AMBER Consortium

UNSA Université de Nice Sophia Antipolis
OCA Observatoire de la Côte d'Azur
LAOG Laboratoire d'Astrophysique Observatoire de Grenoble
MPIfR Max Planck Institute für Radioastronomie
OAA Osservatorio Astrofisica di Arcetri

VLT PROGRAMME

VERY LARGE TELESCOPE INTERFEROMETER

AMBER PRODUCT DATA SPECIFICATION

Doc. No.	VLT-SPE-AMB-15830-3984	
Issue:	3	
Date:	September 07, 2007	

Prepared: G. Zins   04.09.2007
. . . .
Name   Date   Signature

Approved: G Duvert/ P. Ballester   07.09.2007
. . . .
Name   Date   Signature

Released: F. Malbet   07.09.2007
. . . .
Name   Date   Signature

VERY LARGE TELESCOPE INTERFEROMETER

AMBER PRODUCT DATA SPECIFICATION

Doc: VLT-SPE-AMB-15830-3984
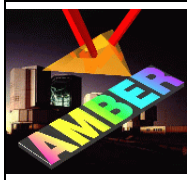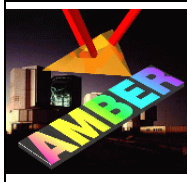
Issue: 3

Date: September 07, 2007

Page: 2 out of 17

CHANGE RECORD

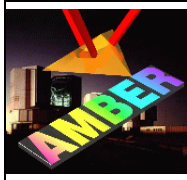| ISSUE	DATE	SECTION/PAGE AFFECTED	REASON/INITIATION DOCUMENTS / REMARKS
Draft 1	01/06/2006		
Draft 2	05/07/2006	All	Updated after document review with DMD
1	05/09/2006		Released
2	25/09/2006	5.2.1.3	Added FLUX_PI_MORE_PJ_ERR column description
3 Draft 1	23/04/2007	5.2.1.3	Updated AMBER_DATA table : • Renamed FLUX_PI_MORE_PJ to BASE_FLUX_SUM • Renamed FLUX_PI_MORE_PJ_ERR to BASE_FLUX_SUM_CORRECTION • Renamed PISTON_OPD to BASE_OPD • Renamed PISTON_ERR to BASE_OPD_ERR • Renamed FRINGE_CONTRAST_SNR to BASE_FRINGE_SNR • Added BASE_FLUX_RATIO • Added BASE_FLUX_RATIO_CORRECTION • Added BASE_FLUX_PRODUCT
3 Draft 2	11/06/2007	5.1.4.3, 5.1.5.3 & 5.1.6.3 5.2 5.2.2	Added FLAG column to OI_VIS, OI_VIS2 and OI_T3 Detailed OI-DATA file contents Added AMBER_SPECTRUM table description
3 Draft 3	12/06/2007	4 5.2.2	Added FRAME SELECTION file description Changed SPC to SPECTRUM in column names.
3 Draft 4	13/06/2007	3.3, 5.1.4.3, 5.1.5.3 & 5.1.6.3 5.1.5.3 5.2 5.1.6.3 5.2.2.3	Updated description of flag column giving signification of the possible values. Fixed the STA_INDEX format. Specified the CAL OI-DATA content is not yet fully defined Fixed the STA_INDEX example. Added the SPECTRUM_ERR unit
3 Draft 5	14/06/2007	3.2 3.3	Changed P2VM_MATRIX table name to P2VM Updated new P2VM table : • Renamed Wavelength to EFF_WAVE • Renamed Matrix to MATRIX • Renamed Vk to VK • Renamed Sum_of_Vk to SUM_VK • Renamed Bad_pixels to BAD_PIXELS • Renamed Photometry to PHOTOMETRY • Renamed Validity_flags to FLAG • Renamed Phase to CALIB_PHASE • Renamed FlatField to FLAT_FIELD • Changed EFF_WAVE unit to m (instead of nm) • Changed CALIB_PHASE unit to deg (instead of rad)
3 Draft 6	15/06/2007	5.2.2.3	Added EFF_BAND
3 Draft 7	21/06/2007	2.2 5.2.1.3 5.2.2.3	Added [4] Updated formulae according to [4]'s notation Added SPECTRUM and SPECTRUM_ERR formulae
3 Draft 8	12/07/2007	5.2.1.2 5.2.1.3	Changed OCS keywords to QC Removed BASE_ prefix to have shorter column names
3 Draft 9	04/09/2007	3.2	Added description of P2VM keywords stored in main header
3	07/09/2007		Released

