS
Type	string
Value	%s
Unit	
Comment	Coordinate system of <axis direction>
Default	None
Range	None
Description	Name of the coordinate represented by axis n. Possible values for <axis direction> are: rows (1), columns (2), frame (3) Examples for values are "PIXEL", "RA—TAN", "DEC—TAN"

#### 8.3.6 CUNITn

Name	CUNITn
Class	header
Context	FITS

Type	string
Value	%s
Unit	
Comment	Unit of coordinate translation
Default	None
Range	None
Description	Unit of the coordinate in n axis n

### 8.3.7 DET.DIT

Name	DET DIT
Class	header
Context	Template
Type	double
Value	%.3f
Unit	s
Comment	Detector integration time
Default	1.0
Range	0.0..3600.0
Description	Detector integration time (average when NDIT > 1)

### 8.3.8 DET.NDIT

Name	DET NDIT
Class	header
Context	Template
Type	integer
Value	%i
Unit	None
Comment	Number of detector integrations
Default	1
Range	1..10
Description	Number of detector integrations

### 8.3.9 DET.READOUT

Name	DET READOUT
Class	header
Context	INS

Type	string
Value	%.50s
Unit	None
Comment	Readout mode of the detector
Default	CDS
Range	CDS TLI RRR
Description	Readout mode of the detector

### 8.3.10 DPR.CATG

Name	DPR CATG
Class	header template
Context	Template
Type	string
Value	%.50s
Unit	None
Comment	Data product category
Default	NODEFAULT
Range	CALIB TEST
Description	Data product category

### 8.3.11 DPR.TECH

Name	DPR TECH
Class	header template
Context	Template
Type	string
Value	%.50s
Unit	None
Comment	Data product technique
Default	None
Range	None
Description	Data product technique

### 8.3.12 DPR.TYPE

Name	DPR TYPE
Class	header template
Context	Template

Type	string
Value	%.50s
Unit	None
Comment	Data product type
Default	None
Range	None
Description	Data product type

### 8.3.13 EXPTIME

Name	EXPTIME
Class	header
Context	FITS
Type	double
Value	%.3f
Unit	s
Comment	Integration time
Default	None
Range	None
Description	The integration time for a single observation (in the infrared this corresponds to DIT. Note that this does not represent the photon statistics).

### 8.3.14 EXTINGT

Name	EXTINCT
Class	header
Context	PRO
Type	double
Value	%.3f
Unit	mag
Comment	Extinction of the observation
Default	0.0
Range	None
Description	Extinction of the observation

### 8.3.15 GAIN

Name	GAIN
Class	header
Context	Detector
Type	double
Value	%.3f
Unit	e/adu
Comment	Gain of the detector
Default	1.0
Range	None
Description	Gain of the detector

### 8.3.16 ICCOEFi

Name	ICCOEFi
Class	header
Context	PRO
Type	double
Value	%.3f
Unit	None
Comment	Illumination Correction Coefficient
Default	0.0
Range	None
Description	Illumination Correction Coefficient

### 8.3.17 INS.DROT

Name	INS DROT
Class	header
Context	INS
Type	double
Value	%.3f
Unit	degree
Comment	Derotator angle
Default	0.0
Range	None
Description	Derotator angle

### 8.3.18 INS.FILT.NAME

Name	INS FILT NAME
Class	header
Context	INS
Type	string
Value	%.50s
Unit	None
Comment	Filter name
Default	open
Range	None
Description	Filter name

### 8.3.19 INS.FILT<sub>i</sub>.NAME

Name	INS FILT <sub>i</sub> NAME
Class	header
Context	INS
Type	string
Value	%.50s
Unit	None
Comment	Filter name
Default	open
Range	None
Description	Filter name

### 8.3.20 INS.MODE

Name	INS MODE
Class	header
Context	INS
Type	string
Value	%.50s
Unit	None
Comment	Instrument Mode
Default	NODEFAULT
Range	IMAGING SPEC PUP
Description	Instrument Mode

### 8.3.21 INS.OPTI6.NAME

Name	INS OPTI6 NAME
Class	header
Context	INS
Type	string
Value	%.50s
Unit	None
Comment	Pupil wheel filter name
Default	open
Range	None
Description	Pupil wheel filter name

### 8.3.22 INS.READMODE

Name	INS READMODE
Class	header
Context	INS
Type	string
Value	%.50s
Unit	None
Comment	Readout mode of the detector
Default	CDS
Range	CDS TLI RRR
Description	Readout mode of the detector

### 8.3.23 INSTRUME

Name	INSTRUME
Class	header
Context	FITS
Type	string
Value	%s
Unit	
Comment	Instrument used
Default	None
Range	None
Description	ESO acronym for the instrument used.

#### 8.3.24 MJD-OBS

Name	MJD-OBS
Class	header
Context	FITS
Type	double
Value	%.8f
Unit	
Comment	Obs start
Default	None
Range	None
Description	Modified Julian Day of the start of the exposure. The MJD is related to the Julian Day (JD) via the formula: $MJD = JD - 2400000.5$ The comment includes a civil representation of the date and time. 8 decimals are required for a precision of one millisecond, 5 decimals for a precision of one second.

#### 8.3.25 OBS.DEC

Name	OBS DEC
Class	header
Context	Template
Type	double
Value	%.3f
Unit	deg
Comment	Declination
Default	0.0
Range	-90.0..90.0
Description	Declination

#### 8.3.26 OBS.RA

Name	OBS RA
Class	header
Context	Template
Type	double
Value	%.3f
Unit	deg
Comment	Right Ascension
Default	0.0

Range	0.0..360.0
Description	Right Ascension

### 8.3.27 OBS.TPLNO

Name	OBS TPLNO
Class	header
Context	Template
Type	integer
Value	%i
Unit	None
Comment	Number of the template of this exposure in an ObservingBlock
Default	0
Range	0..1000
Description	Number of the template of this exposure in an ObservingBlock

### 8.3.28 OCS.PXSCALE

Name	OCS PXSCALE
Class	header
Context	INS
Type	double
Value	%.3f
Unit	arcsec/pix
Comment	Pixel scale
Default	0.004
Range	None
Description	Pixel scale

### 8.3.29 PVn\_ks

Name	PVn_ks
Class	header
Context	FITS
Type	double
Value	%f
Unit	

Comment	Coordinate projection parameter
Default	None
Range	None
Description	Describes the parameter k for the axis n. Required for certain coordinate types

### 8.3.30 TPL.EXPNO

Name	TPL EXPNO
Class	header
Context	Template
Type	integer
Value	%i
Unit	None
Comment	Number of this exposure in a Template
Default	0
Range	0..1000
Description	Number of this exposure in a Template

### 8.3.31 TPL.START

Name	TPL START
Class	header template
Context	Template
Type	double
Value	%.8f
Unit	None
Comment	Start time of template
Default	None
Range	None
Description	Start time of template

### 8.3.32 ZEROPNT

Name	ZEROPNT
Class	header
Context	PRO
Type	double
Value	%.3f

Unit	mag
Comment	Zeropoint of the observation
Default	0.0
Range	None
Description	Zeropoint of the observation

### 8.3.33 INS.FILT1.NAME

Name	INS FILTi NAME
Class	header
Context	INS
Type	string
Value	%.50s
Unit	None
Comment	Filter name
Default	open
Range	None
Description	Filter name

### 8.3.34 INS.FILT2.NAME

Name	INS FILTi NAME
Class	header
Context	INS
Type	string
Value	%.50s
Unit	None
Comment	Filter name
Default	open
Range	None
Description	Filter name

## 8.4 QC Keywords

### 8.4.1 QC.AIRGFWHMMEDIAN

Name	QC AIRGFWHMMEDIAN
Class	header
Context	QC

Type	double
Value	%.3f
Unit	pixel
Comment	FWHM median of the detected airglow lines
Default	
Range	None
Description	FWHM median of the detected airglow lines

#### 8.4.2 QC.AIRGLINPOSDEVMAX

Name	QC AIRGLINPOSDEVMAX
Class	header
Context	QC
Type	double
Value	%.3f
Unit	
Comment	Maximum of the airglow line position deviation
Default	
Range	None
Description	Maximum of the airglow line position deviation

#### 8.4.3 QC.AIRGLINPOSDEVMEAN

Name	QC AIRGLINPOSDEVMEAN
Class	header
Context	QC
Type	double
Value	%.3f
Unit	
Comment	Mean of the airglow line position deviation
Default	
Range	None
Description	Mean of the airglow line position deviation

#### 8.4.4 QC.AIRGLINPOSDEVMEDIAN

Name	QC AIRGLINPOSDEVMEDIAN
Class	header
Context	QC

Type	double
Value	%.3f
Unit	
Comment	Median of the airglow line position deviation
Default	
Range	None
Description	Median of the airglow line position deviation

#### 8.4.5 QC.AIRGLINPOSDEVMIN

Name	QC AIRGLINPOSDEVMIN
Class	header
Context	QC
Type	double
Value	%.3f
Unit	
Comment	Minimum of the airglow line position deviation
Default	
Range	None
Description	Minimum of the airglow line position deviation

#### 8.4.6 QC.AIRGPOLYCOEFF

Name	QC AIRGPOLYCOEFF
Class	header
Context	QC
Type	double array
Value	%.3f
Unit	
Comment	Coefficients of the polynomial fit to the airglow lines
Default	
Range	None
Description	Coefficients of the polynomial fit to the airglow lines

#### 8.4.7 QC.AIRGPOLYDEG

Name	QC AIRGPOLYDEG
Class	header
Context	QC

Type	integer
Value	%.3f
Unit	
Comment	Degree of the polynomial fit for the airglow lines (= parameter REC.AIRGPOLYDEG)
Default	REC.AIRGPOLYDEG
Range	None
Description	Degree of the polynomial fit for the airglow lines (= parameter REC.AIRGPOLYDEG)

#### 8.4.8 QC.BACKGROUNDMEAn

Name	QC BACKGROUNDMEAn
Class	header
Context	QC
Type	float
Value	%.3f
Unit	ADU
Comment	mean value of the pixels in the image per detector n.
Default	-1.0
Range	None
Description	mean value of the pixels in the image per detector n.

#### 8.4.9 QC.BACKGROUNDMEDn

Name	QC BACKGROUNDMEDn
Class	header
Context	QC
Type	float
Value	%.3f
Unit	ADU
Comment	median of the pixel values in the image per detector n.
Default	-1.0
Range	None
Description	median of the pixel values in the image per detector n.

#### 8.4.10 QC.BACKGROUNDSTDn

Name	QC BACKGROUNDSTDn
Class	header
Context	QC
Type	float
Value	%.3f
Unit	ADU
Comment	standard deviation of the pixel values in the image per detector n.
Default	-1.0
Range	None
Description	standard deviation of the pixel values in the image per detector n.

#### 8.4.11 QC.CALIBCATDECMEA

Name	QC CALIBCATDECMEA
Class	header
Context	QC
Type	float
Value	%.3f
Unit	degree
Comment	mean DEC value of the sources in catalog in degrees.
Default	-1.0
Range	None
Description	mean DEC value of the sources in catalog in degrees.

#### 8.4.12 QC.CALIBCATDECMED

Name	QC CALIBCATDECMED
Class	header
Context	QC
Type	float
Value	%.3f
Unit	degree
Comment	median DEC value of the sources in catalog in degrees.
Default	-1.0
Range	None
Description	median DEC value of the sources in catalog in degrees.

#### 8.4.13 QC.CALIBCATDECSTD

Name	QC CALIBCATDECSTD
Class	header
Context	QC
Type	float
Value	%.3f
Unit	degree
Comment	standard deviation DEC value of the sources in catalog in degrees.
Default	-1.0
Range	None
Description	standard deviation DEC value of the sources in catalog in degrees.

#### 8.4.14 QC.CALIBCATNSOURCES

Name	QC CALIBCATNSOURCES
Class	header
Context	QC
Type	float
Value	%.3f
Unit	none
Comment	number of sources in catalog.
Default	-1.0
Range	None
Description	number of sources in catalog.

#### 8.4.15 QC.CALIBCATRAMEA

Name	QC CALIBCATRAMEA
Class	header
Context	QC
Type	float
Value	%.3f
Unit	degree
Comment	mean RA value of the sources in catalog in degrees.
Default	-1.0
Range	None
Description	mean RA value of the sources in catalog in degrees.

#### 8.4.16 QC.CALIBCATRAMED

Name	QC CALIBCATRAMED
Class	header
Context	QC
Type	float
Value	%.3f
Unit	degree
Comment	median RA value of the sources in catalog in degrees.
Default	-1.0
Range	None
Description	median RA value of the sources in catalog in degrees.

#### 8.4.17 QC.CALIBCATRASTD

Name	QC CALIBCATRASTD
Class	header
Context	QC
Type	float
Value	%.3f
Unit	degree
Comment	standard deviation of RA value of the sources in catalog in degrees.
Default	-1.0
Range	None
Description	standard deviation RA value of the sources in catalog in degrees.

#### 8.4.18 QC.CALIMEAi

Name	QC CALIMEAi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Mean of the pixel values in the calibrated image per detector <i>.
Default	0
Range	None

Description	Mean of the pixel values in the calibrated image per detector <i>.
-------------	--

#### 8.4.19 QC.CALISTDi

Name	QC CALISTDi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Standard deviation of the pixel values in the calibrated image per detector <i>.
Default	0
Range	None
Description	Standard deviation of the pixel values in the calibrated image per detector <i>.

#### 8.4.20 QC.COROPHOT.SNRMAXi

Name	QC COROPHOT SNRMAXi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Maximum signal-to-noise ratio of the pixel values for exposure through <FILTER> in each detector <i> TODO: Filter
Default	0
Range	None
Description	

#### 8.4.21 QC.COROPHOT.SNRMEANi

Name	QC COROPHOT SNRMEANi
Class	header
Context	QC
Type	float

Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values for exposure through <FILTER> in each detector <i> TODO: Filter
Default	0
Range	None
Description	

#### 8.4.22 QC.COROPHOT.SNRMED*i*

Name	QC COROPHOT SNRMED <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values for exposure through <FILTER> in each detector <i> TODO: Filter
Default	0
Range	None
Description	

#### 8.4.23 QC.COROPHOT.SNRMIN*i*

Name	QC COROPHOT SNRMIN <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Minimum signal-to-noise ratio of the pixel values for exposure through <FILTER> in each detector <i>. TODO: How to do FILTER?
Default	0
Range	None
Description	

#### 8.4.24 QC.COROPOS.SNRMAXi

Name	QC COROPOS SNRMAXi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Maximum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.25 QC.COROPOS.SNRMEANi

Name	QC COROPOS SNRMEANi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.26 QC.COROPOS.SNRMEDI

Name	QC COROPOS SNRMEDI
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.27 QC.COROPOS.SNRMINi

Name	QC COROPOS SNRMINi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Minimum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.28 QC.CUBEMEAI

Name	QC CUBEMEAI
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Mean of the pixel values in the cube image per exposure <i>.
Default	0
Range	None
Description	Mean of the pixel values in the cube image per exposure <i>.

#### 8.4.29 QC.CUBESTDi

Name	QC CUBESTDi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Standard deviation of the pixel values in the cube image per exposure <i>.
Default	0
Range	None

Description	Standard deviation of the pixel values in the cube image per exposure <i>.</i>
-------------	--

#### 8.4.30 QC.DARKMEAN

Name	QC DARKMEAN
Class	header
Context	QC
Type	double
Value	%.3f
Unit	e/s
Comment	Mean dark current
Default	0.1
Range	None
Description	Mean dark current

#### 8.4.31 QC.DARKMED

Name	QC DARKMED
Class	header
Context	QC
Type	double
Value	%.3f
Unit	e/s
Comment	Median dark current
Default	0.1
Range	None
Description	Median dark current

#### 8.4.32 QC.DARKSTD

Name	QC DARKSTD
Class	header
Context	QC
Type	double
Value	%.3f
Unit	e/s
Comment	Standard deviation of dark current
Default	0.01

Range	None
Description	Standard deviation of dark current

#### 8.4.33 QC.DCRVALn

Name	QC DCRVALn
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Change in DCRVALn of pointing of astrometric solution compared to nominal RA of pointing for each detector
Default	0
Range	None
Description	Change in DCRVALn of pointing of astrometric solution compared to nominal RA of pointing for each detector

#### 8.4.34 QC.DEPERSISTEDIMGMEAn

Name	QC DEPERSISTEDIMGMEAn
Class	header
Context	QC
Type	float
Value	%.3f
Unit	ADU
Comment	mean pixel value of the image of detector n.
Default	-1.0
Range	None
Description	mean pixel value of the image of detector n.

#### 8.4.35 QC.DEPERSISTEDIMGMEDn

Name	QC DEPERSISTEDIMGMEDn
Class	header
Context	QC
Type	float

Value	%.3f
Unit	ADU
Comment	median of pixel values of the image of detector n.
Default	-1.0
Range	None
Description	median of pixel values of the image of detector n.

#### 8.4.36 QC.DEPERSISTEDIMGSTDn

Name	QC DEPERSEDIMGSTDn
Class	header
Context	QC
Type	float
Value	%.3f
Unit	ADU
Comment	standard deviation of pixel values of the image of detector n.
Default	-1.0
Range	None
Description	standard deviation of pixel values of the image of detector n.

#### 8.4.37 QC.DETRENCR

Name	QC DETRENCR
Class	header
Context	QC
Type	int
Value	%i
Unit	None
Comment	Total number of cosmic rays detected in each detector
Default	0
Range	None
Description	Total number of cosmic rays detected in each detector

#### 8.4.38 QC.DETSMEAN

Name	QC DETSMEAN
Class	header
Context	QC
Type	double
Value	%.3f
Unit	adu
Comment	Mean sky brightness
Default	0.0
Range	None
Description	Mean sky brightness

#### 8.4.39 QC.DETSMED

Name	QC DETSMED
Class	header
Context	QC
Type	double
Value	%.3f
Unit	adu
Comment	Median sky brightness in each detector
Default	0.0
Range	None
Description	Median sky brightness in each detector

#### 8.4.40 QC.DETSSTD

Name	QC DETSSTD
Class	header
Context	QC
Type	double
Value	%.3f
Unit	adu
Comment	standard deviation of pixel values in each detector.
Default	0.0
Range	None
Description	standard deviation of pixel values in each detector.

