SUSI2/EMMI Template Signature File Parameters Reference Guide: Acquisition, Observation, and Calibration

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This document describes the Template Signature File (TSF) parameters for the NTT instruments SUSI2 and EMMI.

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Contents

1 Introduction

1.1 Purpose & Scope

This document is intended to provide descriptions of the EMMI and SUSI2 template signature file parameters to P2PP users. It is restricted to the consideration of acquisition, observation, and calibration templates. Signature files for maintenance and setup templates, which are used only by observatory staff, are described in a separate document.

This document is not an instrument user manual; the reader is assumed to be familiar with the instrument he plans to with, or to find that information in the corresponding user's manuas ([1] and [2]. In a similar way, the complete description of the P2PP software is found in [3].

1.2 Intended Audience

It is intended for P2PP users. It is not a technical manual.

1.3 Applicable Documents

These descriptions are based on the actual EMMI and SUSI2 TSF files (version 1.8). To the extent that the actual execution of the templates is described, this description is based on versions 1.14 of the EMMI observation templates and 1.58 of the SUSI templates.

1.4 Reference documents

1. LSO-MAN-ESO-40100-0001/4.1: *EMMI User's Manual*

2. LSO-MAN-ESO-40100-0002/0.4: *SuSI-2 User's Manual*

3. VLT-MAN-ESO-19200-1644/1.1: *P2PP User's Manual*

4. LSO-MAN-ESO-40610-0002/1.0: *Standard Calibration OBs for the NTT: User's Manual*

1.5 Abbreviations and Acronyms

AT: Acquisition Template

EMMI: ESO Multi-Mode Instrument

NTT: New Technology Telescope

OB: Observation Block

P2PP: Phase 2 Preparation Program

SuSI(2): Superb Seeing Imager (2)

TP: Target Package

TSF: Template Signature File

1.6 Conventions used in this document

To be completed in a later version.

1.7 Acknowledgments

The development of the SUSI2 and EMMI templates has been a team effort. It started from early work by Maurizio Chavan on the SUSI templates (which eventually evolved into the SUSI2 templates). The bulk of the EMMI and SUSI templates was created by Paul Le Saux. Subsequent testing, debugging, corrections, improvements, and additions to the initial set, were carried out with assistance of Philippe Gitton, Chris Lidman, Pierre Martin, Gautier Mathys, and Jason Spyromilio. The template set currently in use and described in this manual mostly results from a major overhaul of all the templates by the author of this manual (with advice from Ricardo Schmutzer and some help from Norma Hurtado), which included the implementation of the concept of Instrument Signature File, the adaptation of the SUSI templates for SUSI2, and a general streamlining of all templates to cut down overheads in the execution, and from the addition by Paul Le Saux of the EMMI DIMD templates. Paul Le Saux keeps coordinating continuous improvements of more minor nature that are still continuously made. Many others have in one way or another contributed to bring the templates to their current state, in particular the NTT users at all levels (observers, NTT team members, the DMD User Support Group), through their constructive comments and suggestions. Regrettably, they cannot be all nominally mentioned here, but their help is gratefully acknowledged.

The previous version (0.6) of this manual had been written by Dave Silva, from the DMD User Support Group. The changes in the templates have been so numerous, and there have been so many new templates added, since the release of that version that the text of the present version is almost entirely new. However, the underlying philosophy and the general presentation of the manual remain along the line defined by Dave Silva, and being able to rely on his work in those areas has considerably eased up the preparation of this new manual.

2 SUSI2 Templates: A Reference Guide

This section provides summaries of the currently released SUSI2 templates. It is assumed that the reader is already familiar with the SUSI2 instrument. Further details about SUSI2 may be found on-line at the NTT Web site (http://www.eso.org/ntt/).

Other unreleased, prototype templates may be available at the telescope. Contact the NTT Team (ntt@eso.org) for further information.

When using SUSI2 templates, you will automatically get the default parameter values unless you actively change them. However, some parameters have no default values - the values of these parameters must always be changed to something else or P2PP will report an error.

The following three types of templates associated with SUSI2 are described in this manual: Observation Templates (OT) for science observations, Calibration Templates (CT) for calibration exposures, and Acquisition Templates (AT) for target acquisition.

SUSI2 templates are maintained by the NTT Team (ntt@eso.org).

2.1 SUSI2 Acquisition Templates

Acquisition Templates (AT) determine how a target field is acquired by the telescope. They are attached to specific Observation Blocks during the OB building process described in *The P2PP Users' Manual*.

2.1.1 SAT01: Preset to coordinates - no operator intervention

This acquisition template presets the telescope to the coordinates of the Target associated with this Observation Block and applies the requested rotator offset (the orientation of the CCD will differ from the default one by this offset). Differential tracking rates can be set. An appropriate guide star will be selected automatically. Parameters associated with the guide star are in the TSF for possible future implementation of manual options of guide star selection (a feature which is supported by the TCS) but they are not currently used and can therefore be safely ignored by the P2PP user. There is no further operator intervention

.

Label	Parameter	Default	Units	Notes
Rotator offset angle	ROT.OFFANGLE	0	degrees	
Differential tracking in RA	TARG.ADDVELALPHA	0	arcsec/sec	
Differential tracking in DEC	TARG.ADDVELDELTA	0	arcsec/sec	
RA of guide star	GS1.ALPHA	00:00:00.0		Not used
DEC of guide star	GS1.DELTA	00:00:00.0		Not used
Magnitude of guide star	GS1.MAG	12		Not used

2.1.2 SAT02: Preset to coordinates - update position to specific pixel

This acquisition template allows the user to position an object on the CCD pixel specified through the parameter Pixel coordinates. If the preset flag is set to T (true), it first presets the telescope to the coordinates of the Target associated with this Observation Block, applies the requested rotator offset and then takes an exposure of the field with the specified exposure time and through the selected filter. This image is displayed on a Real-Time Display where the operator is prompted to identify with the cursor the user-specified object (e.g. as marked on a finding chart). The telescope offset required to bring this object to the desired CCD pixel coordinates is computed, and the operator is given the choice between not applying it, applying it blindly, or applying it and taking a new exposure (possibly of different duration) to check the outcome. In the latter case, the resulting image is again displayed on the RTD and the operator can repeat the above procedure at will.

As the acquistion image is obtained with the CCD binned 2x2, the pixel coordinates must be **expressed in binned pixels** (e.g. 500, 1000 for the center of the left chip).

If the preset flag is set to F (false), the first step above is skipped (telescope preset and rotator offset), and the template proceeds immediately to taking an image of the field at the current telescope position. The rest of the procedure is as described above. This option is generally used after long exposures on a given field, to check that the telescope is still at the correct position and to make the adjustments possibly needed before starting new (long) exposures of the same field.

If this AT is used during service observing, a finding chart **must** be supplied by the user.

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Label	Parameter	Default	Units	Notes
Exposure time	WIN1.UIT1	10	seconds	
Pixel coordinates	PIXELCOORD	(none)		
Filter	FILT1.NAME	Free		
Preset flag	PRESET.NEW	T		T=preset; F=no preset
Rotator offset angle	ROT.OFFANGLE	0	degrees	
RA of guide star	GS1.ALPHA	00:00:00.0		Not used
DEC of guide star	GS1.DELTA	00:00:00.0		Not used
Magnitude of guide star	GS1.MAG	12		Not used

2.2 SUSI2 Observation Templates

2.2.1 S0T01: Normal single exposure

This template acquires one image through the specified filter with the given exposure time. Parameters are available for changing the default CCD configuration. When the CCD windowing flag is set to F (false), the full CCD is read out, regardless of the window parameters. When the CCD windowing is set to T (true), the CCD mosaic is dealt with as if it were a single monolithic chip with 4288 columns and 4096 rows.

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Label	Parameter	Default	Units	Notes
Exposure time	WIN1.UIT1	(none)	seconds	
Filter	FILT1.NAME	(none)		Menu
CCD readout speed	READ.SPEED	fast		Not used
CCD windowing flag	WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of window	WIN1.STRX	1		Only used if ST = T
First row of window	WIN1.STRY	1		Only used if ST = T
Number of columns	WIN1.NX	4288		Only used if ST = T
Number of rows	WIN1.NY	4096		Only used if ST = T
CCD X binning	WIN1.BINX	2		
CCD Y binning	WIN1.BINY	2		

2.2.2 SOT02: Jitter mode exposure (combined offset)

This template acquires the specified number of exposures through the indicated filter. The offsetting and exposure time sequence is described below. If autoguiding is active at the beginning of this sequence, it remains active, i.e. the guide probe is moved to compensate for the telescope motion. Parameters are available for changing the default CCD configuration. When the CCD windowing flag is set to F (false), the full CCD is read out, regardless of the window parameters. When the CCD windowing is set to T (true), the CCD mosaic is dealt with as if it were a single monolithic chip with 4288 columns and 4096 rows.

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Label	Parameter	Default	Units	Notes
Number of exposures	SEQ.NEXPO	1		
List of exposure times	WIN1.UIT1	(none)	seconds	
List of telescope RA offsets	TARG.OFFSETALPHA	1	arcsec	
List of telescope DEC offsets	TARG.OFFSETDELTA	1	arcsec	
Filter	FILT1.NAME	(none)		Menu
CCD readout speed	READ.SPEED	fast		Not used
CCD windowing flag	WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of window	WIN1.STRX	1		Only used if ST = T
First row of window	WIN1.STRY	1		Only used if ST = T
Number of columns	WIN1.NX	4288		Only used if ST = T
Number of rows	WIN1.NY	4096		Only used if ST = T
CCD X binning	WIN1.BINX	2		
CCD Y binning	WIN1.BINY	2		

A sequence of exposures with individual offsets can be generated by entering a sequence of values of telescope RA and DEC offsets, and of exposure times. Offsets are applied to the current telescope position **before** the exposure begins. This is true even for the first exposure in a sequence, i.e. if the first offset in the sequence is non-zero, that offset will be applied to the current telescope position before acquiring the first dataset.[1]

The specified number of exposures will be acquired. One can give a different number of values of RA and DEC offsets, and of exposure times, and neither of these numbers need to be equal to the number of exposures. Each sequence of RA offsets, DEC offsets, and exposure times, is incremented independently of the other sequences. For any sequence of RA and DEC offsets, and of exposure times which has fewer values than the number of exposures, that sequence will restart from the beginning until the specified number of exposures have been acquired. This loop-back capability will repeat indefinitely until all exposures have been acquired. Conversely, if any of the sequences of RA and DEC offsets, and of exposure times have more values than the number of exposures, only the first values up to the number of exposures will be used.

Consider the following example:

Label	Input Value(s)
Number of exposures	5
List of telescope RA offsets	0 2
List of telescope DEC offsets	0 4 8 16
List of exposure times	10 20 30

1. This option is useful to move a target out of the gap between the two CCDs of the mosaic, e.g. setting the first offsets to 30 for RA and 0 for DEC (assuming that the rotator offset angle is 0).

Output Frame Number	Relative Offset (RA)	Relative Offset (Dec)	Exposure Time (s)
1	0”	0”	10
2	2”	4”	20
3	0”	8”	30
4	2”	16”	10
5	0”	0”	20

2.3 SUSI2 Calibration Templates

2.3.1 SCT01 - Acquire a series of bias or dark frames

This calibration template acquires the number of bias or dark frames specified by the parameter Number of exposures. Bias frames are acquired if the exposure time is set to zero (0). Dark frames are acquired if the exposure time is non-zero. Parameters are available for changing the default CCD configuration. When the CCD windowing flag is set to F (false), the full CCD is read out, regardless of the window parameters. When the CCD windowing is set to T (true), the CCD mosaic is dealt with as if it were a single monolithic chip with 4288 columns and 4096 rows.

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Label	Parameter	Default	Units	Notes
Number of exposures	SEQ.NEXPO	1		
Exposure time	WIN1.UIT1	0	seconds	
CCD readout speed	READ.SPEED	fast		Not used
CCD windowing flag	WIN1.ST	F		F = no CCD window;T = CCD windowed
First column of window	WIN1.STRX	1		Only used if ST = T
First row of window	WIN1.STRY	1		Only used if ST = T
Number of columns	WIN1.NX	4288		Only used if ST = T
Number of rows	WIN1.NY	4096		Only used if ST = T
CCD X binning	WIN1.BINX	2		
CCD Y binning	WIN1.BINY	2		

2.3.2 SCT02 - Acquire a series of dome flats (automatic exposure time calculation)

This calibration template acquires the number of dome flats specified by the parameter Number of exposures through the indicated filter, with approximately the requested intensity level. Parameters are available for changing the default CCD configuration. When the CCD windowing flag is set to F (false), the full CCD is read out, regardless of the window parameters. When the CCD windowing is set to T (true), the CCD mosaic is dealt with as if it were a single monolithic chip with 4288 columns and 4096 rows.

In the execution of this template, the exposure time is computed automatically as follows:

- A windowed bias frame is acquired.
- A windowed dome flat with a short exposure time is acquired.
- The windowed bias frame is subtracted from the windowed dome flat and the mean intensity is computed.

Based on the mean intensity and the requested intensity, an exposure time is automatically computed.

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Label	Parameter	Default	Units	Notes
Number of exposures	SEQ.NEXPO	1		
Requested intensity level	EXPLEVEL	20000	ADU	
Filter	FILT1.NAME	(none)		Menu
CCD readout speed	READ.SPEED	fast		Not used
CCD windowing flag	WIN1.ST	F		F = no CCD window;T = CCD windowed
First column of window	WIN1.STRX	1		Only used if ST = T
First row of window	WIN1.STRY	1		Only used if ST = T
Number of columns	WIN1.NX	4288		Only used if ST = T
Number of rows	WIN1.NY	4096		Only used if ST = T
CCD X binning	WIN1.BINX	2		
CCD Y binning	WIN1.BINY	2		

2.3.3 SCT03 - Acquire sky (twilight) flats (automatic exposure time calculation)

This calibration template acquires the number of sky (twilight) flats specified by the parameter Number of exposures through the indicated filter, with approximately the requested intensity level. Before each exposure, the telescope is offset by the specified RA and DEC offsets.