TABLE OF CONTENTS

VERY LARGE TELESCOPE INTERFEROMETER

AMBER PRODUCT DATA SPECIFICATION

Doc: VLT-SPE-AMB-15830-3984

Issue: 3
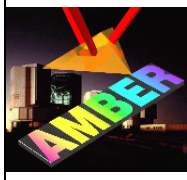
Date: September 07, 2007

Page: 5 out of 17

1   ACRONYMS

AMBER	Astronomical Multi-BEam Recombiner
FITS	Flexible Image Transport System
OI-FITS	Optical Interferometry Flexible Image Transport System
P2VM	Pixel To Visibility Matrix
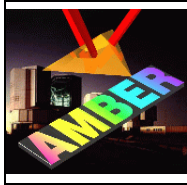
VERY LARGE TELESCOPE INTERFEROMETER

AMBER PRODUCT DATA SPECIFICATION

Doc: VLT-SPE-AMB-15830-3984

Issue: 3

Date: September 07, 2007

Page: 6 out of 17

2   INTRODUCTION

2.1   Scope

This document defines the data format of tables of the FITS file produced by AMBER data reduction software.

The purpose is to provide a reference source for the specification of the FITS files that shall be produced by the AMBER data reduction software.

The keywords/columns that are not described in this document are subject to modification and should not be used by external software. No backward compatibility is ensured for these data.

NOTE: Description of keywords contained in AMBER data file header, which are not described in this document, can be found in AMBER dictionaries available from http://archive.eso.org/DICB

2.2   Applicable Documents

[1]   VLTI Data Interface Control Document - VLT-SPE-ESO-15000-2764/1.0, June 13, 2002

[2]   "A Data Exchange Standard for Optical (Visible/IR) Interferometry", Pauls, T. A.; Young, J. S.; Cotton, W. D.; Monnier, J. D., "A Data Exchange Standard for Optical (Visible/IR) Interferometry", 2005, The Publications of the Astronomical Society of the Pacific, Volume 117, Issue 837, pp. 1255-1262

[3]   F. Millour (et al), "DIFFERENTIAL INTERFEROMETRY WITH THE AMBER/VLTI INSTRUMENT: DESCRIPTION, PERFORMANCES AND ILLUSTRATION", EAS Publications Series, Vol. ?, 2005

[4]   E. Tatulli (et al), Interferometric data reduction with AMBER/VLTI. Principle, estimators, and illustration, A&A 464, 29─42 (2007)

2.3   Conventions

Refer to section 2.5 in [1].
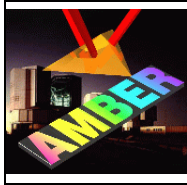
VERY LARGE TELESCOPE INTERFEROMETER

AMBER PRODUCT DATA SPECIFICATION

Doc: VLT-SPE-AMB-15830-3984

Issue: 3

Date: September 07, 2007

Page: 7 out of 17

3 P2VM FILE

3.1 Description

This table provides data relative to P2VM.

3.2 File Main Header

Type	Keyword	Example	Description
(I)	ESO OCS P2VM ID	10836299	Unique P2VM id
(I)	ESO OCS P2VM NTEL	2	Number of telescopes
(I)	ESO OCS P2VM NINTERF	1	Number of interferometric baselines
(D)	ESO QC P2VM VIS*<base>*	0.78	Instrument visibility for the baseline *<base>* ; *<base>* could be either 12, 23 or 31
(D)	ESO QC P2VM ERRVIS*<base>*	1.54e-4	Error on instrument visibility for the baseline *<base>*
(D)	ESO QC P2VM *<band>* VIS*<base>*	32	Instrument visibility for the baseline *<base>* in spectral band *<band>* ; *<band>* could be either J, H or K.
(D)	ESO QC P2VM *<band>* ERRVIS*<base>*	232	Error on instrument visibility for the baseline *<base>* in spectral band *<band>*

3.3 Table Header

Type	Keyword	Example	Description
(S)	EXTNAME	'P2VM'	Extension name
(I)	NWAVE	58	Number of spectral channels
(I)	WINTERF	32	Width of the interferometric channel
(I)	STARTPIX	232	First pixel on detector on Y axis for this P2VM.

