

Required Header Keywords for Test Exposures

Mandatory keywords

Keyword	Type	Comment	Suitable default	Example values	Data model meta member name	Notes	Used by ASN generator
TELESCOP	str	Telescope used to acquire the data	'JWST'		model.meta.telescope		
INSTRUME	str	Instrument used to acquire the data		FGS, MIRI, NIRCAM, NIRISS, NIRSPEC	model.meta.instrument.name		Y
DETECTOR	str	Name of detector used to acquire the data		GUIDER1, NRCA1, NRCBLONG, MIRIMAGE, MIRIFUSHORT, NRS1, NIS, ...	model.meta.instrument.detector		Y
FILTER	str	Name of the filter element used		CLEAR, F070LP, P750L, GR150C, ...	model.meta.instrument.filter		Y
DATE-OBS	str	UTC date at start of exposure (yyyy-mm-dd)	'2016-01-20'		model.meta.observation.date	Vital for CRDS ref file selection	
TIME-OBS	str	UTC time at start of exposure (hh:mm:ss.ssss)	'01:02:03.000'		model.meta.observation.time	Vital for CRDS ref file selection	
EXP_TYPE	str	Type of data in the exposure		MIR_IMAGE, MIR_LRS-FIXEDSLIT, MIR_MRS, NIS_IMAGE, NIS_SOSS, NIS_WFSS, NRC_IMAGE, NRC_GRISM, NRS_FIXEDSLIT, NRS_IFU, MRS_MSASPEC	model.meta.exposure.type		Y
READPATT	str	Readout pattern		DEEP8, FAST, NISRAPID, NRS, NRSIRS2RAPID, RAPID, SLOW	model.meta.exposure.readpatt		
NINTS	int	Number of integrations in exposure		1, 2, 3, ...	model.meta.exposure.nints		
NGROUPS	int	Number of groups per integration		1, 2, 3, ...	model.meta.exposure.ngroups		
NFRAMES	int	Number of frames per group	1	1, 2, 4, 8, ...	model.meta.exposure.nframes		
GROUPGAP	int	Number of frames dropped between groups	0	1, 2, 3, ...	model.meta.exposure.groupgap		
TGROUP	flt	Time between groups (sec)		53.6838	model.meta.exposure.group_time		
TFRAME	flt	Time between frames (sec)		10.73676	model.meta.exposure.frame_time		
SUBARRAY	str	Subarray used		FULL, ALLSLITS, MASKLYOT, SUB160, SUBPRISM, S200B1, ...	model.meta.subarray.name		Y

SUBSTR1	int	Starting pixel in axis 1 direction		1	model.meta.subarray.xstart	1-indexed in DMS science frame	
SUBSTR2	int	Starting pixel in axis 2 direction		1	model.meta.subarray.ystart	1-indexed in DMS science frame	
SUBSIZE1	int	Number of pixels in axis 1 direction	=NAXIS1	2048	model.meta.subarray.xsize		
SUBSIZE2	int	Number of pixels in axis 2 direction	=NAXIS2	2048	model.meta.subarray.ysize		
TARGNAME	str	Standard astronomical catalog name for target		Jupiter, M31, 2MASS-J00243075-6635527	model.meta.target.catalog_name		
PUPIL	str	Name of the pupil element used		CLEARP, F090W, MASKBAR, NRM, WLP8, ...	model.meta.instrument.pupil	NIRCam NIRISS	Y
GRATING	str	Name of the grating element used		G140M, G235H, PRISM, MIRROR, ...	model.meta.instrument.grating	NIRSpec	Y
BAND	str	MRS wavelength band		SHORT, MEDIUM, LONG	model.meta.instrument.band	MIRI MRS	
CHANNEL	str	Instrument channel		NIRCam: 'SHORT', 'LONG' MIRI MRS: '12', '34'	model.meta.instrument.channel	NIRCam MIRI MRS	
LAMP	str	Internal lamp state	' ' (null)	'FLAT4', 'LINE1'	model.meta.instrument.lamp_state	NIRSpec	
GWA_XTIL	flt	Grating Y tilt angle relative to mirror	0.0	0.3310427	model.meta.instrument.gwa_xtilt	NIRSpec	
GWA_YTIL	flt	Grating X tilt angle relative to mirror	0.0	0.125792116	model.meta.instrument.gwa_ytilt	NIRSpec	
GWA_TILT	flt	GWA TILT (avg/calib) temperature (K)		658.323364	model.meta.instrument.gwa_tilt	NIRSpec	
MSAMETFL	str	MSA metadata file name		jw90001001001_01_msa.fits	model.meta.instrument.msa_configuration_file	NIRSpec MSA	
MSAMETID	int	MSA metadata ID		1, 2, 3, ...	model.meta.instrument.msa_metadata_id	NIRSpec MSA	
NUMDTHPT	str	Total number of points in pattern		'2' (MIRI LRS slit) '2', '3', '5' (NIRSpec fixedslit)	model.meta.dither.total_points	MIRI LRS slit NIRSpec fixedslit	
PATT_NUM	int	Position number in primary pattern		1, 2, 3, 4, 5	model.meta.dither.position_number	MIRI LRS slit NIRSpec fixedslit	
TARG_RA	flt	Target RA at mid time of exposure		80.4875	model.meta.target.ra	NIRISS SOSS	
TARG_DEC	flt	Target Dec at mid time of exposure		-69.498333	model.meta.target.dec	NIRISS SOSS	

