

## SOFIA Keywords Dictionary

[ Version:REV F DRAFT] [Date: 08-19-2015 ]

### FITS Keywords Table

All FITS files submitted to the DCS for archiving must adhere to the FITS standard (v3.0, 2008 July 10)

WCS Keywords (see Array Detector Keywords section) should adhere to standard conventions (see [http://fits.gsfc.nasa.gov/fits\\_wcs.html](http://fits.gsfc.nasa.gov/fits_wcs.html) and <http://tdc-www.harvard.edu/wcstools/wcstools.fits.html> for discussion and references).

**FITS Name:** Keyword name - generally not the same as the abstract title.

**Comment:** Short description of keyword - suitable for FITS comment fields. Long descriptions can be found in the detailed descriptions. Comment text should include units as well.

**HDU:** header data unit - where the keyword can be used in the FITS file.

**Representation :** How the value of the keyword should be represented. In simple cases this may just be "string" or "float", but more complicated formats can be specified here (e.g. date and time)

**Type:** Specific FITS type - integer, float, string, or logical (boolean).

**Units:** Required units for keyword, if applicable.

**Range:** Possible keyword values, including enumerated types.

**Example:** Value example.

**Requirement :** Condition for which the keyword is required -- if blank, then the keyword is always required. Keywords marked with an asterisk (\*) are required for archive ingestion: If any of these is missing, the host file must be corrected and then re-ingested.

**Source:** Provider and location, if blank then data provided by SI. Known pre-defined aliases for some of the MCCC HK data items are included. We recommend the SI developers assign custom aliases to the others as well for ease of reference.

**Missing Data Sources:** If the HK datanode is not available, or returns NotFound (or any other error), then the following values should be used to populate the corresponding FITS keyword based on the FITS keyword datatype (float, int, str, bool): FLOAT = -9999.0; INT = -9999; STRING = UNKNOWN; BOOL = defined on keyword by keyword basis. For missing RA and Dec values, use the string representation with "UNKNOWN".

### Observation Keywords

Parameter	FITS Keyword	Comment	HDU	Representation	Type	Units	Range	Example	Requirement	Source
Datasource	DATASRC	Data Source	primary	[string]	[str]		enum [ ASTRO, CALIBRATION, LAB, TEST, OTHER, FIRSTPOINT]	[ASTRO ]	*	:
ObservationType	OBSTYPE	Observation type	any	[string]	[str]		enum [ OBJECT, STANDARD_FLUX, STANDARD_TELLURIC, LAMP, FLAT, DARK, BIAS, SKY, BB, GASCELL, LASER, FOCUS_LOOP ]	[OBJECT ]		:
SourceType	SRCTYPE	Source type	any	[string]	[str]		enum [ POINT_SOURCE, EXTENDED_SOURCE, OTHER, UNKNOWN]	[POINT_SOURCE ]		:
KeywordDictionaryVersion	KWDICT	SOFIA Keyword dictionary version, DCS ICD rev.	primary	[string]	[str]		[]	[DCS_SI_01_A]		:
ObservationID	OBS_ID	SOFIA Observation Identification	any	[MMMMMM_C]nnn	[str]		[]	[2011-06-08_F064B0187]	*	:
ImageID	IMAGEID	Image identification index	extension	[integer]	[int]		[]	[ 1]	Multiple images in a single file for an observation, e.g. dithering, mapping, etc...	:
ObjectName	OBJECT	Object Name	any	[string]	[str]		[]	[Orion Nebula (M42)]		:
AOTUniqueID <i>(Updated)</i>	AOT_ID	Astronomical Observation Template Identifier, most SI already use the correct format, clarified in revF	any	[string]	[str]		[]	[FLITECAM_Imaging AOT SCI-US-ICD-SE03-2044, revB, AOT_FORECAST_GRISM SCI-US-ICD-SE03-2001 Rev. D]	If AOT in use.	:
AORUniqueID <i>(Updated)</i>	AOR_ID	Astronomical Observation Request Identifier. Clarified format in revF to be	any	[PLANID_n]	[str]		[]	[02_0103_128]	If observation associated with DCS AOR	DCS : Observing Plan

		[PLANID]_n,n is an integer from 1 to 9999								
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Data Processing Related Keywords