3.4 Table Columns

Format	Column	Example	Unit	Description
E(NWAVE)	EFF_WAVE	2.6254e-6	m	Part of spectral dispersion table: valid wavelengths for P2VM
D(NBEAM,WINTERF,NWAVE)	MATRIX	7.4952e-2		Real and imaginary parts of the carrying wave (CW) of the interferometer (ck and dk coefficients) for the considered baseline.
D(WINTERF,NWAVE,NBEAM)	VK	2.2407e-2		Contribution to the illumination of each pixel of the interferometric channel by each of the contributing beam (flux ratio w.r.t. the flux in the photometric channel)
D(NWAVE,NBASE)	SUM_VK	5.2646e-3		Sum of vk coefficients on the considered baseline.
B(WINTERF,NWAVE)	BAD_PIXEL	1		Subset of the bad pixel map corresponding to the interferometric channel pixels.
D(NWAVE,NBEAM,NBEAM)	PHOTOMETRY	2.0165e3	e-	Photometric fluxes for all beams during all 2-beam phases of P2VM.
B	FLAG	0		Validity flag; indicating if P2VM values for
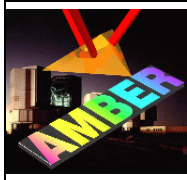
VERY LARGE TELESCOPE INTERFEROMETER

AMBER PRODUCT DATA SPECIFICATION

Doc: VLT-SPE-AMB-15830-3984

Issue: 3

Date: September 07, 2007

Page: 8 out of 17

				spectral channel is valid (1) or not (0).
D(NWAVE,NBASE)	CALIB_PHASE	1.8773	deg	Phase shift of the CWs.
E(WINTERF,NWAVE)	FLAT_FIELD	8.6734e-1		Subset of flat field map corresponding to the interferometric channel pixels.
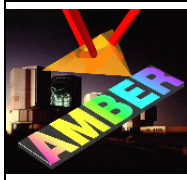
VERY LARGE TELESCOPE INTERFEROMETER

AMBER PRODUCT DATA SPECIFICATION

Doc: VLT-SPE-AMB-15830-3984

Issue: 3

Date: September 07, 2007

Page: 9 out of 17

4   FRAME SELECTION FILE

4.1   Description

This table provides flags per spectral band to perform frame selection when computing interferometric observables.

4.2   Table Header

Type	Keyword	Example	Description
(S)	EXTNAME	'FRAME_SELECTION'	Extension name

4.3   Table Columns

Format	Column	Example	Unit	Description
L(NFRAME)	J	F	-	Flag indicating if frame is selected (T) or rejected (F) when computing interferometric observables in J band.
L(NFRAME)	H	F	-	Flag indicating if frame is selected (T) or rejected (F) when computing interferometric observables in H band.
L(NFRAME)	K	T	-	Flag indicating if frame is selected (T) or rejected (F) when computing interferometric observables in K band.

5   OI-FITS FILE

5.1   VLTI Interferometry Tables

These binary tables are fully compliant with the IAU standard.

5.1.1   OI_ARRAY

The table ARRAY_GEOMETRY defined in [1] has been renamed OI_ARRAY as defined in [2].

5.1.1.1   Description

This table provides the positions and characteristics of the telescopes used in the observation. Each element of the interferometric array is described by a row in the table. An element is referenced using the station index.

5.1.1.2   Table Header

As defined, this table is aimed at ground-based interferometry with separated telescopes. Alternative tables could be used for other cases. These must have at least an ARRNAME keyword, for cross-referencing purposes. Each OI_ARRAY-equivalent table in a file must have a unique value for ARRNAME.

The header provides the coordinates of the interferometric array in the geocentric coordinate frame. The Talues ARRAYX, ARRAYY, ARRAYZ are determined for Paranal and are stored in the table header.