#### 8.4.41 QC.DISTORTXMAX

Name	QC DISTORTXMAX
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Maximal distortion in X.
Default	0
Range	None
Description	Maximal distortion in X.

#### 8.4.42 QC.DISTORTXMEAN

Name	QC DISTORTXMEAN
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Mean distortion in X.
Default	0
Range	None
Description	Mean distortion in X.

#### 8.4.43 QC.DISTORTXMEDIAN

Name	QC DISTORTXMEDIAN
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median distortion in X.
Default	0
Range	None
Description	Median distortion in X.

#### 8.4.44 QC.DISTORTXMIN

Name	QC DISTORTXMIN
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Minimal distortion in X.
Default	0
Range	None
Description	Minimal distortion in X.

#### 8.4.45 QC.DISTORTYMAX

Name	QC DISTORTYMAX
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Maximal distortion in Y.
Default	0
Range	None
Description	Maximal distortion in Y.

#### 8.4.46 QC.DISTORTYMEAN

Name	QC DISTORTYMEAN
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Mean distortion in Y.
Default	0
Range	None
Description	Mean distortion in Y.

#### 8.4.47 QC.DISTORTYMEDIAN

Name	QC DISTORTYMEDIAN
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median distortion in Y.
Default	0
Range	None
Description	Median distortion in Y.

#### 8.4.48 QC.DISTORTYMIN

Name	QC DISTORTYMIN
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Minimal distortion in Y.
Default	0
Range	None
Description	Minimal distortion in Y.

#### 8.4.49 QC.FITSTD

Name	QC FITSTD
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Quality of fit.
Default	0
Range	None
Description	Quality of fit.

#### 8.4.50 QC.FLATMEAN

Name	QC FLATMEAN
Class	header
Context	QC
Type	double
Value	%.3f
Unit	adu
Comment	Mean of pixel values before normalisation in each detector
Default	1.0
Range	None
Description	Mean of pixel values before normalisation in each detector

#### 8.4.51 QC.FLATMED

Name	QC FLATMED
Class	header
Context	QC
Type	int
Value	%i
Unit	adu
Comment	Median of pixel values before normalisation in each detector
Default	1
Range	None
Description	Median of pixel values before normalisation in each detector

#### 8.4.52 QC.FLATSTD

Name	QC FLATSTD
Class	header
Context	QC
Type	double
Value	%.3f
Unit	adu
Comment	Standard deviation of pixel values before normalisation in each detector
Default	0.1

Range	None
Description	Standard deviation of pixel values before normalisation in each detector

#### 8.4.53 QC.FPIXCOLD

Name	QC FPIXCOLD
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Percentage of cold pixels
Default	0
Range	None
Description	Percentage of cold pixels

#### 8.4.54 QC.FPIXHOT

Name	QC FPIXHOT
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Percentage of hot pixels
Default	0
Range	None
Description	Percentage of hot pixels

#### 8.4.55 QC.FPIXNONL

Name	QC FPIXNONL
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Percentage of non-linear pixels

Default	0
Range	None
Description	Percentage of non-linear pixels

#### 8.4.56 QC.FPIXSAT

Name	QC FPIXSAT
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Percentage of saturated pixels
Default	0
Range	None
Description	Percentage of saturated pixels

#### 8.4.57 QC.ILLSNRMD

Name	QC ILLSNRMD
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of sources matched to the reference catalog in each in each detector.
Default	0
Range	None
Description	Median signal-to-noise ratio of sources matched to the reference catalog in each in each detector.

#### 8.4.58 QC.ILLUNMAT

Name	QC ILLUNMAT
Class	header
Context	QC
Type	int
Value	%i

Unit	None
Comment	Number of sources matched to the reference catalog in each detector.
Default	0
Range	None
Description	Number of sources matched to the reference catalog in each detector.

#### 8.4.59 QC.LINEFWHMMEDIAN

Name	QC LINEFWHMMEDIAN
Class	header
Context	QC
Type	double
Value	%.3f
Unit	pixel
Comment	FWHM median of the detected calibration lamp lines
Default	
Range	None
Description	FWHM median of the detected calibration lamp lines

#### 8.4.60 QC.LINEPOLYCOEFF

Name	QC LINEPOLYCOEFF
Class	header
Context	QC
Type	double array
Value	%.3f
Unit	
Comment	Coefficients of the polynomial fit to the calibration lamp lines
Default	
Range	None
Description	Coefficients of the polynomial fit to the calibration lamp lines

#### 8.4.61 QC.LINEPOLYDEG

Name	QC LINEPOLYDEG
Class	header
Context	QC
Type	integer
Value	%.3f
Unit	
Comment	Degree of the polynomial fit for the lamp lines (= parameter REC.LINEPOLYDEG)
Default	REC.LINEPOLYDEG
Range	None
Description	Degree of the polynomial fit for the lamp lines (= parameter REC.LINEPOLYDEG)

#### 8.4.62 QC.LINPOSDEVMAX

Name	QC LINPOSDEVMAX
Class	header
Context	QC
Type	double
Value	%.3f
Unit	
Comment	Maximum of the lamp line position deviation
Default	
Range	None
Description	Maximum of the lamp line position deviation

#### 8.4.63 QC.LINPOSDEVMEAN

Name	QC LINPOSDEVMEAN
Class	header
Context	QC
Type	double
Value	%.3f
Unit	
Comment	Mean of the lamp line position deviation
Default	
Range	None
Description	Mean of the lamp line position deviation

#### 8.4.64 QC.LINPOSDEVMEDIAN

Name	QC LINPOSDEVMEDIAN
Class	header
Context	QC
Type	double
Value	%.3f
Unit	
Comment	Median of the lamp line position deviation
Default	
Range	None
Description	Median of the lamp line position deviation

#### 8.4.65 QC.LINPOSDEVMIN

Name	QC LINPOSDEVMIN
Class	header
Context	QC
Type	double
Value	%.3f
Unit	
Comment	Minimum of the lamp line position deviation
Default	
Range	None
Description	Minimum of the lamp line position deviation

#### 8.4.66 QC.LYOT.SNRMAXi

Name	QC LYOT SNRMAXi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Maximum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.67 QC.LYOT.SNRMEANi

Name	QC LYOT SNRMEANi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.68 QC.LYOT.SNRMEDI

Name	QC LYOT SNRMEDI
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.69 QC.LYOT.SNRMINi

Name	QC LYOT SNRMINi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Minimum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.70 QC.NITER

Name	QC NITER
Class	header
Context	QC
Type	int
Value	%i
Unit	None
Comment	Number of iterations for fit.
Default	0
Range	None
Description	Number of iterations for fit.

#### 8.4.71 QC.NMATCHi

Name	QC NMATCHi
Class	header
Context	QC
Type	int
Value	%i
Unit	None
Comment	Number of sources for which a cross-match with the reference catalog is made for each detector <d>.
Default	0
Range	None
Description	Number of sources for which a cross-match with the reference catalog is made for each detector <d>.

#### 8.4.72 QC.NPIXCOLD

Name	QC NPIXCOLD
Class	header
Context	QC
Type	int
Value	%i
Unit	None
Comment	Number of cold pixels
Default	0
Range	None
Description	Number of cold pixels

#### 8.4.73 QC.NPIXHOT

Name	QC NPIXHOT
Class	header
Context	QC
Type	int
Value	%i
Unit	None
Comment	Number of hot pixels
Default	0
Range	None
Description	Number of hot pixels

#### 8.4.74 QC.NPIXNONL

Name	QC NPIXNONL
Class	header
Context	QC
Type	int
Value	%i
Unit	None
Comment	Number of non-linear
Default	0
Range	None
Description	Number of non-linear

#### 8.4.75 QC.NPIXSAT

Name	QC NPIXSAT
Class	header
Context	QC
Type	int
Value	%i
Unit	None
Comment	Number of saturated pixels
Default	0
Range	None
Description	Number of saturated pixels

#### 8.4.76 QC.NUMAIRGLINESFOUND

Name	QC NUMAIRGLINESFOUND
Class	header
Context	QC
Type	integer
Value	%.3f
Unit	
Comment	Number of detected airglow lines
Default	
Range	None
Description	Number of detected airglow lines

#### 8.4.77 QC.NUMAIRGLINESMISSED

Name	QC NUMAIRGLINESMISSED
Class	header
Context	QC
Type	integer
Value	%.3f
Unit	
Comment	Number of airglow lines, which were not detected
Default	
Range	None
Description	Number of airglow lines, which were not detected

#### 8.4.78 QC.NUMLINESFOUND

Name	QC NUMLINESFOUND
Class	header
Context	QC
Type	integer
Value	%.3f
Unit	
Comment	Number of detected calibration lamp lines
Default	
Range	None
Description	Number of detected calibration lamp lines

#### 8.4.79 QC.NUMLINESMISSED

Name	QC NUMLINESMISSED
Class	header
Context	QC
Type	integer
Value	%.3f
Unit	
Comment	Number of calibration lamp lines, which were not detected
Default	
Range	None
Description	Number of calibration lamp lines, which were not detected

#### 8.4.80 QC.NUMLINESSKIPPED

Name	QC NUMLINESSKIPPED
Class	header
Context	QC
Type	integer
Value	%.3f
Unit	
Comment	Number of calibration lamp lines which are skipped, e.g. due to false detections
Default	
Range	None
Description	Number of calibration lamp lines which are skipped, e.g. due to false detections

#### 8.4.81 QC.PERSISTENCEIMGMEAn

Name	QC PERSISTENCEIMGMEAn
Class	header
Context	QC
Type	float
Value	%.3f
Unit	ADU
Comment	mean of pixel values of the image of detector n.
Default	-1.0
Range	None

Description	mean of pixel values of the image of detector n.
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#### 8.4.82 QC.PERSISTENCEIMGMEDn

Name	QC PERSISTENCEIMGMEDn
Class	header
Context	QC
Type	float
Value	%.3f
Unit	ADU
Comment	median of pixel values of the image of detector n.
Default	-1.0
Range	None
Description	median of pixel values of the image of detector n.

#### 8.4.83 QC.PERSISTENCEIMGSTDn

Name	QC PERSISTENCEIMGSTDn
Class	header
Context	QC
Type	float
Value	%.3f
Unit	ADU
Comment	standard deviation of pixel values of the image of detector n.
Default	-1.0
Range	None
Description	standard deviation of pixel values of the image of detector n.

#### 8.4.84 QC.REGRIDIMGMEAn

Name	QC REGRIDIMGMEAn
Class	header
Context	QC
Type	float
Value	%.3f
Unit	ADU
Comment	mean of pixel values of the image of detector n.

Default	-1.0
Range	None
Description	mean of pixel values of the image of detector n.

#### 8.4.85 QC.REGRIDIMGMEDn

Name	QC REGRIDIMGMEDn
Class	header
Context	QC
Type	float
Value	%.3f
Unit	ADU
Comment	median of pixel values of the image of detector n.
Default	-1.0
Range	None
Description	median of pixel values of the image of detector n.

#### 8.4.86 QC.REGRIDIMGSTDn

Name	QC REGRIDIMGSTDn
Class	header
Context	QC
Type	float
Value	%.3f
Unit	ADU
Comment	standard deviation of pixel values of the image of detector n.
Default	-1.0
Range	None
Description	standard deviation of pixel values of the image of detector n.

#### 8.4.87 QC.RMSDDEC

Name	QC RMSDDEC
Class	header
Context	QC
Type	float
Value	%.3f

Unit	mas
Comment	rms of DEC residuals with reference stars in mas.
Default	-1.0
Range	None
Description	rms of DEC residuals with reference stars in mas.

#### 8.4.88 QC.RMSDRA

Name	QC RMSDRA
Class	header
Context	QC
Type	float
Value	%.3f
Unit	mas
Comment	rms of RA residuals with reference stars in mas.
Default	-1.0
Range	None
Description	rms of RA residuals with reference stars in mas.

#### 8.4.89 QC.STACKIMGMEAn

Name	QC STACKIMGMEAn
Class	header
Context	QC
Type	float
Value	%.3f
Unit	ADU
Comment	mean of pixel values of the image of detector n.
Default	-1.0
Range	None
Description	mean of pixel values of the image of detector n.

#### 8.4.90 QC.STACKIMGMEDn

Name	QC STACKIMGMEDn
Class	header
Context	QC
Type	float
Value	%.3f

Unit	ADU
Comment	median of pixel values of the image of detector n.
Default	-1.0
Range	None
Description	median of pixel values of the image of detector n.

#### 8.4.91 QC.STACKIMSTDn

Name	QC STACKIMSTDn
Class	header
Context	QC
Type	float
Value	%.3f
Unit	ADU
Comment	standard deviation of pixel values of the image of detector n.
Default	-1.0
Range	None
Description	standard deviation of pixel values of the image of detector n.

#### 8.4.92 QC.STAROFFSETSNRMAXn

Name	QC STAROFFSETSNRMAXn
Class	header
Context	QC
Type	float
Value	%.3f
Unit	ADU
Comment	maximum signal-to-noise of TBD of detector n.
Default	-1.0
Range	None
Description	maximum signal-to-noise of TBD of detector n.

#### 8.4.93 QC.STAROFFSETSNRMEAn

Name	QC STAROFFSETSNRMEAn
Class	header
Context	QC

Type	float
Value	%.3f
Unit	ADU
Comment	mean signal-to-noise of TBD of detector n.
Default	-1.0
Range	None
Description	mean signal-to-noise of TBD of detector n.

#### 8.4.94 QC.STAROFFSETSNRMEDn

Name	QC STAROFFSETSNRMEDn
Class	header
Context	QC
Type	float
Value	%.3f
Unit	ADU
Comment	median signal-to-noise of TBD of detector n.
Default	-1.0
Range	None
Description	median signal-to-noise of TBD of detector n.

#### 8.4.95 QC.STAROFFSETSNRMINn

Name	QC STAROFFSETSNRMINn
Class	header
Context	QC
Type	float
Value	%.3f
Unit	ADU
Comment	minimum signal-to-noise of TBD of detector n.
Default	-1.0
Range	None
Description	minimum signal-to-noise of TBD of detector n.

#### 8.4.96 QC.STARPOS.SNRMAXi

Name	QC STARPOS SNRMAXi
Class	header
Context	QC

Type	float
Value	%.3f
Unit	None
Comment	Maximum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.97 QC.STARPOS.SNRMEANi

Name	QC STARPOS SNRMEANi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.98 QC.STARPOS.SNRMEDIi

Name	QC STARPOS SNRMEDIi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.99 QC.STARPOS.SNRMINi

Name	QC STARPOS SNRMINi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Minimum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.100 QC.ZPTSTDi

Name	QC ZPTSTDi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Standard deviation in zeropoint as inferred for each source that is cross-matched with reference catalog for each detector <i>.
Default	0
Range	None
Description	Standard deviation in zeropoint as inferred for each source that is cross-matched with reference catalog for each detector <i>.

#### 8.4.101 QC.CALIMEA0

Name	QC CALIMEAi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Mean of the pixel values in the calibrated image per detector <i>.

Default	0
Range	None
Description	Mean of the pixel values in the calibrated image per detector <i>.

#### 8.4.102 QC.CALIMEA1

Name	QC CALIMEAi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Mean of the pixel values in the calibrated image per detector <i>.
Default	0
Range	None
Description	Mean of the pixel values in the calibrated image per detector <i>.

#### 8.4.103 QC.CALIMEA2

Name	QC CALIMEAi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Mean of the pixel values in the calibrated image per detector <i>.
Default	0
Range	None
Description	Mean of the pixel values in the calibrated image per detector <i>.

#### 8.4.104 QC.CALIMEA3

Name	QC CALIMEAi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Mean of the pixel values in the calibrated image per detector <i>.
Default	0
Range	None
Description	Mean of the pixel values in the calibrated image per detector <i>.

#### 8.4.105 QC.CALIMEA4

Name	QC CALIMEAi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Mean of the pixel values in the calibrated image per detector <i>.
Default	0
Range	None
Description	Mean of the pixel values in the calibrated image per detector <i>.

#### 8.4.106 QC.CALIMEA5

Name	QC CALIMEAi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Mean of the pixel values in the calibrated image per detector <i>.
Default	0

Range	None
Description	Mean of the pixel values in the calibrated image per detector <i>.

#### 8.4.107 QC.CALIMEA6

Name	QC CALIMEAi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Mean of the pixel values in the calibrated image per detector <i>.
Default	0
Range	None
Description	Mean of the pixel values in the calibrated image per detector <i>.

#### 8.4.108 QC.CALIMEA7

Name	QC CALIMEAi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Mean of the pixel values in the calibrated image per detector <i>.
Default	0
Range	None
Description	Mean of the pixel values in the calibrated image per detector <i>.

#### 8.4.109 QC.CALIMEA8

Name	QC CALIMEAi
Class	header
Context	QC

Type	float
Value	%.3f
Unit	None
Comment	Mean of the pixel values in the calibrated image per detector <i>.
Default	0
Range	None
Description	Mean of the pixel values in the calibrated image per detector <i>.

#### 8.4.110 QC.CALIMEA9

Name	QC CALIMEAi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Mean of the pixel values in the calibrated image per detector <i>.
Default	0
Range	None
Description	Mean of the pixel values in the calibrated image per detector <i>.

#### 8.4.111 QC.CALISTD0

Name	QC CALISTDi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Standard deviation of the pixel values in the calibrated image per detector <i>.
Default	0
Range	None
Description	Standard deviation of the pixel values in the calibrated image per detector <i>.