PROGRAM	str	Program number	'12345'	'90001' (5-digit int composed as a string)	model.meta.observation.program_number	NIRCam Only used by level-3 processing.	Y
OBSERVTN	str	Observation number	'001'	'001' (3-digit int composed as a string)	model.meta.observation.observation_number	NIRCam Only used by level-3 processing.	Y
VISIT	str	Visit number	'001'	'001' (3-digit int composed as a string)	model.meta.observation.visit_number	NIRCam Only used by level-3 processing.	
VISITGRP	str	Visit group identifier	'01'	'02' (2-digit int composed as a string)	model.meta.observation.visit_group	NIRCam Only used by level-3 processing.	
SEQ_ID	str	Parallel sequence identifier	'1'	'1' (1-digit int composed as a string)	model.meta.observation.sequence_id	NIRCam Only used by level-3 processing.	
ACT_ID	str	Activity identifier	'01'	'01' (2-digit int composed as a string)	model.meta.observation.activity_id	NIRCam Only used by level-3 processing.	Y
EXPOSURE	str	Exposure request number	'1'	'1' (1-digit int composed as a string)	model.meta.observation.exposure_number	NIRCam Only used by level-3 processing.	
OBSLABEL	str	Proposer label for the observation		'Target 1 NIRCam observation 2'	model.meta.observation.observation_label	Free form label for the observation. Only used by level-3 skymatch.	
EXPSTART	flt	UTC exposure start time		57410.24546415885	model.meta.exposure.start_time	Accurate value not required; just something realistic.	
EXPEND	flt	UTC exposure end time		57410.2477009838	model.meta.exposure.end_time	Accurate value not required; just something realistic.	
EFFEXPTM	flt	Effective exposure time (sec)	100.0	182.526	model.meta.exposure.exposure_time	Accurate value not required; just something realistic.	

Optional Keywords

Keyword	Type	Comment	Suitable default	Example values	Data model meta member name	Notes	Used by ASN generator
FILENAME	str	Name of the file		jw90001001001_02101_00001_nis_uncal.fits	model.meta.filename	Data model will populate if not given	
DATAMODL	str	Type of data model	'RampModel'	RampModel, MIRIRampModel, ImageModel	model.meta.model_type	Data model will attempt to determine model type if not given	
FXD_SLIT	str	Name of fixed slit aperture used	null string	S200A1, S200A2, S200B1, S400A1, S1600A1	model.meta.instrument.fixed_slit	NIRSpec fixedslit Only used by asn_generator.	Y
WFSVISIT	str	Wavefront sensing and control visit indicator	null string	SENSING_CONTROL, SENSING_ONLY	model.meta.visit.wfs_visit_indicator	Only used by asn_generator	Y
PATTYPE	str	Primary dither pattern type	'NONE'	CYCLING, POINT_SOURCE, FULL, INTRASCA, ...	model.meta.dither.primary_type	MIRI and NIRCam Only used by asn_generator	Y
SRCTYPE	str	Advised source type (point/extended)	'UNKNOWN'	POINT, EXTENDED, UNKNOWN	model.meta.target.source_type	src_type step will populate if not given	

WCS Keywords

Keyword	Type	Comment	Suitable default	Example values	Data model meta member name	Notes
WCSAXES	int	Number of World Coordinate System axes		2, 3	model.meta.wcsinfo.wcsaxes	imaging = 2, spectral = 3
RADESYS	str	Name of the coordinate ref frame	'ICRS'		model.meta.coordinates.reference_frame	
V2_REF	flt	Telescope v2 coordinate of ref point (arcsec)		-290.1	model.meta.wcsinfo.v2_ref	Source is SIAF: V2_REF for aperture in use
V3_REF	flt	Telescope v3 coordinate of ref point (arcsec)		-697.5	model.meta.wcsinfo.v3_ref	Source is SIAF: V3_REF for aperture in use
VPARITY	int	Relative sense of rotation between Ideal xy and V2V3		1, -1	model.meta.wcsinfo.vparity	Source is SIAF: VIdlParity for aperture in use
V3I_YANG	flt	Angle from V3 axis to Ideal y axis (deg)		5.12345	model.meta.wcsinfo.v3yangle	Source is SIAF: V3IdlYAngle for aperture in use
RA_REF	flt	Right ascension of the reference point (deg)		80.4875	model.meta.wcsinfo.ra_ref	
DEC_REF	flt	Declination of the reference point (deg)		-69.498333	model.meta.wcsinfo.dec_ref	
ROLL_REF	flt	Telescope roll angle of V3 at ref point (deg)	0.0	0.032538833	model.meta.wcsinfo.roll_ref	
CRVAL1	flt	RA at the reference pixel (deg)		-69.498333	model.meta.wcsinfo.crval1	Not needed by cal pipeline. For FITS WCS compatibility only.