Type	Keyword	Example	Unit	Description
(S)	EXTNAME	'OI_ARRAY'		Extension name
(A)	OI_REVN	1		Revision number of the table definition.
(A)	ARRNAME	'VLTI'		Array name, for cross-referencing.
(A)	FRAME	"GEOCENTRIC'		Coordinate frame.
(D)	ARRAYX	-5.483173E6	m	Array centre x coordinate.
(D)	ARRAYY	1.951952E6	m	Array centre y coordinate.
(D)	ARRAYZ	-2.668147E6	m	Array centre z coordinate..

5.1.1.3   Table Columns

Format	Column	Example	Unit	Description
16A	TEL_NAME	'UT2'		Telescope name.
16A	STA_NAME	'U2'		Station name.
I	STA_INDEX	32		Station number.
E	DIAMETER	8E00	m	Diameter of telescopes into pupil aperture.
3D	STAXYZ	-14.88,-30.5,0.	m	Station coordinates relative to array centre.

5.1.2   OI_TARGET

5.1.2.1   Description

This table contains information about the observed sources. Position and velocity information is stored for each source, one source per row.
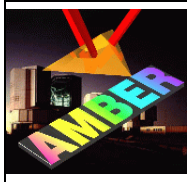
VERY LARGE TELESCOPE INTERFEROMETER

AMBER PRODUCT DATA SPECIFICATION

Doc: VLT-SPE-AMB-15830-3984

Issue: 3

Date: September 07, 2007

Page: 11 out of 17

5.1.2.2   Table Header

Type	Keyword	Example	Description
(S)	EXTNAME	'OI_TARGET'	Extension name.
(I)	OI_REVN	1	Revision number of the table definition.

5.1.2.3   Table Columns

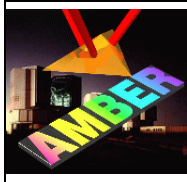| Format	Column	Example	Unit	Description
I	TARGET_ID	1		Index number.
16A	TARGET	'V*zet And'		Target name.
D	RAEP0	11.77854	degree	Right Ascension at mean equinox.
D	DECEP0	24.268334	degree	Declination at mean equinox.
E	EQUINOX	2000.		Equinox.
D	RA_ERR	0.0001	degree	Error in RA at mean equinox.
D	DEC_ERR	0.0001	degree	Error in DEC at mean equinox.
D	SYSVEL	120.	m/s	Systemic radial velocity.
8A	VELTYP	'LSR'		Reference for radial velocity.
				'LSR' : Local Standard of Rest.
				'HELIOCEN' : solar system barycentre.
				'GEOCENTR' : Centre of mass of the earth.
				'TOPOCENT' : Uncorrected.
8A	VELDEF	'OPTICAL'		Definition of radial velocity. 'OPTICAL' or 'RADIO'
D	PMRA	-2.8119E-05	degree/year	Proper motion in RA.
D	PMDEC	-2.2747E-05	degree/year	Proper motion in DEC.
D	PMRA_ERR	2.E-07	degree/year	Error of proper motion in RA.
D	PMDEC_ERR	3.E-07	degree/year	Error of proper motion in DEC.
E	PARALLAX	0.004999	degree	Parallax.
E	PARA_ERR	0.00001	degree	Error in parallax.
16A	SPECTYP	'AOV'		Spectral type.

5.1.3   OI_WAVELENGTH

5.1.3.1   Description

This table describes the spectral bands of detectors with a number of spectral channels. If there are multiple physical detectors, the effective wavelengths/bandwidths for each should be stored in different subsets of the table row, i.e. the table describes a single "virtual" detector.

5.1.3.2   Table Header

Type	Keyword	Example	Description
(S)	EXTNAME	'OI_WAVELENGTH'	Extension name.
(I)	OI_REVN	1	Revision number of the table definition.
(A)	INSNAME	'AMBER'	Name of detector, for cross-referencing.