Parameter	FITS Keyword	Comment	HDU	Representation	Type	Units	Range	Example	Requirement	Source
ProcessingStatus <i>(Updated)</i>	PROCSTAT	Processing status, required for all SI starting revF	primary	[string]	[str]		enum [ LEVEL_0, LEVEL_1, LEVEL_2, LEVEL_3, LEVEL_4 ]	['LEVEL_1']	Required for all SI, FLITECAM already has	SI   Pipeline :
HeaderStatus <i>(Updated)</i>	HEADSTAT	Header status, added MODIFIED in revF	primary	[string]	[str]		enum [ ORIGINAL, UNKNOWN, CORRECTED, ERROR, MODIFIED]	['ORIGINAL']		SI   DCS :
DataQuality <i>(New)</i>	DATAQUAL	Result of data processing	primary	[string]	[str]		enum [ NOMINAL, USABLE, FAIL]	['NOMINAL']		Pipeline :
NumberOfSpectral <i>(New)</i>	N_SPEC	Number of spectra included in file.	primary	[integer]	[int]		[]	[]		Pipeline :
AssociatedAORIDs <i>(New)</i>	ASSC_AOR	List of Astronomical Observation Request Identifiers.	any	[PLANID_n,PLANID_n]	[str]		[]	['02_0103_1,03_0098_127']	LEVEL 2/3/4 data, if product is associated with multiple DCS AORs	DCS : Observing Plan
PipelineName	PIPELINE	Pipeline/Processing Software	primary	[string]	[str]		[]	['FDRP v1.0.0']	LEVEL 2/3/4 Product.	Pipeline :
PipelineVersion	PIPEVERS	Pipeline Version, full tag.	primary	[string]	[str]		[]	['FDRP_1_0_0_UT2013_4_1']	LEVEL 2/3/4 Product.	Pipeline :
ProductType	PRODTYPE	Product type.	primary	[string]	[str]		[]	['DRIP-COADEDED']	LEVEL 2/3/4 Product.	Pipeline :
DCSFileRevision	FILEREV	File revision identifier.	primary	[string]	[str]		[]	['r2']	If file changed in post-processing.	DCS only :

Mission Management Keywords

Parameter	FITS Keyword	Comment	HDU	Representation	Type	Units	Range	Example	Requirement	Source
ObservingPlanUniqueID	PLANID	Observing plan identification	primary	[string]	[str]		[]	['81_0131']	If observation associated with an observing plan.	DCS : Observing Plan
AircraftDeployment	DEPLOY	Site deployment	primary	[string]	[str]		[]	['DAOF']		SSC : Mission Plan
MissionID	MISSN-ID	Mission ID	primary	[string]	[str]		[]	['2011-06-08_FO_F06']	*	MCCS : session.user_environment.mission_id
FlightLeg <i>(Updated)</i>	FLIGHTLG	Flight leg, updated to fltexes_data from leg_data	primary	[integer]	[int]		[]	[ 4]		MCCS : fltexec.fltexec_data.leg_seq

Origination Keywords

Parameter	FITS Keyword	Comment	HDU	Representation	Type	Units	Range	Example	Requirement	Source
Origin	ORIGIN	Origin of FITS file.	primary	[string]	[str]		[]	['FORCAST -- Cornell Univ.']		:
Observers	OBSERVER	Observer(s)	primary	[string]	[str]		[]	['Jane Astro']		:
FileCreator	CREATOR	File creation task (with version info).	primary	[string]	[str]		[]	['Mauna Kea IR']		:
TelescopeOperator	OPERATOR	Telescope operator	primary	[string]	[str]		[]	['Joe Astro']		SSC : Mission Plan
Filename	FILENAME	Name of host file	primary	[string]	[str]		[]	['040101_077_05FL001.fits']		:

Date and Time Keywords

Parameter	FITS Keyword	Comment	HDU	Representation	Type	Units	Range	Example	Requirement	Source
CreationDate	DATE	Date of file creation	any	[yyyy-mm-ddThh:mm:ss].[sss]]	[str]		[]	['2004-01-01T13:45:45.2']		:
ObservationDate	DATE-OBS	UTC Date of exposure start	any	[yyyy-mm-ddThh:mm:ss].[sss]]	[str]		[]	['2004-01-01T12:11:10.5']	*	:
ObservationStartUTC	UTCSTART	UTC of exposure start	any	[hh:mm:ss.s]	[str]		[]	['09:30:01.00']		:
ObservationEndUTC	UTCEND	UTC of exposure end	any	[hh:mm:ss.s]	[str]		[]	['09:30:01.00']		:

## Environmental Keywords

Parameter	FITS Keyword	Comment	HDU	Representation	Type	Units	Range	Example	Requirement	Source
WaterVaporZenith_Start	WVZ_STA	Water vapor, integrated to zenith, observation start.	any	[general]	[flt]	microns	gt [0.0]	[ 1.503]		MCCS : wvm_if.wvmdata.water_vapor
WaterVaporZenith_End	WVZ_END	Water vapor, integrated to zenith, observation end.	any	[general]	[flt]	microns	gt [0.0]	[ 1.634]		MCCS : wvm_if.wvmdata.water_vapor
static_air_temp	TEMP_OUT	Static air temperature outside aircraft. (For Early Science: Value=NotSet)	any	[general]	[flt]	C	[]	[ -10.5]		MCCS : das.ic1080_2hz.static_air_temp   \$static_air_temp
PrimaryMirrorTemperature_1	TEMPPRI1	Temperature of primary mirror	any	[general]	[flt]	C	gt [-273.0]	[ -10.5 ]		MCCS : ta_mcp.mcp_hk_pms.pms_temp_1
PrimaryMirrorTemperature_2	TEMPPRI2	Temperature of primary mirror	any	[general]	[flt]	C	gt [-273.0]	[ -10.5 ]		MCCS : ta_mcp.mcp_hk_pms.pms_temp_2
PrimaryMirrorTemperature_3	TEMPPRI3	Temperature of primary mirror	any	[general]	[flt]	C	gt [-273.0]	[ -10.5 ]		MCCS : ta_mcp.mcp_hk_pms.pms_temp_3
SecondaryMirrorTemperature_1	TEMPSEC1	Temperature of secondary	any	[general]	[flt]	C	[]	[ -15.2]		MCCS : ta_mcp.mcp_hk_pms.sma_temp_1

## Aircraft Keywords

Parameter	FITS Keyword	Comment	HDU	Representation	Type	Units	Range	Example	Requirement	Source
Altitude_Start	ALTI_STA	Aircraft pressure altitude, start of observation.	any	[general]	[flt]	Feet	[]	[ 35229]		MCCS : das.ic1080_15hz.press_alt
Altitude_End	ALTI_END	Aircraft pressure altitude, end of observation.	any	[general]	[flt]	Feet	[]	[ 35128]		MCCS : das.ic1080_15hz.press_alt
Airspeed	AIRSPEED	True aircraft airspeed.	any	[general]	[flt]	Knots	[]	[ 375.0]		MCCS : das.ic1080_10hz.true_airspeed   \$true_airspeed
GroundSpeed	GRDSPEED	Aircraft ground speed.	any	[general]	[flt]	Knots	[]	[ 350.0]		MCCS : das.ic1080_2hz.ground_speed   \$ground_speed
Latitude_Start	LAT_STA	Aircraft latitude, start of observation.	any	[general]	[flt]	Degrees	[]	[ 35.2567]		MCCS : das.ic1080_2hz.lat_fms_1   \$latitude
Longitude_Start	LON_STA	Aircraft longitude, start of observation.	any	[general]	[flt]	Degrees	[]	[ 35.2567]		MCCS : das.ic1080_2hz.lon_fms_1   \$longitude
Latitude_End	LAT_END	Aircraft latitude, end of observation.	any	[general]	[flt]	Degrees	[]	[ 35.2567]		MCCS : das.ic1080_2hz.lat_fms_1   \$latitude
Longitude_End	LON_END	Aircraft longitude, end of observation.	any	[general]	[flt]	Degrees	[]	[ 35.2567]		MCCS : das.ic1080_2hz.lon_fms_1   \$longitude
Heading	HEADING	Aircraft true heading.	any	[general]	[flt]	Degrees	[]	[ 10.7892]		MCCS : das.ic1080_2hz.true_heading   \$heading
TrackAngle	TRACKANG	Aircraft track angle.	any	[general]	[flt]	Degrees	[]	[ 10.7892]		MCCS : das.ic1080_2hz.true_track_angle   \$track_angle