The exposure time is computed automatically as follows:

- A windowed bias frame is acquired.
- A windowed sky flat with a short exposure time is acquired.
- The windowed bias frame is subtracted from the windowed flat and the mean intensity is computed.

Based on the mean intensity and the requested intensity, an exposure time sequence is automatically computed using the Tyson & Gal algorithm.

During the evening twilight, the sequence is started only if the exposure time of the first frame is 2 secs or greater. The sequence terminates when the specified number of exposures have been acquired, or when the calculated exposure time exceeds 200 secs.

During the morning twilight, the sequence is started only if the exposure time of the first frame is 200 secs or less. The sequence terminates when the specified number of exposures have been taken, or when the calculated exposure time becomes shorter than 2 secs.

Label	Parameter	Default	Units	Notes
Number of exposures	SEQ.NEXPO	1		
Requested intensity level	EXPLEVEL	20000	ADU	
Filter	FILT1.NAME	(none)		Menu
CCD readout speed	READ.SPEED	fast		Not used
CCD windowing flag	WIN1.ST	F		F = no CCD window;T = CCD windowed
First column of window	WIN1.STRX	1		Only used if ST = T
First row of window	WIN1.STRY	1		Only used if ST = T
Number of columns	WIN1.NX	4288		Only used if ST = T
Number of rows	WIN1.NY	4096		Only used if ST = T
CCD X binning	WIN1.BINX	2		
CCD Y binning	WIN1.BINY	2		
Telescope RA offset	TARG.OFFSETALPHA	0	arcsec	
Telescope DEC offset	TARG.OFFSETDELTA	0	arcsec	

2.3.4 SCT04 - Acquire a focus frame

This calibration template acquires a “thru focus” focus frame.[1] It takes a single exposure through the indicated filter. Before this exposure is started, the telescope focus is adjusted by (-Telescope focus offset x Number of subexposures/2), and the telescope is offset in the specified direction by (-Telescope offset x Number of subexposures/2). The exposure is subdivided in the specified number of subexposures, of duration approximately equal to the value given by the parameter Subexposure time. Between consecutive subexposures, the shutter is closed but the CCD is not read out (in other words, the exposure is paused), the telescope focus is adjusted by the indicated offset, the telescope is offset by the specified amount in the specifed direction, and when this is completed, the shutter is reopened (the exposure is resumed). When all the subexposures have been acquired, the CCD is read out, the telescope is moved back to its original position, and the original focus is restored.

Label	Parameter	Default	Units	Notes
Filter	FILT1.NAME	(none)		Menu
Subexposure time	WIN1.UIT1	20	seconds	
Number of subexposures	SEQ.NEXPO	9		
Telescope focus offset	FOCUSSSTE P	0.03	mm	
Telescope offset	OFFSET	10	arcsec	
Direction of telescope offset	OFFSETDIR	ALPHA		ALPHA = RA; DELTA = DEC

1. Note that the image analyzer is calibrated so as to keep the telescope in focus after an image analysis. Accordingly, this template is used mostly to check the focus after the first image analysis.

3 EMMI Templates: A Reference Guide

This section provides summaries of the currently released EMMI templates. It is assumed that the reader is already familiar with the EMMI instrument. This section is not intended to be a guide to using EMMI. Further details about EMMI may be found on-line at the NTT Web site (http://www.eso.org/ntt/).

Other unreleased, prototype templates may be available at the telescope. Contact the NTT Team (ntt@eso.org) for further information.

When using EMMI templates, you will automatically get the default parameter values unless you actively change them. However, some parameters have no default values - the values of these parameters must always be changed to something else or P2PP will report an error.

EMMI has five supported modes:

Mode	Description
BIMG	Blue Imaging
BLMD	BLue Medium Dispersion Spectroscopy
RILD	Red Imaging & Low Dispersion Spectroscopy
REMD	Red Medium Dispersion Spectroscopy
DIMD	Dichroic Medium Dispersion Spectroscopy

The following three types of templates associated with each of the EMMI modes are described in this manual: Observation Templates (OT) for science observations, Calibration Templates (CT) for calibration exposures, and Acquisition Templates (AT) for target acquisition.

For example, the science observation template to acquire a single image on the red side of EMMI is called RILDOT01 while RILDCT01 takes bias or dark frames on the red side. To acquire a target that will be observed using RILDOT01, there is acquisition template RILDAT01.

Important Note: When using a given mode to conduct a science observation, and it is necessary to acquire the target, only use an acquisition template associated with that science mode.

The EMMI templates are maintained by the NTT Team (ntt@eso.org).

3.1 BIMG Templates

TABLE 1 BIMG Template Quick Reference

Template	Short Description
BIMGAT01	Preset to coordinates - no operator intervention
BIMGAT02	Preset to coordinates - update position to specified pixel
BIMGOT01	Normal single exposure
BIMGOT02	Jitter mode exposure (combined offset)
BIMGCT01	Acquire a series of bias or dark frames
BIMGCT02	Acquire a series of flats (automatic exptime calculation)
BIMGCT03	Acquire a series of sky (twilight) flats (automatic exptime calculation)
BIMGCT04	Acquire a focus frame

3.1.1 BIMGAT01: Preset to coordinates - no operator intervention

This acquisition template presets the telescope to the coordinates of the Target associated with this Observation Block and applies the requested rotator offset (the orientation of the CCD will differ from the default one by this offset). Differential tracking rates can be set. An appropriate guide star will be selected automatically. Parameters associated with the guide star are in the TSF for possible future implementation of manual options of guide star selection (a feature which is supported by the TCS) but they are not currently used and can therefore be safely ignored by the P2PP user. There is no further operator intervention

.

Label	Parameter	Default	Units	Notes
Rotator offset angle	ROT.OFFANGLE	0	degrees	
Differential tracking in RA	TARG.ADDVELALPHA	0	arcsec/sec	
Differential tracking in DEC	TARG.ADDVELDELTA	0	arcsec/sec	
RA of guide star	GS1.ALPHA	00:00:00.0		Not used
DEC of guide star	GS1.DELTA	00:00:00.0		Not used
Magnitude of guide star	GS1.MAG	12		Not used

3.1.2 BIMGAT02: Preset to coordinates - update position to specific pixel

This acquisition template allows the user to position an object on the CCD pixel specified through the parameter Pixel coordinates. If the preset flag is set to T (true), it first presets the telescope to the coordinates of the Target associated with this Observation Block, applies the requested rotator offset and then takes an exposure of the field with the specified exposure time and through the selected blue color filter. This image is displayed on a Real-Time Display where the operator is prompted to identify with the cursor the user-specified object (e.g. as marked on a finding chart). The telescope offset required to bring this object to the desired CCD pixel coordinates is computed, and the operator is given the choice between not applying it, applying it blindly, or applying it and taking a new exposure (possibly of different duration) to check the outcome. In the latter case, the resulting image is again displayed on the RTD and the operator can repeat the above procedure at will.

If the preset flag is set to F (false), the first step above is skipped (telescope preset and rotator offset), and the template proceeds immediately to taking an image of the field at the current telescope position. The rest of the procedure is as described above. This option is generally used after long exposures on a given field, to check that the telescope is still at the correct position and to make the adjustments possibly needed before starting new (long) exposures of the same field.

If this AT is used during service observing, a finding chart **must** be supplied by the user.

Label	Parameter	Default	Units	Notes
Exposure time	WIN1.UIT1	10	seconds	
Pixel coordinates	PIXELCOORD	(CCD center)		
Blue color filter	FILT4.NAME	Free		
Preset flag	PRESET.NEW	T		T=preset; F=no preset
Rotator offset angle	ROT.OFFANGLE	0	degrees	
RA of guide star	GS1.ALPHA	00:00:00.0		Not used
DEC of guide star	GS1.DELTA	00:00:00.0		Not used
Magnitude of guide star	GS1.MAG	12		Not used

3.1.3 BIMG0T01: Normal single exposure

This template acquires one image through the specified blue color filter with the given exposure time. Parameters are available for changing the default CCD configuration. When the CCD windowing flag is set to F (false), the full CCD is read out, regardless of the window parameters.

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Label	Parameter	Default	Units	Notes
Exposure time	WIN1.UIT1	(none)	seconds	
Blue color filter	FILT4.NAME	(none)		Menu
CCD readout speed	READ.SPEED	normal		Menu
CCD windowing flag	WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of window	WIN1.STRX	1		Only used if ST = T
First row of window	WIN1.STRY	1		Only used if ST = T
Number of columns	WIN1.NX	1124		Only used if ST = T
Number of rows	WIN1.NY	1024		Only used if ST = T
CCD X binning	WIN1.BINX	1		
CCD Y binning	WIN1.BINY	1		

3.1.4 BIMGOT02: Jitter mode exposure (combined offset)

This template acquires the specified number of exposures through the indicated blue color filter. If autoguiding is active at the beginning of this sequence, it remains active, i.e. the guide probe is moved to compensate for the telescope motion. Parameters are available for changing the default CCD configuration. When the CCD windowing flag is set to F (false), the full CCD is read out, regardless of the window parameters.

See Section 2.2.2 for an explanation and example of jitter mode operation

Label	Parameter	Default	Units	Notes
Number of exposures	SEQ.NEXPO	1		
List of exposure times	WIN1.UIT1	(none)	seconds	
List of telescope RA offsets	TARG.OFFSETALPHA	1	arcsec	
List of telescope DEC offsets	TARG.OFFSETDELTA	1	arcsec	
Blue color filter	FILT4.NAME	(none)		Menu
CCD readout speed	READ.SPEED	normal		Menu
CCD windowing flag	WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of window	WIN1.STRX	1		Only used if ST = T
First row of window	WIN1.STRY	1		Only used if ST = T
Number of columns	WIN1.NX	1124		Only used if ST = T
Number of rows	WIN1.NY	1024		Only used if ST = T
CCD X binning	WIN1.BINX	1		
CCD Y binning	WIN1.BINY	1		

3.1.5 BIMGCT01: Acquire a series of bias or dark frames

This calibration template acquires the number of bias or dark frames specified by the parameter Number of exposures. Bias frames are acquired if the exposure time is set to zero (0). Dark frames are acquired if the exposure time is non-zero. Parameters are available for changing the default CCD configuration. When the CCD windowing flag is set to F (false), the full CCD is read out, regardless of the window parameters

.

Label	Parameter	Default	Units	Notes
Number of exposures	SEQ.NEXPO	1		
Exposure time	WIN1.UIT1	0	seconds	
CCD readout speed	READ.SPEED	normal		Menu
CCD windowing flag	WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of window	WIN1.STRX	1		Only used if ST = T
First row of window	WIN1.STRY	1		Only used if ST = T
Number of columns	WIN1.NX	1124		Only used if ST = T
Number of rows	WIN1.NY	1024		Only used if ST = T
CCD X binning	WIN1.BINX	1		
CCD Y binning	WIN1.BINY	1		

3.1.6 BIMGCT02: Acquire a series of flats (automatic exposure time calculation)

This calibration template acquires the number of imaging flats specified by the parameter Number of exposures through the indicated blue color filter, with approximately the requested intensity level. If the parameter CAL.EXT is set to T (true), dome flats are obtained (the parameter Flat field lamp is then ignored). If it is set to F (false), the specified flat field lamp from the EMMI calibration unit is used as light source. Parameters are available for changing the default CCD configuration. When the CCD windowing flag is set to F (false), the full CCD is read out, regardless of the window parameters.

In the execution of this template, the exposure time is computed automatically as follows:

- A windowed bias frame is acquired.
- A windowed dome flat with a short exposure time is acquired.
- The windowed bias frame is subtracted from the windowed dome flat and the mean intensity is computed.

Based on the mean intensity and the requested intensity, an exposure time is automatically computed

.

Label	Parameter	Default	Units	Notes
Number of exposures	SEQ.NEXPO	1		
Requested intensity level	EXPLEVEL	20000	ADU	
External flat flag	CAL.EXT	T		T = dome lamp; F = adapter calibration unit
Flat field lamp	LAMP.NAME	FFBlue		Used only if CAL.EXT = F
Blue color filter	FILT4.NAME	(none)		Menu
CCD readout speed	READ.SPEED	normal		Menu
CCD windowing flag	WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of window	WIN1.STRX	1		Only used if ST = T
First row of window	WIN1.STRY	1		Only used if ST = T
Number of columns	WIN1.NX	1124		Only used if ST = T
Number of rows	WIN1.NY	1024		Only used if ST = T
CCD X binning	WIN1.BINX	1		
CCD Y binning	WIN1.BINY	1		

3.1.7 BIMGCT03: Acquire sky (twilight) flats (automatic exposure time calculation)

This calibration template acquires the number of sky (twilight) flats specified by the parameter Number of exposures through the indicated blue color filter, with approximately the requested intensity level. Before each exposure, the telescope is offset by the specified RA and DEC offsets.

The exposure time is computed automatically as follows:

- A windowed bias frame is acquired.
- A windowed sky flat with a short exposure time is acquired.
- The windowed bias frame is subtracted from the windowed flat and the mean intensity is computed.

Based on the mean intensity and the requested intensity, an exposure time sequence is automatically computed using the Tyson & Gal algorithm.

During the evening twilight, the sequence is started only if the exposure time of the first frame is 5 secs or greater. The sequence terminates when the specified number of exposures have been acquired, or when the calculated exposure time exceeds 200 secs.

During the morning twilight, the sequence is started only if the exposure time of the first frame is 200 secs or less. The sequence terminates when the specified number of exposures have been taken, or when the calculated exposure time becomes shorter than 5 secs.