#### 8.4.112 QC.CALISTD1

Name	QC CALISTDi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Standard deviation of the pixel values in the calibrated image per detector <i>.
Default	0
Range	None
Description	Standard deviation of the pixel values in the calibrated image per detector <i>.

#### 8.4.113 QC.CALISTD2

Name	QC CALISTDi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Standard deviation of the pixel values in the calibrated image per detector <i>.
Default	0
Range	None
Description	Standard deviation of the pixel values in the calibrated image per detector <i>.

#### 8.4.114 QC.CALISTD3

Name	QC CALISTDi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Standard deviation of the pixel values in the calibrated image per detector <i>.
Default	0

Range	None
Description	Standard deviation of the pixel values in the calibrated image per detector <i>.

#### 8.4.115 QC.CALISTD4

Name	QC CALISTDi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Standard deviation of the pixel values in the calibrated image per detector <i>.
Default	0
Range	None
Description	Standard deviation of the pixel values in the calibrated image per detector <i>.

#### 8.4.116 QC.CALISTD5

Name	QC CALISTDi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Standard deviation of the pixel values in the calibrated image per detector <i>.
Default	0
Range	None
Description	Standard deviation of the pixel values in the calibrated image per detector <i>.

#### 8.4.117 QC.CALISTD6

Name	QC CALISTDi
Class	header
Context	QC

Type	float
Value	%.3f
Unit	None
Comment	Standard deviation of the pixel values in the calibrated image per detector <i>.
Default	0
Range	None
Description	Standard deviation of the pixel values in the calibrated image per detector <i>.

#### 8.4.118 QC.CALISTD7

Name	QC CALISTDi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Standard deviation of the pixel values in the calibrated image per detector <i>.
Default	0
Range	None
Description	Standard deviation of the pixel values in the calibrated image per detector <i>.

#### 8.4.119 QC.CALISTD8

Name	QC CALISTDi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Standard deviation of the pixel values in the calibrated image per detector <i>.
Default	0
Range	None
Description	Standard deviation of the pixel values in the calibrated image per detector <i>.

#### 8.4.120 QC.CALISTD9

Name	QC CALISTDi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Standard deviation of the pixel values in the calibrated image per detector <i>.
Default	0
Range	None
Description	Standard deviation of the pixel values in the calibrated image per detector <i>.

#### 8.4.121 QC.COROPHOT.SNRMAX0

Name	QC COROPHOT SNRMAXi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Maximum signal-to-noise ratio of the pixel values for exposure through <FILTER> in each detector <i> TODO: Filter
Default	0
Range	None
Description	

#### 8.4.122 QC.COROPHOT.SNRMAX1

Name	QC COROPHOT SNRMAXi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Maximum signal-to-noise ratio of the pixel values for exposure through <FILTER> in each detector <i> TODO: Filter

Default	0
Range	None
Description	

#### 8.4.123 QC.COROPHOT.SNRMAX2

Name	QC COROPHOT SNRMAXi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Maximum signal-to-noise ratio of the pixel values for exposure through <FILTER> in each detector <i> TODO: Filter
Default	0
Range	None
Description	

#### 8.4.124 QC.COROPHOT.SNRMAX3

Name	QC COROPHOT SNRMAXi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Maximum signal-to-noise ratio of the pixel values for exposure through <FILTER> in each detector <i> TODO: Filter
Default	0
Range	None
Description	

#### 8.4.125 QC.COROPHOT.SNRMAX4

Name	QC COROPHOT SNRMAXi
Class	header
Context	QC

Type	float
Value	%.3f
Unit	None
Comment	Maximum signal-to-noise ratio of the pixel values for exposure through <FILTER> in each detector <i> TODO: Filter
Default	0
Range	None
Description	

#### 8.4.126 QC.COROPHOT.SNRMAX5

Name	QC COROPHOT SNRMAXi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Maximum signal-to-noise ratio of the pixel values for exposure through <FILTER> in each detector <i> TODO: Filter
Default	0
Range	None
Description	

#### 8.4.127 QC.COROPHOT.SNRMAX6

Name	QC COROPHOT SNRMAXi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Maximum signal-to-noise ratio of the pixel values for exposure through <FILTER> in each detector <i> TODO: Filter
Default	0
Range	None
Description	

#### 8.4.128 QC.COROPHOT.SNRMAX7

Name	QC COROPHOT SNRMAXi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Maximum signal-to-noise ratio of the pixel values for exposure through <FILTER> in each detector <i> TODO: Filter
Default	0
Range	None
Description	

#### 8.4.129 QC.COROPHOT.SNRMAX8

Name	QC COROPHOT SNRMAXi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Maximum signal-to-noise ratio of the pixel values for exposure through <FILTER> in each detector <i> TODO: Filter
Default	0
Range	None
Description	

#### 8.4.130 QC.COROPHOT.SNRMAX9

Name	QC COROPHOT SNRMAXi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Maximum signal-to-noise ratio of the pixel values for exposure through <FILTER> in each detector <i> TODO: Filter

Default	0
Range	None
Description	

#### 8.4.131 QC.COROPHOT.SNRMEAN0

Name	QC COROPHOT SNRMEAN <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values for exposure through <FILTER> in each detector <i> TODO: Filter
Default	0
Range	None
Description	

#### 8.4.132 QC.COROPHOT.SNRMEAN1

Name	QC COROPHOT SNRMEAN <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values for exposure through <FILTER> in each detector <i> TODO: Filter
Default	0
Range	None
Description	

#### 8.4.133 QC.COROPHOT.SNRMEAN2

Name	QC COROPHOT SNRMEAN <i>i</i>
Class	header
Context	QC

Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values for exposure through <FILTER> in each detector <i> TODO: Filter
Default	0
Range	None
Description	

#### 8.4.134 QC.COROPHOT.SNRMEAN3

Name	QC COROPHOT SNRMEANi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values for exposure through <FILTER> in each detector <i> TODO: Filter
Default	0
Range	None
Description	

#### 8.4.135 QC.COROPHOT.SNRMEAN4

Name	QC COROPHOT SNRMEANi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values for exposure through <FILTER> in each detector <i> TODO: Filter
Default	0
Range	None
Description	

#### 8.4.136 QC.COROPHOT.SNRMEAN5

Name	QC COROPHOT SNRMEANi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values for exposure through <FILTER> in each detector <i> TODO: Filter
Default	0
Range	None
Description	

#### 8.4.137 QC.COROPHOT.SNRMEAN6

Name	QC COROPHOT SNRMEANi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values for exposure through <FILTER> in each detector <i> TODO: Filter
Default	0
Range	None
Description	

#### 8.4.138 QC.COROPHOT.SNRMEAN7

Name	QC COROPHOT SNRMEANi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values for exposure through <FILTER> in each detector <i> TODO: Filter

Default	0
Range	None
Description	

#### 8.4.139 QC.COROPHOT.SNRMEAN8

Name	QC COROPHOT SNRMEANi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values for exposure through <FILTER> in each detector <i> TODO: Filter
Default	0
Range	None
Description	

#### 8.4.140 QC.COROPHOT.SNRMEAN9

Name	QC COROPHOT SNRMEANi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values for exposure through <FILTER> in each detector <i> TODO: Filter
Default	0
Range	None
Description	

#### 8.4.141 QC.COROPHOT.SNRMED0

Name	QC COROPHOT SNRMEDI
Class	header
Context	QC

Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values for exposure through <FILTER> in each detector <i> TODO: Filter
Default	0
Range	None
Description	

#### 8.4.142 QC.COROPHOT.SNRMED1

Name	QC COROPHOT SNRMED <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values for exposure through <FILTER> in each detector <i> TODO: Filter
Default	0
Range	None
Description	

#### 8.4.143 QC.COROPHOT.SNRMED2

Name	QC COROPHOT SNRMED <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values for exposure through <FILTER> in each detector <i> TODO: Filter
Default	0
Range	None
Description	

#### 8.4.144 QC.COROPHOT.SNRMED3

Name	QC COROPHOT SNRMED <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values for exposure through <FILTER> in each detector <i> TODO: Filter
Default	0
Range	None
Description	

#### 8.4.145 QC.COROPHOT.SNRMED4

Name	QC COROPHOT SNRMED <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values for exposure through <FILTER> in each detector <i> TODO: Filter
Default	0
Range	None
Description	

#### 8.4.146 QC.COROPHOT.SNRMED5

Name	QC COROPHOT SNRMED <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values for exposure through <FILTER> in each detector <i> TODO: Filter

Default	0
Range	None
Description	

#### 8.4.147 QC.COROPHOT.SNRMED6

Name	QC COROPHOT SNRMED <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values for exposure through <FILTER> in each detector <i> TODO: Filter
Default	0
Range	None
Description	

#### 8.4.148 QC.COROPHOT.SNRMED7

Name	QC COROPHOT SNRMED <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values for exposure through <FILTER> in each detector <i> TODO: Filter
Default	0
Range	None
Description	

#### 8.4.149 QC.COROPHOT.SNRMED8

Name	QC COROPHOT SNRMED <i>i</i>
Class	header
Context	QC

Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values for exposure through <FILTER> in each detector <i> TODO: Filter
Default	0
Range	None
Description	

#### 8.4.150 QC.COROPHOT.SNRMED9

Name	QC COROPHOT SNRMED <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values for exposure through <FILTER> in each detector <i> TODO: Filter
Default	0
Range	None
Description	

#### 8.4.151 QC.COROPHOT.SNRMIN0

Name	QC COROPHOT SNRMIN <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Minimum signal-to-noise ratio of the pixel values for exposure through <FILTER> in each detector <i>. TODO: How to do FILTER?
Default	0
Range	None
Description	

#### 8.4.152 QC.COROPHOT.SNRMIN1

Name	QC COROPHOT SNRMINi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Minimum signal-to-noise ratio of the pixel values for exposure through <FILTER> in each detector <i>. TODO: How to do FILTER?
Default	0
Range	None
Description	

#### 8.4.153 QC.COROPHOT.SNRMIN2

Name	QC COROPHOT SNRMINi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Minimum signal-to-noise ratio of the pixel values for exposure through <FILTER> in each detector <i>. TODO: How to do FILTER?
Default	0
Range	None
Description	

#### 8.4.154 QC.COROPHOT.SNRMIN3

Name	QC COROPHOT SNRMINi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Minimum signal-to-noise ratio of the pixel values for exposure through <FILTER> in each detector <i>. TODO: How to do FILTER?

Default	0
Range	None
Description	

#### 8.4.155 QC.COROPHOT.SNRMIN4

Name	QC COROPHOT SNRMINi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Minimum signal-to-noise ratio of the pixel values for exposure through <FILTER> in each detector <i>. TODO: How to do FILTER?
Default	0
Range	None
Description	

#### 8.4.156 QC.COROPHOT.SNRMIN5

Name	QC COROPHOT SNRMINi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Minimum signal-to-noise ratio of the pixel values for exposure through <FILTER> in each detector <i>. TODO: How to do FILTER?
Default	0
Range	None
Description	

#### 8.4.157 QC.COROPHOT.SNRMIN6

Name	QC COROPHOT SNRMINi
Class	header
Context	QC

Type	float
Value	%.3f
Unit	None
Comment	Minimum signal-to-noise ratio of the pixel values for exposure through <FILTER> in each detector <i>. TODO: How to do FILTER?
Default	0
Range	None
Description	

#### 8.4.158 QC.COROPHOT.SNRMIN7

Name	QC COROPHOT SNRMINi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Minimum signal-to-noise ratio of the pixel values for exposure through <FILTER> in each detector <i>. TODO: How to do FILTER?
Default	0
Range	None
Description	

#### 8.4.159 QC.COROPHOT.SNRMIN8

Name	QC COROPHOT SNRMINi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Minimum signal-to-noise ratio of the pixel values for exposure through <FILTER> in each detector <i>. TODO: How to do FILTER?
Default	0
Range	None
Description	

#### 8.4.160 QC.COROPHOT.SNRMIN9

Name	QC COROPHOT SNRMINi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Minimum signal-to-noise ratio of the pixel values for exposure through <FILTER> in each detector <i>. TODO: How to do FILTER?
Default	0
Range	None
Description	

#### 8.4.161 QC.COROPOS.SNRMAX0

Name	QC COROPOS SNRMAXi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Maximum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.162 QC.COROPOS.SNRMAX1

Name	QC COROPOS SNRMAXi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Maximum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None

Description
-------------

#### 8.4.163 QC.COROPOS.SNRMAX2

Name	QC COROPOS SNRMAXi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Maximum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.164 QC.COROPOS.SNRMAX3

Name	QC COROPOS SNRMAXi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Maximum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.165 QC.COROPOS.SNRMAX4

Name	QC COROPOS SNRMAXi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None

Comment	Maximum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.166 QC.COROPOS.SNRMAX5

Name	QC COROPOS SNRMAXi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Maximum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.167 QC.COROPOS.SNRMAX6

Name	QC COROPOS SNRMAXi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Maximum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.168 QC.COROPOS.SNRMAX7

Name	QC COROPOS SNRMAXi
Class	header
Context	QC

Type	float
Value	%.3f
Unit	None
Comment	Maximum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.169 QC.COROPOS.SNRMAX8

Name	QC COROPOS SNRMAXi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Maximum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.170 QC.COROPOS.SNRMAX9

Name	QC COROPOS SNRMAXi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Maximum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.171 QC.COROPOS.SNRMEAN0

Name	QC COROPOS SNRMEANi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.172 QC.COROPOS.SNRMEAN1

Name	QC COROPOS SNRMEANi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.173 QC.COROPOS.SNRMEAN2

Name	QC COROPOS SNRMEANi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.174 QC.COROPOS.SNRMEAN3

Name	QC COROPOS SNRMEANi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.175 QC.COROPOS.SNRMEAN4

Name	QC COROPOS SNRMEANi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.176 QC.COROPOS.SNRMEAN5

Name	QC COROPOS SNRMEANi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.177 QC.COROPOS.SNRMEAN6

Name	QC COROPOS SNRMEAN <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector < <i>i</i> >
Default	0
Range	None
Description	

#### 8.4.178 QC.COROPOS.SNRMEAN7

Name	QC COROPOS SNRMEAN <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector < <i>i</i> >
Default	0
Range	None
Description	

#### 8.4.179 QC.COROPOS.SNRMEAN8

Name	QC COROPOS SNRMEAN <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector < <i>i</i> >
Default	0
Range	None
Description	

#### 8.4.180 QC.COROPOS.SNRMEAN9

Name	QC COROPOS SNRMEANi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.181 QC.COROPOS.SNRMED0

Name	QC COROPOS SNRMEDi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.182 QC.COROPOS.SNRMED1

Name	QC COROPOS SNRMEDi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.183 QC.COROPOS.SNRMED2

Name	QC COROPOS SNRMED <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector < <i>i</i> >
Default	0
Range	None
Description	

#### 8.4.184 QC.COROPOS.SNRMED3

Name	QC COROPOS SNRMED <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector < <i>i</i> >
Default	0
Range	None
Description	

#### 8.4.185 QC.COROPOS.SNRMED4

Name	QC COROPOS SNRMED <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector < <i>i</i> >
Default	0
Range	None
Description	

#### 8.4.186 QC.COROPOS.SNRMED5

Name	QC COROPOS SNRMED <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.187 QC.COROPOS.SNRMED6

Name	QC COROPOS SNRMED <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.188 QC.COROPOS.SNRMED7

Name	QC COROPOS SNRMED <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.189 QC.COROPOS.SNRMED8

Name	QC COROPOS SNRMED <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector < <i>i</i> >
Default	0
Range	None
Description	

#### 8.4.190 QC.COROPOS.SNRMED9

Name	QC COROPOS SNRMED <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector < <i>i</i> >
Default	0
Range	None
Description	

#### 8.4.191 QC.COROPOS.SNRMIN0

Name	QC COROPOS SNRMIN <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Minimum signal-to-noise ratio of the pixel values in each detector < <i>i</i> >
Default	0
Range	None
Description	

#### 8.4.192 QC.COROPOS.SNRMIN1

Name	QC COROPOS SNRMINi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Minimum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.193 QC.COROPOS.SNRMIN2

Name	QC COROPOS SNRMINi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Minimum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.194 QC.COROPOS.SNRMIN3

Name	QC COROPOS SNRMINi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Minimum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.195 QC.COROPOS.SNRMIN4

Name	QC COROPOS SNRMINi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Minimum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.196 QC.COROPOS.SNRMIN5

Name	QC COROPOS SNRMINi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Minimum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.197 QC.COROPOS.SNRMIN6

Name	QC COROPOS SNRMINi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Minimum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.198 QC.COROPOS.SNRMIN7

Name	QC COROPOS SNRMINi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Minimum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.199 QC.COROPOS.SNRMIN8

Name	QC COROPOS SNRMINi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Minimum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.200 QC.COROPOS.SNRMIN9

Name	QC COROPOS SNRMINi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Minimum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.201 QC.CUBEMEA0

Name	QC CUBEMEAi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Mean of the pixel values in the cube image per exposure <i>.
Default	0
Range	None
Description	Mean of the pixel values in the cube image per exposure <i>.

#### 8.4.202 QC.CUBEMEA1

Name	QC CUBEMEAi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Mean of the pixel values in the cube image per exposure <i>.
Default	0
Range	None
Description	Mean of the pixel values in the cube image per exposure <i>.

#### 8.4.203 QC.CUBEMEA2

Name	QC CUBEMEAi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Mean of the pixel values in the cube image per exposure <i>.
Default	0

Range	None
Description	Mean of the pixel values in the cube image per exposure <i>.

#### 8.4.204 QC.CUBEMEA3

Name	QC CUBEMEAi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Mean of the pixel values in the cube image per exposure <i>.
Default	0
Range	None
Description	Mean of the pixel values in the cube image per exposure <i>.