## Telescope Keywords

Parameter	FITS Keyword	Comment	HDU	Representation	Type	Units	Range	Example	Requirement	Source
Telescope	TELESCOP	Telescope name	primary	[string]	[str]		[]	['SOFIA 2.5m' ]		:
TelescopeConfig	TELCONF	Telescope configuration	primary	[string]	[str]		[]	[]		SSC : Mission Plan
TelescopeRA	TELRA	SI Boresight RA (J2000) - as returned by MCCS, , removed type str in revF	any	[general] [hh:mm:ss.s]	[flt]	Hours	interval [0,24 ]	[9.023456] [5:35:17.3]		MCCS : coord.pos.sibs.ra
TelescopeDec	TELDEC	SI Boresight Dec (J2000) - as returned by MCCS, removed type str in revF	any	[general] [dd:mm:ss]	[flt]	decimal degrees	interval [-90,90]	[47.345789] [-5:23:28]		MCCS : coord.pos.sibs.dec
TelescopeVPA	TELVPA	SI Boresight VPA (ICRS J2000) - as returned by MCCS	any	[general]	[flt]	decimal degrees	interval [0,360]	[255.05]		MCCS : coord.pos.sibs.vpa
TelescopeEquinox	TELEQUI	Equinox of ERF coords (RA/Dec /VPA).	any	[general]	[str]		[]	[J2000]		MCCS : coord.pos.sibs.equinox

LastRewindUTC	LASTREW	Time of last rewind (UTC).	any	[yyyy-mm-ddThh:mm:ss.sssZ]	[str]		[]	[2012-09-13T21:30:28.317Z]		MCCS : ta_pos.time_of_last_rewind
TelescopeFocus_Start	FOCUS_ST	Telescope focus - SMA FCM t position (microns), observation start.	any	[general]	[flt]	microns	interval [-5000,5000]	[1245]		MCCS : ta_scs.fcm_status.fcm_act_t
TelescopeFocus_End	FOCUS_EN	Telescope focus - SMA FCM t position (microns), observation end.	any	[general]	[flt]	microns	interval [-5000,5000]	[1322]		MCCS : ta_scs.fcm_status.fcm_act_t
TelescopeElevation (Updated)	TELEL	Telescope elevation above the horizon at observation start - as returned by MCCS. Changed source from coord.pos.sibs.el to coord.pos.sibs.alt in revF.	any	[general]	[flt]	decimal degrees	interval [0,90]	[47.345789]		MCCS : coord.pos.sibs.alt
TelescopeCrossElevation	TELXEL	Telescope cross elevation at observation start - as returned by MCCS	any	[general]	[flt]	decimal degrees	interval [-90,90]	[0.543]		MCCS : coord.pos.sibs.xel
TelescopeLineOfSight	TELLOS	Telescope LOS at observation start - as returned by MCCS	any	[general]	[flt]	decimal degrees	interval [-180,180]	[0.543]		MCCS : coord.pos.sibs.los
TascuStatus	TSC-STAT	TASCU Status at observation end.	any	[string (TBC)]	[str]		[]	[STAB_INERTIAL_ONGOING]		MCCS : ta_state.tsc_status
TascuFBCStatus	FBC-STAT	FBC Status at observation end.	any	[string]	[str]		enum [ FBC_OFF (1), FBC_QS (2), FBC_DY (3), FBC_ON (4) ]	[FBC_ON]		MCCS : ta_tsc.tsc_mcs_hk.fbc_status
ObservationRequestRA	OBSRA	RA - requested	any	[general] [hh:mm:ss.s]	[flt] [str]	Hours	interval [0,24]	[9.0230] [5:35:17.3]		DCS : AOR
ObservationRequestDec	OBSDEC	Dec - requested	any	[general] [dd:mm:ss]	[flt] [str]	Degrees	interval [-90,90]	[47.3465] [-5:23:28]		DCS : AOR
ObservationRequestEquinox	EQUINOX	Coordinate equinox for OBSRA and OBSDEC	any	[general]	[flt]	yr	[]	[ 2000.0]		DCS : AOR
ZenithAngle_Start	ZA_START	Telescope zenith angle, start of observation.	any	[general]	[flt]	decimal degrees	interval [0,90]	[ 42.359]		MCCS : (90 - coord.pos.sibs.alt)
ZenithAngle_End	ZA_END	Telescope zenith angle, end of observation.	any	[general]	[flt]	decimal degrees	interval [0,90]	[ 39.285]		MCCS : (90 - coord.pos.sibs.alt)
TrackingMode	TRACMODE	SOFIA tracking mode	any	[string]	[str]		enum [ OFF, CENTROID, ROF, LIMB, OFFSET+ROF+OFFSET, CENTROID+INERTIAL, ROF+INERTIAL, OFFSET+INERTIAL, ROF+OFFSET+INERTIAL ]	['CENTROID']	Tracking	MCCS : ta_pos.track_state
TrackingError	TRACERR	Tracking error flag.	any	[boolean]	[log]		[]	[F]	Tracking	: ta_trc.trc_status_table.main_op_mode_id