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Label	Parameter	Default	Units	Notes
Number of exposures	SEQ.NEXPO	1		
Requested intensity level	EXPLEVEL	20000	ADU	
Blue color filter	FILT4.NAME	(none)		Menu
CCD readout speed	READ.SPEED	normal		Menu
CCD windowing flag	WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of window	WIN1.STRX	1		Only used if ST = T
First row of window	WIN1.STRY	1		Only used if ST = T
Number of columns	WIN1.NX	1124		Only used if ST = T
Number of rows	WIN1.NY	1024		Only used if ST = T
CCD X binning	WIN1.BINX	1		
CCD Y binning	WIN1.BINY	1		
Telescope RA offset	TARG.OFFSETALPHA	10	arcsec	
Telescope DEC offset	TARG.OFFSETDELTA	0	arcsec	

3.1.8 BIMGCT04: Acquire a focus frame

This calibration template acquires a “thru focus” focus frame.[1] It takes a single exposure through the indicated blue color filter. Before this exposure is started, the telescope focus is adjusted by (-Telescope focus offset x Number of subexposures/2), and the telescope is offset in the specified direction by (-Telescope offset x Number of subexposures/2). The exposure is subdivided in the specified number of subexposures, of duration approximately equal to the value given by the parameter Subexposure time. Between consecutive subexposures, the shutter is closed but the CCD is not read out (in other words, the exposure is paused), the telescope focus is adjusted by the indicated offset, the telescope is offset by the specified amount in the specifed direction, and when this is completed, the shutter is reopened (the exposure is resumed). When all the subexposures have been acquired, the CCD is read out, the telescope is moved back to its original position, and the original focus is restored.

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Label	Parameter	Default	Units	Notes
Blue color filter	FILT4.NAME	(none)		Menu
Subexposure time	WIN1.UIT1	20	seconds	
Number of subexposures	SEQ.NEXPO	9		
Telescope focus offset	FOCUSSSTE P	0.03	mm	
Telescope offset	OFFSET	10	arcsec	
Direction of telescope offset	OFFSETDIR	ALPHA		ALPHA = RA; DELTA = DEC

1. Note that the image analyzer is calibrated so as to keep the telescope in focus after an image analysis. Accordingly, this template is used mostly to check the focus after the first image analysis.

3.2 BLMD Templates

TABLE 2 BLMD Template Quick Reference

Template	Short Description
BLMDAT01	Preset to coordinates - no operator intervention
BLMDAT02	Interactive presetting to specific slit position
BLMDOT01	Normal single spectroscopic exposure
BLMDCT01	Acquire a series of bias or dark frames
BLMDCT02	Acquire a series of flats (automatic exptime calculation)
BLMDCT03	Sky flat (slit transfer function - automatic exptime calculation)
BLMDCT07	Acquire wavelength calibration frames

3.2.1 BLMDAT01: Preset to coordinates

This acquisition template presets the telescope to the coordinates of the Target associated with this Observation Block and applies the requested rotator offset. If a value between -359.99 and +359.99 is specified for the latter, the orientation of the slit on the sky will differ from the default one by this offset. If a rotator offset angle of -9999 is set, the slit orientation on the sky will be defined by the parallactic angle at the time of preset. Differential tracking rates can be set. An appropriate guide star will be selected automatically. Parameters associated with the guide star are in the TSF for possible future implementation of manual options of guide star selection (a feature which is supported by the TCS) but they are not currently used and can therefore be safely ignored by the P2PP user.

When this AT is executed, the operator will center the object by eye on the slit viewer.

When using this AT in service mode, users **must** provide a finding chart.

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Label	Parameter	Default	Units	Notes
Rotator offset angle	ROT.OFFANGLE	0	degrees	-9999: slit at parallactic angle
Differential tracking in RA	TARG.ADDVELALPHA	0	arcsec/sec	
Differential tracking in DEC	TARG.ADDVELDELTA	0	arcsec/sec	
RA of guide star	GS1.ALPHA	00:00:00.0		Not used
DEC of guide star	GS1.DELTA	00:00:00.0		Not used
Magnitude of guide star	GS1.MAG	12		Not used

3.2.2 BLMDAT02: Interactive presetting to specific slit position

This acquisition template allows the user to position an object on the medium-dispersion slit. It is used for acquiring objects too faint to be seen on the slit viewer. The location of the slit must have been determined beforehand; it is passed to the template through the parameter Pixel coordinates (the X-coordinate is along the long direction of the slit, and accordingly, is in general less critical than the Y-coordinate). If the preset flag is set to T (true), the template first presets the telescope to the coordinates of the Target associated with this Observation Block, applies the requested rotator offset (see below) and then takes an exposure of the field with the specified exposure time and through the selected blue color filter. This image (which is actually taken in BIMG mode) is displayed on a Real-Time Display where the operator is prompted to identify with the cursor the user-specified object (e.g. as marked on a finding chart). The telescope offset required to bring this object to the desired location on the slit is computed, and the operator is given the choice between not applying it, applying it blindly, or applying it and taking a new exposure (possibly of different duration) to check the outcome. In the latter case, the resulting image is again displayed on the RTD and the operator can repeat the above procedure at will.

If the preset flag is set to F (false), the first step above is skipped (telescope preset and rotator offset), and the template proceeds immediately to taking an image of the field at the current telescope position. The rest of the procedure is as described above. This option is generally used after long exposures on a given object, to check that the telescope is still at the correct position and to make the adjustments possibly needed before starting new (long) exposures of the same object.

If a value between -359.99 and +359.99 is specified for the rotator offset angle, the orientation of the slit on the sky will differ from the default one by this offset. If a rotator offset angle of -9999 is set, the slit orientation on the sky will be defined by the parallactic angle at the time of preset.

If this AT is used during service observing, a finding chart **must** be supplied by the user.

Label	Parameter	Default	Units	Notes
Exposure time	WIN1.UIT1	10	seconds	
Pixel coordinates	PIXELCOORD	(CCD center)		
Blue color filter	FILT4.NAME	Free		
Preset flag	PRESET.NEW	T		T=preset; F=no preset
Rotator offset angle	ROT.OFFAN-GLE	0	degrees	-9999: slit at parallactic angle
RA of guide star	GS1.ALPHA	00:00:00.0		Not used
DEC of guide star	GS1.DELTA	00:00:00.0		Not used
Magnitude of guide star	GS1.MAG	12		Not used

3.2.3 BLMDOT01: Normal single spectroscopic exposure

This template acquires one spectroscopic exposure with the given exposure time. The medium-dispersion slit width and length are adjusted to the specified values. The selected blue grating is tilted to obtain the requested central wavelength. A blue color filter and a neutral density filter can be put in the beam. Parameters are available for changing the default CCD configuration. When the CCD windowing flag is set to F (false), the full CCD is read out, regardless of the window parameters.

Label	Parameter	Default	Units	Notes
Exposure time	WIN1.UIT1	(none)	seconds	
Slit width	SLIT1.WID	1	arcsec	
Slit length	SLIT1.LEN	200	arcsec	
Blue grating	GRAT2.NAME	(none)		Menu
Blue central wavelength	GRAT2.WLEN	0	nm	
Blue color filter	FILT4.NAME	Free		Menu
CCD readout speed	READ.SPEED	normal		Menu
CCD windowing flag	WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of window	WIN1.STRX	1		Only used if ST = T
First row of window	WIN1.STRY	1		Only used if ST = T
Number of columns	WIN1.NX	1124		Only used if ST = T
Number of rows	WIN1.NY	1024		Only used if ST = T
CCD X binning	WIN1.BINX	1		
CCD Y binning	WIN1.BINY	1		
Blue neutral density	FILT3.NAME	Free		Menu

3.2.4 BLMDCT01: Acquire a series of bias or dark frames

This calibration template acquires the number of bias or dark frames specified by the parameter Number of exposures. Bias frames are acquired if the exposure time is set to zero (0). Dark frames are acquired if the exposure time is non-zero. Parameters are available for changing the default CCD configuration. When the CCD windowing flag is set to F (false), the full CCD is read out, regardless of the window parameters.

.

Label	Parameter	Default	Units	Notes
Number of exposures	SEQ.NEXPO	1		
Exposure time	WIN1.UIT1	0	seconds	
CCD readout speed	READ.SPEED	normal		Menu
CCD windowing flag	WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of window	WIN1.STRX	1		Only used if ST = T
First row of window	WIN1.STRY	1		Only used if ST = T
Number of columns	WIN1.NX	1124		Only used if ST = T
Number of rows	WIN1.NY	1024		Only used if ST = T
CCD X binning	WIN1.BINX	1		
CCD Y binning	WIN1.BINY	1		

3.2.5 BLMDCT02: Acquire a series of flats (automatic exposure time calculation)

This calibration template acquires the number of spectroscopic flats specified by the parameter Number of exposures, with approximately the requested intensity level. The medium-dispersion slit width and length are adjusted to the specified values. The selected blue grating is tilted to obtain the requested central wavelength. A blue color filter and a neutral density filter can be put in the beam. If the parameter CAL.EXT is set to T (true), dome flats are obtained (the parameter Flat field lamp is then ignored). If it is set to F (false), the specified flat field lamp from the EMMI calibration unit is used as light source. Parameters are available for changing the default CCD configuration. When the CCD windowing flag is set to F (false), the full CCD is read out, regardless of the window parameters.

In the execution of this template, the exposure time is computed automatically as follows:

- A full window flat with a short exposure time is acquired in 4x4 binned mode.
- The resulting frame is displayed and the user is prompted to delimit with the cursor the region of the spectrum on which the requested intensity level should be achieved. This region is used to define the readout window of the CCD for the next two exposures.
- A bias frame is acquired with the CCD windowing defined in the previous step.
- A flat with a short exposure time is acquired, with the same CCD windowing.
- The windowed bias frame is subtracted from the windowed flat and the mean intensity is computed.

Based on the mean intensity and the requested intensity, an exposure time is automatically computed.

Label	Parameter	Default	Units	Notes
Number of exposures	SEQ.NEXPO	1		
Requested intensity level	EXPLEVEL	20000	ADU	
External flat flag	CAL.EXT	T		T = dome lamp; F = adapter calibration unit
Flat field lamp	LAMP.NAME	FFBlue		Used only if CAL.EXT = F
Slit width	SLIT1.WID	1	arcsec	
Slit length	SLIT1.LEN	200	arcsec	
Blue grating	GRAT2.NAME	(none)		Menu
Blue central wavelength	GRAT2.WLEN	0	nm	
Blue color filter	FILT4.NAME	Free		Menu
CCD readout speed	READ.SPEED	normal		Menu
CCD windowing flag	WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of window	WIN1.STRX	1		Only used if ST = T
First row of window	WIN1.STRY	1		Only used if ST = T
Number of columns	WIN1.NX	1124		Only used if ST = T
Number of rows	WIN1.NY	1024		Only used if ST = T
CCD X binning	WIN1.BINX	1		
CCD Y binning	WIN1.BINY	1		
Blue neutral density	FILT3.NAME	Free		Menu

3.2.6 BLMDCT03: Sky flat (slit transfer function - automatic exptime calculation)

This calibration template acquires one spectroscopic sky flat, with approximately the requested intensity level. The medium-dispersion slit width and length are adjusted to the specified values. The selected blue grating is tilted to obtain the requested central wavelength. A blue color filter and a neutral density filter can be put in the beam. Parameters are available for changing the default CCD configuration. When the CCD windowing flag is set to F (false), the full CCD is read out, regardless of the window parameters.

In the execution of this template, the exposure time is computed automatically as follows:

- A full window flat with a short exposure time is acquired in 4x4 binned mode.
- The resulting frame is displayed and the user is prompted to delimit with the cursor the region of the spectrum on which the requested intensity level should be achieved. This region is used to define the readout window of the CCD for the next two exposures.
- A bias frame is acquired with the CCD windowing defined in the previous step.
- A flat with a short exposure time is acquired, with the same CCD windowing.
- The windowed bias frame is subtracted from the windowed flat and the mean intensity is computed.

Based on the mean intensity and the requested intensity, an exposure time is automatically computed.

Label	Parameter	Default	Units	Notes
Requested intensity level	EXPLEVEL	20000	ADU	
Slit width	SLIT1.WID	1	arcsec	
Slit length	SLIT1.LEN	200	arcsec	
Blue grating	GRAT2.NAME	(none)		Menu
Blue central wavelength	GRAT2.WLEN	0	nm	
Blue color filter	FILT4.NAME	Free		Menu
CCD readout speed	READ.SPEED	normal		Menu
CCD windowing flag	WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of window	WIN1.STRX	1		Only used if ST = T
First row of window	WIN1.STRY	1		Only used if ST = T
Number of columns	WIN1.NX	1124		Only used if ST = T
Number of rows	WIN1.NY	1024		Only used if ST = T
CCD X binning	WIN1.BINX	1		
CCD Y binning	WIN1.BINY	1		
Blue neutral density	FILT3.NAME	Free		Menu

3.2.7 BLMDCT07: Acquire wavelength calibration frames

This template acquires one spectroscopic wavelength calibration frame using SLIT1 with width WID and length LEN, and GRAT2 with a central wavelength of WLEN nanometers (nm). Neutral filter FILT3 and order separating filter FILT4 can be specified. This template acquires one spectroscopic wavelength calibration frame using. Both LAMP1 and LAMP2 can be used. Parameters are available for changing the default CCD configuration.