#### 8.4.205 QC.CUBEMEA4

Name	QC CUBEMEAi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Mean of the pixel values in the cube image per exposure <i>.
Default	0
Range	None
Description	Mean of the pixel values in the cube image per exposure <i>.

#### 8.4.206 QC.CUBEMEA5

Name	QC CUBEMEAi
Class	header
Context	QC

Type	float
Value	%.3f
Unit	None
Comment	Mean of the pixel values in the cube image per exposure <i>.
Default	0
Range	None
Description	Mean of the pixel values in the cube image per exposure <i>.

#### 8.4.207 QC.CUBEMEA6

Name	QC CUBEMEAi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Mean of the pixel values in the cube image per exposure <i>.
Default	0
Range	None
Description	Mean of the pixel values in the cube image per exposure <i>.

#### 8.4.208 QC.CUBEMEA7

Name	QC CUBEMEAi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Mean of the pixel values in the cube image per exposure <i>.
Default	0
Range	None
Description	Mean of the pixel values in the cube image per exposure <i>.

#### 8.4.209 QC.CUBEMEA8

Name	QC CUBEMEAi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Mean of the pixel values in the cube image per exposure <i>.
Default	0
Range	None
Description	Mean of the pixel values in the cube image per exposure <i>.

#### 8.4.210 QC.CUBEMEA9

Name	QC CUBEMEAi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Mean of the pixel values in the cube image per exposure <i>.
Default	0
Range	None
Description	Mean of the pixel values in the cube image per exposure <i>.

#### 8.4.211 QC.CUBESTD0

Name	QC CUBESTDi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Standard deviation of the pixel values in the cube image per exposure <i>.
Default	0

Range	None
Description	Standard deviation of the pixel values in the cube image per exposure <i>.

#### 8.4.212 QC.CUBESTD1

Name	QC CUBESTDi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Standard deviation of the pixel values in the cube image per exposure <i>.
Default	0
Range	None
Description	Standard deviation of the pixel values in the cube image per exposure <i>.

#### 8.4.213 QC.CUBESTD2

Name	QC CUBESTDi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Standard deviation of the pixel values in the cube image per exposure <i>.
Default	0
Range	None
Description	Standard deviation of the pixel values in the cube image per exposure <i>.

#### 8.4.214 QC.CUBESTD3

Name	QC CUBESTDi
Class	header
Context	QC

Type	float
Value	%.3f
Unit	None
Comment	Standard deviation of the pixel values in the cube image per exposure <i>.
Default	0
Range	None
Description	Standard deviation of the pixel values in the cube image per exposure <i>.

#### 8.4.215 QC.CUBESTD4

Name	QC CUBESTDi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Standard deviation of the pixel values in the cube image per exposure <i>.
Default	0
Range	None
Description	Standard deviation of the pixel values in the cube image per exposure <i>.

#### 8.4.216 QC.CUBESTD5

Name	QC CUBESTDi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Standard deviation of the pixel values in the cube image per exposure <i>.
Default	0
Range	None
Description	Standard deviation of the pixel values in the cube image per exposure <i>.

#### 8.4.217 QC.CUBESTD6

Name	QC CUBESTDi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Standard deviation of the pixel values in the cube image per exposure <i>.
Default	0
Range	None
Description	Standard deviation of the pixel values in the cube image per exposure <i>.

#### 8.4.218 QC.CUBESTD7

Name	QC CUBESTDi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Standard deviation of the pixel values in the cube image per exposure <i>.
Default	0
Range	None
Description	Standard deviation of the pixel values in the cube image per exposure <i>.

#### 8.4.219 QC.CUBESTD8

Name	QC CUBESTDi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Standard deviation of the pixel values in the cube image per exposure <i>.
Default	0

Range	None
Description	Standard deviation of the pixel values in the cube image per exposure <i>.

#### 8.4.220 QC.CUBESTD9

Name	QC CUBESTDi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Standard deviation of the pixel values in the cube image per exposure <i>.
Default	0
Range	None
Description	Standard deviation of the pixel values in the cube image per exposure <i>.

#### 8.4.221 QC.LYOT.SNRMAX0

Name	QC LYOT SNRMAXi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Maximum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.222 QC.LYOT.SNRMAX1

Name	QC LYOT SNRMAXi
Class	header
Context	QC
Type	float

Value	%.3f
Unit	None
Comment	Maximum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.223 QC.LYOT.SNRMAX2

Name	QC LYOT SNRMAXi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Maximum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.224 QC.LYOT.SNRMAX3

Name	QC LYOT SNRMAXi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Maximum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.225 QC.LYOT.SNRMAX4

Name	QC LYOT SNRMAXi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Maximum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.226 QC.LYOT.SNRMAX5

Name	QC LYOT SNRMAXi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Maximum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.227 QC.LYOT.SNRMAX6

Name	QC LYOT SNRMAXi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Maximum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.228 QC.LYOT.SNRMAX7

Name	QC LYOT SNRMAXi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Maximum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.229 QC.LYOT.SNRMAX8

Name	QC LYOT SNRMAXi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Maximum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.230 QC.LYOT.SNRMAX9

Name	QC LYOT SNRMAXi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Maximum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.231 QC.LYOT.SNRMEAN0

Name	QC LYOT SNRMEAN <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.232 QC.LYOT.SNRMEAN1

Name	QC LYOT SNRMEAN <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.233 QC.LYOT.SNRMEAN2

Name	QC LYOT SNRMEAN <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.234 QC.LYOT.SNRMEAN3

Name	QC LYOT SNRMEANi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.235 QC.LYOT.SNRMEAN4

Name	QC LYOT SNRMEANi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.236 QC.LYOT.SNRMEAN5

Name	QC LYOT SNRMEANi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.237 QC.LYOT.SNRMEAN6

Name	QC LYOT SNRMEAN <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.238 QC.LYOT.SNRMEAN7

Name	QC LYOT SNRMEAN <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.239 QC.LYOT.SNRMEAN8

Name	QC LYOT SNRMEAN <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.240 QC.LYOT.SNRMEAN9

Name	QC LYOT SNRMEANi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.241 QC.LYOT.SNRMED0

Name	QC LYOT SNRMEDi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.242 QC.LYOT.SNRMED1

Name	QC LYOT SNRMEDi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.243 QC.LYOT.SNRMED2

Name	QC LYOT SNRMED <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector < <i>i</i> >
Default	0
Range	None
Description	

#### 8.4.244 QC.LYOT.SNRMED3

Name	QC LYOT SNRMED <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector < <i>i</i> >
Default	0
Range	None
Description	

#### 8.4.245 QC.LYOT.SNRMED4

Name	QC LYOT SNRMED <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector < <i>i</i> >
Default	0
Range	None
Description	

#### 8.4.246 QC.LYOT.SNRMED5

Name	QC LYOT SNRMED <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector < <i>i</i> >
Default	0
Range	None
Description	

#### 8.4.247 QC.LYOT.SNRMED6

Name	QC LYOT SNRMED <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector < <i>i</i> >
Default	0
Range	None
Description	

#### 8.4.248 QC.LYOT.SNRMED7

Name	QC LYOT SNRMED <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector < <i>i</i> >
Default	0
Range	None
Description	

#### 8.4.249 QC.LYOT.SNRMED8

Name	QC LYOT SNRMED <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.250 QC.LYOT.SNRMED9

Name	QC LYOT SNRMED <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.251 QC.LYOT.SNRMIN0

Name	QC LYOT SNRMIN <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Minimum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.252 QC.LYOT.SNRMIN1

Name	QC LYOT SNRMINi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Minimum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.253 QC.LYOT.SNRMIN2

Name	QC LYOT SNRMINi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Minimum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.254 QC.LYOT.SNRMIN3

Name	QC LYOT SNRMINi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Minimum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.255 QC.LYOT.SNRMIN4

Name	QC LYOT SNRMINi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Minimum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.256 QC.LYOT.SNRMIN5

Name	QC LYOT SNRMINi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Minimum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.257 QC.LYOT.SNRMIN6

Name	QC LYOT SNRMINi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Minimum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.258 QC.LYOT.SNRMIN7

Name	QC LYOT SNRMINi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Minimum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.259 QC.LYOT.SNRMIN8

Name	QC LYOT SNRMINi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Minimum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.260 QC.LYOT.SNRMIN9

Name	QC LYOT SNRMINi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Minimum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.261 QC.NMATCH0

Name	QC NMATCHi
Class	header
Context	QC
Type	int
Value	%i
Unit	None
Comment	Number of sources for which a cross-match with the reference catalog is made for each detector <d>.
Default	0
Range	None
Description	Number of sources for which a cross-match with the reference catalog is made for each detector <d>.

#### 8.4.262 QC.NMATCH1

Name	QC NMATCHi
Class	header
Context	QC
Type	int
Value	%i
Unit	None
Comment	Number of sources for which a cross-match with the reference catalog is made for each detector <d>.
Default	0
Range	None
Description	Number of sources for which a cross-match with the reference catalog is made for each detector <d>.

#### 8.4.263 QC.NMATCH2

Name	QC NMATCHi
Class	header
Context	QC
Type	int
Value	%i
Unit	None
Comment	Number of sources for which a cross-match with the reference catalog is made for each detector <d>.
Default	0

Range	None
Description	Number of sources for which a cross-match with the reference catalog is made for each detector <d>.

#### 8.4.264 QC.NMATCH3

Name	QC NMATCHi
Class	header
Context	QC
Type	int
Value	%i
Unit	None
Comment	Number of sources for which a cross-match with the reference catalog is made for each detector <d>.
Default	0
Range	None
Description	Number of sources for which a cross-match with the reference catalog is made for each detector <d>.

#### 8.4.265 QC.NMATCH4

Name	QC NMATCHi
Class	header
Context	QC
Type	int
Value	%i
Unit	None
Comment	Number of sources for which a cross-match with the reference catalog is made for each detector <d>.
Default	0
Range	None
Description	Number of sources for which a cross-match with the reference catalog is made for each detector <d>.

#### 8.4.266 QC.NMATCH5

Name	QC NMATCHi
Class	header
Context	QC

Type	int
Value	%i
Unit	None
Comment	Number of sources for which a cross-match with the reference catalog is made for each detector <d>.
Default	0
Range	None
Description	Number of sources for which a cross-match with the reference catalog is made for each detector <d>.

#### 8.4.267 QC.NMATCH6

Name	QC NMATCHi
Class	header
Context	QC
Type	int
Value	%i
Unit	None
Comment	Number of sources for which a cross-match with the reference catalog is made for each detector <d>.
Default	0
Range	None
Description	Number of sources for which a cross-match with the reference catalog is made for each detector <d>.

#### 8.4.268 QC.NMATCH7

Name	QC NMATCHi
Class	header
Context	QC
Type	int
Value	%i
Unit	None
Comment	Number of sources for which a cross-match with the reference catalog is made for each detector <d>.
Default	0
Range	None
Description	Number of sources for which a cross-match with the reference catalog is made for each detector <d>.

#### 8.4.269 QC.NMATCH8

Name	QC NMATCHi
Class	header
Context	QC
Type	int
Value	%i
Unit	None
Comment	Number of sources for which a cross-match with the reference catalog is made for each detector <d>.
Default	0
Range	None
Description	Number of sources for which a cross-match with the reference catalog is made for each detector <d>.

#### 8.4.270 QC.NMATCH9

Name	QC NMATCHi
Class	header
Context	QC
Type	int
Value	%i
Unit	None
Comment	Number of sources for which a cross-match with the reference catalog is made for each detector <d>.
Default	0
Range	None
Description	Number of sources for which a cross-match with the reference catalog is made for each detector <d>.

#### 8.4.271 QC.STARPOS.SNRMAX0

Name	QC STARPOS SNRMAXi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Maximum signal-to-noise ratio of the pixel values in each detector <i>
Default	0

Range	None
Description	

#### 8.4.272 QC.STARPOS.SNRMAX1

Name	QC STARPOS SNRMAXi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Maximum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.273 QC.STARPOS.SNRMAX2

Name	QC STARPOS SNRMAXi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Maximum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.274 QC.STARPOS.SNRMAX3

Name	QC STARPOS SNRMAXi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None

Comment	Maximum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.275 QC.STARPOS.SNRMAX4

Name	QC STARPOS SNRMAXi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Maximum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.276 QC.STARPOS.SNRMAX5

Name	QC STARPOS SNRMAXi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Maximum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.277 QC.STARPOS.SNRMAX6

Name	QC STARPOS SNRMAXi
Class	header
Context	QC

Type	float
Value	%.3f
Unit	None
Comment	Maximum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.278 QC.STARPOS.SNRMAX7

Name	QC STARPOS SNRMAXi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Maximum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.279 QC.STARPOS.SNRMAX8

Name	QC STARPOS SNRMAXi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Maximum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.280 QC.STARPOS.SNRMAX9

Name	QC STARPOS SNRMAXi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Maximum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.281 QC.STARPOS.SNRMEAN0

Name	QC STARPOS SNRMEANi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.282 QC.STARPOS.SNRMEAN1

Name	QC STARPOS SNRMEANi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.283 QC.STARPOS.SNRMEAN2

Name	QC STARPOS SNRMEANi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.284 QC.STARPOS.SNRMEAN3

Name	QC STARPOS SNRMEANi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.285 QC.STARPOS.SNRMEAN4

Name	QC STARPOS SNRMEANi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.286 QC.STARPOS.SNRMEAN5

Name	QC STARPOS SNRMEAN <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector < <i>i</i> >
Default	0
Range	None
Description	

#### 8.4.287 QC.STARPOS.SNRMEAN6

Name	QC STARPOS SNRMEAN <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector < <i>i</i> >
Default	0
Range	None
Description	

#### 8.4.288 QC.STARPOS.SNRMEAN7

Name	QC STARPOS SNRMEAN <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector < <i>i</i> >
Default	0
Range	None
Description	

#### 8.4.289 QC.STARPOS.SNRMEAN8

Name	QC STARPOS SNRMEANi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.290 QC.STARPOS.SNRMEAN9

Name	QC STARPOS SNRMEANi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.291 QC.STARPOS.SNRMED0

Name	QC STARPOS SNRMEDI
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.292 QC.STARPOS.SNRMED1

Name	QC STARPOS SNRMED <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector < <i>i</i> >
Default	0
Range	None
Description	

#### 8.4.293 QC.STARPOS.SNRMED2

Name	QC STARPOS SNRMED <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector < <i>i</i> >
Default	0
Range	None
Description	

#### 8.4.294 QC.STARPOS.SNRMED3

Name	QC STARPOS SNRMED <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector < <i>i</i> >
Default	0
Range	None
Description	

#### 8.4.295 QC.STARPOS.SNRMED4

Name	QC STARPOS SNRMED <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.296 QC.STARPOS.SNRMED5

Name	QC STARPOS SNRMED <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.297 QC.STARPOS.SNRMED6

Name	QC STARPOS SNRMED <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.298 QC.STARPOS.SNRMED7

Name	QC STARPOS SNRMED <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector < <i>i</i> >
Default	0
Range	None
Description	

#### 8.4.299 QC.STARPOS.SNRMED8

Name	QC STARPOS SNRMED <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector < <i>i</i> >
Default	0
Range	None
Description	

#### 8.4.300 QC.STARPOS.SNRMED9

Name	QC STARPOS SNRMED <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Median signal-to-noise ratio of the pixel values in each detector < <i>i</i> >
Default	0
Range	None
Description	

#### 8.4.301 QC.STARPOS.SNRMIN0

Name	QC STARPOS SNRMINi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Minimum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.302 QC.STARPOS.SNRMIN1

Name	QC STARPOS SNRMINi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Minimum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.303 QC.STARPOS.SNRMIN2

Name	QC STARPOS SNRMINi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Minimum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.304 QC.STARPOS.SNRMIN3

Name	QC STARPOS SNRMINi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Minimum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.305 QC.STARPOS.SNRMIN4

Name	QC STARPOS SNRMINi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Minimum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.306 QC.STARPOS.SNRMIN5

Name	QC STARPOS SNRMINi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Minimum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.307 QC.STARPOS.SNRMIN6

Name	QC STARPOS SNRMINi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Minimum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.308 QC.STARPOS.SNRMIN7

Name	QC STARPOS SNRMINi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Minimum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.309 QC.STARPOS.SNRMIN8

Name	QC STARPOS SNRMINi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Minimum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.310 QC.STARPOS.SNRMIN9

Name	QC STARPOS SNRMINi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Minimum signal-to-noise ratio of the pixel values in each detector <i>
Default	0
Range	None
Description	

#### 8.4.311 QC.ZPTSTD0

Name	QC ZPTSTDi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Standard deviation in zeropoint as inferred for each source that is cross-matched with reference catalog for each detector <i>.
Default	0
Range	None
Description	Standard deviation in zeropoint as inferred for each source that is cross-matched with reference catalog for each detector <i>.

#### 8.4.312 QC.ZPTSTD1

Name	QC ZPTSTDi
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None

Comment	Standard deviation in zeropoint as inferred for each source that is cross-matched with reference catalog for each detector <i>.
Default	0
Range	None
Description	Standard deviation in zeropoint as inferred for each source that is cross-matched with reference catalog for each detector <i>.

#### 8.4.313 QC.ZPTSTD2

Name	QC ZPTSTD <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Standard deviation in zeropoint as inferred for each source that is cross-matched with reference catalog for each detector <i>.
Default	0
Range	None
Description	Standard deviation in zeropoint as inferred for each source that is cross-matched with reference catalog for each detector <i>.

#### 8.4.314 QC.ZPTSTD3

Name	QC ZPTSTD <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Standard deviation in zeropoint as inferred for each source that is cross-matched with reference catalog for each detector <i>.
Default	0
Range	None
Description	Standard deviation in zeropoint as inferred for each source that is cross-matched with reference catalog for each detector <i>.