CRVAL2	flt	Dec at the reference pixel (deg)		0.032538833	model.meta.wcsinfo.crval2	Not needed by cal pipeline. For FITS WCS compatibility only.
CRPIX1	flt	axis 1 coordinate of the reference pixel		1024.5	model.meta.wcsinfo.crpix1	Not needed by cal pipeline. For FITS WCS compatibility only.
CRPIX2	flt	axis 2 coordinate of the reference pixel		1024.5	model.meta.wcsinfo.crpix2	Not needed by cal pipeline. For FITS WCS compatibility only.
CDELTA1	flt	first axis increment per pixel (deg)		3.05556E-05	model.meta.wcsinfo.cdelt1	Imaging modes only.
CDELTA2	flt	second axis increment per pixel (deg)		3.05556E-05	model.meta.wcsinfo.cdelt2	Imaging modes only.
PC1_1	flt	linear transformation matrix element			model.meta.wcsinfo.pc1_1	Imaging modes only.
PC1_2	flt	linear transformation matrix element			model.meta.wcsinfo.pc1_2	Imaging modes only.
PC2_1	flt	linear transformation matrix element			model.meta.wcsinfo.pc2_1	Imaging modes only.
PC2_2	flt	linear transformation matrix element			model.meta.wcsinfo.pc2_2	Imaging modes only.
CTYPE1	str	first axis coordinate type	'RA---TAN'		model.meta.wcsinfo.ctype1	Not needed by cal pipeline. For FITS WCS compatibility only.
CTYPE2	str	second axis coordinate type	'DEC--TAN'		model.meta.wcsinfo.ctype2	Not needed by cal pipeline. For FITS WCS compatibility only.
CTYPE3	str	third axis coordinate type	'WAVE'		model.meta.wcsinfo.ctype3	Not needed by cal pipeline. For FITS WCS compatibility only. Only for spectroscopic exposures.
CUNIT1	str	first axis units	'deg'		model.meta.wcsinfo.cunit1	Not needed by cal pipeline. For FITS WCS compatibility only.
CUNIT2	str	second axis units	'deg'		model.meta.wcsinfo.cunit2	Not needed by cal pipeline. For FITS WCS compatibility only.
CUNIT3	str	third axis units	'microns'		model.meta.wcsinfo.cunit3	Not needed by cal pipeline. For FITS WCS compatibility only. Only for spectroscopic exposures.

Table notes:

Column 1 "Keyword" is the exact spelling of each FITS keyword name.

Column 2 "Type" indicates the data type for each FITS keyword, where "str"=string, "int"=integer, and "flt"=floating-point. Keyword values that require special formatting, e.g. yyyy-mm-dd for DATE-OBS, are indicated in the comment portion (Column 3).

Column 3 "Comment" lists the comment portion (short description) of each keyword as it appears in FITS header records.

Column 4 "Suitable default" lists values that are appropriate and useable if you can't come up with anything more specific.

Column 5 "Example values" lists a few possible examples. Some keywords, such as FILTER, EXP_TYPE, and SUBARRAY, have far too many allowed values to list all the cases here. You should be able to determine these from APT observing templates for your instrument.

Column 6 "Data model meta member name" lists the name of the software data model attribute that contains the value of each keyword. This is intended for those of you who use the SSB python data models in the jwst package to create or manipulate your test data. Assigning values to these data model attributes will result in the appropriate keyword getting populated when the data model is saved to a FITS file.

Column 7 "Notes" gives additional information about the keyword, where necessary. Optional keywords are noted there, as well as indications that some keywords are only needed for certain instruments or instrument modes. Note that a few keywords are only used by the asn_generator (see Column 8) and hence are not necessary for just testing the Cal Pipelines.

Column 8 "Used by ASN generator" indicates whether the keyword value is used by asn_generator to create ASN tables. This function is only needed if the test files get used to "reverse engineer" data sets back to the SSR level, in order to perform end-to-end testing of the entire DMS system.

Information for Moving Targets

These are not really header keywords but information needed like pointing of the telescope. [Howard Bushouse](#) to provide information by 07 Mar 2017

Other Types?