Label	Parameter	Default	Units	Notes
Lamp1 exposure time	LAMP1.EXPTIME	1	seconds	
Calibration lamp1	LAMP1.NAME	(no lamp)		Menu
Lamp2 exposure time	LAMP2.EXPTIME	1		
Calibration lamp2	LAMP2.NAME	(no lamp)		Menu
Slit width	SLIT1.WID	1	arcsec	
Slit length	SLIT1.LEN	200	arcsec	
Blue grating	GRAT2.NAME	(none)		Menu
Blue central wavelength	GRAT2.WLEN	0	nm	
Blue color filter	FILT4.NAME	Free		Menu
CCD readout speed	READ.SPEED	normal		Menu
CCD windowing flag	WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of window	WIN1.STRX	1		Only used if ST = T
First row of window	WIN1.STRY	1		Only used if ST = T
Number of columns	WIN1.NX	1124		Only used if ST = T
Number of rows	WIN1.NY	1024		Only used if ST = T
CCD X binning	WIN1.BINX	1		
CCD Y binning	WIN1.BINY	1		
Blue neutral density	FILT3.NAME	Free		Menu

3.3 RILD Templates

TABLE 3 RILD Template Quick Reference

Template	Short Description
RILDAT01	Preset to coordinates - no operator intervention
RILDAT02	Interactive presetting to specific PIXEL position (imaging)
RILDAT03	Interactive presetting to specific SLIT position (spectroscopy)
RILDAT04	Interactive presetting for MOS mask alignment
RILDOT01	Normal single imaging exposure
RILDOT02	Jitter mode imaging exposure (combined offset)
RILDOT03	Normal single spectroscopic exposure
RILDCT01	Acquire a series of bias or dark frames
RILDCT02	Acquire a series of imaging flats (automatic exptime calculation)
RILDCT03	Acquire a series of imaging sky (twilight) flats (automatic exptime calculation)
RILDCT04	Acquire an imaging focus frame (thru-focus mode)
RILDCT05	Acquire an imaging focus frame (focus wedge mode)
RILDCT07	Acquire wavelength calibration frames (spectroscopy)
RILDCT12	Acquire spectroscopic flat field frames
RILDCT13	Spectroscopic sky flat (slit transfer function - automatic exptime calculation)

3.3.1 RILDAT01: Preset to coordinates - no operator intervention

This acquisition template presets the telescope to the coordinates of the Target associated with this Observation Block and applies the requested rotator offset (the orientation of the CCD will differ from the default one by this offset). Differential tracking rates can be set. An appropriate guide star will be selected automatically. Parameters associated with the guide star are in the TSF for possible future implementation of manual options of guide star selection (a feature which is supported by the TCS) but they are not currently used and can therefore be safely ignored by the P2PP user. There is no further operator intervention.

.

Label	Parameter	Default	Units	Notes
Rotator offset angle	ROT.OFFANGLE	0	degrees	
Differential tracking in RA	TARG.ADDVELALPHA	0	arcsec/sec	
Differential tracking in DEC	TARG.ADDVELDELTA	0	arcsec/sec	
RA of guide star	GS1.ALPHA	00:00:00.0		Not used
DEC of guide star	GS1.DELTA	00:00:00.0		Not used
Magnitude of guide star	GS1.MAG	12		Not used

3.3.2 RILDAT02: Interactive presetting to specific PIXEL position (imaging)

This acquisition template allows the user to position an object on the CCD pixel specified through the parameter Pixel coordinates. If the preset flag is set to T (true), it first presets the telescope to the coordinates of the Target associated with this Observation Block, applies the requested rotator offset and then takes an exposure of the field with the specified exposure time and through the selected red color filter. This image is displayed on a Real-Time Display where the operator is prompted to identify with the cursor the user-specified object (e.g. as marked on a finding chart). The telescope offset required to bring this object to the desired CCD pixel coordinates is computed, and the operator is given the choice between not applying it, applying it blindly, or applying it and taking a new exposure (possibly of different duration) to check the outcome. In the latter case, the resulting image is again displayed on the RTD and the operator can repeat the above procedure at will.

If the preset flag is set to F (false), the first step above is skipped (telescope preset and rotator offset), and the template proceeds immediately to taking an image of the field at the current telescope position. The rest of the procedure is as described above. This option is generally used after long exposures on a given field, to check that the telescope is still at the correct position and to make the adjustments possibly needed before starting new (long) exposures of the same field.

If this AT is used during service observing, a finding chart **must** be supplied by the user.

.

Label	Parameter	Default	Units	Notes
Exposure time	WIN1.UIT1	10	seconds	
Pixel coordinates	PIXELCOORD	(CCD center)		
Red color filter	FILT2.NAME	Free		
Preset flag	PRESET.NEW	T		T=preset; F=no preset
Rotator offset angle	ROT.OFFAN-GLE	0	degrees	-9999: slit at parallactic angle
RA of guide star	GS1.ALPHA	00:00:00.0		Not used
DEC of guide star	GS1.DELTA	00:00:00.0		Not used
Magnitude of guide star	GS1.MAG	12		Not used

3.3.3 RILDAT03: Interactive presetting to specific SLIT position (spectroscopy)

This acquisition template allows the user to position an object at a given location on a specified long slit. The slit is referred to by its width in the menu attached to the parameter Starplate. The place along the long dimension of the slit (Y direction) where the object should be located is defined by the parameter Slit Y pixel coordinate. If the preset flag is set to T (true), the template first presets the telescope to the coordinates of the Target associated with this Observation Block, applies the requested rotator offset (see below) and then takes an exposure of the field with the specified exposure time and through the selected red color filter. This image is displayed on a Real-Time Display where the operator is prompted to identify with the cursor the user-specified object (e.g. as marked on a finding chart). The telescope offset required to bring this object to the desired location on the selected slit is computed, and the operator is given the choice between not applying it, applying it blindly, or applying it and taking a new exposure (possibly of different duration) to check the outcome. In the latter case, the resulting image is again displayed on the RTD and the operator can repeat the above procedure at will.

If the preset flag is set to F (false), the first step above is skipped (telescope preset and rotator offset), and the template proceeds immediately to taking an image of the field at the current telescope position. The rest of the procedure is as described above. This option is generally used after long exposures on a given object, to check that the telescope is still at the correct position and to make the adjustments possibly needed before starting new (long) exposures of the same object.

If a value between -359.99 and +359.99 is specified for the rotator offset angle, the orientation of the slit on the sky will differ from the default one by this offset. If a rotator offset angle of -9999 is set, the slit orientation on the sky will be defined by the parallactic angle at the time of preset.

This template is used to acquire a target to be observed in grism spectroscopy with template RILDOT03. The user must be aware that templates within an observation block are fully independent from each other. Accordingly, it is essential that the user make sure that the slit specified in the present template through the parameter Starplate is the same slit that will be used for observation with template RILDOT03. The control system has no way to check for possible mismatch of slit specification between RILDAT02 and RILDOT03. Such mismatch, if it occurs, will result in the object being out of the slit for the spectroscopic observation. Note also that the parameter Starplate in this acquisition template is used only as reference to get the slit position, but that the slit is not actually inserted in the light beam to take the exposure(s). Should one wish to acquire an image of the object through the slit, this can be done using template RILDOT01, setting the parameter Starplate to the appropriate slit.

If this AT is used during service observing, a finding chart **must** be supplied by the user.

.

Label	Parameter	Default	Units	Notes
Exposure time	WIN1.UIT1	10	seconds	
Slit Y pixel coordinate	PIXEL.Y	1024		
Starplate	SLIT2.NAME	(none)		Menu
Red color filter	FILT2.NAME	Free		
Preset flag	PRESET.NEW	T		T=preset; F=no preset
Rotator offset angle	ROT.OFFAN-GLE	0	degrees	-9999: slit at parallactic angle
RA of guide star	GS1.ALPHA	00:00:00.0		Not used
DEC of guide star	GS1.DELTA	00:00:00.0		Not used
Magnitude of guide star	GS1.MAG	12		Not used

3.3.4 RILDAT04: Interactive presetting for MOS mask alignment

This acquisition template allows the user to align a MOS mask on the sky. The X,Y coordinates of up to 3 slitlets are given through the parameters Reference pixel 1, 2, and 3. These coordinates must have been determined before from a lamp exposure taken through the mask, without grism. If the preset flag is set to T (true), the template first presets the telescope to the coordinates of the Target associated with this Observation Block, applies the requested rotator offset, and then takes an exposure of the field with the specified exposure time and through the selected red color filter. This image is displayed on a Real-Time Display where the operator is prompted to identify with the cursor the 3 reference objects to be brought to the coordinates of the 3 reference slitlets. The telescope offsets required to bring each object to its desired location are computed,[1] and their consistency is checked. They are then averaged, and the operator is given the choice between not applying the resulting offset, applying it blindly, or applying it and taking a new exposure (possibly of different duration) to check the outcome. In the latter case, the resulting image is again displayed on the RTD and the operator can repeat the above procedure at will.[2]

1. The alignment is restricted to altitude and azimuth offsets; no rotator offset is computed nor applied.
2. After completion of this acquisition procedure, it is strongly recommended to take an image of the field through the mask (using template RILDOT01) to verify that the alignment stars are indeed visible through the slitlets.

If the preset flag is set to F (false), the first step above is skipped (telescope preset and rotator offset), and the template proceeds immediately to taking an image of the field at the current telescope position. The rest of the procedure is as described above. This option is generally used after long exposures on a given field, to check that the telescope is still at the correct position and to make the adjustments possibly needed before starting new (long) exposures of the same field.

Label	Parameter	Default	Units	Notes
Exposure time	WIN1.UIT1	10	seconds	
Preset flag	PRESET.NEW	T		T=preset; F=no preset
Rotator offset angle	ROT.OFFAN-GLE	0	degrees	
RA of guide star	GS1.ALPHA	00:00:00.0		Not used
DEC of guide star	GS1.DELTA	00:00:00.0		Not used
Magnitude of guide star	GS1.MAG	12		Not used
Reference pixel 1	PIXELCOORD1	(CCD center)		
Reference pixel 2	PIXELCOORD2	(CCD center)		
Reference pixel 3	PIXELCOORD3	(CCD center)		
Red color filter	FILT2.NAME	Free		

3.3.5 RILD0T01: Normal single imaging exposure

This template acquires one image through the specified red color filter with the given exposure time. Parameters are available for changing the default CCD configuration. When the CCD windowing flag is set to F (false), the full CCD is read out, regardless of the window parameters.

For normal imaging, parameter Starplate is set to free. However, one can also use this template to take an image of objects to be observed in spectroscopy (with template RILDOT03) through either the selected long slit or the MOS mask, or for coronographic observations. The value of parameter Starplate is then specified accordingly.

Label	Parameter	Default	Units	Notes
Exposure time	WIN1.UIT1	(none)	seconds	
Starplate	SLIT2.NAME	Free		Menu
Red color filter	FILT2.NAME	(none)		Menu
CCD readout speed	READ.SPEED	fast		Menu
CCD windowing flag	WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of window	WIN1.STRX	1		Only used if ST = T
First row of window	WIN1.STRY	1		Only used if ST = T
Number of columns	WIN1.NX	2086		Only used if ST = T
Number of rows	WIN1.NY	2046		Only used if ST = T
CCD X binning	WIN1.BINX	1		
CCD Y binning	WIN1.BINY	1		

3.3.6 RILDOT02: Jitter mode exposure (combined offset)

This template acquires the specified number of exposures through the indicated red color filter. If autoguiding is active at the beginning of this sequence, it remains active, i.e. the guide probe is moved to compensate for the telescope motion. Parameters are available for changing the default CCD configuration. When the CCD windowing flag is set to F (false), the full CCD is read out, regardless of the window parameters.

See Section 2.2.2 for an explanation and example of jitter mode operation.

.

Label	Parameter	Default	Units	Notes
Number of exposures	SEQ.NEXPO	1		
List of exposure times	WIN1.UIT1	(none)	seconds	
List of telescope RA offsets	TARG.OFFSETALPHA	1	arcsec	
List of telescope DEC offsets	TARG.OFFSETDELTA	1	arcsec	
Red color filter	FILT2.NAME	(none)		Menu
CCD readout speed	READ.SPEED	fast		Menu
CCD windowing flag	WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of window	WIN1.STRX	1		Only used if ST = T
First row of window	WIN1.STRY	1		Only used if ST = T
Number of columns	WIN1.NX	2086		Only used if ST = T
Number of rows	WIN1.NY	2046		Only used if ST = T
CCD X binning	WIN1.BINX	1		
CCD Y binning	WIN1.BINY	1		

3.3.7 RILD0T03: Normal single spectroscopic exposure

This template acquires one spectroscopic exposure through the specified slit (parameter Starplate), red color filter, and grism, with the given exposure time. Parameters are available for changing the default CCD configuration. When the CCD windowing flag is set to F (false), the full CCD is read out, regardless of the window parameters.

Label	Parameter	Default	Units	Notes
Exposure time	WIN1.UIT1	(none)	seconds	
Starplate	SLIT2.NAME	(none)		Menu
Red color filter	FILT2.NAME	Free		Menu
Grism	GRIS1.NAME	(none)		Menu
CCD readout speed	READ.SPEED	normal		Menu
CCD windowing flag	WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of window	WIN1.STRX	1		Only used if ST = T
First row of window	WIN1.STRY	1		Only used if ST = T
Number of columns	WIN1.NX	2086		Only used if ST = T
Number of rows	WIN1.NY	2046		Only used if ST = T
CCD X binning	WIN1.BINX	1		

Label	Parameter	Default	Units	Notes
CCD Y binning	WIN1.BINY	1		

3.3.8 RILDCT01: Acquire a series of bias or dark frames

This calibration template acquires the number of bias or dark frames specified by the parameter Number of exposures. Bias frames are acquired if the exposure time is set to zero (0). Dark frames are acquired if the exposure time is non-zero. Parameters are available for changing the default CCD configuration. When the CCD windowing flag is set to F (false), the full CCD is read out, regardless of the window parameters.

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Label	Parameter	Default	Units	Notes
Number of exposures	SEQ.NEXPO	1		
Exposure time	WIN1.UIT1	0	seconds	
CCD readout speed	READ.SPEED	normal		Menu
CCD windowing flag	WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of window	WIN1.STRX	1		Only used if ST = T
First row of window	WIN1.STRY	1		Only used if ST = T
Number of columns	WIN1.NX	2086		Only used if ST = T
Number of rows	WIN1.NY	2046		Only used if ST = T
CCD X binning	WIN1.BINX	1		
CCD Y binning	WIN1.BINY	1		

3.3.9 RILDCT02: Acquire a series of imaging flats (automatic exposure time calculation)

This calibration template acquires the number of imaging flats specified by the parameter Number of exposures through the indicated red color filter, with approximately the requested intensity level. If the parameter CAL.EXT is set to T (true), dome flats are obtained (the parameter Flat field lamp is then ignored). If it is set to F (false), the specified flat field lamp from the EMMI calibration unit is used as light source. Parameters are available for changing the default CCD configuration. When the CCD windowing flag is set to F (false), the full CCD is read out, regardless of the window parameters.

In the execution of this template, the exposure time is computed automatically as follows:

- A windowed bias frame is acquired.
- A windowed dome flat with a short exposure time is acquired.
- The windowed bias frame is subtracted from the windowed dome flat and the mean intensity is computed.