#### 8.4.315 QC.ZPTSTD4

Name	QC ZPTSTD <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Standard deviation in zeropoint as inferred for each source that is cross-matched with reference catalog for each detector <i>.
Default	0
Range	None
Description	Standard deviation in zeropoint as inferred for each source that is cross-matched with reference catalog for each detector <i>.

#### 8.4.316 QC.ZPTSTD5

Name	QC ZPTSTD <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Standard deviation in zeropoint as inferred for each source that is cross-matched with reference catalog for each detector <i>.
Default	0
Range	None
Description	Standard deviation in zeropoint as inferred for each source that is cross-matched with reference catalog for each detector <i>.

#### 8.4.317 QC.ZPTSTD6

Name	QC ZPTSTD <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f

Unit	None
Comment	Standard deviation in zeropoint as inferred for each source that is cross-matched with reference catalog for each detector <i>.
Default	0
Range	None
Description	Standard deviation in zeropoint as inferred for each source that is cross-matched with reference catalog for each detector <i>.

#### 8.4.318 QC.ZPTSTD7

Name	QC ZPTSTD <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Standard deviation in zeropoint as inferred for each source that is cross-matched with reference catalog for each detector <i>.
Default	0
Range	None
Description	Standard deviation in zeropoint as inferred for each source that is cross-matched with reference catalog for each detector <i>.

#### 8.4.319 QC.ZPTSTD8

Name	QC ZPTSTD <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Standard deviation in zeropoint as inferred for each source that is cross-matched with reference catalog for each detector <i>.
Default	0
Range	None

Description	Standard deviation in zeropoint as inferred for each source that is cross-matched with reference catalog for each detector <i>.
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#### 8.4.320 QC.ZPTSTD9

Name	QC ZPTSTD <i>i</i>
Class	header
Context	QC
Type	float
Value	%.3f
Unit	None
Comment	Standard deviation in zeropoint as inferred for each source that is cross-matched with reference catalog for each detector <i>.
Default	0
Range	None
Description	Standard deviation in zeropoint as inferred for each source that is cross-matched with reference catalog for each detector <i>.

## 9 Association Matrices

Template	Raw Data	CATG	TYPE	TECH	CPL Recipe	Processed Data
MICADO_coro_cal_starvisible	I_CORO_OFFSET_RAW	CALIB	STAR	CORONOGRAPHY	micado_img_detrend_hci	I_DT_CORO_OFFSET_IMG
MICADO_coro_obs_fpm	I_SCI_CORO_WAFFLE_RAW	SCIENCE	OBJECT	CORONOGRAPHY, WAFFLE	micado_img_detrend_hci	I_DT_SCI_CORO_WAFFLE_IMG
MICADO_coro_obs_fpm[bg]	I_CORO_BGD_RAW	CALIB	BACKGROUND	CORONOGRAPHY	micado_img_detrend_hci	I_DT_CORO_BGD_IMG
MICADO_coro_obs_ppm	I_SCI_CORO_PUPIL_RAW	SCIENCE	PUPIL	CORONOGRAPHY	micado_img_detrend_hci	I_DT_SCI_CORO_PUPIL_IMG
MICADO_img_cal_coldmask	I_CAM_RAW	CALIB	PINHOLE, CAM	IMAGE, AI	micado_img_detrend	I_DT_CAM_IMG
MICADO_img_cal_dark	I_DARK_RAW	CALIB	DARK	IMAGE, SI	micado_det_dark	I_MASTER_DARK_IMG
MICADO_img_cal_flat	I_FLAT_RAW	CALIB	FLAT, LAMP	IMAGE, SI	micado_img_flat	I_MASTER_FLAT_IMG
MICADO_img_cal_refstars	I_AstromFIELD_RAW	CALIB	STD, ASTROMETRY	IMAGE, SI	micado_img_detrend	I_DT_AstromFIELD_IMG
MICADO_img_cal_warmmask	I_WAW_RAW	CALIB	PINHOLE, WAW	IMAGE, AI	micado_img_detrend	I_DT_WAW_IMG
MICADO_img_cal_zeropoint	I_STDFIELD_RAW	CALIB	STD, PHOTOM	IMAGE, SI	micado_img_detrend	I_DT_STDFIELD_IMG
MICADO_img_obs	I_SCI_RAW	SCIENCE	OBJECT, SKY	IMAGE, SI	micado_img_detrend	I_DT_SCI_SI_IMG
MICADO_img_obs[bg]	I_BKGFIELD_RAW	CALIB	OBJECT, BCKGRND	IMAGE, AI	micado_img_detrend	I_DT_BKGFIELD_IMG
MICADO_img_obs_astrometry	I_SCI_AI_RAW	SCIENCE	OBJECT, SKY	IMAGE, AI	micado_img_detrend	I_DT_SCI_AI_IMG
MICADO_img_tec_illum	I_ILLUM_RAW	CALIB	STD, ILLUM	IMAGE, SI	micado_img_detrend	I_DT_ILLUM_IMG
MICADO_img_tec_nonlin	I_NONLIN_RAW	CALIB	NONLIN, LAMP	IMAGE, SI	micado_img_nonlinearity	I_NONLINEARITY_IMG
Dummy	...	...	...	...	...	...

Table 158: Data Processing Table for MICADO.

## 9.1 Automatically Generated Association Matrices

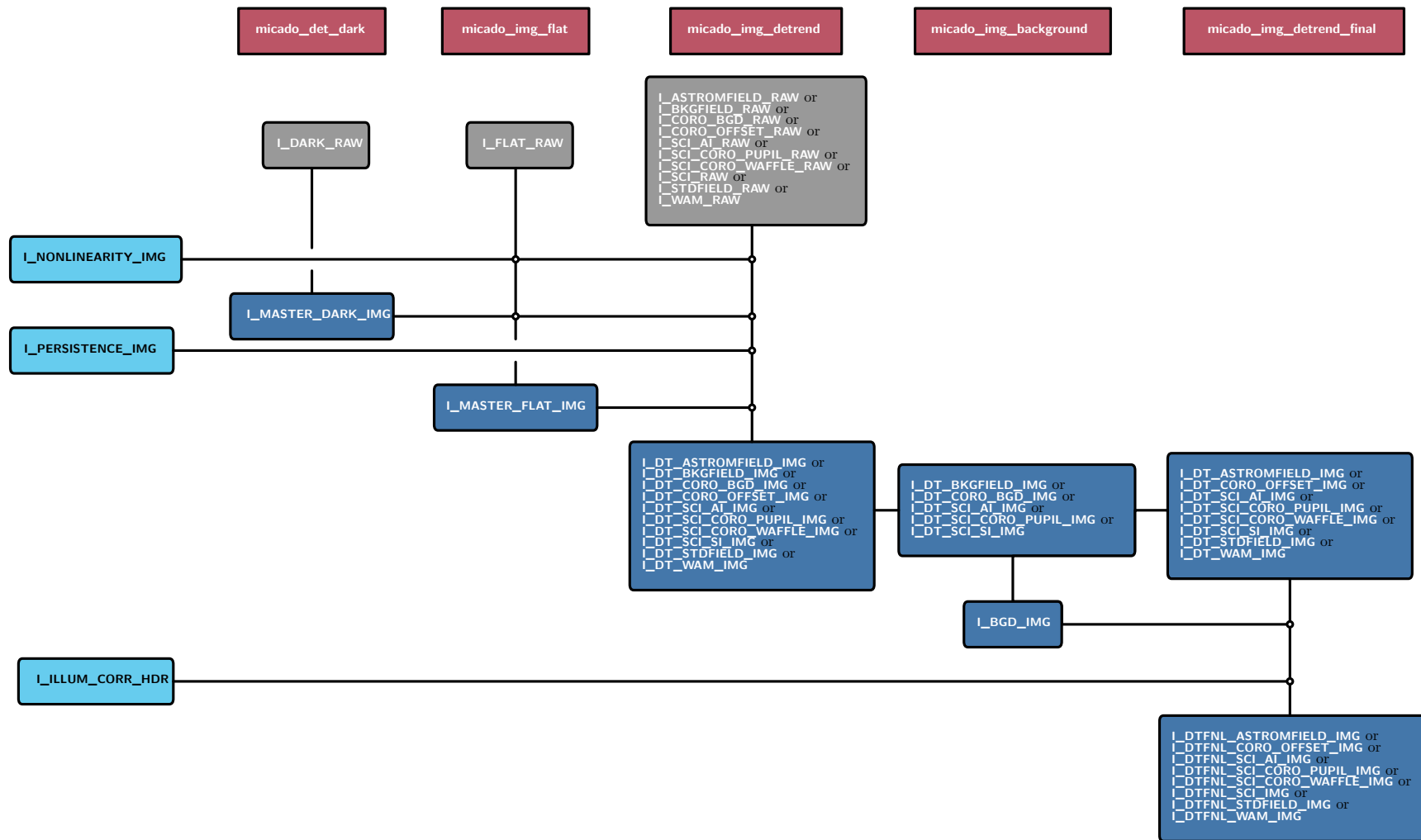


Figure 1: Up to DetrendFinal

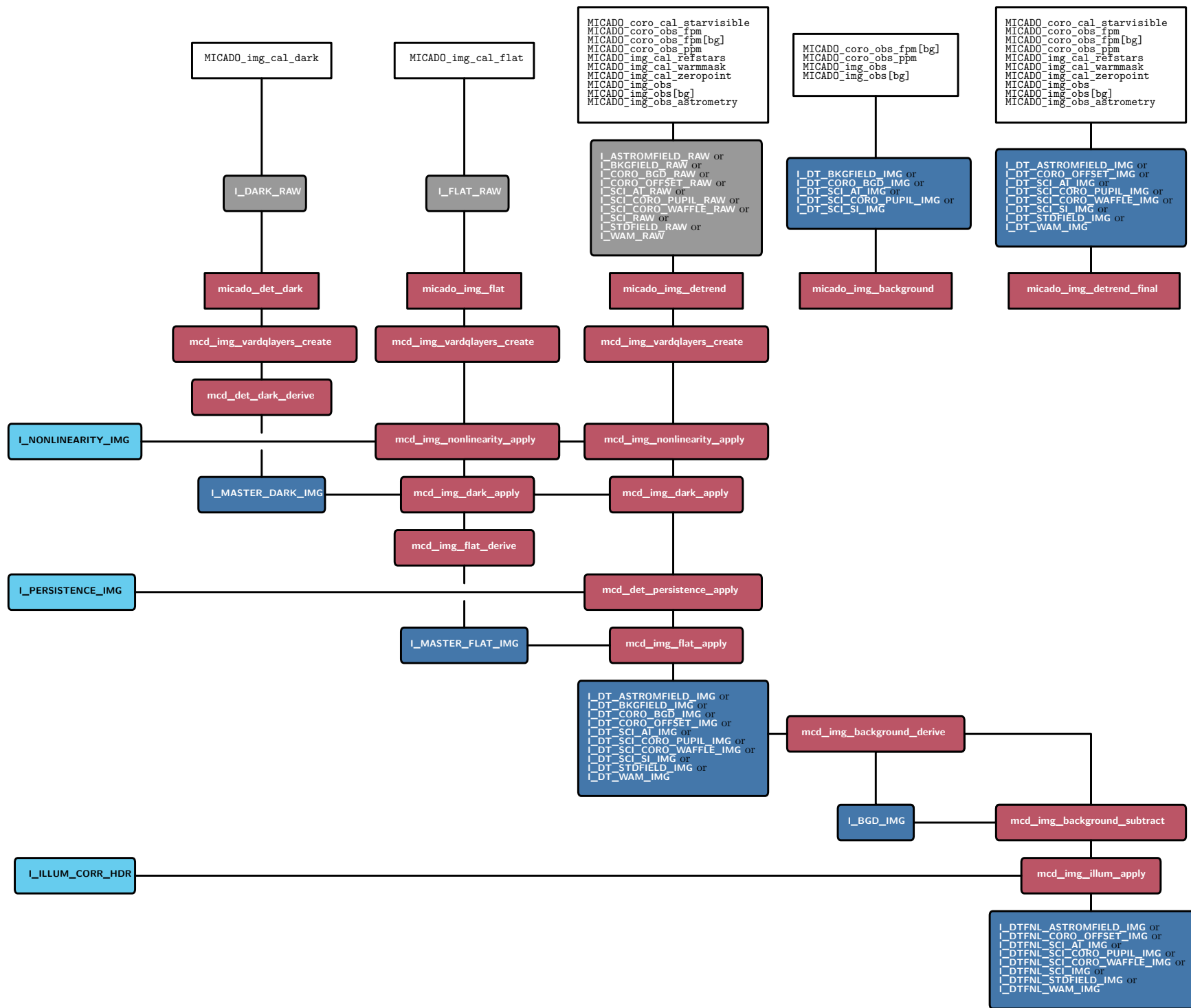


Figure 9: Next-Data-Field Pipeline v1.0

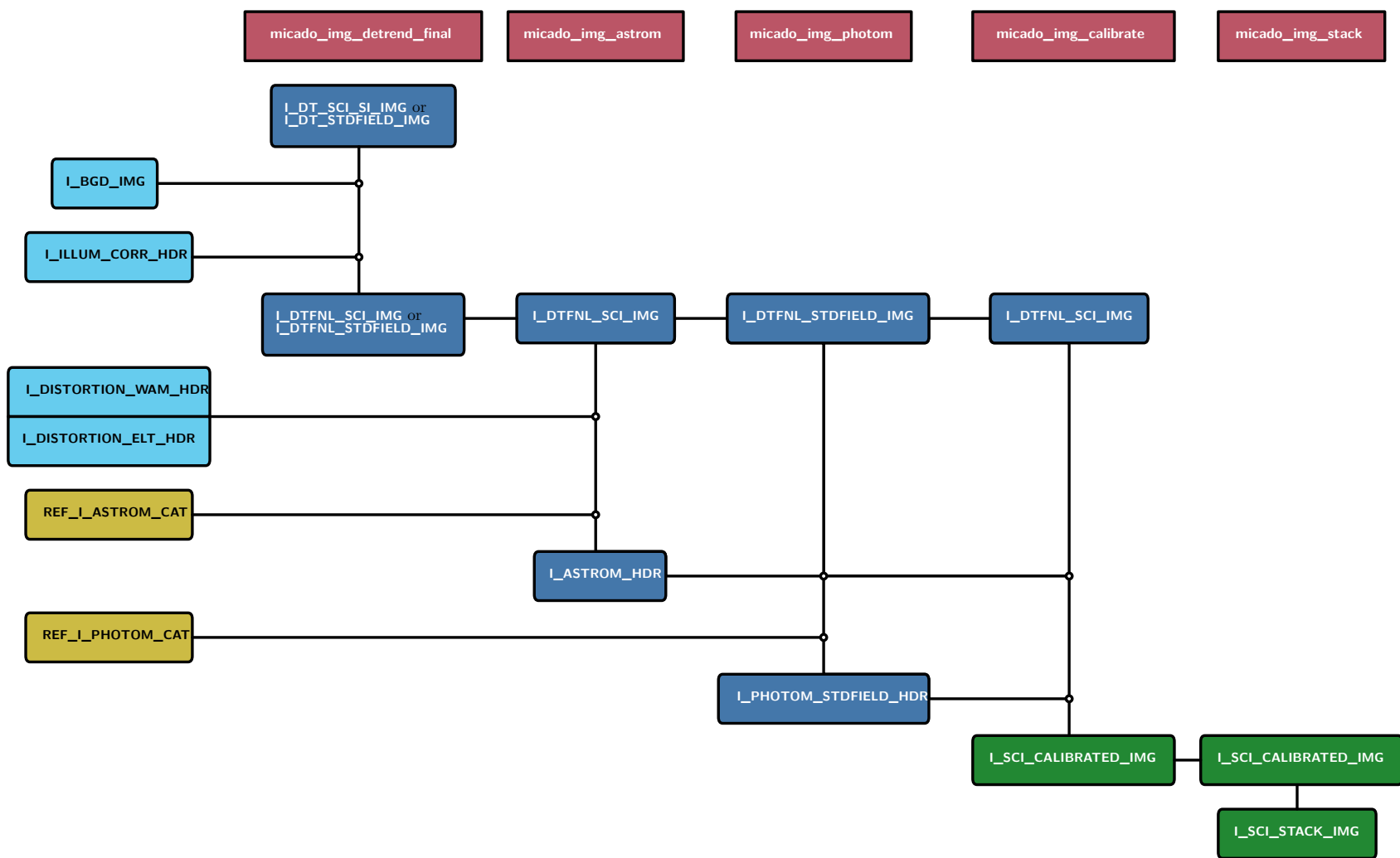


Figure 3: Standard Imaging from DetrendFinal

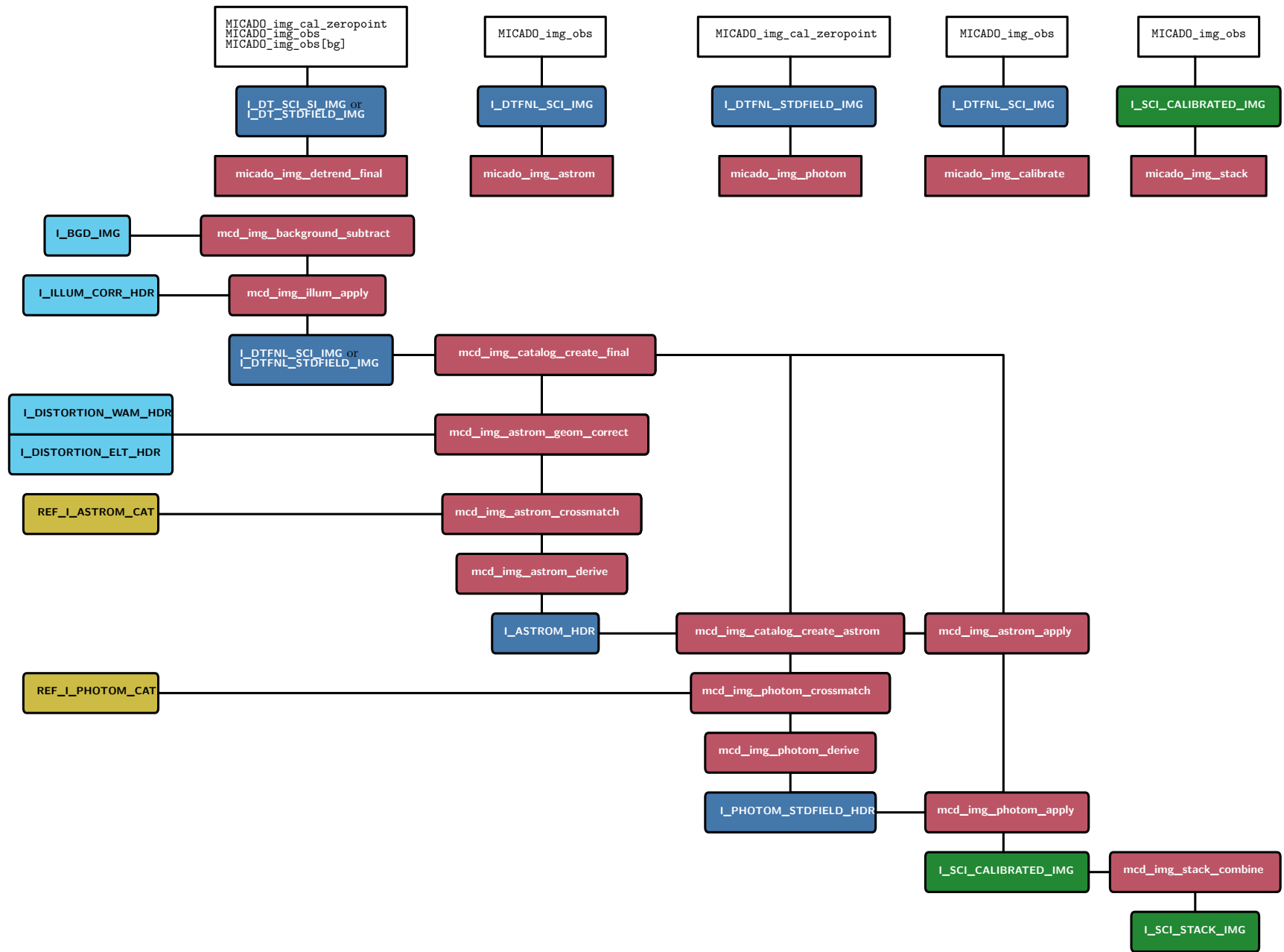


Figure 4: Standard Imaging from DetrendFinal, large version of 3.