VERY LARGE TELESCOPE INTERFEROMETER

AMBER PRODUCT DATA SPECIFICATION

Doc: VLT-SPE-AMB-15830-3984

Issue: 3

Date: September 07, 2007

Page: 12 out of 17

5.1.3.3   Table Columns

| Format	Column	Example	Unit	Description
E	EFF_WAVE	2.1783E-06	m	Effective wavelength of channel.
E	EFF_BAND	3.4163E-08	m	Effective bandpass of channel.

5.1.4   OI_VIS

5.1.4.1   Description

This table describes the partially calibrated visibility and related data.

5.1.4.2   Table Header

Type	Keyword	Example	Description
(S)	EXTNAME	'OI_VIS'	Extension name.
(I)	OI_REVN	1	Revision number of the table definition.
(A)	DATE-OBS	'2006-04-01'	UTC start date of observation.
(A)	ARRNAME	'VLTI'	Identifies corresponding OI_ARRAY.
(A)	INSNAME	'AMBER'	Identifies corresponding OI_WAVELENGTH table.

5.1.4.3   Table Columns

Format	Column	Example	Unit	Description
I	TARGET_ID	1		Target number as index into OI_TARGET table.
D	TIME	5.0892E03	s	Mean UTC time of the measurement in seconds since 0h on DATE-OBS
D	MJD	5.3365E04	day	Mean UTC time of the measurement expressed as a modified Julian Day
D	INT_TIME	1.70E01	s	Total integration time for the measured visibilities
C(NWAVE)	VISDATA	(-33.67,78.90)	-	Raw Complex Visibilities
C(NWAVE)	VISERR	(2.67,7.56)	-	Error on above
D(NWAVE)	VISAMP	5.020148	-	Differential Visibility amplitude, as described in [3].
D(NWAVE)	VISAMPERR	2.6410E-01	-	Error on above
D(NWAVE)	VISPHI	1.5167E-01	deg	Differential Visibility phase, as described in [3].
D(NWAVE)	VISPHIERR	5.5629E-02	deg	Error on above
D	UCOORD	146.5	m	U coordinate of the data.
D	VCOORD	11.23	m	V coordinate of the data.
2I	STA_INDEX	32,33	-	Station numbers contributing to the data.
L(NWAVE)	FLAG	F	-	Flag indicating if visibility values are erroneous (T) or not (F)
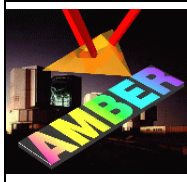
VERY LARGE TELESCOPE INTERFEROMETER

AMBER PRODUCT DATA SPECIFICATION

Doc: VLT-SPE-AMB-15830-3984

Issue: 3

Date: September 07, 2007

Page: 13 out of 17

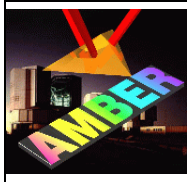### 5.1.5 OI_VIS2

5.1.5.1 Description

This table describes the partially calibrated squared visibility and related data.

5.1.5.2 Table Header

Type	Keyword	Example	Description
(S)	EXTNAME	'OI_VIS2'	Extension name.
(I)	OI_REVN	1	Revision number of the table definition.
(A)	DATE-OBS	'2006-04-01'	UTC start date of observation.
(A)	ARRNAME	'VLTI'	Identifies corresponding OI_ARRAY.
(A)	INSNAME	'AMBER'	Identifies corresponding OI_WAVELENGTH table.

5.1.5.3 Table Columns

Format	Column	Example	Unit	Description
I	TARGET_ID	1		Target number as index into OI_TARGET table.
D	TIME	5.0892E03	s	Mean UTC time of the measurement in seconds since 0h on DATE-OBS
D	MJD	5.3365E04	day	Mean UTC time of the measurement expressed as a modified Julian Day
D	INT_TIME	1.70E01	s	Total integration time for the measured visibilities
D(NWAVE)	VIS2DATA	4.3365E-01		Squared visibility
D(NWAVE)	VIS2ERR	1.3596E-02		Error in squared visibility.
D	UCOORD	11.23	m	U coordinate of the data.
D	VCOORD	32,33	m	V coordinate of the data.
2I	STA_INDEX	32,33		Station numbers contributing to the data.
L(NWAVE)	FLAG	F	-	Flag indicating if squared visibility values are erroneous (T) or not (F)

VERY LARGE TELESCOPE INTERFEROMETER

AMBER PRODUCT DATA SPECIFICATION

Doc: VLT-SPE-AMB-15830-3984

Issue: 3

Date: September 07, 2007

Page: 14 out of 17

### 5.1.6   OI_T3

5.1.6.1   Description

This table describes the partially calibrated phase closures and related data.