Based on the mean intensity and the requested intensity, an exposure time is automatically computed

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Label	Parameter	Default	Units	Notes
Number of exposures	SEQ.NEXPO	1		
Requested intensity level	EXPLEVEL	20000	ADU	
External flat flag	CAL.EXT	T		T = dome lamp; F = adapter calibration unit
Flat field lamp	LAMP.NAME	FFRed		Used only if CAL.EXT = F
Starplate	SLIT2.NAME	(none)		Menu
Red color filter	FILT2.NAME	Free		Menu
CCD readout speed	READ.SPEED	fast		Menu
CCD windowing flag	WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of window	WIN1.STRX	1		Only used if ST = T
First row of window	WIN1.STRY	1		Only used if ST = T
Number of columns	WIN1.NX	2086		Only used if ST = T
Number of rows	WIN1.NY	2046		Only used if ST = T
CCD X binning	WIN1.BINX	1		
CCD Y binning	WIN1.BINY	1		

3.3.10 RILDCT03: Acquire imaging sky (twilight) flats (automatic exposure time calculation)

This calibration template acquires the number of sky (twilight) flats specified by the parameter Number of exposures through the indicated red color filter, with approximately the requested intensity level. A starplate (long slit, coronographic mask) may possibly be inserted in the light beam. Before each exposure, the telescope is offset by the specified RA and DEC offsets.

The exposure time is computed automatically as follows:

- A windowed bias frame is acquired.
- A windowed sky flat with a short exposure time is acquired.
- The windowed bias frame is subtracted from the windowed flat and the mean intensity is computed.

Based on the mean intensity and the requested intensity, an exposure time sequence is automatically computed using the Tyson & Gal algorithm.

During the evening twilight, the sequence is started only if the exposure time of the first frame is 5 secs or greater. The sequence terminates when the specified number of exposures have been acquired, or when the calculated exposure time exceeds 200 secs.

During the morning twilight, the sequence is started only if the exposure time of the first frame is 200 secs or less. The sequence terminates when the specified number of exposures have been taken, or when the calculated exposure time becomes shorter than 5 secs.

Label	Parameter	Default	Units	Notes
Number of exposures	SEQ.NEXPO	1		
Requested intensity level	EXPLEVEL	20000	ADU	
Starplate	SLIT2.NAME	(none)		Menu
Red color filter	FILT2.NAME	(none)		Menu
CCD readout speed	READ.SPEED	fast		Menu
CCD windowing flag	WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of window	WIN1.STRX	1		Only used if ST = T
First row of window	WIN1.STRY	1		Only used if ST = T
Number of columns	WIN1.NX	2086		Only used if ST = T
Number of rows	WIN1.NY	2046		Only used if ST = T
CCD X binning	WIN1.BINX	1		
CCD Y binning	WIN1.BINY	1		
Telescope RA offset	TARG.OFFSETALPHA	10	arcsec	
Telescope DEC offset	TARG.OFFSETDELTA	0	arcsec	

3.3.11 RILDCT04: Acquire an imaging focus frame (thru focus method)

This calibration template acquires a “thru focus” focus frame. It takes a single exposure through the indicated red color filter. Before this exposure is started, the telescope focus is adjusted by (-Telescope focus offset x Number of subexposures/2), and the telescope is offset in the specified direction by (-Telescope offset x Number of subexposures/2). The exposure is subdivided in the specified number of subexposures, of duration approximately equal to the value given by the parameter Subexposure time. Between consecutive subexposures, the shutter is closed but the CCD is not read out (in other words, the exposure is paused), the telescope focus is adjusted by the indicated offset, the telescope is offset by the specified amount in the specifed direction, and when this is completed, the shutter is reopened (the exposure is resumed). When all the subexposures have been acquired, the CCD is read out, the telescope is moved back to its original position, and the original focus is restored.

Label	Parameter	Default	Units	Notes
Red color filter	FILT2.NAME	(none)		Menu
Subexposure time	WIN1.UIT1	20	seconds	
Number of subexposures	SEQ.NEXPO	9		
Telescope focus offset	FOCUSSSTE P	0.03	mm	
Telescope offset	OFFSET	10	arcsec	
Direction of telescope offset	OFFSETDIR	ALPHA		ALPHA = RA; DELTA = DEC

3.3.12 RILDCT05: Acquire imaging focus frame (focus wedge method)

This calibration template acquires one exposure through the specified red color filter and the focus wedge, with the given exposure time.

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Label	Parameter	Default	Units	Notes
Red color filter	FILT2.NAME	(none)		Menu
Exposure time	WIN1.UIT1	20	seconds	

3.3.13 RILDCT07: Acquire wavelength calibration frames (spectroscopy)

This template acquires one spectroscopic wavelength calibration exposure through the specified slit (parameter Starplate), red color filter, and grism. Different exposure times can be used for each of the two calibration lamps. Exposures can be taken using only one calibration lamp by leaving the parameter defining the other calibration lamp unspecified (corresponding entry field left blank) or by setting the exposure time to 0 for the other calibration lamp. Parameters are available for changing the default CCD configuration. When the CCD windowing flag is set to F (false), the full CCD is read out, regardless of the window parameters.

Label	Parameter	Default	Units	Notes
Lamp1 exposure time	LAMP1.EXPTIME	1	seconds	
Calibration lamp1	LAMP1.NAME	(no lamp)		Menu
Lamp2 exposure time	LAMP2.EXPTIME	1		
Calibration lamp2	LAMP2.NAME	(no lamp)		Menu
Starplate	SLIT2.NAME	(none)		Menu
Red color filter	FILT2.NAME	Free		Menu
Grism	GRIS1.NAME	(none)		Menu
CCD readout speed	READ.SPEED	normal		Menu
CCD windowing flag	WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of window	WIN1.STRX	1		Only used if ST = T
First row of window	WIN1.STRY	1		Only used if ST = T
Number of columns	WIN1.NX	2086		Only used if ST = T
Number of rows	WIN1.NY	2046		Only used if ST = T
CCD X binning	WIN1.BINX	1		
CCD Y binning	WIN1.BINY	1		

3.3.14 RILDCT12: Acquire spectroscopic flat field frames

This calibration template acquires the number of spectroscopic flats specified by the parameter Number of exposures, through the specified slit (parameter Starplate), red color filter, and grism, with approximately the requested intensity level. If the parameter CAL.EXT is set to T (true), dome flats are obtained (the parameter Flat field lamp is then ignored). If it is set to F (false), the specified flat field lamp from the EMMI calibration unit is used as light source. Parameters are available for changing the default CCD configuration. When the CCD windowing flag is set to F (false), the full CCD is read out, regardless of the window parameters.

In the execution of this template, the exposure time is computed automatically as follows:

- A full window flat with a short exposure time is acquired in 4x4 binned mode.

- The resulting frame is displayed and the user is prompted to delimit with the cursor the region of the spectrum on which the requested intensity level should be achieved. This region is used to define the readout window of the CCD for the next two exposures.
- A bias frame is acquired with the CCD windowing defined in the previous step.
- A flat with a short exposure time is acquired, with the same CCD windowing.
- The windowed bias frame is subtracted from the windowed flat and the mean intensity is computed.

Based on the mean intensity and the requested intensity, an exposure time is automatically computed.

Label	Parameter	Default	Units	Notes
Number of exposures	SEQ.NEXPO	1		
Requested intensity level	EXPLEVEL	20000	ADU	
External flat flag	CAL.EXT	T		T = dome lamp; F = adapter calibration unit
Flat field lamp	LAMP.NAME	FFRed		Used only if CAL.EXT = F
Starplate	SLIT2.NAME	(none)		Menu
Red color filter	FILT2.NAME	Free		Menu
Grism	GRIS1.NAME	(none)		Menu
CCD readout speed	READ.SPEED	normal		Menu
CCD windowing flag	WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of window	WIN1.STRX	1		Only used if ST = T
First row of window	WIN1.STRY	1		Only used if ST = T
Number of columns	WIN1.NX	2086		Only used if ST = T
Number of rows	WIN1.NY	2046		Only used if ST = T
CCD X binning	WIN1.BINX	1		
CCD Y binning	WIN1.BINY	1		

3.3.15 RILDCT13: spectroscopic sky flat (slit transfer function)

This calibration template acquires one spectroscopic sky flat through the specified slit (parameter Starplate), red color filter, and grism, with approximately the requested intensity level. Parameters are available for changing the default CCD configuration. When the CCD windowing flag is set to F (false), the full CCD is read out, regardless of the window parameters.

In the execution of this template, the exposure time is computed automatically as follows:

- A full window flat with a short exposure time is acquired in 4x4 binned mode.
- The resulting frame is displayed and the user is prompted to delimit with the cursor the region of the spectrum on which the requested intensity level should be achieved. This region is used to define the readout window of the CCD for the next two exposures.
- A bias frame is acquired with the CCD windowing defined in the previous step.
- A flat with a short exposure time is acquired, with the same CCD windowing.
- The windowed bias frame is subtracted from the windowed flat and the mean intensity is computed.

Based on the mean intensity and the requested intensity, an exposure time is automatically computed.

Label	Parameter	Default	Units	Notes
Requested intensity level	EXPLEVEL	20000	ADU	
Starplate	SLIT2.NAME	(none)		Menu
Red color filter	FILT2.NAME	Free		Menu
Grism	GRIS1.NAME	(none)		Menu
CCD readout speed	READ.SPEED	normal		Menu
CCD windowing flag	WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of window	WIN1.STRX	1		Only used if ST = T
First row of window	WIN1.STRY	1		Only used if ST = T
Number of columns	WIN1.NX	2086		Only used if ST = T
Number of rows	WIN1.NY	2046		Only used if ST = T
CCD X binning	WIN1.BINX	1		
CCD Y binning	WIN1.BINY	1		

3.4 REMD Templates

TABLE 4 REMD Template Quick Reference

Template	Short Description
REMDAT01	Preset to coordinates - no operator intervention
REMDAT02	Interactive presetting to specific slit position
REMDOT01	Obtain single medium dispersion spectroscopic exposure
REMDOT02	Obtain single echelle spectroscopic exposure
REMDCT01	Acquire a series of bias or dark frames
REMDCT02	Acquire a series of medium dispersion flats (automatic exptime calculation)
REMDCT03	Acquire a series of echelle flats (automatic exptime calculation)
REMDCT07	Acquire medium dispersion wavelength calibration frames
REMDCT08	Acquire echelle wavelength calibration frames
REMDCT12	Medium dispersion sky flat (slit transfer function - automatic exptime calculation)
REMDCT13	Echelle sky flat (slit transfer function - automatic exptime calculation)

3.4.1 REMDAT01: Preset to coordinates

This acquisition template presets the telescope to the coordinates of the Target associated with this Observation Block and applies the requested rotator offset. If a value between -359.99 and +359.99 is specified for the latter, the orientation of the slit on the sky will differ from the default one by this offset. If a rotator offset angle of -9999 is set, the slit orientation on the sky will be defined by the parallactic angle at the time of preset. Differential tracking rates can be set. An appropriate guide star will be selected automatically. Parameters associated with the guide star are in the TSF for possible future implementation of manual options of guide star selection (a feature which is supported by the TCS) but they are not currently used and can therefore be safely ignored by the P2PP user.

When this AT is executed, the operator will center the object by eye on the slit viewer

When using this AT in service mode, users **must** provide a finding chart.

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Label	Parameter	Default	Units	Notes
Rotator offset angle	ROT.OFFANGLE	0	degrees	-9999: slit at parallactic angle
Differential tracking in RA	TARG.ADDVELALPHA	0	arcsec/sec	
Differential tracking in DEC	TARG.ADDVELDELTA	0	arcsec/sec	
RA of guide star	GS1.ALPHA	00:00:00.0		Not used
DEC of guide star	GS1.DELTA	00:00:00.0		Not used
Magnitude of guide star	GS1.MAG	12		Not used

3.4.2 REMDAT02

This acquisition template allows the user to position an object on the medium-dispersion slit. It is used for acquiring objects too faint to be seen on the slit viewer. The location of the slit must have been determined beforehand; it is passed to the template through the parameter Pixel coordinates (the X-coordinate is along the long direction of the slit, and accordingly, is in general less critical than the Y-coordinate). If the preset flag is set to T (true), the template first presets the telescope to the coordinates of the Target associated with this Observation Block, applies the requested rotator offset (see below) and then takes an exposure of the field with the specified exposure time and through the selected red color filter. This image (which is actually taken in RILD mode) is displayed on a Real-Time Display where the operator is prompted to identify with the cursor the user-specified object (e.g. as marked on a finding chart). The telescope offset required to bring this object to the desired location on the slit is computed, and the operator is given the choice between not applying it, applying it blindly, or applying it and taking a new exposure (possibly of different duration) to check the outcome. In the latter case, the resulting image is again displayed on the RTD and the operator can repeat the above procedure at will.

If the preset flag is set to F (false), the first step above is skipped (telescope preset and rotator offset), and the template proceeds immediately to taking an image of the field at the current telescope position. The rest of the procedure is as described above. This option is generally used after long exposures on a given object, to check that the telescope is still at the correct position and to make the adjustments possibly needed before starting new (long) exposures of the same object.

If a value between -359.99 and +359.99 is specified for the rotator offset angle, the orientation of the slit on the sky will differ from the default one by this offset. If a rotator offset angle of -9999 is set, the slit orientation on the sky will be defined by the parallactic angle at the time of preset.

If this AT is used during service observing, a finding chart **must** be supplied by the user.

Label	Parameter	Default	Units	Notes
Exposure time	WIN1.UIT1	10	seconds	
Pixel coordinates	PIXELCOORD	(CCD center)		
Red color filter	FILT2.NAME	Free		
Preset flag	PRESET.NEW	T		T=preset; F=no preset
Rotator offset angle	ROT.OFFAN-GLE	0	degrees	-9999: slit at parallactic angle
RA of guide star	GS1.ALPHA	00:00:00.0		Not used
DEC of guide star	GS1.DELTA	00:00:00.0		Not used
Magnitude of guide star	GS1.MAG	12		Not used

3.4.3 REMDOT01: Normal single medium dispersion spectroscopic exposure

This template acquires one spectroscopic exposure with the given exposure time. The medium-dispersion slit width and length are adjusted to the specified values. The selected red grating is tilted to obtain the requested central wavelength. A red color filter and a neutral density filter can be put in the beam. Parameters are available for changing the default CCD configuration. When the CCD windowing flag is set to F (false), the full CCD is read out, regardless of the window parameters.