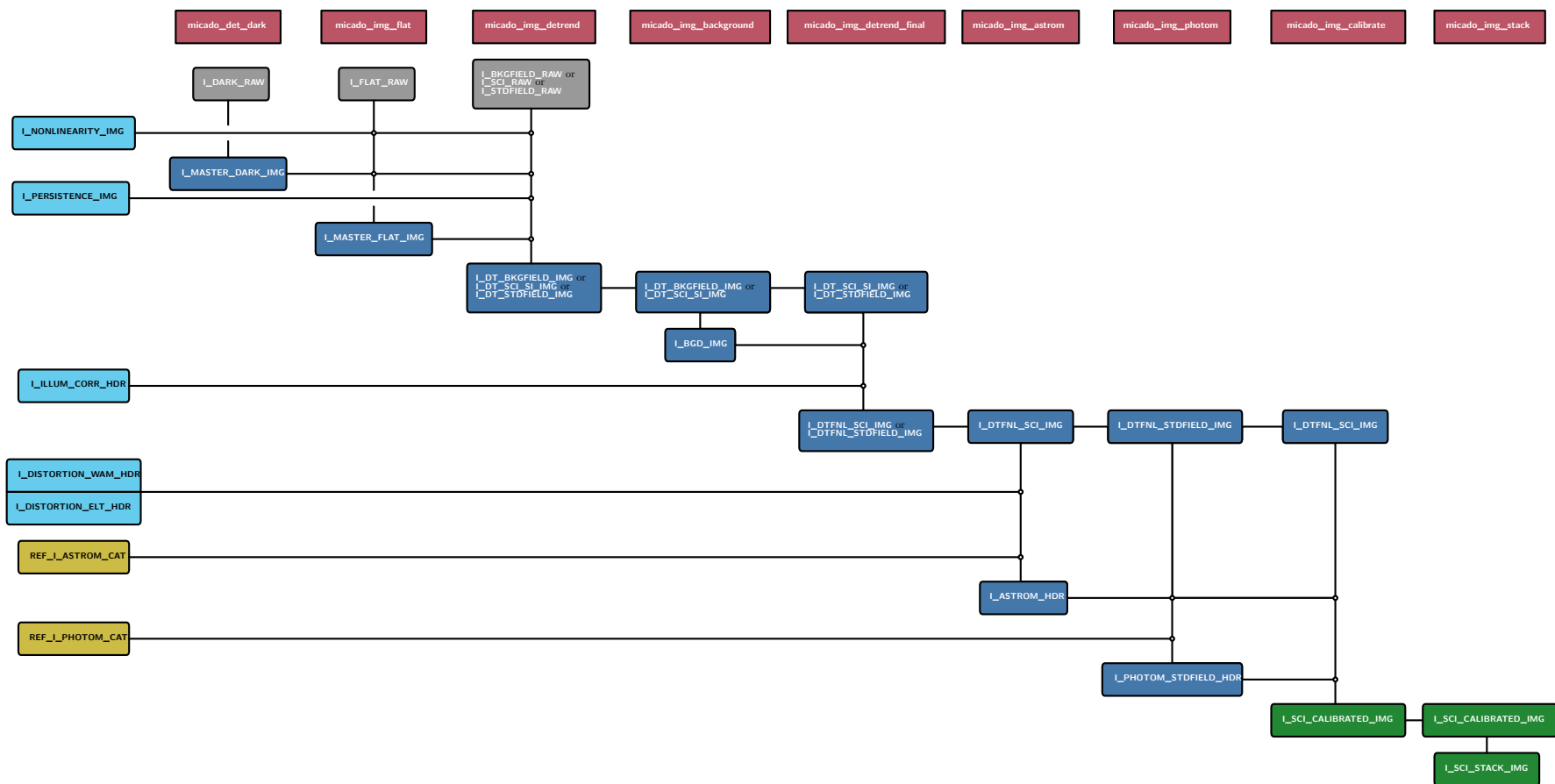


Figure 5: Full Standard Imaging Association Matrix.