## Data Collection Keywords

Parameter	FITS Keyword	Comment	HDU	Representation	Type	Units	Range	Example	Requirement	Source
isChopping	CHOPPING	Chopping flag	primary	[boolean]	[log]		[ ]	[ T ]	If mode in use.	:
isNodding	NODDING	Nodding flag	primary	[boolean]	[log]		[ ]	[ T ]	If mode in use.	:
isDithering	DITHER	Dithering flag	primary	[boolean]	[log]		[ ]	[ T ]	If mode in use.	:
isMapping	MAPPING	Mapping flag.	primary	[boolean]	[log]		[ ]	[ T ]	If mode in use.	:
isScanning	SCANNING	Scanning flag.	primary	[boolean]	[log]		[ ]	[ T ]	If mode in use.	:

## Annotation Keywords

Parameter	FITS Keyword	Comment	HDU	Representation	Type	Units	Range	Example	Requirement	Source
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## Instrument Keywords

Parameter	FITS Keyword	Comment	HDU	Representation	Type	Units	Range	Example	Requirement	Source
Instrument	INSTRUME	Instrument	primary	[string]	[str]		[ ]	['FLITECAM' ]	*	:
Datatype	DATATYPE	Data type	primary	[string]	[str]		enum [ IMAGE, SPECTRAL, OTHER]	[IMAGE]		:
InstrumentConfiguration	INSTCFG	Instrument configuration	primary	[string]	[str]		[ ]	['IMAGING']		:
InstrumentMode	INSTMODE	Instrument observing mode	primary	[string]	[str]		[ ]	['C2N']		:
MCCSMode	MCCSMODE	MCCS SI Mode (MCCS_SI_04).	primary	[string]	[str]		[ ]	['fitecam_imaging']		MCCS : (instrument).si_config.current_mode
ExposureTime	EXPTIME	On-source exposure time	any	[general]	[flt]	s	[ ]	[ 600]		:
SpectralElement1	SPECTEL1	First spectral element in use.	any	[string]	[str]		[ ]	['FLT_J']	*	:
SpectralElement2	SPECTEL2	Second spectral element in use -- Set to "NONE" if no second element.	any	[string]	[str]		[ ]	['FOR_XG063']	*	:
InstrumentSlit	SLIT	Instrument slit in use.	any	[string]	[str]		[ ]	['FOR_SS24']	Spectroscopy configs: if slit in use.	:
WavelengthCentral	WAVECENT	Central wavelength of observation.	primary	[general]	[flt]	Microns	[ ]	[ 2.2]	Imaging modes only.	:
Resolution	RESOLUN	Spectral resolution of observation.	primary	[general]	[flt]		[ ]	[2500]	Spectroscopy modes only.	:
DetectorChannel <i>(New)</i>	DETCAN	The values are FORCAST: SW   LW , FIFI-LS: BLUE   RED	primary	[string]	[str]		enum [ SW, LW, BLUE, RED ]	[LW]	FORCAST and FIFI-LS should populate these.	:
TotalIntegrationTime <i>(New)</i>	TOTINT	Total integration time (s), for FORCAST, If SKYMODE is C2NC2 or NXCAC, then TOTINT = DETTIME * 0.5, otherwise TOTINT = DETTIME*2.0	any	[float]	[flt]	s	[ ]	[ 600]	FORCAST	:

## Array Detector Keywords

Parameter	FITS Keyword	Comment	HDU	Representation	Type	Units	Range	Example	Requirement	Source
Detector	DETECTOR	Detector name	primary	[string]	[str]		[ ]	['SBRC InSb' ]	Array instruments only.	:
DetectorSize	DETSIZE	Detector size	primary	[vector]	[str]		[ ]	['(1024,1024)']	Array instruments only.	:
PixelScale	PIXSCAL	Pixel scale	primary	[general]	[flt]	arcsec	[ ]	[ 0.32]	Array instruments only.	:
Subarrays	SUBARRNO	Number of subarrays used	primary	[integer]	[int]		[ ]	[ 2]	If subarrays in use.	:
SubarraySize	SUBARR%2d	Sub array size	primary	[section]	[str]		[ ]	['[0:255,0:255]']	If subarrays in use.	:
ScienceInstrumentBoresightX <i>(Updated)</i>	SIBS_X	SI Boresight (x) - as returned by MCCS, typo in name fixed	any	[float]	[flt]		[ ]	[255]	Array instruments only.	MCCS : coord.pos.sibs.xsi
ScienceInstrumentBoresightY <i>(Updated)</i>	SIBS_Y	SI Boresight (y) - as returned by MCCS, typo in name fixed	any	[float]	[flt]		[ ]	[255]	Array instruments only.	MCCS : coord.pos.sibs.ysi
WCS_CTYPE	CTYPEn	Axis type (8 characters)	any	[string]	[str]		[ ]	[RA--TAN]	Imaging only.	:

WCS_CRPIX <i>(Updated)</i>	CRPIXn	Array location of the reference point in pixels for the n-th axis. Changed from int to float in revF	any	[float]	[flt]		[]	[511]	Array instruments only.	:	
WCS_CRVAL	CRVALn	Coordinate value at reference point for the n-th axis.	any	[flt]	[flt]		[]	[82.345690]	Imaging only.	:	
WCS_CDELT	CDELTn	Plate scale for the n-th axis at reference point (deg/pixel).	any	[flt]	[flt]		[]	[1.3852E-4]	Imaging only.	:	
WCS_CROTA2	CROTA2	Rotation of axes in degrees.	any	[flt]	[flt]		[]	[113.45]	Imaging only.	:	
WCS_RotMatrix	CDi_j	WCS Rotation Matrix elements.	any	[flt]	[flt]		[]	[1.3852E-4]	Imaging only.	:	

Heterodyne Keywords

Parameter	FITS Keyword	Comment	HDU	Representation	Type	Units	Range	Example	Requirement	Source
FrontendDevice	FRONTEND	Name of frontend device.	primary	[string]	[str]		[]	['GREAT LOW 1']	Heterodyne instruments only.	:
BackendDevice	BACKEND	Name of backend device.	primary	[string]	[str]		[]	['AOS']	Heterodyne instruments only.	:
BackendBandwidth	BANDWID	Total bandwidth of heterodyne backend	primary	[general]	[flt]	MHz	[]	[ 300.547]	Heterodyne instruments only.	:
SystemTemperature	TSYS	System temperature.	primary	[general]	[flt]	K	[]	[10.5]	Heterodyne instruments only.	:
FrequencyResolution	FREQRES	Nominal frequency resolution -- may differ from channel spacing.	primary	[general]	[flt]	MHz	[]	[100.0]	Heterodyne instruments only.	:
ReferenceFrequency	OBSFREQ	Reference frequency.	primary	[general]	[flt]	MHz	[]	[]	Heterodyne instruments only.	:
SidebandFrequency	IMAGFREQ	Image sideband frequency.	primary	[general]	[flt]	MHz	[]	[]	Heterodyne instruments only.	:
RestFrequency	RESTFREQ	Rest frequency.	primary	[general]	[flt]	MHz	[]	[]	Heterodyne instruments only.	:
VelocityDefinition	VELDEF	Velocity Definition	primary	[string]	[str]		[]	[RAD1-LSR]	Heterodyne instruments only.	:
VelocityFrame	VFRAME	Radial velocity of reference frame.	primary	[general]	[flt]	km/s	[]	[250.3]	Heterodyne instruments only.	:
RadialVelocity	RVSYS	Radial velocity.	primary	[general]	[flt]	km/s	[]	[22.3]	Heterodyne instruments only.	:

Data Structure Keywords

Parameter	FITS Keyword	Comment	HDU	Representation	Type	Units	Range	Example	Requirement	Source
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Chopping Keywords

Parameter	FITS Keyword	Comment	HDU	Representation	Type	Units	Range	Example	Requirement	Source
ChopFrequency	CHPFREQ	Chop frequency	any	[general]	[flt]	MHz	interval [ 0.0, 20.0 ]	[ 15.0]	Chopping	MCCS : sma.chop.frequency
ChopProfile	CHPPROF	Chopping profile: 2 or 3 point	any	[string]	[str]		enum [ 2-POINT, 3-POINT]	['2-POINT']	Chopping	MCCS : sma.chop.profile
ChopSymmetry	CHPSYM	Chopping symmetry: symmetric or asymmetric	any	[string]	[str]		[]	['on-axis']	Chopping	MCCS : sma.chop_symmetry
ChopAmplitude_1	CHPAMP1	Chop amplitude 1	any	[general]	[flt]	arcsec	interval [ -1125.0, 1125.0 ]	[ 300.0]	Chopping	MCCS : sma.sky_amplitude
ChopAmplitude_2	CHPAMP2	Chop amplitude 2	any	[general]	[flt]	arcsec	interval [ -1125.0, 1125.0 ]	[ 300.0]	Chopping	MCCS : sma.sky_amp2
ChopCoordSys <i>(Updated)</i>	CHPCRSYS	MCCS Coordinate system for sky tip, tilt, and angle. Added S1RF in revF	any	[string]	[str]		enum [TARF, ERF, S1RF]	[ERF ]	Chopping	MCCS : sma.sky_coord_sys
ChopAngle <i>(Updated)</i>	CHPANGLE	Calculated angle in the sky_coord_sys reference frame. Range increased in revF from -/+180 to -/+360	any	[general]	[flt]	decimal degrees	interval [-360,360]	[ 45.0]	Chopping	MCCS : sma.sky_angle
ChopTip	CHPTIP	Calculated tip in the sky_coord_sys reference frame.	any	[general]	[flt]	arcsec	interval [-301,301]	[15]	Chopping	MCCS : sma.sky_tip
ChopTilt	CHPTILT	Calculated tilt in the sky_coord_sys reference frame.	any	[general]	[flt]	arcsec	interval [-301,301]	[10]	Chopping	MCCS : sma.sky_tilt
ChopPhase <i>(Updated)</i>	CHPPHASE	Chop phase, User-supplied phase for the sma.chop command, changed to float in revF	any	[float]	[flt]	millisec	interval [ 0,1000 ]	[ 200]	Chopping	MCCS : sma.chop.phase

Nodding Keywords

Parameter	FITS	Comment	HDU	Representation	Type	Units	Range	Example	Requirement	Source
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	Keyword									
NodDwellTime	NODTIME	Nod time	any	[general]	[flt]	s	[]	[ 300.0]	Nodding	:
NodCycles	NODN	Nod cycles.	any	[integer]	[int]		[]	[ 30]	Nodding	:
NodSettleTime	NODSETL	Nod settle time	any	[general]	[flt]	s	[]	[ 0.0556]	Nodding	:
NodAmplitude	NODAMP	Nod amplitude on sky.	any	[general]	[flt]	arcsec	[]	[ 30.0]	Nodding	MCCS : (e.g. nod.amplitude)
NodBeam	NODBEAM	Current nod beam position	any	[string]	[str]		[]	[ 'A' ]	Nodding	MCCS : (e.g. nod.current)
NodPattern (Updated)	NODPATT	Nodding pattern, one cycle. Added BA in revF	any	[string]	[str]		enum [ ABBA, AB, BA, CUSTOM ]	[ 'ABBA' ]	Nodding	:
NodStyle	NODSTYLE	Chop/nod Style.	any	[string]	[str]		enum [NMC, NPC, C2NC2, CUSTOM]	[ 'NPC' ]	Nodding/Chopping	:
NodCoordSys	NODCRSYS	Coordinate system for Nod angle	any	[string]	[str]		enum [ERF, ECRF, GALRF, TARF, FPIRF, FFIRF, WFIRF, SIRF, USER]	[ 'ERF' ]	Nodding	MCCS : (e.g. nod.coord_sys)
NodAngle (Updated)	NODANGLE	Nod angle, range increased in revF from +/-180 to +/-360	any	[general]	[flt]	decimal degrees	interval [-360,360]	[ 45.0]	Nodding	MCCS : (e.g. nod.pos_angle)