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Label	Parameter	Default	Units	Notes
Exposure time	WIN1.UIT1	(none)	seconds	
Slit width	SLIT1.WID	1	arcsec	
Slit length	SLIT1.LEN	200	arcsec	
Red grating	GRAT1.NAME	(none)		Menu
Red central wavelength	GRAT1.WLEN	0	nm	
Red color filter	FILT2.NAME	Free		Menu
CCD readout speed	READ.SPEED	normal		Menu
CCD windowing flag	WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of window	WIN1.STRX	1		Only used if ST = T
First row of window	WIN1.STRY	1		Only used if ST = T
Number of columns	WIN1.NX	2086		Only used if ST = T
Number of rows	WIN1.NY	2046		Only used if ST = T
CCD X binning	WIN1.BINX	1		
CCD Y binning	WIN1.BINY	1		
Red neutral density	FILT1.NAME	Free		Menu

3.4.4 REMDOT02: Obtain single echelle spectroscopic exposure

This template acquires one spectroscopic exposure with the given exposure time, with the specified echelle grating. The medium-dispersion slit width and length are adjusted to the indicated values. A grism can be specified to be used as cross-disperser, and a red color filter and a neutral density filter can be put in the beam. Parameters are available for changing the default CCD configuration. When the CCD windowing flag is set to F (false), the full CCD is read out, regardless of the window parameters.

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Label	Parameter	Default	Units	Notes
Exposure time	WIN1.UIT1	(none)	seconds	
Slit width	SLIT1.WID	1	arcsec	
Slit length	SLIT1.LEN	5	arcsec	
Echelle grating	GRAT1.NAME	(none)		Menu
Grism	GRIS1.NAME	(none)		Menu
Red color filter	FILT2.NAME	Free		Menu
CCD readout speed	READ.SPEED	normal		Menu
CCD windowing flag	WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of window	WIN1.STRX	1		Only used if ST = T
First row of window	WIN1.STRY	1		Only used if ST = T
Number of columns	WIN1.NX	2086		Only used if ST = T
Number of rows	WIN1.NY	2046		Only used if ST = T
CCD X binning	WIN1.BINX	1		
CCD Y binning	WIN1.BINY	1		
Red neutral density	FILT1.NAME	Free		Menu

3.4.5 REMDCT01: Acquire a series of bias or dark frames

This calibration template acquires the number of bias or dark frames specified by the parameter Number of exposures. Bias frames are acquired if the exposure time is set to zero (0). Dark frames are acquired if the exposure time is non-zero. Parameters are available for changing the default CCD configuration. When the CCD windowing flag is set to F (false), the full CCD is read out, regardless of the window parameters.

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Label	Parameter	Default	Units	Notes
Number of exposures	SEQ.NEXPO	1		
Exposure time	WIN1.UIT1	0	seconds	
CCD readout speed	READ.SPEED	normal		Menu
CCD windowing flag	WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of window	WIN1.STRX	1		Only used if ST = T
First row of window	WIN1.STRY	1		Only used if ST = T
Number of columns	WIN1.NX	2086		Only used if ST = T
Number of rows	WIN1.NY	2046		Only used if ST = T
CCD X binning	WIN1.BINX	1		
CCD Y binning	WIN1.BINY	1		

3.4.6 REMDCT02: Acquire a series of medium dispersion flats (automatic exptime calculation)

This calibration template acquires the number of spectroscopic flats specified by the parameter Number of exposures, with approximately the requested intensity level. The medium-dispersion slit width and length are adjusted to the specified values. The selected red grating is tilted to obtain the requested central wavelength. A red color filter and a neutral density filter can be put in the beam. If the parameter CAL.EXT is set to T (true), dome flats are obtained (the parameter Flat field lamp is then ignored). If it is set to F (false), the specified flat field lamp from the EMMI calibration unit is used as light source. Parameters are available for changing the default CCD configuration. When the CCD windowing flag is set to F (false), the full CCD is read out, regardless of the window parameters.

In the execution of this template, the exposure time is computed automatically as follows:

- A full window flat with a short exposure time is acquired in 4x4 binned mode.
- The resulting frame is displayed and the user is prompted to delimit with the cursor the region of the spectrum on which the requested intensity level should be achieved. This region is used to define the readout window of the CCD for the next two exposures.
- A bias frame is acquired with the CCD windowing defined in the previous step.
- A flat with a short exposure time is acquired, with the same CCD windowing.
- The windowed bias frame is subtracted from the windowed flat and the mean intensity is computed.

Based on the mean intensity and the requested intensity, an exposure time is automatically computed.

.

Label	Parameter	Default	Units	Notes
Number of exposures	SEQ.NEXPO	1		
Requested intensity level	EXPLEVEL	20000	ADU	
External flat flag	CAL.EXT	T		T = dome lamp; F = adapter calibration unit
Flat field lamp	LAMP.NAME	FFRed		Used only if CAL.EXT = F
Slit width	SLIT1.WID	1	arcsec	
Slit length	SLIT1.LEN	200	arcsec	
Red grating	GRAT1.NAME	(none)		Menu
Red central wavelength	GRAT1.WLEN	0	nm	
Red color filter	FILT2.NAME	Free		Menu
CCD readout speed	READ.SPEED	normal		Menu
CCD windowing flag	WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of window	WIN1.STRX	1		Only used if ST = T
First row of window	WIN1.STRY	1		Only used if ST = T
Number of columns	WIN1.NX	2086		Only used if ST = T
Number of rows	WIN1.NY	2046		Only used if ST = T
CCD X binning	WIN1.BINX	1		
CCD Y binning	WIN1.BINY	1		
Red neutral density	FILT1.NAME	Free		Menu

3.4.7 REMDCT03: Acquire a series of echelle flats (automatic exptime calculation)

This calibration template acquires the number of spectroscopic flats given by the parameter Number of exposures, using the specified echelle grating, with approximately the requested intensity level. The medium-dispersion slit width and length are adjusted to the indicated values. A grism can be specified to be used as cross-disperser, and a red color filter and a neutral density filter can be put in the beam. If the parameter CAL.EXT is set to T (true), dome flats are obtained (the parameter Flat field lamp is then ignored). If it is set to F (false), the specified flat field lamp from the EMMI calibration unit is used as light source. Parameters are available for changing the default CCD configuration. When the CCD windowing flag is set to F (false), the full CCD is read out, regardless of the window parameters.

In the execution of this template, the exposure time is computed automatically as follows:

- A full window flat with a short exposure time is acquired in 4x4 binned mode.
- The resulting frame is displayed and the user is prompted to delimit with the cursor the region of the spectrum on which the requested intensity level should be achieved. This region is used to define the readout window of the CCD for the next two exposures.
- A bias frame is acquired with the CCD windowing defined in the previous step.
- A flat with a short exposure time is acquired, with the same CCD windowing.
- The windowed bias frame is subtracted from the windowed flat and the mean intensity is computed.

Based on the mean intensity and the requested intensity, an exposure time is automatically computed.

Label	Parameter	Default	Units	Notes
Number of exposures	SEQ.NEXPO	1		
Requested intensity level	EXPLEVEL	20000	ADU	
External flat flag	CAL.EXT	T		T = dome lamp; F = adapter calibration unit
Flat field lamp	LAMP.NAME	FFRed		Used only if CAL.EXT = F
Slit width	SLIT1.WID	1	arcsec	
Slit length	SLIT1.LEN	5	arcsec	
Echelle grating	GRAT1.NAME	(none)		Menu
Grism	GRIS1.NAME	(none)		Menu
Red color filter	FILT2.NAME	Free		Menu
CCD readout speed	READ.SPEED	normal		Menu
CCD windowing flag	WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of window	WIN1.STRX	1		Only used if ST = T
First row of window	WIN1.STRY	1		Only used if ST = T
Number of columns	WIN1.NX	2086		Only used if ST = T
Number of rows	WIN1.NY	2046		Only used if ST = T
CCD X binning	WIN1.BINX	1		
CCD Y binning	WIN1.BINY	1		
Red neutral density	FILT1.NAME	Free		Menu

3.4.8 REMDCT07: Acquire medium dispersion wavelength calibration frames

This template acquires one spectroscopic wavelength calibration exposure. The medium-dispersion slit width and length are adjusted to the specified values. The selected red grating is tilted to obtain the requested central wavelength. A red color filter and a neutral density filter can be put in the beam. Different exposure times can be used for each of the two calibration lamps. Exposures can be taken using only one calibration lamp by leaving the parameter defining the other calibration lamp unspecified (corresponding entry field left blank) or by setting the exposure time to 0 for the other calibration lamp. Parameters are available for changing the default CCD configuration. When the CCD windowing flag is set to F (false), the full CCD is read out, regardless of the window parameters.

Label	Parameter	Default	Units	Notes
Lamp1 exposure time	LAMP1.EXPTIME	1	seconds	
Calibration lamp1	LAMP1.NAME	(no lamp)		Menu
Lamp2 exposure time	LAMP2.EXPTIME	1		
Calibration lamp2	LAMP2.NAME	(no lamp)		Menu
Slit width	SLIT1.WID	1	arcsec	
Slit length	SLIT1.LEN	200	arcsec	
Red grating	GRAT1.NAME	(none)		Menu
Red central wavelength	GRAT1.WLEN	0	nm	
Red color filter	FILT2.NAME	Free		Menu
CCD readout speed	READ.SPEED	normal		Menu
CCD windowing flag	WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of window	WIN1.STRX	1		Only used if ST = T
First row of window	WIN1.STRY	1		Only used if ST = T
Number of columns	WIN1.NX	2086		Only used if ST = T
Number of rows	WIN1.NY	2046		Only used if ST = T
CCD X binning	WIN1.BINX	1		
CCD Y binning	WIN1.BINY	1		
Red neutral density	FILT1.NAME	Free		Menu

3.4.9 REMDCT08: Acquire echelle wavelength calibration frames

This template acquires one spectroscopic wavelength calibration exposure with the specified echelle grating. The medium-dispersion slit width and length are adjusted to the indicated values. A grism can be specified to be used as cross-disperser, and a red color filter and a neutral density filter can be put in the beam. Different exposure times can be used for each of the two calibration lamps. Exposures can be taken using only one calibration lamp by leaving the parameter defining the other calibration lamp unspecified (corresponding entry field left blank) or by setting the exposure time to 0 for the other calibration lamp. Parameters are available for changing the default CCD configuration. When the CCD windowing flag is set to F (false), the full CCD is read out, regardless of the window parameters.

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Label	Parameter	Default	Units	Notes
Lamp1 exposure time	LAMP1.EXPTIME	1	seconds	
Calibration lamp1	LAMP1.NAME	(no lamp)		Menu
Lamp2 exposure time	LAMP2.EXPTIME	1		
Calibration lamp2	LAMP2.NAME	(no lamp)		Menu
Slit width	SLIT1.WID	1	arcsec	
Slit length	SLIT1.LEN	5	arcsec	
Echelle grating	GRAT1.NAME	(none)		Menu
Grism	GRIS1.NAME	(none)		Menu
Red color filter	FILT2.NAME	Free		Menu
CCD readout speed	READ.SPEED	normal		Menu
CCD windowing flag	WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of window	WIN1.STRX	1		Only used if ST = T
First row of window	WIN1.STRY	1		Only used if ST = T
Number of columns	WIN1.NX	2086		Only used if ST = T
Number of rows	WIN1.NY	2046		Only used if ST = T
CCD X binning	WIN1.BINX	1		
CCD Y binning	WIN1.BINY	1		
Red neutral density	FILT1.NAME	Free		Menu

3.4.10 REMDCT12: Medium dispersion sky flat (slit transfer function)

This calibration template acquires one spectroscopic sky flat, with approximately the requested intensity level. The medium-dispersion slit width and length are adjusted to the specified values. The selected red grating is tilted to obtain the requested central wavelength. A red color filter and a neutral density filter can be put in the beam. Parameters are available for changing the default CCD configuration. When the CCD windowing flag is set to F (false), the full CCD is read out, regardless of the window parameters.

In the execution of this template, the exposure time is computed automatically as follows:

- A full window flat with a short exposure time is acquired in 4x4 binned mode.
- The resulting frame is displayed and the user is prompted to delimit with the cursor the region of the spectrum on which the requested intensity level should be achieved. This region is used to define the readout window of the CCD for the next two exposures.
- A bias frame is acquired with the CCD windowing defined in the previous step.
- A flat with a short exposure time is acquired, with the same CCD windowing.
- The windowed bias frame is subtracted from the windowed flat and the mean intensity is computed.

Based on the mean intensity and the requested intensity, an exposure time is automatically computed.

Label	Parameter	Default	Units	Notes
Requested intensity level	EXPLEVEL	20000	ADU	
Slit width	SLIT1.WID	1	arcsec	
Slit length	SLIT1.LEN	200	arcsec	
Red grating	GRAT1.NAME	(none)		Menu
Red central wavelength	GRAT1.WLEN	0	nm	
Red color filter	FILT2.NAME	Free		Menu
CCD readout speed	READ.SPEED	normal		Menu
CCD windowing flag	WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of window	WIN1.STRX	1		Only used if ST = T
First row of window	WIN1.STRY	1		Only used if ST = T
Number of columns	WIN1.NX	2086		Only used if ST = T
Number of rows	WIN1.NY	2046		Only used if ST = T
CCD X binning	WIN1.BINX	1		
CCD Y binning	WIN1.BINY	1		
Red neutral density	FILT1.NAME	Free		Menu

3.4.11 REMDCT13: Echelle sky flat (slit transfer function)

This calibration template acquires one spectroscopic sky flat, using the specified echelle grating, with approximately the requested intensity level. The medium-dispersion slit width and length are adjusted to the indicated values. A grism can be specified to be used as cross-disperser, and a red color filter and a neutral density filter can be put in the beam. Parameters are available for changing the default CCD configuration. When the CCD windowing flag is set to F (false), the full CCD is read out, regardless of the window parameters.