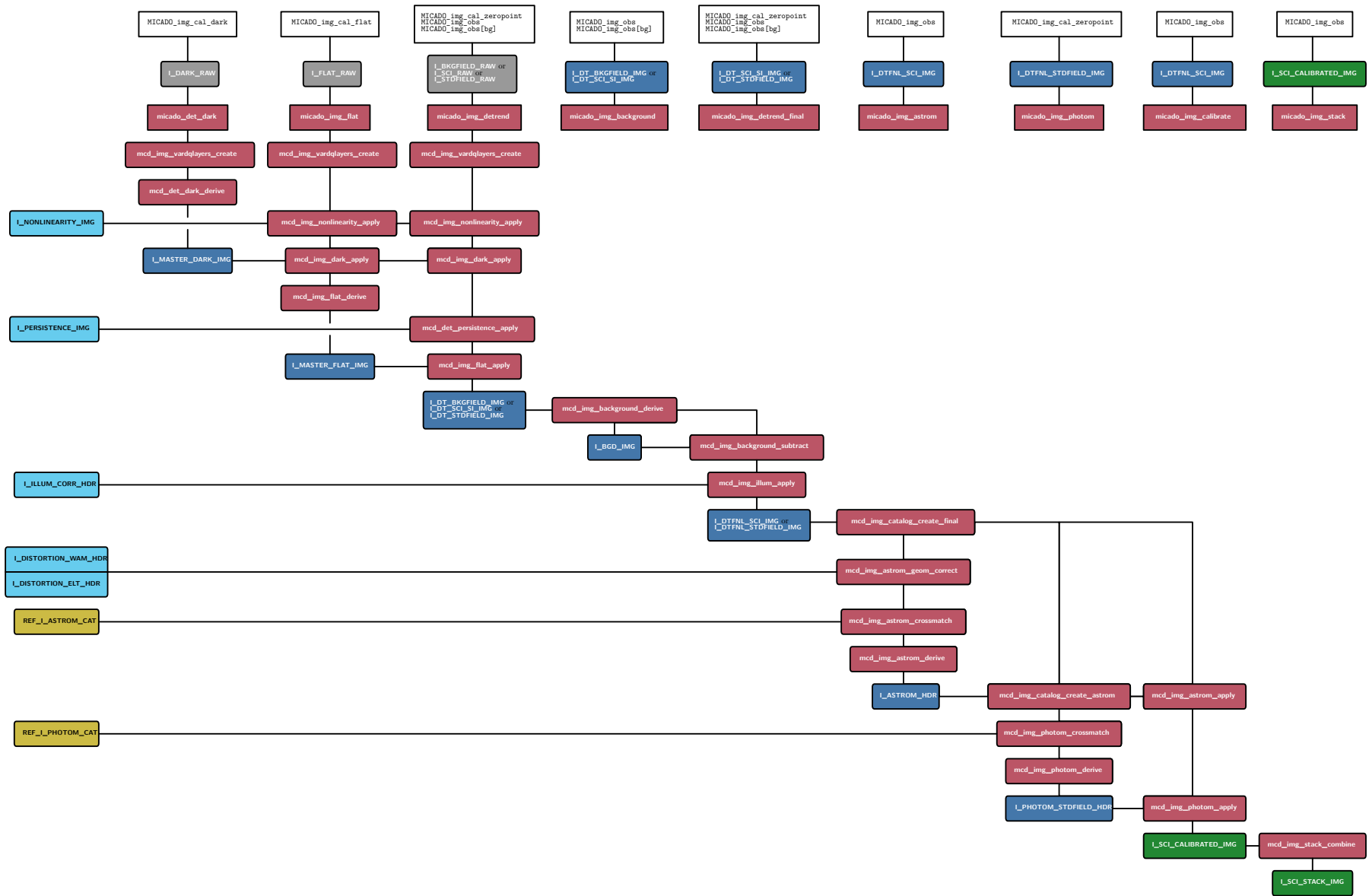


Figure 6: Standard Imaging Association Matrix. Expanded version of Figure 5

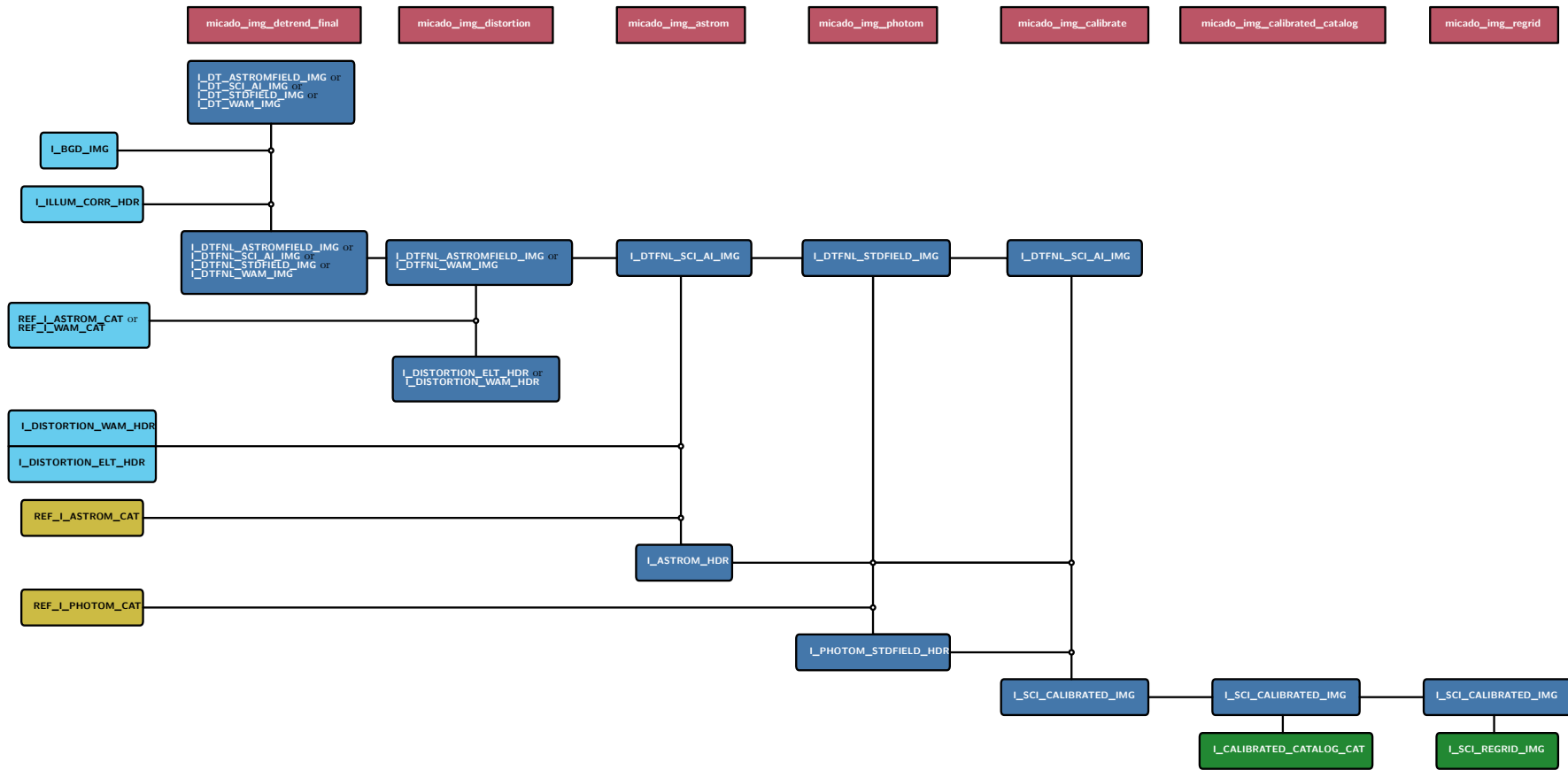


Figure 7: Astrometric Imaging from DetrendFinal

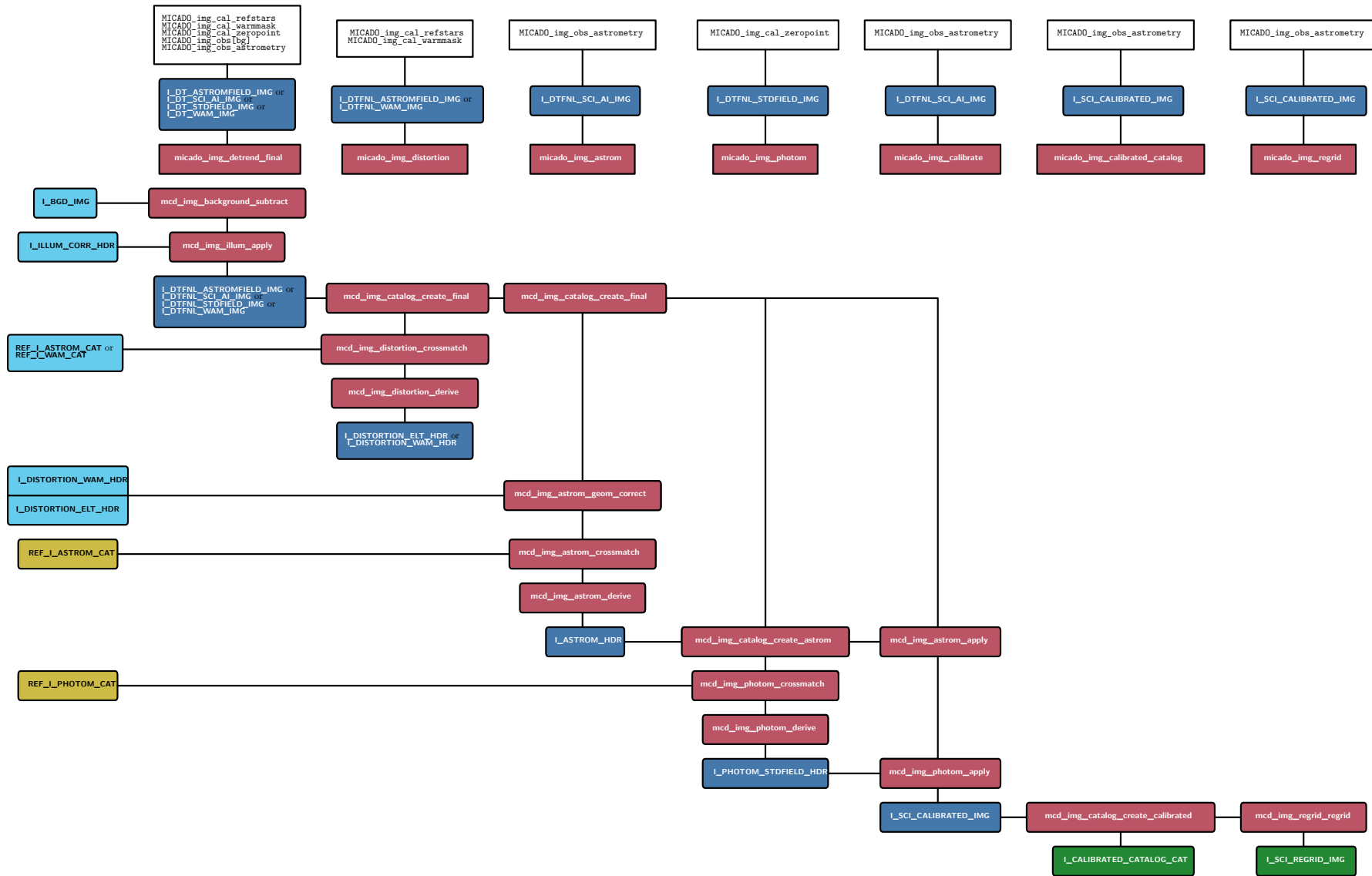


Figure 8: Enlarged Astrometric Imaging from DetrendFinal



Figure 9: HCI from DetrendFinal

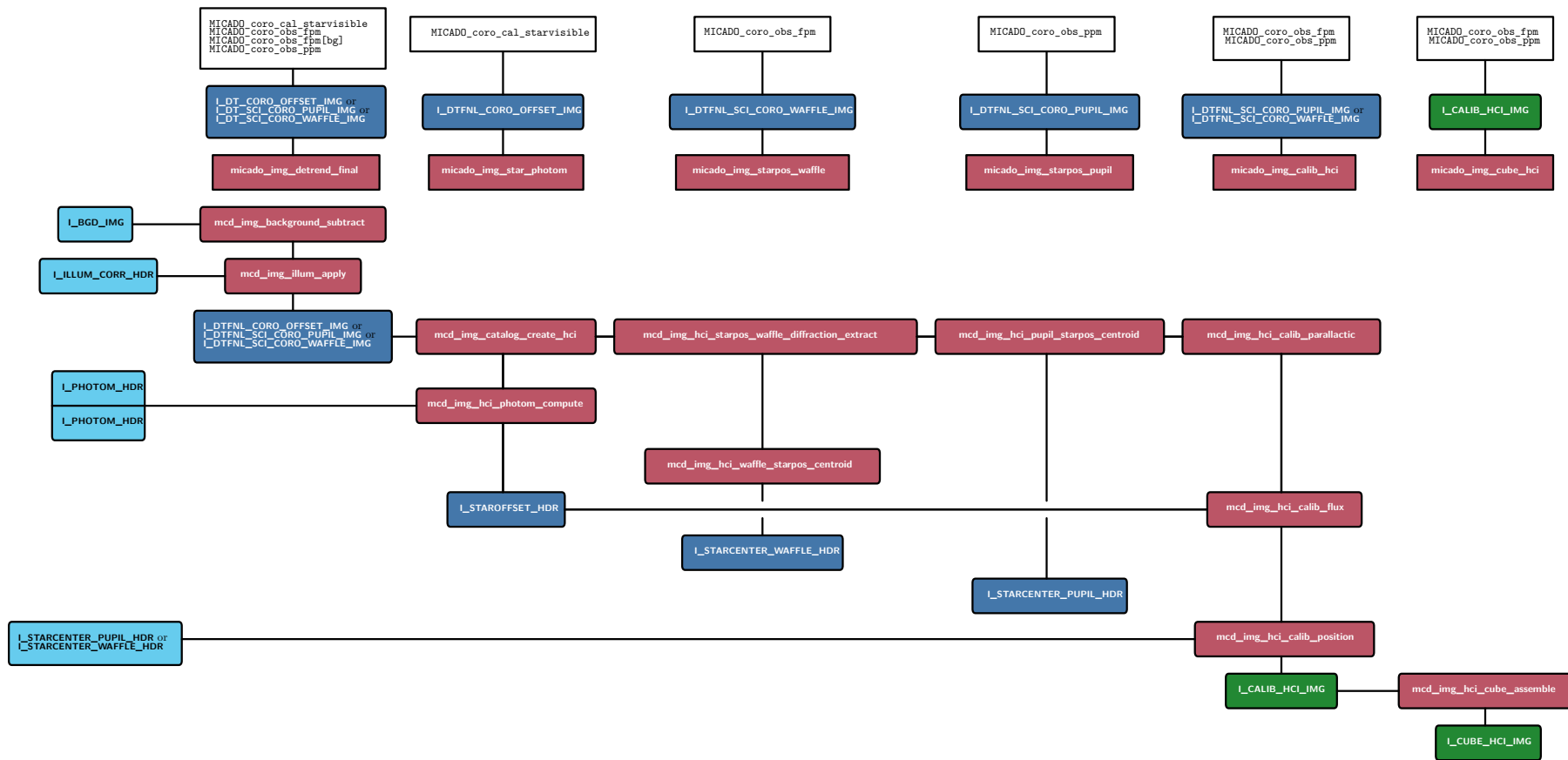


Figure 10: HCI from DetrendFinal, large version

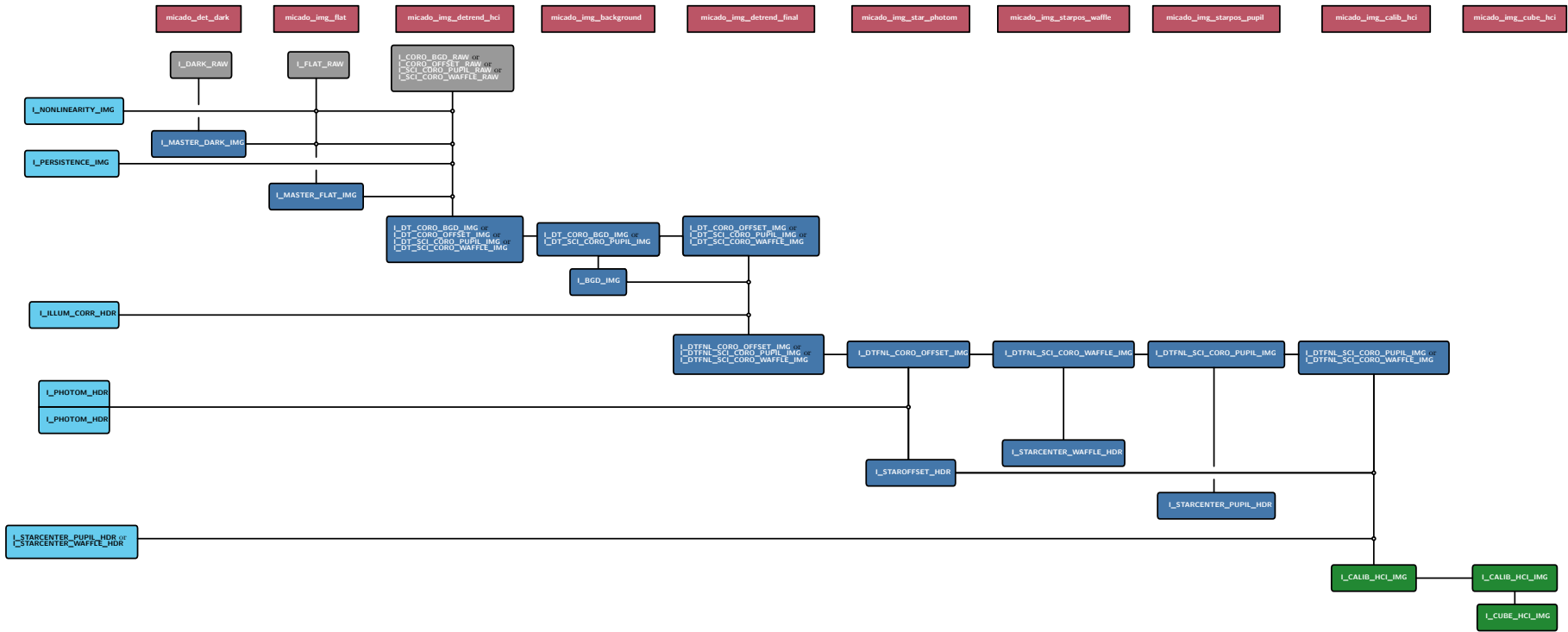


Figure 11: High Contrast Imaging Association Matrix. Expanded version of Figure 11



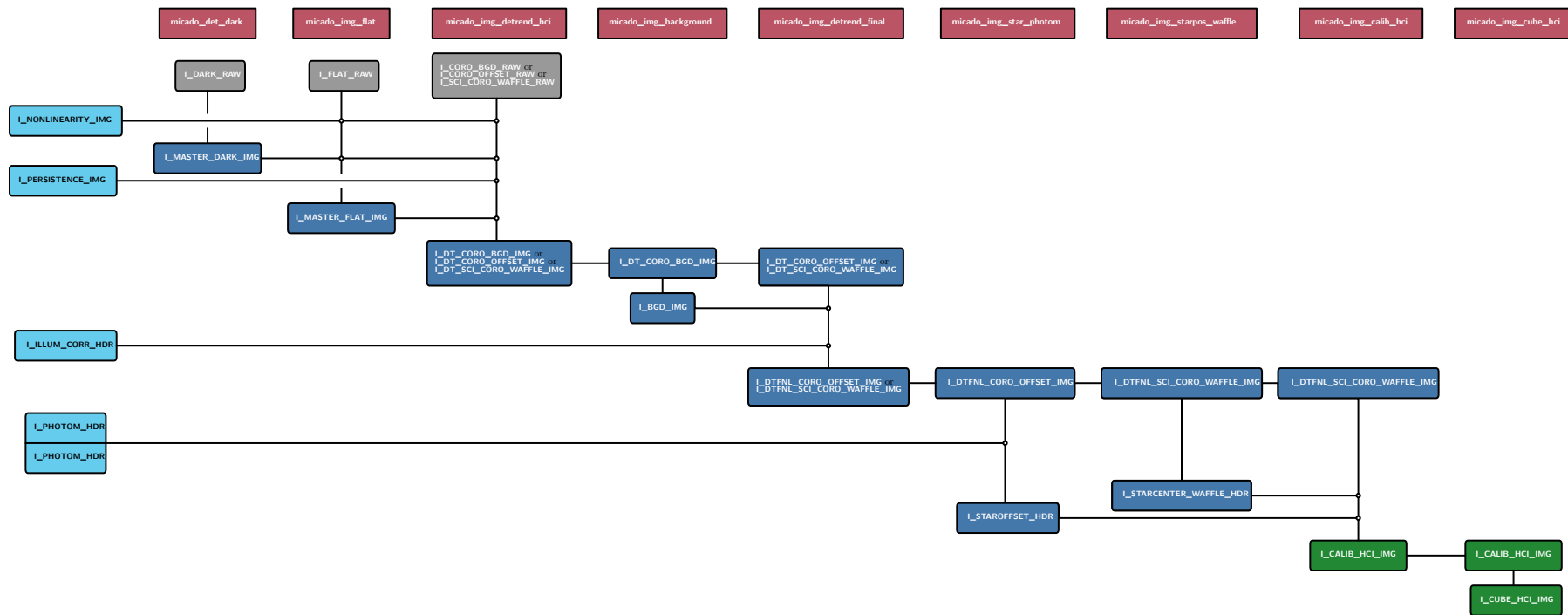


Figure 13: High Contrast Imaging Focal Plane Mode Association Matrix. Smaller version of Figure 14

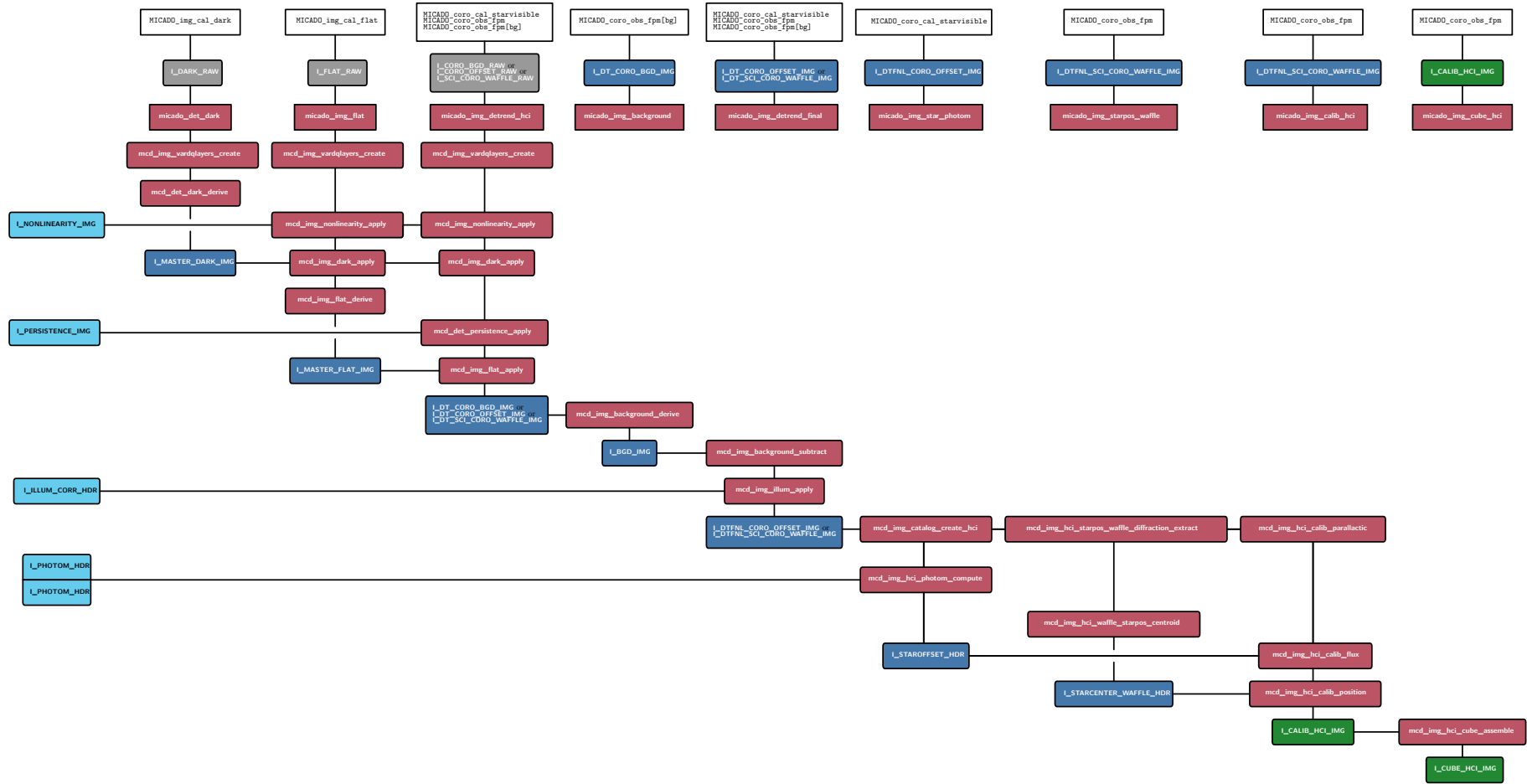


Figure 14: High Contrast Imaging Focal Plane Mode Association Matrix. Expanded version of Figure 13

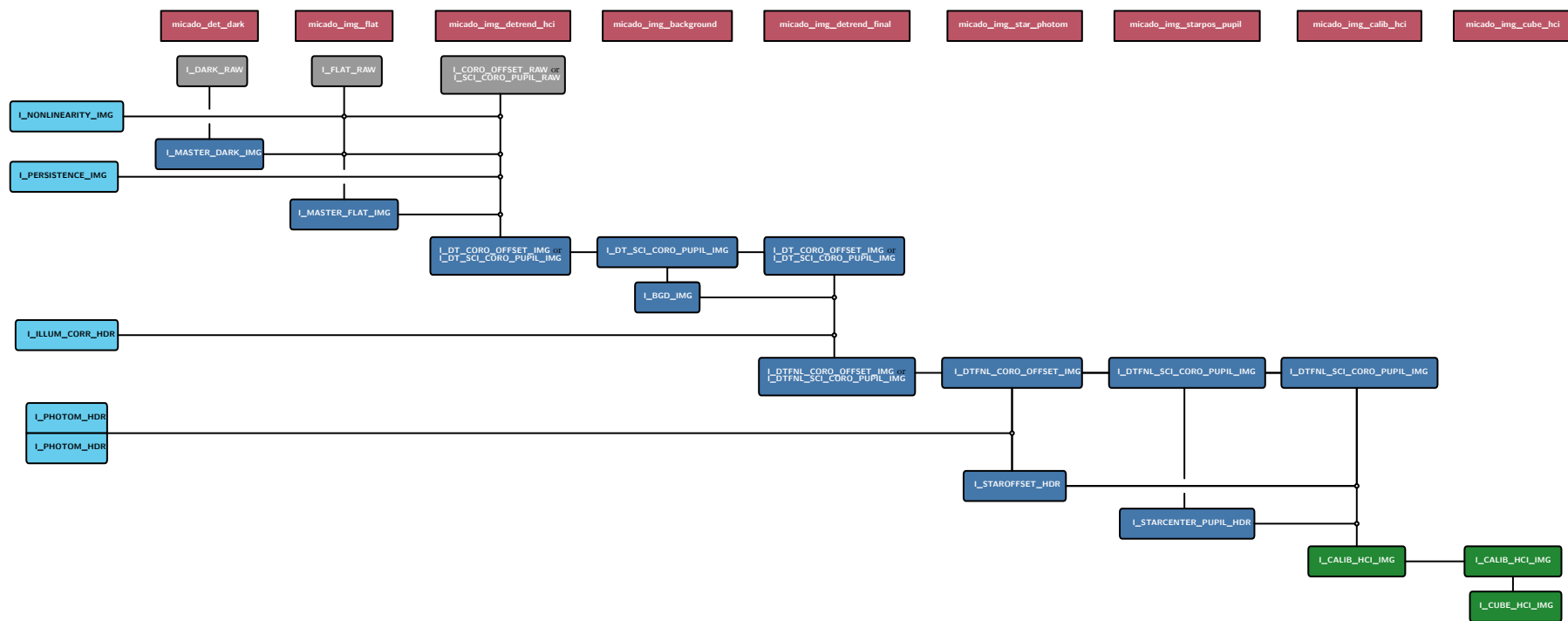


Figure 15: High Contrast Imaging Pupil Plane Mode Association Matrix. Smaller version of Figure 16





Figure 17: Astrometric Imaging Association Matrix.