5.1.6.2   Table Header

Type	Keyword	Example	Description
(S)	EXTNAME	'OI_VIS3	Extension name.
(I)	OI_REVN	1	Revision number of the table definition.
(A)	DATE-OBS	'2006-04-01'	UTC start date of observation.
(A)	ARRNAME	'VLTI'	Identifies corresponding OI_ARRAY.
(A)	INSNAME	'AMBER'	Identifies corresponding OI_WAVELENGTH table.

5.1.6.3   Table Columns

Format	Column	Example	Unit	Description
I	TARGET_ID	1		Target number as index into OI_TARGET table.
D	TIME	5.0892E03	s	Mean UTC time of the measurement in seconds since 0h on DATE-OBS
D	MJD	5.3365E04	day	Mean UTC time of the measurement expressed as a modified Julian Day
D	INT_TIME	1.70E01	s	Total integration time for the measured visibilities
D(NWAVE)	T3AMP	2.1415E04		Triple Product Amplitude.
D(NWAVE)	T3AMPERR	2.0485E03		Error in triple product amplitude.
D(NWAVE)	T3PHI	4.9021	deg	Triple Product Phase
D(NWAVE)	T3PHIERR	-3.6949E-01	deg	Error in triple product phase
D	U1COORD	146.5	m	U coordinate of baseline AB of the triangle
D	V1COORD	11.23	m	V coordinate of baseline AB of the triangle
D	U2COORD	156.5	m	U coordinate of baseline BC of the triangle
D	V2COORD	11.23	m	V coordinate of baseline BC of the triangle
3I	STA_INDEX	32,33,34		Station numbers contributing to the data.
L(NWAVE)	FLAG	F	-	Flag indicating if phase closure values are erroneous (T) or not (F)
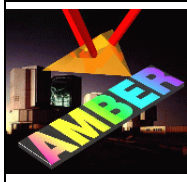
5.2 AMBER Interferometry Tables

In addition to the VLTI interferometry tables, two AMBER specific tables are added to the OI-FITS file produced by the AMBER data reduction software: AMBER_DATA and AMBER_SPECTRUM (see descriptions hereafter).

The presence of these tables depends on the type of produced OI-DATA file; 3 types of OI-DATA files are considered:

- RAW OI-DATA file which contains visibilities for each frame (or binned frame),

- AVG OI-DATA file which contains averaged visibilities over all frames or a subset of frames (after frame selection),

- CAL OI-DATA file which contains calibrated visibilities with a calibrator *(file content not yet fully specified)*.

The following table specifies which table is included in which OI-DATA file:

| OI-DATA file type	AMBER_DATA table	AMBER_SPECTRUM table
RAW OI-DATA	X	X
AVG OI-DATA		X
CAL OI-DATA		

5.2.1 AMBER_DATA

5.2.1.1 Description

This table describes specific data related to AMBER instrument. These data concern photometric fluxes and ratios, and values of pistons and fringe contrasts. The spectral bands possibly observed with AMBER instrument are the three near-infrared spectral bands known as 'J', 'H', and 'K'.

5.2.1.2 Table Header

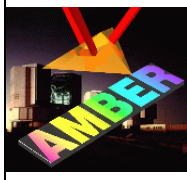| Type	Keyword	Example	Description
(S)	EXTNAME	'AMBER_DATA'	Extension name
(S)	INSNAME	'AMBER'	Instrument name
(I)	AMB_REVN	1	Revision number of the table definition
(I)	ESO QC NBBANDS	3	Number of spectral bands in observation. Spectral bands refer to well-defined, continuous wavelength range in the spectrum. For AMBER instrument, 'J', 'H' and 'K' bands are considered
(S)	ESO QC BANDi NAME	'K'	Name of spectral band #i
(R)	ESO QC BANDi LOWBOUND	1.942	Lower bound of spectral band #i
(R)	ESO QC BANDi LOWBOUND	3.5	Upper bound of spectral band #i
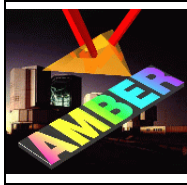
VERY LARGE TELESCOPE INTERFEROMETER
AMBER PRODUCT DATA SPECIFICATION