In the execution of this template, the exposure time is computed automatically as follows:

- A full window flat with a short exposure time is acquired in 4x4 binned mode.
- The resulting frame is displayed and the user is prompted to delimit with the cursor the region of the spectrum on which the requested intensity level should be achieved. This region is used to define the readout window of the CCD for the next two exposures.
- A bias frame is acquired with the CCD windowing defined in the previous step.
- A flat with a short exposure time is acquired, with the same CCD windowing.
- The windowed bias frame is subtracted from the windowed flat and the mean intensity is computed.

Based on the mean intensity and the requested intensity, an exposure time is automatically computed.

Label	Parameter	Default	Units	Notes
Requested intensity level	EXPLEVEL	20000	ADU	
Slit width	SLIT1.WID	1	arcsec	
Slit length	SLIT1.LEN	5	arcsec	
Echelle grating	GRAT1.NAME	(none)		Menu
Grism	GRIS1.NAME	Free		Menu
Red color filter	FILT2.NAME	Free		Menu
CCD readout speed	READ.SPEED	normal		Menu
CCD windowing flag	WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of window	WIN1.STRX	1		Only used if ST = T
First row of window	WIN1.STRY	1		Only used if ST = T
Number of columns	WIN1.NX	2086		Only used if ST = T
Number of rows	WIN1.NY	2046		Only used if ST = T
CCD X binning	WIN1.BINX	1		
CCD Y binning	WIN1.BINY	1		
Red neutral density	FILT1.NAME	Free		Menu

3.5 DIMD Templates

TABLE 5 DIMD Template Quick Reference

Template	Short Description
DIMDAT01	Preset to coordinates - no operator intervention
DIMDOT01	Blue + red medium dispersion exposures
DIMDOT02	Blue medium dispersion + red echelle exposures
DIMDCT01	Blue + red bias or dark frames
DIMDCT02	Blue + red medium dispersion flats (automatic exptime calculation)
DIMDCT03	Blue medium dispersion + red echelle flats (automatic exptime calculation)
DIMDCT07	Blue + red medium dispersion wavelength calibration frames
DIMDCT08	Blue medium dispersion + red echelle wavelength calibration frames
DIMDCT12	Blue + red medium dispersion sky flats (slit transfer function)
DUMDCT13	Blue medium dispersion + red echelle sky flats (slit transfer function)

3.5.1 DIMDAT01: Preset to coordinates - no operator intervention

This acquisition template presets the telescope to the coordinates of the Target associated with this Observation Block and applies the requested rotator offset. If a value between -359.99 and +359.99 is specified for the latter, the orientation of the slit on the sky will differ from the default one by this offset. If a rotator offset angle of -9999 is set, the slit orientation on the sky will be defined by the parallactic angle at the time of preset. Differential tracking rates can be set. An appropriate guide star will be selected automatically. Parameters associated with the guide star are in the TSF for possible future implementation of manual options of guide star selection (a feature which is supported by the TCS) but they are not currently used and can therefore be safely ignored by the P2PP user.

When this AT is executed, the operator will center the object by eye on the slit viewer

When using this AT in service mode, users **must** provide a finding chart.

Note: there is no DIMD acquisition template for objects too faint to be seen on the slit viewer. In such cases, the object can be acquired by blind offset using either REMDAT02 or BLMDAT02, according to whether the acquisition image should be taken in the red or in the blue arm.

Label	Parameter	Default	Units	Notes
Rotator offset angle	ROT.OFFANGLE	0	degrees	-9999: slit at parallactic angle
Differential tracking in RA	TARG.ADDVELALPHA	0	arcsec/sec	
Differential tracking in DEC	TARG.ADDVELDELTA	0	arcsec/sec	
RA of guide star	GS1.ALPHA	00:00:00.0		Not used
DEC of guide star	GS1.DELTA	00:00:00.0		Not used
Magnitude of guide star	GS1.MAG	12		Not used

3.5.2 DIMDOT01: Blue + red medium dispersion exposures

This template acquires the specified number of medium-dispersion spectroscopic exposures in both arms simultaneously. Different exposure times can be requested in the blue and in the red arm, but a single value of the exposure time is used for all the exposures in a given arm, and the exposure starts are synchronized between both arms (that is, the first blue exposure and the first red exposure start simultaneously, as do the second blue exposureand the second red exposure, etc.). The medium-dispersion slit width and length are the same for both arms. The other parameters must be specified independently for the blue and the red arm. They are identical to those used for the templates BLMDOT01 and REMDOT01: see the description of those templates for details.

Label	Parameter	Default	Units	Notes
Number of exposures	SEQ.NEXPO	1		
Exposure time of red side	DET1.WIN1.UIT1	(none)	seconds	
Exposure time of blue side	DET2.WIN1.UIT1	(none)	seconds	
Slit width	SLIT1.WID	1	arcsec	
Slit length	SLIT1.LEN	200	arcsec	
Red grating	GRAT1.NAME	(none)		Menu
Red central wavelength	GRAT1.WLEN	0	nm	
Red color filter	FILT2.NAME	Free		Menu
Blue grating	GRAT2.NAME	(none)		Menu
Blue central wavelength	GRAT2.WLEN	0	nm	
Blue color filter	FILT4.NAME	Free		Menu
Red CCD readout speed	DET1.READ.SPEED	normal		Menu
Red CCD windowing flag	DET1.WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of red window	DET1.WIN1.STRX	1		Only used if ST = T
First row of red window	DET1.WIN1.STRY	1		Only used if ST = T
Number of red columns	DET1.WIN1.NX	2086		Only used if ST = T
Number of red rows	DET1.WIN1.NY	2046		Only used if ST = T
Red CCD X binning	DET1.WIN1.BINX	1		
Red CCD Y binning	DET1.WIN1.BINY	1		
Blue CCD readout speed	DET2.READ.SPEED	normal		Menu
Blue CCD windowing flag	DET2.WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of blue window	DET2.WIN1.STRX	1		Only used if ST = T
First row of blue window	DET2.WIN1.STRY	1		Only used if ST = T
Number of blue columns	DET2.WIN1.NX	1124		Only used if ST = T
Number of blue rows	DET2.WIN1.NY	1024		Only used if ST = T
Blue CCD X binning	DET2.WIN1.BINX	1		
Blue CCD Y binning	DET2.WIN1.BINY	1		
Red neutral density	FILT1.NAME	Free		Menu
Blue neutral density	FILT3.NAME	Free		Menu

3.5.3 DIMDOT02: Blue medium dispersion + red echelle exposures

This template simulatneously acquires the specified number of blue medium-dispersion and red echelle spectroscopic exposures. Different exposure times can be requested in the blue and in the red arm, but a single value of the exposure time is used for all the exposures in a given arm, and the exposure starts are synchronized between both arms (that is, the first blue exposure and the first red exposure start simultaneously, as do the second blue exposureand the second red exposure, etc.). The medium-dispersion slit width and length are also the same for both arms (note the impact on the format of the blue spectrum if the red echelle spectrum is cross-dispersed). The other parameters must be specified independently for the blue and the red arm. They are identical to those used for the templates BLMDOT01 and REMDOT02: see the description of those templates for details.

Label	Parameter	Default	Units	Notes
Number of exposures	SEQ.NEXPO	1		
Exposure time of red side	DET1.WIN1.UIT1	(none)	seconds	
Exposure time of blue side	DET2.WIN1.UIT1	(none)	seconds	
Slit width	SLIT1.WID	1	arcsec	
Slit length	SLIT1.LEN	5	arcsec	
Echelle grating	GRAT1.NAME	(none)		Menu
Grism	GRIS1.NAME	(none)		Menu
Red color filter	FILT2.NAME	Free		Menu
Blue grating	GRAT2.NAME	(none)		Menu
Blue central wavelength	GRAT2.WLEN	0	nm	
Blue color filter	FILT4.NAME	Free		Menu
Red CCD readout speed	DET1.READ.SPEED	normal		Menu
Red CCD windowing flag	DET1.WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of red window	DET1.WIN1.STRX	1		Only used if ST = T
First row of red window	DET1.WIN1.STRY	1		Only used if ST = T
Number of red columns	DET1.WIN1.NX	2086		Only used if ST = T
Number of red rows	DET1.WIN1.NY	2046		Only used if ST = T
Red CCD X binning	DET1.WIN1.BINX	1		
Red CCD Y binning	DET1.WIN1.BINY	1		
Blue CCD readout speed	DET2.READ.SPEED	normal		Menu
Blue CCD windowing flag	DET2.WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of blue window	DET2.WIN1.STRX	1		Only used if ST = T
First row of blue window	DET2.WIN1.STRY	1		Only used if ST = T
Number of blue columns	DET2.WIN1.NX	1124		Only used if ST = T
Number of blue rows	DET2.WIN1.NY	1024		Only used if ST = T
Blue CCD X binning	DET2.WIN1.BINX	1		
Blue CCD Y binning	DET2.WIN1.BINY	1		
Red neutral density	FILT1.NAME	Free		Menu
Blue neutral density	FILT3.NAME	Free		Menu

3.5.4 DIMDCT01: Blue + red bias or dark frames

This calibration template simultaneously acquires in both arms the number of bias or dark frames specified by the parameter Number of exposures. Bias frames are acquired if the exposure time is set to zero (0). Dark frames are acquired if the exposure time is non-zero. Different exposure times can be requested in the blue and in the red arm, but a single value of the exposure time is used for all the exposures in a given arm, and the exposure starts are synchronized between both arms (that is, the first blue exposure and the first red exposure start simultaneously, as do the second blue exposureand the second red exposure, etc.). Parameters are available for changing the default CCD configurations (this is done independently for the blue and the red CCD). When the CCD windowing flag is set to F (false), the full CCD is read out, regardless of the window parameters.

Label	Parameter	Default	Units	Notes
Number of exposures	SEQ.NEXPO	1		
Exposure time of red side	DET1.WIN1.UIT1	(none)	seconds	
Red CCD readout speed	DET1.READ.SPEED	fast		Menu
Red CCD windowing flag	DET1.WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of red window	DET1.WIN1.STRX	1		Only used if ST = T
First row of red window	DET1.WIN1.STRY	1		Only used if ST = T
Number of red columns	DET1.WIN1.NX	2086		Only used if ST = T
Number of red rows	DET1.WIN1.NY	2046		Only used if ST = T
Red CCD X binning	DET1.WIN1.BINX	1		
Red CCD Y binning	DET1.WIN1.BINY	1		
Exposure time of blue side	DET2.WIN1.UIT1	(none)	seconds	
Blue CCD readout speed	DET2.READ.SPEED	normal		Menu
Blue CCD windowing flag	DET2.WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of blue window	DET2.WIN1.STRX	1		Only used if ST = T
First row of blue window	DET2.WIN1.STRY	1		Only used if ST = T
Number of blue columns	DET2.WIN1.NX	1124		Only used if ST = T
Number of blue rows	DET2.WIN1.NY	1024		Only used if ST = T
Blue CCD X binning	DET2.WIN1.BINX	1		
Blue CCD Y binning	DET2.WIN1.BINY	1		

3.5.5 DIMDCT02: Blue + red medium dispersion flats

This calibration template acquires simultaneously in both arms the number of medium-dispersion spectroscopic flats specified by the parameter Number of exposures, with approximately the specified exposure levels. If the parameter CAL.EXT is set to T (true), dome flats are obtained (the parameter Flat field lamp is then ignored). If it is set to F (false), the specified flat field lamp from the EMMI calibration unit is used as light source. Different exposure levels can be requested in the blue and in the red arm, and the required exposure times to achieve these levels will be automatically determined independently for each arm. The exposure starts are synchronized between both arms (that is, the first blue exposure and the first red exposure start simultaneously, as do the second blue exposureand the second red exposure, etc.). The medium-dispersion slit width and length are the same for both arms. The other parameters must be specified independently for the blue and the red arm. They are identical to those used for the templates BLMDCT02 and REMDCT02: see the description of those templates for details. These descriptions also explain how the exposure times are computed.

Label	Parameter	Default	Units	Notes
Number of exposures	SEQ.NEXPO	1		
External flat flag	CAL.EXT	T		T = dome lamp; F = adapter calibration unit
Flat field lamp	LAMP.NAME	(none)		Used only if CAL.EXT = F
Slit width	SLIT1.WID	1	arcsec	
Slit length	SLIT1.LEN	200	arcsec	
Red grating	GRAT1.NAME	(none)		Menu
Red central wavelength	GRAT1.WLEN	0	nm	
Red color filter	FILT2.NAME	Free		Menu
Blue grating	GRAT2.NAME	(none)		Menu
Blue central wavelength	GRAT2.WLEN	0	nm	
Blue color filter	FILT4.NAME	Free		Menu
Red requested intensity level	DET1.EXPLEVEL	20000	ADU	
Red CCD readout speed	DET1.READ.SPEED	normal		Menu
Red CCD windowing flag	DET1.WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of red window	DET1.WIN1.STRX	1		Only used if ST = T
First row of red window	DET1.WIN1.STRY	1		Only used if ST = T
Number of red columns	DET1.WIN1.NX	2086		Only used if ST = T
Number of red rows	DET1.WIN1.NY	2046		Only used if ST = T
Red CCD X binning	DET1.WIN1.BINX	1		
Red CCD Y binning	DET1.WIN1.BINY	1		
Blue requested intensity level	DET2.EXPLEVEL	20000	ADU	
Blue CCD readout speed	DET2.READ.SPEED	normal		Menu
Blue CCD windowing flag	DET2.WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of blue window	DET2.WIN1.STRX	1		Only used if ST = T
First row of blue window	DET2.WIN1.STRY	1		Only used if ST = T
Number of blue columns	DET2.WIN1.NX	1124		Only used if ST = T
Number of blue rows	DET2.WIN1.NY	1024		Only used if ST = T
Blue CCD X binning	DET2.WIN1.BINX	1		
Blue CCD Y binning	DET2.WIN1.BINY	1		
Red neutral density	FILT1.NAME	Free		Menu
Blue neutral density	FILT3.NAME	Free		Menu

3.5.6 DIMDCT03: Blue medium dispersion + red echelle flats

This calibration template simultaneously acquires the requested number of blue medium-dispersion and red echelle spectroscopic flats, with approximately the specified exposure levels. If the parameter CAL.EXT is set to T (true), dome flats are obtained (the parameter Flat field lamp is then ignored). If it is set to F (false), the specified flat field lamp from the EMMI calibration unit is used as light source. Different exposure levels can be requested in the blue and in the red arm, and the required exposure times to achieve these levels will be automatically determined independently for each arm. The exposure starts are synchronized between both arms (that is, the first blue exposure and the first red exposure start simultaneously, as do the second blue exposureand the second red exposure, etc.). The medium-dispersion slit width and length are the same for both arms (note the impact on the format of the blue spectrum if the red echelle spectrum is cross-dispersed). The other parameters must be specified independently for the blue and the red arm. They are identical to those used for the templates BLMDCT02 and REMDCT03: see the description of those templates for details. These descriptions also explain how the exposure times are computed.