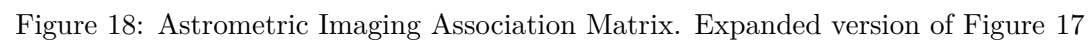


Figure 18: Astrometric Imaging Association Matrix. Expanded version of Figure 17

## **9.2 Outdated Manually Enhanced Association Matrices**

These Association Matrices are enhanced manually. They are therefore probably always out of date.

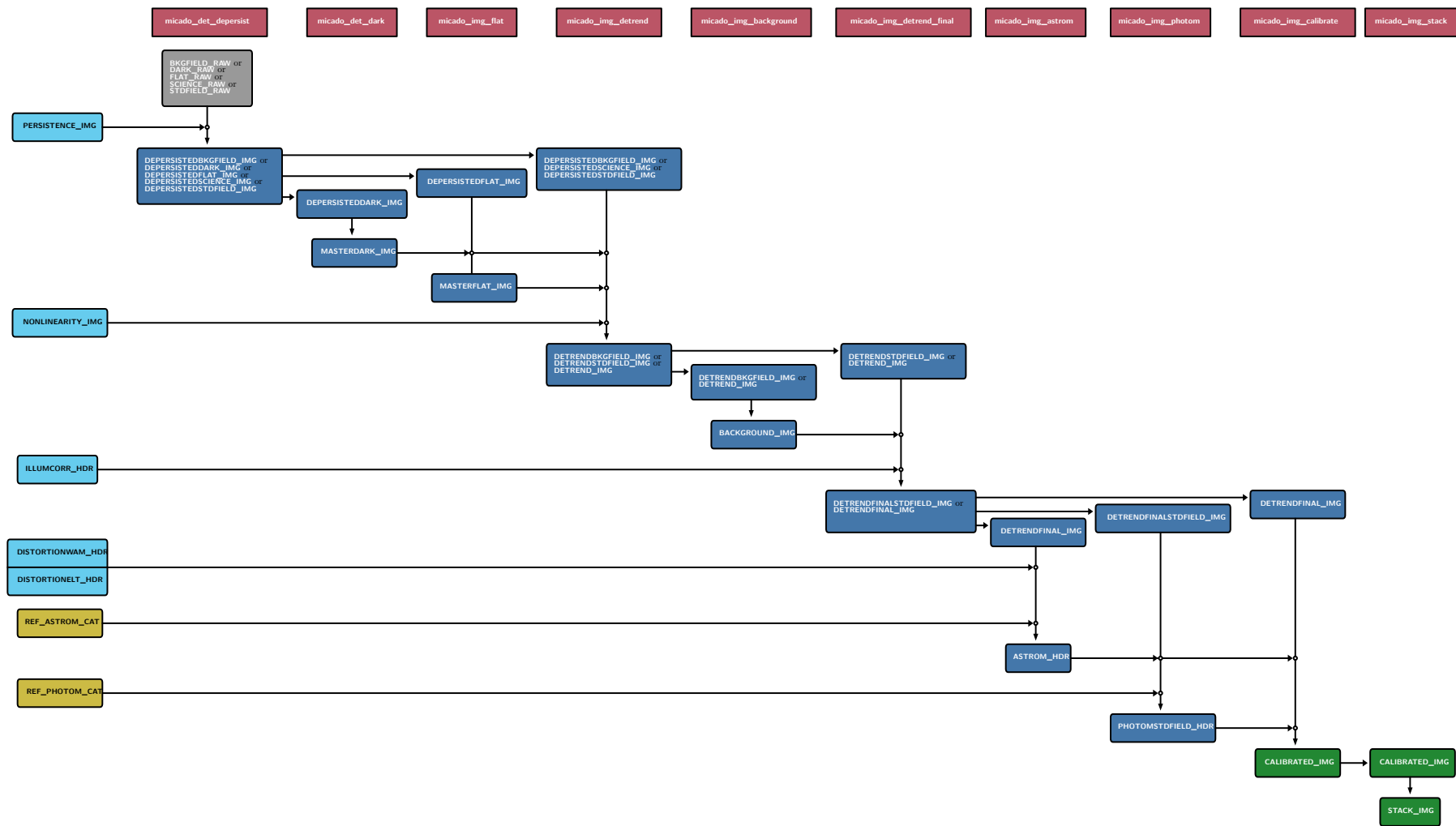


Figure 19: Association Matrix.

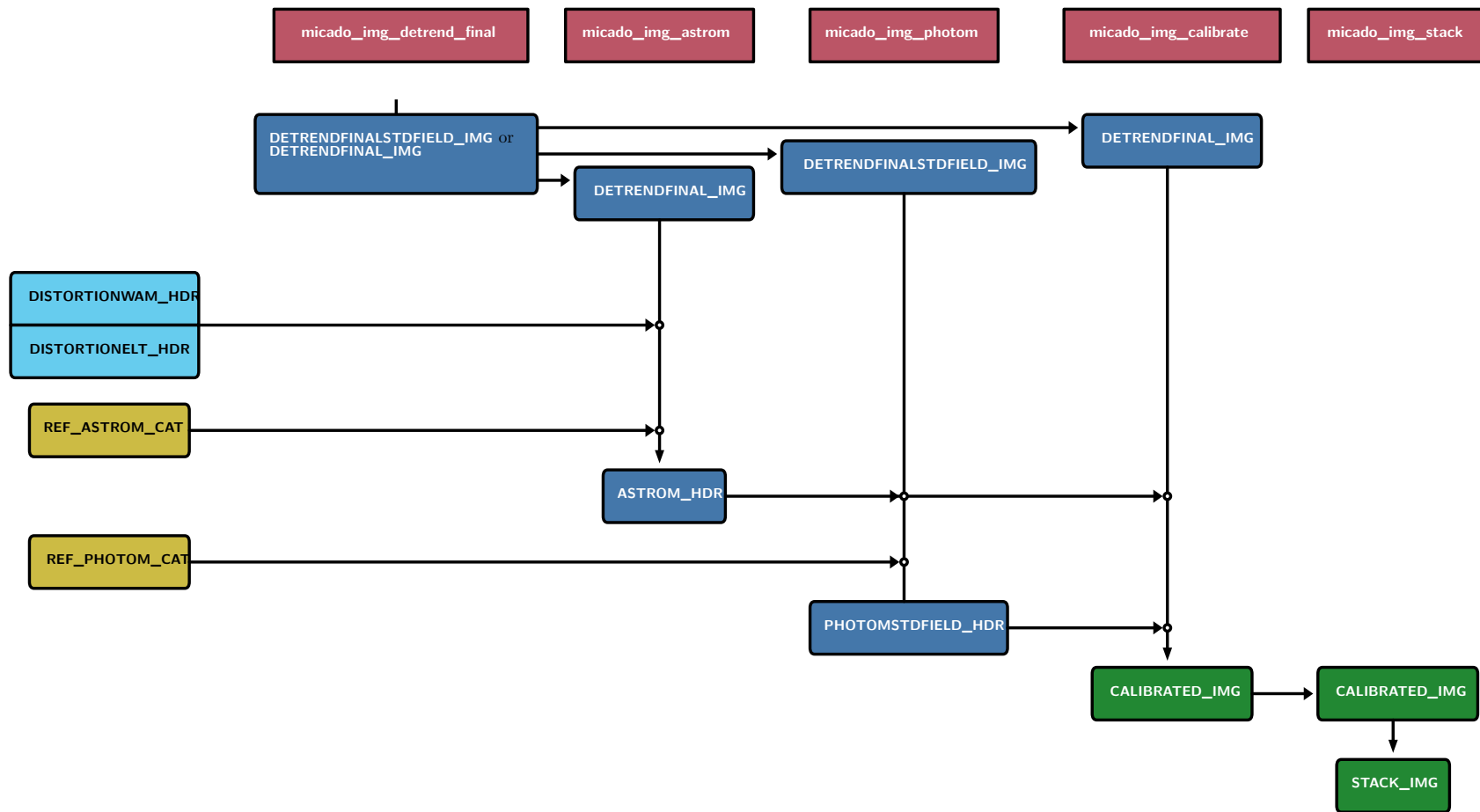


Figure 20: Association Matrix.

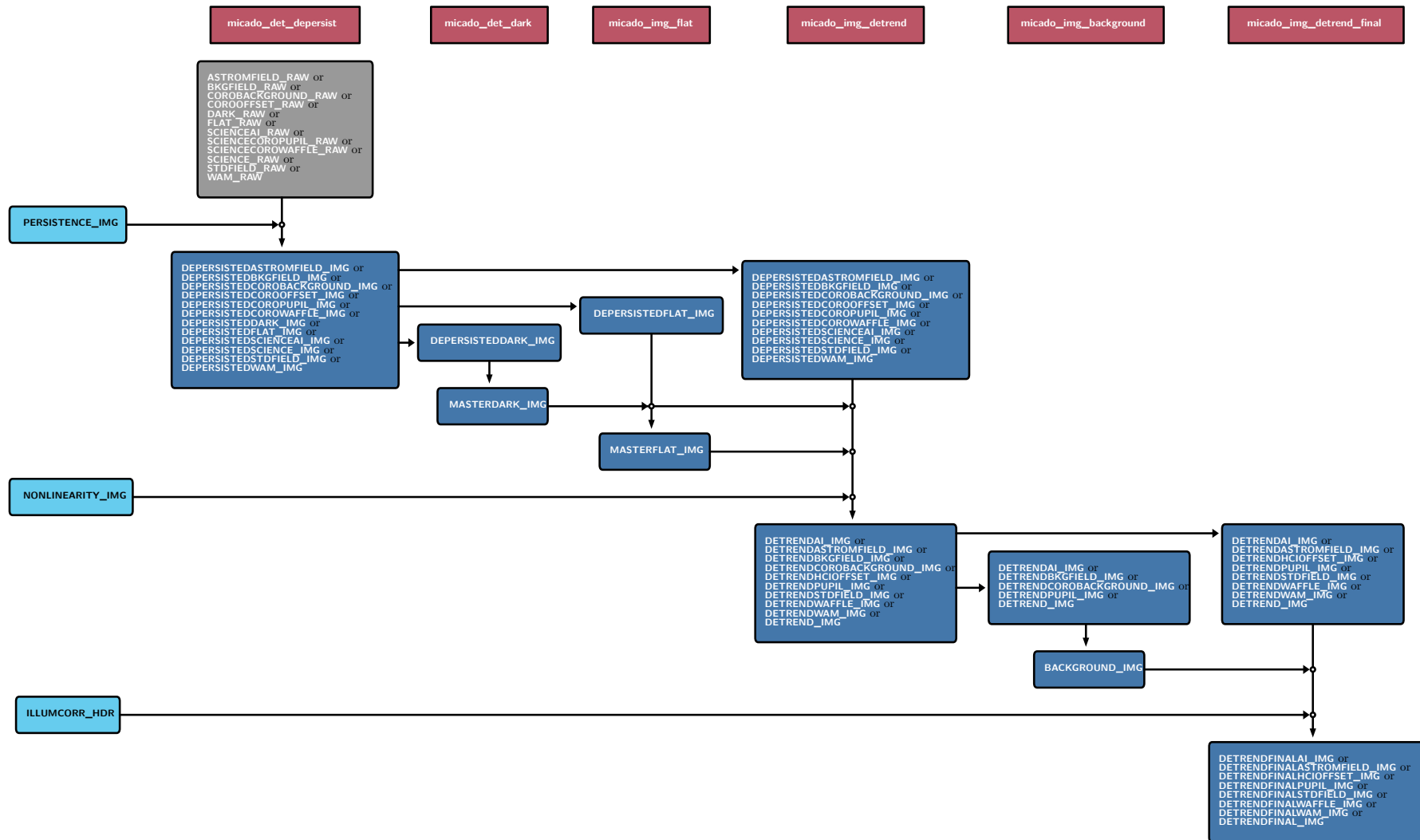


Figure 21: Association Matrix.

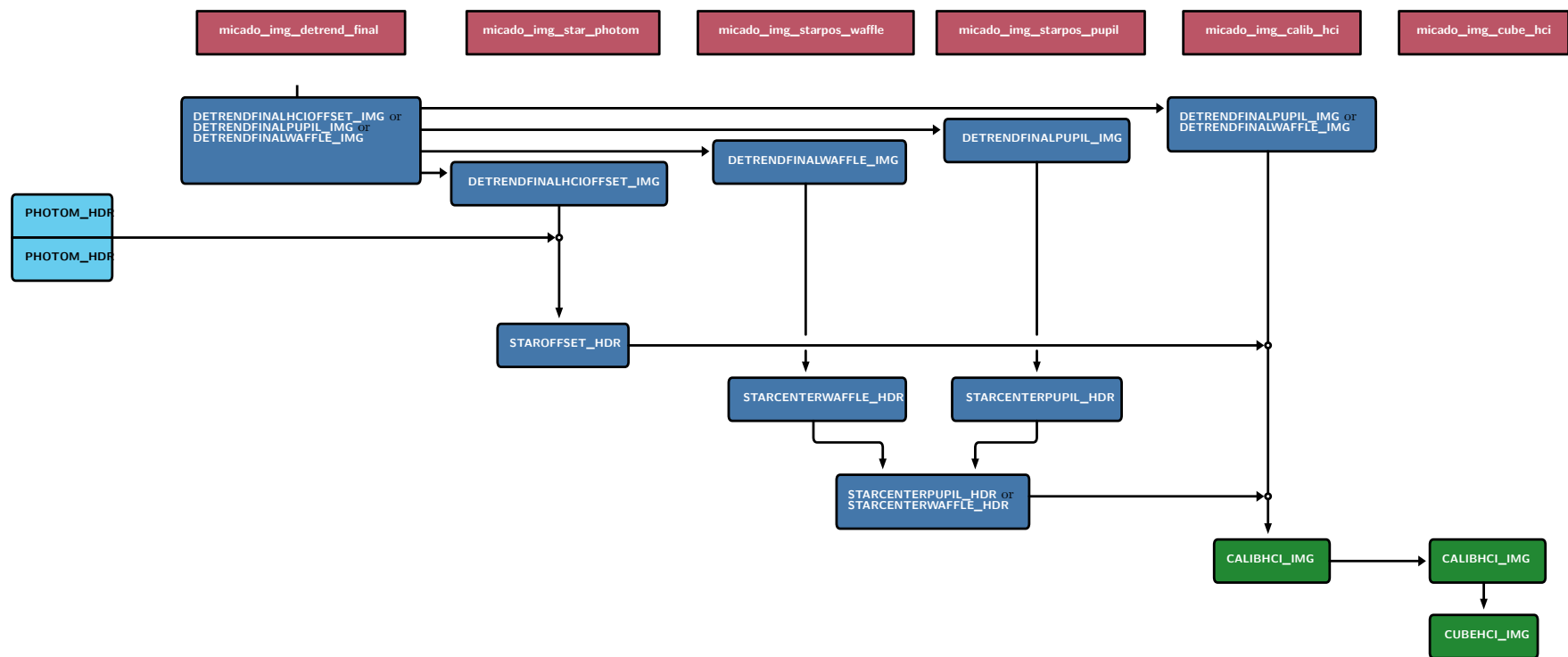


Figure 22: Association Matrix.



Figure 23: Association Matrix.

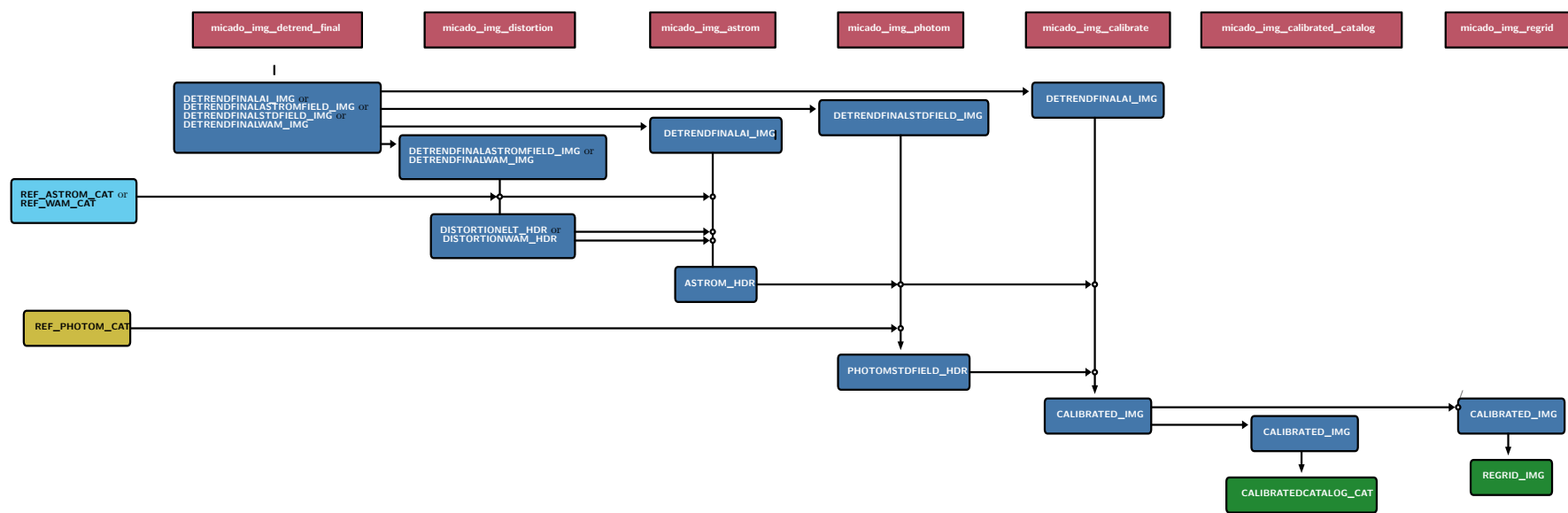


Figure 24: Association Matrix.