Doc: VLT-SPE-AMB-15830-3984
Issue: 3
Date: September 07, 2007
Page: 16 out of 17

5.2.1.3   Table Columns

Format	Column	Example	Unit	Description
I	TARGET_ID	1		Target identifier. This is an index to reference the source in the of OI_TARGET table
D	TIME	5.0893e3	days	Time tag for this exposure (MJD, UTC)
D	MJD	5.3365e4	days	Time tag for this observation (MJD, UTC)
D	INT_TIME	0.17	s	Total integration time for the measured data.
D(NWAVE)	FLUX_SUM	1.3394e6	e-	Photometric contribution of the two telescopes to the interferogram. $$P_i \sum_1^{N_{Pix}} V_k^i + P_j \sum_1^{N_{Pix}} V_k^j$$
D(NWAVE)	FLUX_SUM_CORRECTION	4.7941e3	e-^{2}	Sum of variances of photometric contribution above. $$\sigma^2\left(P_i \sum_1^{N_{Pix}} V_k^i\right) + \sigma^2\left(P_j \sum_1^{N_{Pix}} V_k^j\right)$$
D(NWAVE)	FLUX_RATIO	1.3394e6		Ratio of photometric contribution of telescopes $$\dfrac{P_i \sum_1^{N_{Pix}} V_k^i}{P_j \sum_1^{N_{Pix}} V_k^j}$$
D(NWAVE)	FLUX_RATIO_CORRECTION	4.7941e3		Ratio of variances of Photometric contribution of 1st and 2nd telescopes to the interferogram. $$\dfrac{\sigma^2\left(P_i \sum_1^{N_{Pix}} V_k^i\right)}{\sigma^2\left(P_j \sum_1^{N_{Pix}} V_k^j\right)}$$
D(NWAVE)	FLUX_PRODUCT	1.3394e6	e-^{2}	Geometric mean of photoelectrons per spectral channel involved in the fringe pattern for this baseline, estimated from the simultaneous photometry. $$P_i P_j \sum_1^{N_{Pix}} V_k^i V_k^j$$
E(NBBANDS)	OPD	8.258e-6	m	Piston value for wavelengths of present spectral band(s) for this baseline.
E(NBBANDS)	OPD_ERR	5.526e-8	m	Error associated on piston for present spectral band(s) for this baseline.
D(NBBANDS)	FRINGE_SNR	6.480		Fringe contrast SNR for present spectral band(s)
2I	STA_INDEX	32, 33		Station numbers as defined in the OI_ARRAY table, corresponding to the baseline.

Note: in the formulas above P_i corresponds to the telescope 1 (i.e. referred by STA_INDEX[1]) and P_j corresponds to the telescope 2 (i.e. referred by STA_INDEX[2]).

5.2.2 AMBER_SPECTRUM

5.2.2.1 Description

This table describes the spectra information for each telescope/beam.

5.2.2.2 Table Header

Type	Keyword	Example	Description
(S)	EXTNAME	'AMBER_SPECTRUM'	Extension name
(S)	INSNAME	'AMBER'	Instrument name
(I)	AMB_REVN	1	Revision number of the table definition

5.2.2.3 Table Columns

Format	Column	Example	Unit	Description
E	EFF_WAVE	2.1783E-06	m	Effective wavelength of channel.
E	EFF_BAND	3.4163E-08	m	Effective bandpass of channel.
D(NTEL)	SPECTRUM	1834.237	e-	Flux $$\sum_{N_{Frames}} P_{i,\lambda}$$
D(NTEL)	SPECTRUM_ERR	5.235	e-	Flux error $$\sqrt{N_{Pix} N_{Frames} \sigma_{\det}^2 + \sum_{N_{Frames}} P_{i,\lambda}}$$