Label	Parameter	Default	Units	Notes
Number of exposures	SEQ.NEXPO	1		
External flat flag	CAL.EXT	T		T = dome lamp; F = adapter calibration unit
Flat field lamp	LAMP.NAME	(none)		Used only if CAL.EXT = F
Slit width	SLIT1.WID	1	arcsec	
Slit length	SLIT1.LEN	5	arcsec	
Echelle grating	GRAT1.NAME	(none)		Menu
Grism	GRIS1.NAME	(none)		Menu
Red color filter	FILT2.NAME	Free		Menu
Blue grating	GRAT2.NAME	(none)		Menu
Blue central wavelength	GRAT2.WLEN	0	nm	
Blue color filter	FILT4.NAME	Free		Menu
Red requested intensity level	DET1.EXPLEVEL	20000	ADU	
Red CCD readout speed	DET1.READ.SPEED	normal		Menu
Red CCD windowing flag	DET1.WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of red window	DET1.WIN1.STRX	1		Only used if ST = T
First row of red window	DET1.WIN1.STRY	1		Only used if ST = T
Number of red columns	DET1.WIN1.NX	2086		Only used if ST = T
Number of red rows	DET1.WIN1.NY	2046		Only used if ST = T
Red CCD X binning	DET1.WIN1.BINX	1		
Red CCD Y binning	DET1.WIN1.BINY	1		
Blue requested intensity level	DET2.EXPLEVEL	20000	ADU	
Blue CCD readout speed	DET2.READ.SPEED	normal		Menu
Blue CCD windowing flag	DET2.WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of blue window	DET2.WIN1.STRX	1		Only used if ST = T
First row of blue window	DET2.WIN1.STRY	1		Only used if ST = T
Number of blue columns	DET2.WIN1.NX	1124		Only used if ST = T
Number of blue rows	DET2.WIN1.NY	1024		Only used if ST = T
Blue CCD X binning	DET2.WIN1.BINX	1		
Blue CCD Y binning	DET2.WIN1.BINY	1		
Red neutral density	FILT1.NAME	Free		Menu
Blue neutral density	FILT3.NAME	Free		Menu

3.5.7 DIMDCT07: Blue + red medium dispersion wavelength calibration frames

This template simultaneously acquires one blue and one red medium-dispersion spectroscopic wavelength calibration exposure. Different exposure times can be used for each of the two calibration lamps, but these exposure times will be the same for both arms. Generally this implies that a well exposed spectrum will be obtained in one arm, while the exposure in the other arm will have an unsuitable level: this is an intrinsic limitation of the design of the DIMD mode, and as a result, in order to obtain a suitable wavelength calibration, it will often be necessary to execute this template twice with different exposure time combinations. The medium-dispersion slit width and length are the same for both arms. The other parameters must be specified independently for the blue and the red arm. They are identical to those used for the templates BLMDCT07 and REMDCT07: see the description of those templates for details.

Label	Parameter	Default	Units	Notes
Lamp1 exposure time	LAMP1.EXPTIME	1	seconds	
Calibration lamp1	LAMP1.NAME	(no lamp)		Menu
Lamp2 exposure time	LAMP2.EXPTIME	1		
Calibration lamp2	LAMP2.NAME	(no lamp)		Menu
Slit width	SLIT1.WID	1	arcsec	
Slit length	SLIT1.LEN	200	arcsec	
Red grating	GRAT1.NAME	(none)		Menu
Red central wavelength	GRAT1.WLEN	0	nm	
Red color filter	FILT2.NAME	Free		Menu
Blue grating	GRAT2.NAME	(none)		Menu
Blue central wavelength	GRAT2.WLEN	0	nm	
Blue color filter	FILT4.NAME	Free		Menu
Red requested intensity level	DET1.EXPLEVEL	20000	ADU	
Red CCD readout speed	DET1.READ.SPEED	normal		Menu
Red CCD windowing flag	DET1.WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of red window	DET1.WIN1.STRX	1		Only used if ST = T
First row of red window	DET1.WIN1.STRY	1		Only used if ST = T
Number of red columns	DET1.WIN1.NX	2086		Only used if ST = T
Number of red rows	DET1.WIN1.NY	2046		Only used if ST = T
Red CCD X binning	DET1.WIN1.BINX	1		
Red CCD Y binning	DET1.WIN1.BINY	1		
Blue requested intensity level	DET2.EXPLEVEL	20000	ADU	
Blue CCD readout speed	DET2.READ.SPEED	normal		Menu
Blue CCD windowing flag	DET2.WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of blue window	DET2.WIN1.STRX	1		Only used if ST = T
First row of blue window	DET2.WIN1.STRY	1		Only used if ST = T
Number of blue columns	DET2.WIN1.NX	1124		Only used if ST = T
Number of blue rows	DET2.WIN1.NY	1024		Only used if ST = T
Blue CCD X binning	DET2.WIN1.BINX	1		
Blue CCD Y binning	DET2.WIN1.BINY	1		
Red neutral density	FILT1.NAME	Free		Menu
Blue neutral density	FILT3.NAME	Free		Menu

3.5.8 DIMDCT08: Blue medium dispersion + red echelle wavelength calibration frames

This template simultaneously acquires one blue medium-dispersion and one red echelle spectroscopic wavelength calibration exposure. Different exposure times can be used for each of the two calibration lamps, but these exposure times will be the same for both arms. Generally this implies that a well exposed spectrum will be obtained in one arm, while the exposure in the other arm will have an unsuitable level: this is an intrinsic limitation of the design of the DIMD mode, and as a result, in order to obtain a suitable wavelength calibration, it will often be necessary to execute this template twice with different exposure time combinations. The medium-dispersion slit width and length are the same for both arms. The other parameters must be specified independently for the blue and the red arm. They are identical to those used for the templates BLMDCT07 and REMDCT08: see the description of those templates for details.

Label	Parameter	Default	Units	Notes
Lamp1 exposure time	LAMP1.EXPTIME	1	seconds	
Calibration lamp1	LAMP1.NAME	(no lamp)		Menu
Lamp2 exposure time	LAMP2.EXPTIME	1		
Calibration lamp2	LAMP2.NAME	(no lamp)		Menu
Slit width	SLIT1.WID	1	arcsec	
Slit length	SLIT1.LEN	5	arcsec	
Echelle grating	GRAT1.NAME	(none)		Menu
Grism	GRIS1.NAME	(none)		Menu
Red color filter	FILT2.NAME	Free		Menu
Blue grating	GRAT2.NAME	(none)		Menu
Blue central wavelength	GRAT2.WLEN	0	nm	
Blue color filter	FILT4.NAME	Free		Menu
Red requested intensity level	DET1.EXPLEVEL	20000	ADU	
Red CCD readout speed	DET1.READ.SPEED	normal		Menu
Red CCD windowing flag	DET1.WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of red window	DET1.WIN1.STRX	1		Only used if ST = T
First row of red window	DET1.WIN1.STRY	1		Only used if ST = T
Number of red columns	DET1.WIN1.NX	2086		Only used if ST = T
Number of red rows	DET1.WIN1.NY	2046		Only used if ST = T
Red CCD X binning	DET1.WIN1.BINX	1		
Red CCD Y binning	DET1.WIN1.BINY	1		
Blue requested intensity level	DET2.EXPLEVEL	20000	ADU	
Blue CCD readout speed	DET2.READ.SPEED	normal		Menu
Blue CCD windowing flag	DET2.WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of blue window	DET2.WIN1.STRX	1		Only used if ST = T
First row of blue window	DET2.WIN1.STRY	1		Only used if ST = T
Number of blue columns	DET2.WIN1.NX	1124		Only used if ST = T
Number of blue rows	DET2.WIN1.NY	1024		Only used if ST = T
Blue CCD X binning	DET2.WIN1.BINX	1		
Blue CCD Y binning	DET2.WIN1.BINY	1		
Red neutral density	FILT1.NAME	Free		Menu
Blue neutral density	FILT3.NAME	Free		Menu

3.5.9 DIMDCT12: Blue + red medium dispersion sky flats (slit transfer function)

This calibration template acquires simultaneously one blue and one red medium-dispersion spectroscopic sky flats, with approximately the specified exposure levels. Different exposure levels can be requested in the blue and in the red arm, and the required exposure times to achieve these levels will be automatically determined independently for each arm. The blue exposure and the red exposure start simultaneously. The medium-dispersion slit width and length are the same for both arms. The other parameters must be specified independently for the blue and the red arm. They are identical to those used for the templates BLMDCT12 and REMDCT12: see the description of those templates for details. These descriptions also explain how the exposure times are computed.

Label	Parameter	Default	Units	Notes
Slit width	SLIT1.WID	1	arcsec	
Slit length	SLIT1.LEN	200	arcsec	
Red grating	GRAT1.NAME	(none)		Menu
Red central wavelength	GRAT1.WLEN	0	nm	
Red color filter	FILT2.NAME	Free		Menu
Blue grating	GRAT2.NAME	(none)		Menu
Blue central wavelength	GRAT2.WLEN	0	nm	
Blue color filter	FILT4.NAME	Free		Menu
Red requested intensity level	DET1.EXPLEVEL	20000	ADU	
Red CCD readout speed	DET1.READ.SPEED	normal		Menu
Red CCD windowing flag	DET1.WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of red window	DET1.WIN1.STRX	1		Only used if ST = T
First row of red window	DET1.WIN1.STRY	1		Only used if ST = T
Number of red columns	DET1.WIN1.NX	2086		Only used if ST = T
Number of red rows	DET1.WIN1.NY	2046		Only used if ST = T
Red CCD X binning	DET1.WIN1.BINX	1		
Red CCD Y binning	DET1.WIN1.BINY	1		
Blue requested intensity level	DET2.EXPLEVEL	20000	ADU	
Blue CCD readout speed	DET2.READ.SPEED	normal		Menu
Blue CCD windowing flag	DET2.WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of blue window	DET2.WIN1.STRX	1		Only used if ST = T
First row of blue window	DET2.WIN1.STRY	1		Only used if ST = T
Number of blue columns	DET2.WIN1.NX	1124		Only used if ST = T
Number of blue rows	DET2.WIN1.NY	1024		Only used if ST = T
Blue CCD X binning	DET2.WIN1.BINX	1		
Blue CCD Y binning	DET2.WIN1.BINY	1		
Red neutral density	FILT1.NAME	Free		Menu
Blue neutral density	FILT3.NAME	Free		Menu

3.5.10 DIMDCT13: Blue medium dispersion + red echelle sky flats (slit transfer function)

This calibration template simultaneously acquires one blue medium-dispersion and one red echelle spectroscopic sky flats, with approximately the specified exposure levels. Different exposure levels can be requested in the blue and in the red arm, and the required exposure times to achieve these levels will be automatically determined independently for each arm. The blue exposure and the red exposure start simultaneously. The medium-dispersion slit width and length are the same for both arms (note the impact on the format of the blue spectrum if the red echelle spectrum is cross-dispersed). The other parameters must be specified independently for the blue and the red arm. They are identical to those used for the templates BLMDCT12 and REMDCT13: see the description of those templates for details. These descriptions also explain how the exposure times are computed.

Label	Parameter	Default	Units	Notes
Slit width	SLIT1.WID	1	arcsec	
Slit length	SLIT1.LEN	5	arcsec	
Echelle grating	GRAT1.NAME	(none)		Menu
Grism	GRIS1.NAME	(none)		Menu
Red color filter	FILT2.NAME	Free		Menu
Blue grating	GRAT2.NAME	(none)		Menu
Blue central wavelength	GRAT2.WLEN	0	nm	
Blue color filter	FILT4.NAME	Free		Menu
Red requested intensity level	DET1.EXPLEVEL	20000	ADU	
Red CCD readout speed	DET1.READ.SPEED	normal		Menu
Red CCD windowing flag	DET1.WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of red window	DET1.WIN1.STRX	1		Only used if ST = T
First row of red window	DET1.WIN1.STRY	1		Only used if ST = T
Number of red columns	DET1.WIN1.NX	2086		Only used if ST = T
Number of red rows	DET1.WIN1.NY	2046		Only used if ST = T
Red CCD X binning	DET1.WIN1.BINX	1		
Red CCD Y binning	DET1.WIN1.BINY	1		
Blue requested intensity level	DET2.EXPLEVEL	20000	ADU	
Blue CCD readout speed	DET2.READ.SPEED	normal		Menu
Blue CCD windowing flag	DET2.WIN1.ST	F		F = no CCD window; T = CCD windowed
First column of blue window	DET2.WIN1.STRX	1		Only used if ST = T
First row of blue window	DET2.WIN1.STRY	1		Only used if ST = T
Number of blue columns	DET2.WIN1.NX	1124		Only used if ST = T
Number of blue rows	DET2.WIN1.NY	1024		Only used if ST = T
Blue CCD X binning	DET2.WIN1.BINX	1		
Blue CCD Y binning	DET2.WIN1.BINY	1		
Red neutral density	FILT1.NAME	Free		Menu
Blue neutral density	FILT3.NAME	Free		Menu