## Dithering Keywords

Parameter	FITS Keyword	Comment	HDU	Representation	Type	Units	Range	Example	Requirement	Source
DitherCoordiante (New)	DTHCRSYS	Dither coordinate, needed by DPS for FORECAST, FLITECAM	any	[str]	[str]		enum [SIRF,TARF,ERF]	[SIRF]	Dithering	SI I DCS, not from MCCS :
DitherXOffset (New)	DTHXOFF	Dither offset in X axis (arcseconds).	any	[float]	[flt]	arcsec	[]	[ 2.5]	Dithering	:
DitherYOffset (New)	DTHYOFF	Dither offset in Y axis (arcseconds).	any	[float]	[flt]	arcsec	[]	[ 2.5]	Dithering	:
DitherPattern (Updated)	DTHPATT	Dither pattern, added NONE in revF	any	[string]	[str]		enum [NONE, 3-POINT, 5-POINT, 9-POINT, CUSTOM ]	[ '9-POINT' ]	Dithering	:
DitherPositions	DTHNPOS	Number of dither positions.	any	[integer]	[int]		[]	[ 9]	Dithering	:
DitherPositionIndex	DTHINDEX	Dither position index.	any	[integer]	[int]		[]	[ 5]	Dithering	:
DitherOffset	DTHOFFS	Dither offset (arcseconds).	any	[float]	[flt]	arcsec	[]	[ 2.5]	Dithering	:

## Mapping Keywords

Parameter	FITS Keyword	Comment	HDU	Representation	Type	Units	Range	Example	Requirement	Source
MapCoordSys	MAPCRSYS	Coordinate system for mapping/scanning.	any	[string]	[str]		enum [EQUATORIAL, GALACTIC, ECLIPTIC, USER]	[ 'GALACTIC' ]	Mapping	:
MapPositionsX	MAPNXPOS	Number of map positions in X	any	[integer]	[int]		[]	[ 4]	Mapping	:
MapPositionsY	MAPNYPOS	Number of map positions in Y	any	[integer]	[int]		[]	[ 4]	Mapping	:
MapIntervalX	MAPINTX	Mapping step interval in X	primary	[general]	[flt]	arcmin	[]	[ 8.5]	Mapping	:
MapIntervalY	MAPINTY	Mapping step interval in Y	any	[general]	[flt]	arcmin	[]	[ 8.5]	Mapping	:

## Scanning Keywords (Constant Velocity)

Parameter	FITS Keyword	Comment	HDU	Representation	Type	Units	Range	Example	Requirement	Source
ScanStartRA	SCNRA0	Start of scan - RA.	any	[general] [hh:mm:ss.s]	[flt] [str]	Hours	interval [0,24]	[9.0230] [5:35:17.3]	Scanning	:
ScanStartDec	SCNDEC0	Start of scan - Dec.	any	[general] [dd:mm:ss]	[flt] [str]	Degrees	interval [-90,90]	[47.3465] [-5:23:28]	Scanning	:
ScanEndRA	SCNRAF	End of scan - RA.	any	[general] [hh:mm:ss.s]	[flt] [str]	Hours	interval [0,24]	[9.0305] [5:40:32.5]	Scanning	:
ScanEndDec	SCNDECf	End of scan - Dec.	any	[general] [dd:mm:ss]	[flt] [str]	Degrees	interval [-90,90]	[47.3465] [-5:23:28]	Scanning	:
ScanRate	SCNRATE	Scan rate	any	[general]	[flt]	arcsec/s	[]	[ 10.0]	Scanning	:
ScanDirection	SCNDIR	Scan direction	any	[general]	[flt]	degrees	[]	[ -35.5]	Scanning	: