FIRST - SPIRE
Optical design configuration control file
PHOTOMETER and SPECTROMETER

SPIREconfig39 SPIRE-LAM-PRJ-000761
Date: 16 Jan 2002

C:\Utilisateurs\Kjetil\first\OptoMech\OpticsConfig\[SPIREconfig39.xls]History

Calculations based on identification numbers:

		Phot	Spec
Global data	Glob	(BOLPHT155D)	(BOLSP508)
Gut ray	GutRay	(BOLPHT155)	(BOLSP508)
M3Cent ray	CM3CentRay	(BOLPHT154C)	
M5Cent ray	CM5CentRay	(BOLPHT154C)	

The configuration control file takes data generated by the SYNOPSYS raytracing program and calculates data concerning:

- Aperture data
- Gut ray impacts on the optical surfaces
- Interface points for each mirror in the instrument coordinate system
- Interface points in the local surface coordinates

It also transforms the left handed system used by SYNOPSYS into a right handed one and transforms the labels of the axis to be compatible with the instrument standard:

SPIRE	*SYNO*	*LOCAL*	*Directions*
X	-Zsyno	Norm	Tow. tel
Y	Xsyno	Sag	Tow. Spectro
Z	Ysyno	Tang	Tow. PAX

Contents:

The file contains the following spreadsheets:
Introduction: This sheet.
History: Evolution history of the file
Theory:
Variables: List of variables
SurfaceList: List of surface names and numbers used throughout
Final results:
Apertures: Dimensions and decenters of apertures in local coordinates
GutRayImpacts: Coordinates of gut ray impacts on each surface
Interfaces: Coordinates defining mirror interfaces in global coordinates
SurfDef: Coordinates defining mirror interfaces in local coordinates
Intermediate calculations:
GutCalc: Calculating surface normal vectors at gut ray impacts
M3CentCalc: Calculating surface normal vectors at centre of M3
M5CentCalc: Calculating surface normal vectors at centre of M5
AperturesSyno: Read aperture data from SYNO output
VertexCalc: Transform vertex data into instrument coordinates
VerticesSyno: Read vertex data from SYNO output and calculate local axes
RayImpacts: Transform ray impact data into instrument coordinates
RayImpactsSyno: Read ray impact data from SYNO output
SYNOPSYS outputs:
- Listing of surface data and Euler angles in global coordinates and aperture data
PhotGlob: Photometer
SpecGlob: Spectrometer
- Gut ray impacts in global coordinates
PhotGutRay: Photometer
SpecGutRay: Spectrometer arm
- Other
M3CentRay: Ray impacts for ray centred on M3 in global coordinates

Filename	Date	Comments
SPIREconfig01	210700	
SPIREconfig02	240800	Corrected error in jumping from detector back to dichroic. Added dummy for normal on primary. Corrected sign of normals (norm = ray out - ray in).
SPIREconfig03	240800	Reviewed ’comments’ sheet.
SPIREconfigPhot03	10900	Separate file for Phot and Spec
SPIREconfigPhot10	171000	Spigot axes calculated. Transformation to IID-B ("MSSL") coordinates.
SPIREconfigPhot11		
SPIREconfigPhot12	141100	Corrected Euler calculations, dowls added
SPIREconfigPhot13		
SPIREconfigPhot20	160101	Entirely renovated. Error in dowl calculation eliminated.
SPIREconfigPhot21	200301	Improved precision for interfaces
SPIREconfigPhot22	230301	
SPIREconfigPhot23	260301	Correct spigot direction (modify automatic sign calculation) and dowl direction (add flag). norm and sag vectors in Interfaces sheet has correct directions (towards spigot and towards dowl)
SPIREconfigPhot24	110501	BOLPHT155: new telescope. Includes comprative calculations
SPIREconfigPhot25	130601	Cleaned up: Comparative calculations removed
SPIREconfig30		Revised version, Euler calculation corrected, spig and dowl coordinates give positions on interface surface. Phot and Spec in same file. Draft
SPIREconfig31	200701	Official release of Revised version
SPIREconfig32	200801	Corrected SM8B spigot co-ordinates
SPIREconfig33	240801	BOLSP502: new telescope in spectrometer.
SPIREconfig34	270901	Added aperture data.
SPIREconfig35	031001	BOLSP503: lower half included.
SPIREconfig36	071101	
SPIREconfig37	211101	Further improvements and corrections for implementation of spectrometer upper and lower half includibg SCAL. Corrected Euler calculations in spec part (-cEuler replaces cEuler). NB: Re-corrected Euler calculations (cEuler replaces -cEuler). See my correspondence and notes of 11-13/7/01.
SPIREconfig38	051201	Bolsp505: Cold-stop dimensions, SM12 dimensions, det rotation. Bolpht155d: Cold-stop dimension
SPIREconfig39	040102	Bolsp509. No SM11 gamma rotation, RT replaces CC, Sdet rotation (zero global). NormDir for holes correctly calculated and normal and sag unit vectors added in Apertures sheet.

Theory

Contents

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1. Surface orientation from Euler angles

The listing of surface data in global coordinates give coordinates for each surface vertex and the Euler angles (in degrees with 5 significant decimals, ie a precision of 1e-5 deg) defining the orientation of the surface in space. These are used to calculate interface data for all mirrors except CM3 and CM5, see sec. 2 and 3.

The global coordinate system used by SYNOPSYS is left-handed and has its origin at the telescope focal point, ie 202mm above the SPIRE origin. The Z-axis is along the telescope axis, pointing away from the telescope, the Y-axis is in the plane of the photometer, pointing towards PAX, the X-axis is perpendicular to the plane of the photometer, pointing towards the spectrometer, see table.

SPIRE	*SYNO*	*LOCAL*	*Directions*
X	-Zsyno	Norm	Tow. tel
Y	Xsyno	Sag	Tow. Spectro
Z	Ysyno	Tang	Tow. PAX

Euler angles aEuler, bEuler, cEuler represent consequtive rotations about the X, Y, and Z axes, respectively, in a counter-clockwise direction. The resulting coordinate system representing local surface coordinates are named Sag, Tang, and Norm, respectively. Norm is along the surface axis, Tan is in general in the plane of the system and Sag is in general pointing towards the optical bench. For centred surfaces, Norm defines the spigot axis and Sag defines the dowl location.

The local axes are produced by the following:

$$\begin{bmatrix} ySag & yTan & yNorm \\ zSag & zTan & zNorm \\ xSag & xTan & xNorm \end{bmatrix}_{SPIRE} = \begin{bmatrix} ySag & yTan & yNorm \\ zSag & zTan & zNorm \\ xSag & xTan & xNorm \end{bmatrix}_{SYNOPSYS} \begin{bmatrix} 1 & 0 & 0 \\ 0 & \cos a & \sin a \\ 0 & -\sin a & \cos a \end{bmatrix} \begin{bmatrix} \cos b & 0 & -\sin b \\ 0 & 1 & 0 \\ \sin b & 0 & \cos b \end{bmatrix} \begin{bmatrix} \cos c & \sin c & 0 \\ -\sin c & \cos c & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$= \begin{bmatrix} \sin a \sin b \cos c - \cos a \sin c & \sin a \sin b \sin c + \cos a \cos c & \sin a \cos b \\ \cos a \sin b \cos c + \sin a \sin c & \cos a \sin b \sin c - \sin a \cos c & \cos a \cos b \end{bmatrix}$$

2. Surface normal vectors from ray impact data

For CM3 and CM5 (see sec 3), interface data are calculated from ray impact data. These are provided by raytracing outputs in mm with 6 significant decimals. With around 100 path length between impact points, this gives an angular precision of around 1e-6 deg.
For each component (i) the direction cosines of the exiting ray vector is calculated by normalizing the difference between ray impact coordinates on surfaces i and i+1:

$$\mathbf{r}_i = \frac{\mathbf{P}_{i+1} - \mathbf{P}_i}{\left|\mathbf{P}_{i+1} - \mathbf{P}_i\right|}$$

For reflecting surfaces, the local normal is obtained as the normalized difference between incident and reflected rays:

$$\mathbf{n}_i = \frac{\mathbf{r}_i - \mathbf{r}_{i-1}}{\left|\mathbf{r}_i - \mathbf{r}_{i-1}\right|}$$

3. Surface sagittal vectors

For centred surfaces, the spigot axis intercepts the optical surface at the surface vertec point, which is also coincident with the gut ray impact point. Two surfaces are not of this type:

CM3: This mirror is an off-axis asphere, ie its surface vertex does not coincide with the gut ray impact point. Also, since the mirror is common for photometer and spectrometer, its aperture is not symmetrical about the photometer gut ray impact point, and so the spigot , which is located near the centre of gravity of the mirror, does not intercept the surface in the gut ray impact point.

CM5: This mirror is common for photometer and spectrometer, its aperture is therefore not symmetrical about the photometer gut ray impact point, and so the spigot , which is located near the centre of gravity of the mirror, does not intercept the surface in the gut ray impact point.

For each of these surfaces a separate ray is traced for which the sky coordinates are chosen so as to impact the mirror surface at the spigot axis interception point. Local normal vectors are calculated as above and used to define the spigot vectors for these mirrors.

The local Sag vector (required to define the dowl position) is calculated by rotating the Sag vector at the vertex through an angle Theta in the X-Y plane:

Xsag = VertexCalc!Xsag*COS(Theta)-VertexCalc!Ysag*SIN(Theta)
Ysag = VertexCalc!Xsag*SIN(Theta)+VertexCalc!Ysag*COS(Theta)
Zsag = VertexCalc!Zsag

Theta is the angle between the projections onto the X-Y plane of the spigot vector and the vertex normal vector:

```
Theta = ACOS((Xnorm*VertexCalc!Xnorm+Ynorm*VertexCalc!Ynorm)
        /(RACINE(Xnorm^2+Ynorm^2)*RACINE(VertexCalc!Xnorm^2+VertexCalc!Ynorm^2)))
        *SIGNE(Xnorm*Ynorm))
```

where the SIGNE function provides the correct sign of Theta.

4 Interface data in global coordinates (Interfa&ces)

For each mirror, the following are given in the global instrument coordinate system:

(Xmirr, Ymirr, Zmirr): coordinates of the intersection point between the spigot axis and the optical surface

(Xnorm, Ynorm, Znorm): direction cosines of the surface normal, pointing away from the optical surface. This is parallel with the spigot axis.

(Xspig, Yspig, Zspig): coordinates of the intersection between the spigot axis and the interface plane:

(XYZ)spig = (XYZ)mirr + ThMirr*(XYZ)norm

where ThMirr is a negative number giving the thickness of the mirror.

(Xsag, Ysag, Zsag): direction cosines of the surface sag vector along which the dowl is located. The sag vector always has a positive y co-ordinate.

(Xdowl, Ydowl, Zdowl): coordinates of the intersection between the dowl axis (parallel with the spigot axis) and the interface plane

(XYZ)dowl= (XYZ)spig + DowlDir*DowlSep*(XYZ)sag

where DowlDir = +-1 gives the direction towards the dowl and DowlSep is the distance between spigot and dowl axes.

5. Interface data in local coordinates (SurfDef)

For each mirror, the interface vectors listed above are also given in terms of local coordinates for each optical surface, whose origin is at the surface vertex and whose axes are aligned with the vertex normal. For the spigot interception points, this requires a transformation involving translation and rotation, expressed as:

```
Xmirr = VertexCalc!Xnorm*(Interfaces!Xmirr-VertexCalc!Xmirr)
        +VertexCalc!Ynorm*(Interfaces!Ymirr-VertexCalc!Ymirr)
        +VertexCalc!Znorm*(Interfaces!Zmirr-VertexCalc!Zmirr)
Ymirr = VertexCalc!Xsag*(Interfaces!Xmirr-VertexCalc!Xmirr)
        +VertexCalc!Ysag*(Interfaces!Ymirr-VertexCalc!Ymirr)
        +VertexCalc!Zsag*(Interfaces!Zmirr-VertexCalc!Zmirr)
Zmirr = VertexCalc!Xtang*(Interfaces!Xmirr-VertexCalc!Xmirr)
        +VertexCalc!Ytang*(Interfaces!Ymirr-VertexCalc!Ymirr)
        +VertexCalc!Ztang*(Interfaces!Zmirr-VertexCalc!Zmirr)
```

For the direction cosines for the Norm (spigot) and Sag (dowl) vectors, the transformation only involves rotation:

```
Xnorm = VertexCalc!Xnorm*Interfaces!Xnorm+VertexCalc!Ynorm*Interfaces!Ynorm
        +VertexCalc!Znorm*Interfaces!Znorm
Ynorm = VertexCalc!Xsag*Interfaces!Xnorm+VertexCalc!Ysag*Interfaces!Ynorm
        +VertexCalc!Zsag*Interfaces!Znorm
Znorm = VertexCalc!Xtang*Interfaces!Xnorm+VertexCalc!Ytang*Interfaces!Ynorm
        +VertexCalc!Ztang*Interfaces!Znorm
```

Name	Description
ID	System identification number
ThisCol	Column identification label
SystemPart	
CompName	
System	Ray traced system: Phot, SpecUp, SpecLo
Flag	
SurfNum	
Line	
Ray	
Syst	
Axe	
AxeSyno	
Local	
Type	Aperture type
Dia	
EllipsX	
EllipsY	
RectX	
RectY	
OffsetX	
OffsetY	
ThMirr	Mirror thickness
Thick	Thickness of thick mirrors (CM3, CM5, PM7, PM9)
Thin	Thickness of other mirrors
SpigLength	Distance to spigot point
DowlSep	Distance to dowl point
Theta	Angle between surface vertex normal and spigot axis
UpFlag	Direction of exiting ray, 1 for +X
LeftHandCorr	Factor applied to Zspire to transform LHS to RHS
NormDirCorr	Factor applied to VertexNormal to point it up (+X)
NormDir	Automatically determined normal direction factor
DowlDir	Manually entered factor (+/-1) to determine dowl direction (gen tow bench)
XPhotGut	Gut ray impact coordinates
YPhotGut	
ZPhotGut	
XSpecGut	
YSpecGut	
ZSpecGut	
XgutPhot	Gut ray impact coordinates
YgutPhot	
ZgutPhot	
XGutSpec	
YGutSpec	
ZGutSpec	
XCM3cent	Ray centred on CM3, impact coordinates
YCM3cent	
ZCM3cent	
XCM5cent	Ray centred on CM5, impact coordinates
YCM5cent	
ZCM5cent	
aEuler	Surface orientation Euler angles
bEuler	
cEuler	
Xaxis	Surface vertex axis direction vector
Yaxis	
Zaxis	
Xvertex	Surface vertex coordinates used in VertexCalc
Yvertex	
Zvertex	
Xtang	Surface vertex tangential vector
Ytang	
Ztang	
Xsag	Surface vertex sagittal vector
Ysag	
Zsag	
Xmirr	Mirror surface coordinate
Ymirr	
Zmirr	
Xnorm	Preliminary mirror normal vectors, to calculate NormDir
Ynorm	
Znorm	
Xnorm	Mirror normal vector (spigot vector)
Ynorm	
Znorm	
Xspig	Point along spigot vector
Yspig	
Zspig	
XsagM	Mirror sagittal vector (pointing towards dowl)
YsagM	
ZsagM	
Xdowl	Point in direction of dowl
Ydowl	
Zdowl	
Line0	Line of first surface in listing
Line0Phot	
Line0Spec	
Xcol	Column of each coordinate in listing
Ycol	
Zcol	
Xfact	Direction correction for SPIRE (RHS) with respect to Syno (LHS) co-ordinates
Yfact	
Zfact	
X0	Offset of SPIRE origin with respect to Synopsys origin
Y0	
Z0	
Xdiff	Difference between ray impact coordinates
Ydiff	
Zdiff	
DiffMod	Modulo of difference vector
Xray	Unit ray vector
Yray	
Zray	
dXray	Difference between unit ray vectors
dYray	
dZray	
dRayMod	Modulo of difference vector
Csag	Local co-ordinates of aperure centre
Ctang	
NextIndex	Refractive index following the surface
ListLine0Phot	
ListLine0Spec	
IndexCol	
ListLine	
Air	1

SystemPart	CompName	System	Flag	SurfNum
	Dummy	Phot	Ignore	5
Telescope	M1	Phot	Mirror	6
	M2	Phot	Mirror	7
Common optics	CFP	Phot	Ignore	9
	CM3	Phot	Mirror	11
	CM4	Phot	Mirror	14
	CM5	Phot	Mirror	17
Photometer optics	PM6	Phot	Mirror	20
	PM7	Phot	Mirror	22
	PM8	Phot	Mirror	24
	PCS	Phot	Hole	26
	PM9	Phot	Mirror	27
Short wave	PDIC1	Phot	Hole	31
	PM10	Phot	Mirror	36
	PSW	Phot	Det	38
	PDIC1	Phot	Ignore	31
Medium wave	PDIC2	Phot	Hole	46
	PMW	Phot	Det	51
	PDIC2	Phot	Ignore	46
Long wave	PM11	Phot	Mirror	57
	PLW	Phot	Det	59
	CM5	Spec	Ignore	17
Spectrometer optics	SM6	Spec	Mirror	22
	SCS	Spec	Hole	26
	SM7	Spec	Mirror	30
	SM8A	Spec	Mirror	36
Upper arm	SBS1	Spec	Hole	39
	SM9A	Spec	Mirror	43
	SRTA1	Spec	Mirror	46
	SRTA2	Spec	Mirror	51
	SM10A	Spec	Mirror	56
	SBS2	Spec	Hole	60
	SM11A	Spec	Mirror	63
	SM12A	Spec	Mirror	67
	SFLA	Spec	Hole	69
	SSW	Spec	Det	71
Lower arm	SCAL	Spec	Hole	102
	SM8B	Spec	Mirror	98
	SBS1	Spec	Hole	39
	SM9B	Spec	Mirror	111
	SRTB1	Spec	Mirror	114
	SRTB2	Spec	Mirror	119
	SM10B	Spec	Mirror	124
	SBS2	Spec	Hole	60
	SM11B	Spec	Mirror	131
	SM12B	Spec	Mirror	136
	SFLB	Spec	Hole	138
	SLW	Spec	Det	140

Axis directions:

X	-Zsyno	Tow. tel
Y	Xsyno	Tow. Spectro
Z	Ysyno	Tow. PAX

ThisCol

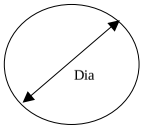
SystemPart	CompName	System	Flag	Type	Dia or Dsag	Dtang	Csag	Ctang	Xc	Yc	Zc	Xnorm	Ynorm	Znorm	Xsag	Ysag	Zsag
	Dummy	Phot	Ignore														
Telescope	M1	Phot	Mirror	Circ	3500.000												
	M2	Phot	Mirror	Circ	308.120												
Common optics	CFP	Phot	Ignore														
	CM3	Phot	Mirror	Rect	139.000	62.000	-19.500	145.000									
	CM4	Phot	Mirror	Ellips	30.000	32.000											
	CM5	Phot	Mirror	Rect	161.000	85.000	19.500	-1.500									
Photometer optics	PM6	Phot	Mirror	Rect	46.000	27.000											
	PM7	Phot	Mirror	Rect	118.000	101.000	0.000	-1.000									
	PM8	Phot	Mirror	Circ	64.000												
	PCS	Phot	Hole	Ellips	46.128	39.808	0.000	0.738	192.327	0.000	-448.460	0.67997	0.00000	0.73324	0.00000	1.00000	0.00000
	PM9	Phot	Mirror	Circ	112.000												
Short wave	PDIC1	Phot	Hole	Circ	80.000				238.420	0.000	-527.460	-0.90513	0.00000	-0.42513	0.00000	1.00000	0.00000
	PM10	Phot	Mirror	Rect	78.000	40.000	2.500	0.000									
	PSW	Phot	Det	Rect	40.000	22.000			139.942	-50.000	-619.803	0.00000	1.00000	0.00000	0.72946	0.00000	0.68402
	PDIC1	Phot	Ignore														
Medium wave	PDIC2	Phot	Hole	Circ	72.000				337.640	0.000	-514.998	-0.89924	-0.42262	-0.11294	-0.41932	0.90631	-0.05267
	PMW	Phot	Det	Rect	40.000	22.000			283.429	-65.114	-521.807	0.63778	0.76604	0.08010	-0.76007	0.64279	-0.09546
	PDIC2	Phot	Ignore														
Long wave	PM11	Phot	Mirror	Rect	56.000	53.000	0.000	2.750									
	PLW	Phot	Det	Rect	40.000	22.000			381.298	0.000	-468.515	-0.00002	0.00000	-1.00000	0.00000	1.00000	0.00000
	CM5	Spec	Ignore														
Spectrometer optics	SM6	Spec	Mirror	Ellips	24.000	18.000	1.000	0.000									
	SCS	Spec	Hole	Ellips	23.900	25.140	0.400	-0.820	314.318	142.272	-233.284	-0.49645	-0.75284	-0.43216	0.10552	0.44182	-0.89088
	SM7	Spec	Mirror	Rect	57.000	40.000	4.000	0.000									
	SM8A	Spec	Mirror	Circ	60.000												
Upper arm	SBS1	Spec	Hole	Circ	30.000		0.000	1.500	223.128	170.857	-319.899	1.00000	0.00000	0.00000	0.00000	1.00000	0.00000
	SM9A	Spec	Mirror	Circ	50.000												
	SRTA1	Spec	Mirror	Circ	36.808												
	SRTA2	Spec	Mirror	Circ	38.262												
	SM10A	Spec	Mirror	Circ	60.000												
	SBS2	Spec	Hole	Circ	36.000		0.000	-2.000	223.128	170.857	-546.599	1.00000	0.00000	0.00000	0.00000	1.00000	0.00000
	SM11A	Spec	Mirror	Circ	74.000		0.000	1.000									
	SM12A	Spec	Mirror	Ellips	24.800	18.000	-0.630	0.500									
	SFLA	Spec	Hole	Circ	15.020				263.583	236.757	-636.663	0.00000	-1.00000	0.00000	-0.98481	0.00000	-0.17365
	SSW	Spec	Det	Circ	20.000				263.583	250.857	-636.663	0.00000	-1.00000	0.00000	-1.00000	0.00000	0.00000
Lower arm	SCAL	Spec	Hole	Circ	25.000				158.853	170.857	-219.396	0.98481	0.00000	0.17365	0.00000	1.00000	0.00000
	SM8B	Spec	Mirror	Circ	60.000												
	SBS1	Spec	Hole	Circ	30.000		0.000	1.500	223.128	170.857	-319.899	1.00000	0.00000	0.00000	0.00000	1.00000	0.00000
	SM9B	Spec	Mirror	Circ	50.000												
	SRTB1	Spec	Mirror	Circ	36.808												
	SRTB2	Spec	Mirror	Circ	38.262												
	SM10B	Spec	Mirror	Circ	60.000												
	SBS2	Spec	Hole	Circ	36.000		0.000	-2.000	223.128	170.857	-546.599	1.00000	0.00000	0.00000	0.00000	1.00000	0.00000
	SM11B	Spec	Mirror	Circ	74.000		0.000	-1.000									
	SM12B	Spec	Mirror	Ellips	24.800	18.000	-0.630	-0.500									
	SFLB	Spec	Hole	Circ	14.687				182.673	246.957	-636.663	0.00000	-1.00000	0.00000	0.98481	0.00000	-0.17365
	SLW	Spec	Det	Circ	20.000				182.673	250.857	-636.663	0.00000	-1.00000	0.00000	1.00000	0.00000	0.00000
Axe									x	y	z						

Axis directions:

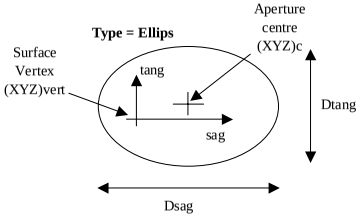
X	-Zsyno	Tow. tel
Y	Xsyno	Tow. Spectro
Z	Ysyno	Tow. PAX

Legend

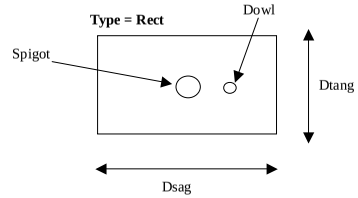
Type = Circ



Type = Ellips



Type = Rect



This sheet gives aperture dimensions and centre offset with respect to surface vertices (coincident with gut ray impact for all surfaces except CM3).

Interfaces for LAM supplied mirrors are given interms of spigot and dowl coordinates in the "Interfaces" sheet.

For other surfaces, CM4, filters, dichroics, etc, this sheet calculates the global co-ordinates of the geometrical aperture centres, XYZc, and unit vectors indicating norm and sag vectors.

ThisCol

SystemPart	CompName	System	Flag	XGut	YGut	ZGut
	Dummy	Phot	Ignore			
Telescope	M1	Phot	Mirror	1252.429	0.000	54.793
	M2	Phot	Mirror	2839.998	0.000	0.000
Common optics	CFP	Phot	Ignore			
	CM3	Phot	Mirror	131.142	0.000	-93.494
	CM4	Phot	Mirror	316.125	0.000	-200.094
	CM5	Phot	Mirror	119.783	0.000	-179.689
Photometer optics	PM6	Phot	Mirror	296.151	0.000	-259.533
	PM7	Phot	Mirror	94.234	0.000	-279.481
	PM8	Phot	Mirror	240.466	0.000	-397.634
	PCS	Phot	Hole	192.867	0.000	-448.961
	PM9	Phot	Mirror	104.471	0.000	-544.281
Short wave	PDIC1	Phot	Hole	238.419	0.000	-527.459
	PM10	Phot	Mirror	139.942	0.000	-619.802
	PSW	Phot	Det	139.942	-50.000	-619.803
	PDIC1	Phot	Ignore			
Medium wave	PDIC2	Phot	Hole	337.640	0.000	-514.998
	PMW	Phot	Det	283.429	-65.114	-521.807
	PDIC2	Phot	Ignore			
Long wave	PM11	Phot	Mirror	381.298	0.000	-509.515
	PLW	Phot	Det	381.298	0.000	-468.515
	CM5	Spec	Ignore			
Spectrometer optics	SM6	Spec	Mirror	306.147	33.819	-263.978
	SCS	Spec	Hole	314.984	141.696	-233.044
	SM7	Spec	Mirror	317.373	170.860	-224.681
	SM8A	Spec	Mirror	373.504	170.861	-234.579
Upper arm	SBS1	Spec	Hole	223.128	170.857	-321.398
	SM9A	Spec	Mirror	373.123	170.854	-407.998
	SRTA1	Spec	Mirror	248.124	170.854	-407.998
	SRTA2	Spec	Mirror	248.123	170.854	-457.999
	SM10A	Spec	Mirror	373.123	170.854	-457.998
	SBS2	Spec	Hole	223.128	170.857	-544.598
	SM11A	Spec	Mirror	354.746	170.860	-620.588
	SM12A	Spec	Mirror	263.581	170.858	-636.663
	SFLA	Spec	Hole	263.582	236.757	-636.663
	SSW	Spec	Det	263.583	250.857	-636.663
Lower arm	SCAL	Spec	Hole	158.853	170.859	-219.397
	SM8B	Spec	Mirror	72.751	170.861	-234.579
	SBS1	Spec	Hole	223.128	170.857	-321.398
	SM9B	Spec	Mirror	73.132	170.854	-407.998
	SRTB1	Spec	Mirror	198.132	170.854	-407.998
	SRTB2	Spec	Mirror	198.132	170.854	-457.999
	SM10B	Spec	Mirror	73.132	170.854	-457.998
	SBS2	Spec	Hole	223.128	170.857	-544.598
	SM11B	Spec	Mirror	91.509	170.860	-620.588
	SM12B	Spec	Mirror	182.674	170.858	-636.663
	SFLB	Spec	Hole	182.673	246.957	-636.663
	SLW	Spec	Det	182.673	250.857	-636.663

Axe				X	Y	Z
Local				Gut	Gut	Gut
	Axis directions:		*LOCAL*			
	X	-Zsyno	Norm	Tow. tel		
	Y	Xsyno	Sag	Tow. Spectro		
	Z	Ysyno	Tang	Tow. PAX		

ThisCol

Mirror thickness
Thick -14.9380073
Thin -6.97107006

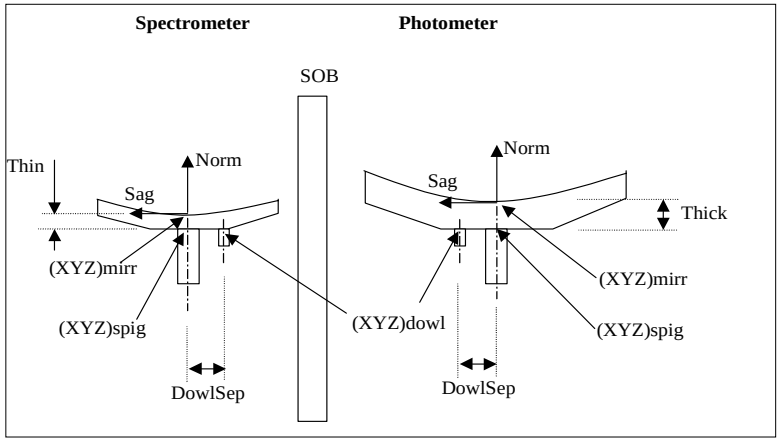
Dowl separation
DowlSep 11.95040582

SystemPart	CompName	System	ThMirr	DowlDir	Flag	Xmirr	Ymirr	Zmirr	Xnorm	Ynorm	Znorm	Xspig	Yspig	Zspig	Xsag	Ysag	Zsag	Xdowl	Ydowl	Zdowl	Check	CompName
	Dummy	Phot			Ignore																	Dummy
Telescope	M1	Phot			Vertex	1252.000000	0.000000	0.000000	1.000000	0.000000	0.000000	1245.028930	0.000000	0.000000	0.000000	1.000000	0.000000	1245.028930	0.000000	0.000000	90	M1
	M2	Phot			Vertex	2839.998000	0.000000	0.000000	#VALEUR!	#VALEUR!	#VALEUR!	#VALEUR!	#VALEUR!	#VALEUR!	0.000000	1.000000	0.000000	#VALEUR!	#VALEUR!	#VALEUR!	#VALEUR!	M2
Common optics	CFP	Phot			Ignore																	CFP
	CM3	Phot	Thick	1	CM3Cent	131.229806	-19.500476	-95.222336	0.970091	0.051240	-0.237270	116.738573	-20.265898	-91.677995	-0.052746	0.998608	0.000000	116.108235	-8.332128	-91.677995	90	CM3
	CM4	Phot			Vertex	316.125371	0.000000	-200.093020	-0.951361	0.000000	0.308077	322.757377	0.000000	-202.240649	0.000000	1.000000	0.000000	322.757377	0.000000	-202.240649	90	CM4
	CM5	Phot	Thick	1	CM5Cent	120.054658	19.499867	-181.314796	0.964213	-0.070038	-0.255710	105.651236	20.546097	-177.494991	0.072447	0.997372	0.000000	106.517005	32.465101	-177.494991	90	CM5
Photometer optics	PM6	Phot		1	Vertex	296.150668	0.000000	-259.533222	-0.986693	0.000000	0.162592	303.028976	0.000000	-260.666665	0.000000	1.000000	0.000000	303.028976	11.950406	-260.666665	90	PM6
	PM7	Phot	Thick	1	Vertex	94.233806	0.000000	-279.482925	0.958086	0.000000	-0.286481	79.921912	0.000000	-275.203469	0.000000	1.000000	0.000000	79.921912	11.950406	-275.203469	90	PM7
	PM8	Phot		1	Vertex	240.466424	0.000000	-397.635459	-0.997428	0.000000	-0.071682	247.419561	0.000000	-397.135759	0.000000	1.000000	0.000000	247.419561	11.950406	-397.135759	90	PM8
	PCS	Phot			Hole	192.868434	0.000000	-448.962170	0.679971	0.000000	0.733239				0.000000	1.000000	0.000000				90	PCS
	PM9	Phot	Thick	1	Vertex	104.472165	0.000000	-544.283205	0.889746	0.000000	0.456455	91.181126	0.000000	-551.101735	0.000000	1.000000	0.000000	91.181126	11.950406	-551.101735	90	PM9
Short wave	PDIC1	Phot			Hole	238.419841	0.000000	-527.460001	-0.905134	0.000000	-0.425125				0.000000	1.000000	0.000000				90	PDIC1
	PM10	Phot		-1	Vertex	139.942327	0.000000	-619.802728	0.515808	-0.707107	0.483675	136.346591	4.929291	-623.174463	0.515808	0.707107	0.483675	130.182473	-3.520922	-628.954579	90	PM10
	PSW	Phot			Det	139.942327	-50.000000	-619.802728	0.000000	1.000000	0.000000				0.729463	0.000000	0.684020				90	PSW
	PDIC1	Phot			Ignore																	PDIC1
Medium wave	PDIC2	Phot			Hole	337.640341	0.000000	-514.998367	-0.899243	-0.422618	-0.112941				-0.419324	0.906308	-0.052665				90	PDIC2
	PMW	Phot			Det	283.429289	-65.113778	-521.807023	0.637777	0.766044	0.080102				-0.760073	0.642788	-0.095462				90	PMW
	PDIC2	Phot			Ignore																	PDIC2
Long wave	PM11	Phot		1	Vertex	381.297361	0.000000	-509.515249	-0.749864	0.000000	0.661592	386.524716	0.000000	-514.127253	0.000000	1.000000	0.000000	386.524716	11.950406	-514.127253	90	PM11
	PLW	Phot			Det	381.298363	0.000000	-468.515249	-0.000024	0.000000	-1.000000				0.000000	1.000000	0.000000				90	PLW
	CM5	Spec		1	CM5Cent	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	90	CM5
Spectrometer optics	SM6	Spec		1	Vertex	306.150668	33.820000	-263.975222	-0.544804	0.709952	0.446270	309.948532	28.870872	-267.086199	0.687606	0.682830	-0.246862	318.165703	37.030973	-270.036295	90	SM6
	SCS	Spec			Hole	314.982809	141.695656	-233.042376	-0.496447	-0.752844	-0.432165				0.105523	0.441817	-0.890877				90	SCS
	SM7	Spec		-1	Vertex	317.370319	170.856678	-224.680587	0.650560	-0.687862	-0.321895	312.835218	175.651815	-222.436632	0.755385	0.629897	0.180620	303.808064	168.124290	-224.595115	90	SM7
	SM8A	Spec		-1	Vertex	373.504361	170.856678	-234.578533	-0.984808	0.000000	-0.173648	380.369525	170.856678	-233.368019	-0.018814	0.994113	0.106700	380.594362	158.976622	-234.643132	90	SM8A
Upper arm	SBS1	Spec			Hole	223.127710	170.856678	-321.398533	1.000000	0.000000	0.000000				0.000000	1.000000	0.000000				90	SBS1
	SM9A	Spec		-1	Vertex	373.123310	170.856678	-407.998533	-0.965926	0.000000	0.258819	379.856847	170.856678	-409.802779	0.000000	1.000000	0.000000	379.856847	158.906272	-409.802779	90	SM9A
	SRTA1	Spec		-1	Vertex	248.123310	170.856678	-407.998533	0.707107	0.000000	-0.707107	243.194019	170.856678	-403.069242	0.000000	1.000000	0.000000	243.194019	158.906272	-403.069242	90	SRTA1
	SRTA2	Spec		-1	Vertex	248.123310	170.856678	-457.998533	0.707107	0.000000	0.707107	243.194019	170.856678	-462.927824	0.000000	1.000000	0.000000	243.194019	158.906272	-462.927824	90	SRTA2
	SM10A	Spec		-1	Vertex	373.123310	170.856678	-457.998533	-0.965926	0.000000	-0.258819	379.856847	170.856678	-456.194287	0.000000	1.000000	0.000000	379.856847	158.906272	-456.194287	90	SM10A
	SBS2	Spec			Hole	223.127710	170.856678	-544.598533	1.000000	0.000000	0.000000				0.000000	1.000000	0.000000				90	SBS2
	SM11A	Spec		-1	Vertex	354.746250	170.856678	-620.588533	-0.984808	0.000000	0.173648	361.611414	170.856678	-621.799047	0.000000	1.000000	0.000000	361.611414	158.906272	-621.799047	90	SM11A
	SM12A	Spec		-1	Vertex	263.582597	170.856678	-636.663145	0.696364	0.707107	0.122788	258.728193	165.927387	-637.519107	-0.696364	0.707107	-0.122788	267.050028	157.477174	-636.051743	90	SM12A
	SFLA	Spec		-1	Hole	263.582597	236.756678	-636.663145	0.000000	-1.000000	0.000000				-0.984808	0.000000	-0.173648				90	SFLA
	SSW	Spec			Det	263.582597	250.856678	-636.663145	0.000000	-1.000000	0.000000				-1.000000	0.000000	0.000000				90	SSW
Lower arm	SCAL	Spec			Hole	158.852800	170.856678	-219.396473	0.984808	0.000000	0.173648				0.000000	1.000000	0.000000				90	SCAL
	SM8B	Spec		-1	Vertex	72.751059	170.856678	-234.578533	0.984808	0.000000	-0.173648	65.885895	170.856678	-233.368019	0.018814	0.994113	0.106700	65.661058	158.976622	-234.643132	90	SM8B
	SBS1	Spec			Hole	223.127710	170.856678	-321.398533	1.000000	0.000000	0.000000				0.000000	1.000000	0.000000				90	SBS1
	SM9B	Spec		-1	Vertex	73.132110	170.856678	-407.998533	0.965926	0.000000	0.258819	66.398573	170.856678	-409.802779	0.000000	1.000000	0.000000	66.398573	158.906272	-409.802779	90	SM9B
	SRTB1	Spec		-1	Vertex	198.132110	170.856678	-407.998533	-0.707107	0.000000	-0.707107	203.061401	170.856678	-403.069242	0.000000	1.000000	0.000000	203.061401	158.906272	-403.069242	90	SRTB1
	SRTB2	Spec		-1	Vertex	198.132110	170.856678	-457.998533	-0.707107	0.000000	0.707107	203.061401	170.856678	-462.927824	0.000000	1.000000	0.000000	203.061401	158.906272	-462.927824	90	SRTB2
	SM10B	Spec		-1	Vertex	73.132110	170.856678	-457.998533	0.965926	0.000000	-0.258819	66.398573	170.856678	-456.194287	0.000000	1.000000	0.000000	66.398573	158.906272	-456.194287	90	SM10B
	SBS2	Spec			Hole	223.127710	170.856678	-544.598533	1.000000	0.000000	0.000000				0.000000	1.000000	0.000000				90	SBS2
	SM11B	Spec		-1	Vertex	91.509169	170.856678	-620.588533	0.984808	0.000000	0.173648	84.644005	170.856678	-621.799047	0.000000	1.000000	0.000000	84.644005	158.906272	-621.799047	90	SM11B
	SM12B	Spec		-1	Vertex	182.672823	170.856678	-636.663145	-0.696364	0.707107	0.122788	187.527227	165.927387	-637.519107	0.696364	0.707107	-0.122788	179.205392	157.477174	-636.051743	90	SM12B
	SFLB	Spec			Hole	182.672823	246.956678	-636.663145	0.000000	-1.000000	0.000000				0.984808	0.000000	-0.173648				90	SFLB
	SLW	Spec			Det	182.672823	250.856678	-636.663145	0.000000	-1.000000	0.000000				1.000000	0.000000	0.000000				90	SLW
Axe						x	y	z	x	y	z	x	y	z	x	y	z	x	y	z		

Axis directions:

SPIRE	*SYNO*	*LOCAL*	*Directions*
X	-Zsyno	Norm	Tow. tel
Y	Xsyno	Sag	Tow. Spectro
Z	Ysyno	Tang	Tow. PAX

NB: All dimensions are for operational conditions (4K)



180

-1

ThisCol

Mirror thickness
Thick -14.9380073
Thin -6.97107006

Dowl separation
DowlSep 11.95040582

SystemPart	CompName	System	ThMirr	DowlDir	Flag	Xmirr	Ymirr	Zmirr	Xnorm	Ynorm	Znorm	Xspig	Yspig	Zspig	Xsag	Ysag	Zsag	Xdowl	Ydowl	Zdowl	Check	CompName
	Dummy	Phot			Ignore																	Dummy
Telescope	M1	Phot			Vertex	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	-6.971070	0.000000	0.000000	0.000000	1.000000	0.000000	#VALEUR!	#VALEUR!	#VALEUR!	90	M1
	M2	Phot			Vertex	#VALEUR!	0.000000	#VALEUR!	#VALEUR!	#VALEUR!	#VALEUR!	#VALEUR!	#VALEUR!	#VALEUR!	#VALEUR!	1.000000	#VALEUR!	#VALEUR!	#VALEUR!	#VALEUR!	#VALEUR!	M2
Common optics	CFP	Phot			Ignore																	CFP
	CM3	Phot	Thick	1	Vertex	29.842009	-19.500476	145.000210	0.923152	0.051240	-0.381006	16.051964	-20.265898	150.691682	-0.052142	0.998608	0.007963	15.428851	-8.332128	150.786845	90	CM3
	CM4	Phot			Vertex	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	-6.971070	0.000000	0.000000	0.000000	1.000000	0.000000	#VALEUR!	#VALEUR!	#VALEUR!	90	CM4
	CM5	Phot	Thick	1	Vertex	0.687534	19.499867	-1.499950	0.997531	-0.070038	0.005091	-14.213596	20.546097	-1.575997	0.069930	0.997372	0.018928	-13.377900	32.465101	-1.349798	90	CM5
Photometer optics	PM6	Phot		1	Vertex	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	-6.971070	0.000000	0.000000	0.000000	1.000000	0.000000	-6.971070	11.950406	0.000000	90	PM6
	PM7	Phot	Thick	1	Vertex	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	-14.938007	0.000000	0.000000	0.000000	1.000000	0.000000	-14.938007	11.950406	0.000000	90	PM7
	PM8	Phot		1	Vertex	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	-6.971070	0.000000	0.000000	0.000000	1.000000	0.000000	-6.971070	11.950406	0.000000	90	PM8
	PCS	Phot			Hole																	PCS
	PM9	Phot	Thick	1	Vertex	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	-14.938007	0.000000	0.000000	0.000000	1.000000	0.000000	-14.938007	11.950406	0.000000	90	PM9
Short wave	PDIC1	Phot			Hole																	PDIC1
	PM10	Phot		-1	Vertex	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	-6.971070	0.000000	0.000000	0.000000	1.000000	0.000000	-6.971070	-11.950406	0.000000	90	PM10
	PSW	Phot			Det																	PSW
	PDIC1	Phot			Ignore																	PDIC1
Medium wave	PDIC2	Phot			Hole																	PDIC2
	PMW	Phot			Det																	PMW
	PDIC2	Phot			Ignore																	PDIC2
Long wave	PM11	Phot		1	Vertex	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	-6.971070	0.000000	0.000000	0.000000	1.000000	0.000000	-6.971070	11.950406	0.000000	90	PM11
	PLW	Phot			Det																	PLW
	CM5	Spec		1	Ignore																	CM5
Spectrometer optics	SM6	Spec		1	Vertex	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	-6.971070	0.000000	0.000000	0.000000	1.000000	0.000000	-6.971070	11.950406	0.000000	90	SM6
	SCS	Spec			Hole																	SCS
	SM7	Spec		-1	Vertex	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	-6.971070	0.000000	0.000000	0.000000	1.000000	0.000000	-6.971070	-11.950406	0.000000	90	SM7
	SM8A	Spec		-1	Vertex	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	-6.971070	0.000000	0.000000	0.000000	1.000000	0.000000	-6.971070	-11.950406	0.000000	90	SM8A
Upper arm	SBS1	Spec			Hole																	SBS1
	SM9A	Spec		-1	Vertex	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	-6.971070	0.000000	0.000000	0.000000	1.000000	0.000000	-6.971070	-11.950406	0.000000	90	SM9A
	SRTA1	Spec		-1	Vertex	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	-6.971070	0.000000	0.000000	0.000000	1.000000	0.000000	-6.971070	-11.950406	0.000000	90	SRTA1
	SRTA2	Spec		-1	Vertex	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	-6.971070	0.000000	0.000000	0.000000	1.000000	0.000000	-6.971070	-11.950406	0.000000	90	SRTA2
	SM10A	Spec		-1	Vertex	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	-6.971070	0.000000	0.000000	0.000000	1.000000	0.000000	-6.971070	-11.950406	0.000000	90	SM10A
	SBS2	Spec			Hole																	SBS2
	SM11A	Spec		-1	Vertex	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	-6.971070	0.000000	0.000000	0.000000	1.000000	0.000000	-6.971070	-11.950406	0.000000	90	SM11A
	SM12A	Spec		-1	Vertex	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	-6.971070	0.000000	0.000000	0.000000	1.000000	0.000000	-6.971070	-11.950406	0.000000	90	SM12A
	SFLA	Spec		-1	Hole																	SFLA
	SSW	Spec			Det																	SSW
Lower arm	SCAL	Spec			Hole																	SCAL
	SM8B	Spec		-1	Vertex	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	-6.971070	0.000000	0.000000	0.000000	1.000000	0.000000	-6.971070	-11.950406	0.000000	90	SM8B
	SBS1	Spec			Hole																	SBS1
	SM9B	Spec		-1	Vertex	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	-6.971070	0.000000	0.000000	0.000000	1.000000	0.000000	-6.971070	-11.950406	0.000000	90	SM9B
	SRTB1	Spec		-1	Vertex	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	-6.971070	0.000000	0.000000	0.000000	1.000000	0.000000	-6.971070	-11.950406	0.000000	90	SRTB1
	SRTB2	Spec		-1	Vertex	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	-6.971070	0.000000	0.000000	0.000000	1.000000	0.000000	-6.971070	-11.950406	0.000000	90	SRTB2
	SM10B	Spec		-1	Vertex	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	-6.971070	0.000000	0.000000	0.000000	1.000000	0.000000	-6.971070	-11.950406	0.000000	90	SM10B
	SBS2	Spec			Hole																	SBS2
	SM11B	Spec		-1	Vertex	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	-6.971070	0.000000	0.000000	0.000000	1.000000	0.000000	-6.971070	-11.950406	0.000000	90	SM11B
	SM12B	Spec		-1	Vertex	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	-6.971070	0.000000	0.000000	0.000000	1.000000	0.000000	-6.971070	-11.950406	0.000000	90	SM12B
	SFLB	Spec			Hole																	SFLB
	SLW	Spec			Det																	SLW
Axe						x	y	z	x	y	z	x	y	z	x	y	z	x	y	z		
Local						Norm	Sag	Tang	Norm	Sag	Tang	Norm	Sag	Tang	Norm	Sag	Tang	Norm	Sag	Tang		

Axis directions:

X	-Zsyno	Tow. tel	*Directions*
Y	Xsyno	Tow. Spectro	Tow. tel
Z	Ysyno	Tow. PAX	Tow. Spectro
			Tow. PAX

SPIRE	*SYNO*	*LOCAL*
X	-Zsyno	Norm
Y	Xsyno	Sag
Z	Ysyno	Tang

LeftHandCorr -1
NormDirCorr -1

ThisCol		SystemPart	CompName	System	Flag	XGut	YGut	ZGut	Xdiff	Ydiff	Zdiff	DiffMod	Xray	Yray	Zray	dXray	dYray	dZray	drayMod	Xnorm	Ynorm	Znorm	UpFlag	
ID	(BOLPHT155)		Dummy	Phot	Ignore	3252.000	0.000	61.177																#VALEUR!
		Telescope	M1	Phot	Mirror	1252.429	0.000	54.793	-1999.571	0.000	-6.383	1999.581	-1.000	0.000	-0.003	1.999	0.000	-0.031	2.000	1.000	0.000	-0.016	1.000	0.99988
			M2	Phot	Mirror	2839.998	0.000	0.000	1587.569	0.000	-54.793	1588.514	0.999	0.000	-0.034	#VALEUR!	########	########	########	########	########	########	#VALEUR!	#VALEUR!
Ray	Gut	Common optics	CFP	Phot	Ignore	228.383	0.000	-90.137																#VALEUR!
			CM3	Phot	Mirror	131.142	0.000	-93.494	-97.241	0.000	-3.356	97.299	-0.999	0.000	-0.034	1.866	0.000	-0.465	1.923	0.970	0.000	-0.242	1.000	0.92273
			CM4	Phot	Mirror	316.125	0.000	-200.094	184.983	0.000	-106.600	213.501	0.866	0.000	-0.499	-1.861	0.000	0.603	1.956	-0.951	0.000	0.308	-1.000	1.00000
			CM5	Phot	Mirror	119.783	0.000	-179.689	-196.343	0.000	20.405	197.400	-0.995	0.000	0.103	1.906	0.000	-0.516	1.974	0.965	0.000	-0.261	1.000	1.00000
		Photometer optics	PM6	Phot	Mirror	296.151	0.000	-259.533	176.368	0.000	-79.845	193.600	0.911	0.000	-0.412	-1.906	0.000	0.314	1.932	-0.987	0.000	0.163	-1.000	1.00000
			PM7	Phot	Mirror	94.234	0.000	-279.481	-201.916	0.000	-19.948	202.899	-0.995	0.000	-0.098	1.773	0.000	-0.530	1.851	0.958	0.000	-0.286	1.000	1.00000
			PM8	Phot	Mirror	240.466	0.000	-397.634	146.232	0.000	-118.153	188.000	0.778	0.000	-0.628	-1.458	0.000	-0.105	1.462	-0.997	0.000	-0.072	-1.000	1.00000
			PCS	Phot	Hole	192.867	0.000	-448.961	-47.599	0.000	-51.327	70.001	-0.680	0.000	-0.733									#VALEUR!
			PM9	Phot	Mirror	104.471	0.000	-544.281	-88.396	0.000	-95.320	129.999	-0.680	0.000	-0.733	1.672	0.000	0.858	1.879	0.890	0.000	0.456	1.000	1.00000
		Short wave	PDIC1	Phot	Hole	238.419	0.000	-527.459	133.948	0.000	16.822	135.000	0.992	0.000	0.125									#VALEUR!
			PM10	Phot	Mirror	139.942	0.000	-619.802	-98.477	0.000	-92.344	135.000	-0.729	0.000	-0.684	0.729	-1.000	0.684	1.414	0.516	-0.707	0.484	1.000	1.00000
			PSW	Phot	Det	139.942	-50.000	-619.803	0.000	-50.000	0.000	50.000	0.000	-1.000	0.000									#VALEUR!
			PDIC1	Phot	Ignore	238.419	0.000	-527.459																#VALEUR!
		Medium wave	PDIC2	Phot	Hole	337.640	0.000	-514.998	99.221	0.000	12.461	100.000	0.992	0.000	0.125									#VALEUR!
			PMW	Phot	Det	283.429	-65.114	-521.807	-54.211	-65.114	-6.809	85.000	-0.638	-0.766	-0.080									#VALEUR!
			PDIC2	Phot	Ignore	337.640	0.000	-514.998																#VALEUR!
		Long wave	PM11	Phot	Mirror	381.298	0.000	-509.515	43.657	0.000	5.483	44.000	0.992	0.000	0.125	-0.992	0.000	0.875	1.323	-0.750	0.000	0.662	-1.000	1.00000
			PLW	Phot	Det	381.298	0.000	-468.515	0.001	0.000	41.000	41.000	0.000	0.000	1.000									#VALEUR!
			CM5	Spec	Ignore	125.121	58.001	-183.379																#VALEUR!
		Spectrometer optics	SM6	Spec	Mirror	306.147	33.819	-263.978	181.027	-24.182	-80.599	199.629	0.907	-0.121	-0.404	-0.828	1.079	0.679	1.520	-0.545	0.710	0.446	-1.000	1.00000
			SCS	Spec	Hole	314.984	141.696	-233.044	8.837	107.877	30.934	112.572	0.078	0.958	0.275									#VALEUR!
			SM7	Spec	Mirror	317.373	170.860	-224.681	2.389	29.164	8.363	30.433	0.078	0.958	0.275	0.906	-0.958	-0.448	1.393	0.651	-0.688	-0.322	1.000	1.00000
			SM8A	Spec	Mirror	373.504	170.861	-234.579	56.131	0.001	-9.897	56.997	0.985	0.000	-0.174	-1.851	0.000	-0.326	1.879	-0.985	0.000	-0.174	-1.000	1.00000
		Upper arm	SBS1	Spec	Hole	223.128	170.857	-321.398	-150.377	-0.003	-86.820	173.640	-0.866	0.000	-0.500									#VALEUR!
			SM9A	Spec	Mirror	373.123	170.854	-407.998	149.996	-0.003	-86.600	173.200	0.866	0.000	-0.500	-1.866	0.000	0.500	1.932	-0.966	0.000	0.259	-1.000	1.00000
			SRTA1	Spec	Mirror	248.124	170.854	-407.998	-125.000	0.000	0.000	125.000	-1.000	0.000	0.000	1.000	0.000	-1.000	1.414	0.707	0.000	-0.707	1.000	1.00000
			SRTA2	Spec	Mirror	248.123	170.854	-457.999	0.000	0.000	-50.000	50.000	0.000	0.000	-1.000	1.000	0.000	1.000	1.414	0.707	0.000	0.707	1.000	1.00000
			SM10A	Spec	Mirror	373.123	170.854	-457.998	125.000	0.000	0.000	125.000	1.000	0.000	0.000	-1.866	0.000	-0.500	1.932	-0.966	0.000	-0.259	-1.000	1.00000
			SBS2	Spec	Hole	223.128	170.857	-544.598	-149.996	0.003	-86.600	173.200	-0.866	0.000	-0.500									#VALEUR!
			SM11A	Spec	Mirror	354.746	170.860	-620.588	131.619	0.003	-75.990	151.980	0.866	0.000	-0.500	-1.851	0.000	0.326	1.879	-0.985	0.000	0.174	-1.000	1.00000
			SM12A	Spec	Mirror	263.581	170.858	-636.663	-91.165	-0.002	-16.075	92.572	-0.985	0.000	-0.174	0.985	1.000	0.174	1.414	0.696	0.707	0.123	1.000	1.00000
			SFLA	Spec	Hole	263.582	236.757	-636.663	0.001	65.898	0.000	65.898	0.000	1.000	0.000									#VALEUR!
			SSW	Spec	Det	263.583	250.857	-636.663	0.000	14.100	0.000	14.100	0.000	1.000	0.000									#VALEUR!
Axis directions:		Lower arm	SCAL	Spec	Hole	158.853	170.859	-219.397	-104.730	-79.998	417.267	437.584	-0.239	-0.183	0.954									#VALEUR!
X	-Zsyno		SM8B	Spec	Mirror	72.751	170.861	-234.579	-86.102	0.002	-15.182	87.430	-0.985	0.000	-0.174	1.851	0.000	-0.326	1.879	0.985	0.000	-0.174	1.000	1.00000
Y	Xsyno		SBS1	Spec	Hole	223.128	170.857	-321.398	150.377	-0.003	-86.820	173.640	0.866	0.000	-0.500									#VALEUR!
Z	Ysyno		SM9B	Spec	Mirror	73.132	170.854	-407.998	-149.996	-0.003	-86.600	173.200	-0.866	0.000	-0.500	1.866	0.000	0.500	1.932	0.966	0.000	0.259	1.000	1.00000
			SRTB1	Spec	Mirror	198.132	170.854	-407.998	125.000	0.000	0.000	125.000	1.000	0.000	0.000	-1.000	0.000	-1.000	1.414	-0.707	0.000	-0.707	-1.000	1.00000
			SRTB2	Spec	Mirror	198.132	170.854	-457.999	0.000	0.000	-50.000	50.000	0.000	0.000	-1.000	-1.000	0.000	1.000	1.414	-0.707	0.000	0.707	-1.000	1.00000
			SM10B	Spec	Mirror	73.132	170.854	-457.998	-125.000	0.000	0.000	125.000	-1.000	0.000	0.000	1.866	0.000	-0.500	1.932	0.966	0.000	-0.259	1.000	1.00000
			SBS2	Spec	Hole	223.128	170.857	-544.598	149.996	0.003	-86.600	173.200	0.866	0.000	-0.500									#VALEUR!
			SM11B	Spec	Mirror	91.509	170.860	-620.588	-131.619	0.003	-75.990	151.980	-0.866	0.000	-0.500	1.851	0.000	0.326	1.879	0.985	0.000	0.174	1.000	1.00000
			SM12B	Spec	Mirror	182.674	170.858	-636.663	91.165	-0.002	-16.075	92.572	0.985	0.000	-0.174	-0.985	1.000	0.174	1.414	-0.696	0.707	0.123	-1.000	1.00000
			SFLB	Spec	Hole	182.673	246.957	-636.663	-0.002	76.098	0.000	76.098	0.000	1.000	0.000									#VALEUR!
			SLW	Spec	Det	182.673	250.857	-636.663	-0.002	79.998	0.000	79.998	0.000	1.000	0.000									#VALEUR!
Axe						X	Y	Z																

Axis directions:

X	-Zsyno	Tow. tel
Y	Xsyno	Tow. Spectro
Z	Ysyno	Tow. PAX

SPIRE	*SYNO*	*Directions*
X	-Zsyno	Tow. tel
Y	Xsyno	Tow. Spectro
Z	Ysyno	Tow. PAX

LeftHandCorr	-1
NormDirCorr	-1

		SystemPart	CompName	Flag	XCM3Cent	YCM3Cent	ZCM3Cent	Xdiff	Ydiff	Zdiff	DiffMod	Xray	Yray	Zray	dXray	dYray	dZray	drayMod	Xnorm	Ynorm	Znorm	Theta	1-cos(theta)	Xsag	Ysag	Zsag	normDOTsag
ID	(BOLPHT154C)		Dummy	Ignore	3252.1620	12.7595	62.3054																				
		Telescope	M1		1252.6255	11.4279	55.8034	-1999.5365	-1.3315	-6.5020	1999.547	-0.99999	-0.00067	-0.00325	1.999351383	-0.006528	-0.031877	1.999616	0.999868	-0.003265	-0.015942	-0.187	5.3E-06	0.003	1.000	0.000	90.000
			M2		2840.1310	0.0000	0.0000	1587.5055	-11.4279	-55.8034	1588.527	0.999357	-0.00719	-0.03513	-1.99871378	2.17E-10	1.64E-10	1.998714	-1	1.09E-10	8.2E-11	#VALEUR!	#VALEUR!	#VALEUR!	#VALEUR!	0.000	#VALEUR!
Ray	CM3Cent	Common optics	CFP	Hole	230.6808	-18.7846	-91.7265	-2609.4502	-18.7846	-91.7265	2611.129	-0.99936	-0.00719	-0.03513													
			CM3		**131.2298**	**-19.5005**	**-95.2223**	**-99.4510**	**-0.7159**	**-3.4959**	**99.51498**	**-0.99936**	**-0.00719**	**-0.03513**	**1.865488011**	**0.098535**	**-0.456271**	**1.923002**	**0.970091**	**0.05124**	**-0.23727**	**3.024**	**1.4E-03**	**-0.053**	**0.999**	**0.000**	**90.000**
			CM4		316.1172	-0.0026	-200.1183	184.8874	19.4979	-104.8959	213.4635	0.866131	0.09134	-0.4914	-1.85590195	6.12E-10	0.600993	1.950786	-0.951361	3.14E-10	0.308077	0.000	0.0E+00	0.000	1.000	0.000	90.000
			CM5		120.7179	18.0297	-178.4826	-195.3993	18.0323	21.6357	197.4187	-0.98977	0.09134	0.109593	1.899207903	-0.127849	-0.523829	1.974268	0.961981	-0.064758	-0.265328	-3.851	2.3E-03	0.067	0.998	0.000	90.000
		Photometer optics	PM6		296.4855	10.9737	-258.5423	175.7676	-7.0560	-80.0597	193.2708	0.909437	-0.03651	-0.41424	-1.90477568	0.059001	0.320453	1.932445	-0.985682	0.030532	0.165828	-1.774	4.8E-04	0.031	1.000	0.000	90.000
			PM7		95.2127	15.5219	-277.5065	-201.2729	4.5482	-18.9643	202.2155	-0.99534	0.022492	-0.09378	1.765649782	-0.086767	-0.540638	1.848604	0.955126	-0.046936	-0.292457	-2.813	1.2E-03	0.049	0.999	0.000	90.000
			PM8		240.4503	3.4032	-397.1228	145.2376	-12.1187	-119.6163	188.5441	0.770311	-0.06427	-0.63442	-1.44594073	0.01721	-0.101317	1.449588	-0.997484	0.011872	-0.069894	-0.682	7.1E-05	0.012	1.000	0.000	90.000
			PCS	Hole	192.8564	0.0878	-448.9510	-47.5939	-3.3154	-51.8282	70.44383	-0.67563	-0.04706	-0.73574														
			PM9		104.8114	-6.0455	-544.8290	-88.0450	-6.1333	-95.8780	130.3155	-0.67563	-0.04706	-0.73574	1.667834876	0.032335	0.859478	1.876545	0.88878	0.017231	0.458011	1.111	1.9E-04	-0.019	1.000	0.000	90.000
		Short wave	PDIC1		238.7332	-8.0337	-528.1273	133.9219	-1.9882	16.7017	134.974	0.992205	-0.01473	0.12374	-1.72099429	-2.65E-11	-0.80832	1.901369	-0.905134	-1.4E-11	-0.425125	0.000	#VALEUR!	0.000	1.000	0.000	90.000
			PM10		133.0902	-10.1690	-627.3619	-105.6430	-2.1352	-99.2346	144.9569	-0.72879	-0.01473	-0.68458	0.718638501	-0.985161	0.67387	1.393228	0.515808	-0.707107	0.483675	0.000	0.0E+00	0.516	0.707	0.484	90.000
			PSW	Det	132.6859	-50.0000	-627.7885	-0.4043	-39.8310	-0.4266	39.83539	-0.01015	-0.99989	-0.01071														
			PDIC1	Ignore	238.7332	-8.0337	-528.1273																				
		Medium wave	PDIC2		342.1664	-9.5693	-515.2279	103.4332	-1.5356	12.8994	104.2458	0.992205	-0.01473	0.12374	-1.61860858	-0.760699	-0.20329	1.799968	-0.899243	-0.422618	-0.112941	0.000	#VALEUR!	-0.419	0.906	-0.053	90.000
			PMW	Det	291.7118	-72.0274	-521.6353	-50.4546	-62.4582	-6.4074	80.54655	-0.6264	-0.77543	-0.07955														
			PDIC2	Ignore	342.1664	-9.5693	-515.2279																				
		Long wave	PM11		380.4720	-10.1379	-510.4507	38.3056	-0.5687	4.7772	38.6065	0.992205	-0.01473	0.12374	-0.99305026	-3.03E-09	0.876151	1.324307	-0.749864	-2.29E-09	0.661592	0.000	0.0E+00	0.000	1.000	0.000	90.000
			PLW	Det	380.4366	-10.7557	-468.5152	-0.0354	-0.6178	41.9355	41.94005	-0.00084	-0.01473	0.999891														

Axis directions:

X	-Zsyno	Tow. tel
Y	Xsyno	Tow. Spectro
Z	Ysyno	Tow. PAX

		SystemPart	CompName	Flag	XCM5Cent	YCM5Cent	ZCM5Cent	Xdiff	Ydiff	Zdiff	DiffMod	Xray	Yray	Zray	dXray	dYray	dZray	drayMod	Xnorm	Ynorm	Znorm	Theta	1-cos(theta)	Xsag	Ysag	Zsag	normDOTsag
ID	(BOLPHT154C)		Dummy	Ignore	3252.1620	13.8175	60.2982																				
		Telescope	M1		1252.6005	12.3755	54.0055	-1999.5615	-1.4420	-6.2928	1999.572	-0.99999	-0.00072	-0.00315	1.999386328	-0.00707	-0.030851	1.999637	0.999875	-0.003535	-0.015428	-0.203	6.3E-06	0.004	1.000	0.000	90.000
			M2		2840.1310	0.0000	0.0000	1587.5305	-12.3755	-54.0055	1588.497	0.999392	-0.00779	-0.034	-1.99878308	1.49E-10	2.53E-10	1.998783	-1	7.43E-11	1.26E-10	#VALEUR!	#VALEUR!	#VALEUR!	#VALEUR!	0.000	#VALEUR!
Ray	CM5Cent	Common optics	CFP	Hole	229.0220	-20.3548	-88.8262	-2611.1090	-20.3548	-88.8262	2612.699	-0.99939	-0.00779	-0.034													
			CM3		132.0890	-21.1104	-92.1237	-96.9330	-0.7556	-3.2975	96.99197	-0.99939	-0.00779	-0.034	1.857648356	0.106277	-0.469684	1.919051	0.968004	0.05538	-0.244748	3.274	1.6E-03	-0.057	0.998	0.000	90.000
			CM4		316.1157	0.0070	-200.1227	184.0267	21.1174	-107.9991	214.4192	0.858257	0.098487	-0.50368	-1.84884772	5.11E-10	0.598708	1.943371	-0.951361	2.63E-10	0.308077	0.000	0.0E+00	0.000	1.000	0.000	90.000
			CM5		**120.0547**	**19.4999**	**-181.3148**	**-196.0611**	**19.4928**	**18.8080**	**197.9234**	**-0.99059**	**0.098487**	**0.095026**	**1.902079502**	**-0.138163**	**-0.504434**	**1.972676**	**0.964213**	**-0.070038**	**-0.25571**	**-4.155**	**2.6E-03**	**0.072**	**0.997**	**0.000**	**90.000**
		Photometer optics	PM6		296.2011	11.8325	-260.4333	176.1464	-7.6674	-79.1185	193.2514	0.911489	-0.03968	-0.40941	-1.906096	0.063602	0.308493	1.931946	-0.98662	0.032921	0.15968	-1.911	5.6E-04	0.033	0.999	0.000	90.000
			PM7		94.2458	16.6906	-280.9240	-201.9553	4.8581	-20.4906	203.0502	-0.99461	0.023926	-0.10091	1.773580729	-0.093433	-0.522279	1.851241	0.95805	-0.05047	-0.282124	-3.016	1.4E-03	0.053	0.999	0.000	90.000
			PM8		240.5116	3.6394	-397.9392	146.2658	-13.0512	-117.0153	187.7674	0.778973	-0.06951	-0.62319	-1.46079525	0.018597	-0.106552	1.464794	-0.99727	0.012696	-0.072742	-0.729	8.1E-05	0.013	1.000	0.000	90.000
			PCS	Hole	192.8529	0.0808	-448.9477	-47.6587	-3.5586	-51.0085	69.89909	-0.68182	-0.05091	-0.72974													
			PM9		104.2706	-6.5334	-543.7561	-88.5822	-6.6142	-94.8083	129.9199	-0.68182	-0.05091	-0.72974	1.673781117	0.035008	0.8553	1.879975	0.890321	0.018622	0.454953	1.198	2.2E-04	-0.021	1.000	0.000	90.000
		Short wave	PDIC1		238.1168	-8.6790	-526.8148	133.8462	-2.1457	16.9413	134.9311	0.991959	-0.0159	0.125555	-1.72198781	2.65E-09	-0.808787	1.902466	-0.905134	1.39E-09	-0.425125	0.000	#VALEUR!	0.000	1.000	0.000	90.000
			PM10		131.3549	-11.0046	-626.7329	-106.7619	-2.3255	-99.9181	146.2434	-0.73003	-0.0159	-0.68323	0.71777063	-0.983971	0.673056	1.391545	0.515808	-0.707107	0.483675	0.000	1.1E-16	0.516	0.707	0.484	90.000
			PSW	Det	130.8768	-50.0000	-627.1297	-0.4781	-38.9954	-0.3968	39.00035	-0.01226	-0.99987	-0.01018													
			PDIC1	Ignore	238.1168	-8.6790	-526.8148																				
		Medium wave	PDIC2		342.3318	-10.3497	-513.6240	104.2150	-1.6707	13.1908	105.0598	0.991959	-0.0159	0.125555	-1.61768862	-0.760267	-0.203174	1.798945	-0.899243	-0.422618	-0.112941	0.000	#VALEUR!	-0.419	0.906	-0.053	90.000
			PMW	Det	292.1583	-72.5860	-519.8478	-50.1735	-62.2363	-6.2238	80.18403	-0.62573	-0.77617	-0.07762													
			PDIC2	Ignore	342.3318	-10.3497	-513.6240																				
		Long wave	PM11		382.1150	-10.9875	-508.5885	39.7833	-0.6378	5.0355	40.10574	0.991959	-0.0159	0.125555	-0.99097262	1.56E-08	0.874318	1.321536	-0.749864	1.18E-08	0.661592	0.000	0.0E+00	0.000	1.000	0.000	90.000
			PLW	Det	382.1546	-11.6248	-468.5153	0.0395	-0.6373	40.0732	40.0783	0.000987	-0.0159	0.999873													

Axis directions:

X	-Zsyno	Tow. tel
Y	Xsyno	Tow. Spectro
Z	Ysyno	Tow. PAX

ThisCol		SystemPart	CompName	System	Flag	SurfNum	Line	Type	Dia	EllipsX	EllipsY	RectX	RectY	OffsetX	OffsetY
			Dummy	Phot	Ignore	5	318								
		Telescope	M1	Phot	Mirror	6	319	Circ	3500.000						
Line0Phot	313		M2	Phot	Mirror	7	320	Circ	308.120						
Line0Spec	570	Common optics	CFP	Phot	Ignore	9	322								
			CM3	Phot	Mirror	11	324	Rect				139.000	62.000	-19.500	145.000
			CM4	Phot	Mirror	14	327	Ellips		30.000	32.000				
			CM5	Phot	Mirror	17	330	Rect				161.000	85.000	19.500	-1.500
Xcol	c	Photometer optics	PM6	Phot	Mirror	20	333	Rect				46.000	27.000		
Ycol	d		PM7	Phot	Mirror	22	335	Rect				118.000	101.000	0.000	-1.000
			PM8	Phot	Mirror	24	337	Circ	64.000						
			PCS	Phot	Hole	26	339	Ellips		46.128	39.808			0.000	0.738
			PM9	Phot	Mirror	27	340	Circ	112.000						
		Short wave	PDIC1	Phot	Hole	31	344	Circ	80.000						
			PM10	Phot	Mirror	36	349	Rect				78.000	40.000	2.500	0.000
			PSW	Phot	Det	38	351	Rect				40.000	22.000		
			PDIC1	Phot	Ignore	31	344								
		Medium wave	PDIC2	Phot	Hole	46	359	Circ	72.000						
			PMW	Phot	Det	51	364	Rect				40.000	22.000		
			PDIC2	Phot	Ignore	46	359								
		Long wave	PM11	Phot	Mirror	57	370	Rect				56.000	53.000	0.000	-2.750
			PLW	Phot	Det	59	372	Rect				40.000	22.000		
			CM5	Spec	Ignore	17	587								
		Spectrometer optics	SM6	Spec	Mirror	22	592	Ellips		24.000	18.000			1.000	0.000
			SCS	Spec	Hole	26	596	Ellips		23.900	25.140			0.400	-0.820
			SM7	Spec	Mirror	30	600	Rect				57.000	40.000	4.000	0.000
			SM8A	Spec	Mirror	36	606	Circ	60.000						
		Upper arm	SBS1	Spec	Hole	39	609	Circ	30.000					0.000	1.500
			SM9A	Spec	Mirror	43	613	Circ	50.000						
			SRTA1	Spec	Mirror	46	616	Circ	36.808						
			SRTA2	Spec	Mirror	51	621	Circ	38.262						
			SM10A	Spec	Mirror	56	626	Circ	60.000						
			SBS2	Spec	Hole	60	630	Circ	36.000					0.000	2.000
			SM11A	Spec	Mirror	63	633	Circ	74.000					0.000	1.000
			SM12A	Spec	Mirror	67	637	Ellips		24.800	18.000			-0.630	-0.500
			SFLA	Spec	Hole	69	639	Circ	15.020						
			SSW	Spec	Det	71	641	Circ	20.000						
		Lower arm	SCAL	Spec	Hole	102	672	Circ	25.000						
			SM8B	Spec	Mirror	98	668	Circ	60.000						
			SBS1	Spec	Hole	39	609	Circ	30.000					0.000	1.500
			SM9B	Spec	Mirror	111	681	Circ	50.000						
			SRTB1	Spec	Mirror	114	684	Circ	36.808						
			SRTB2	Spec	Mirror	119	689	Circ	38.262						
			SM10B	Spec	Mirror	124	694	Circ	60.000						
			SBS2	Spec	Hole	60	630	Circ	36.000					0.000	2.000
			SM11B	Spec	Mirror	131	701	Circ	74.000					0.000	1.000
			SM12B	Spec	Mirror	136	706	Ellips		24.800	18.000			-0.630	-0.500
			SFLB	Spec	Hole	138	708	Circ	14.687						
			SLW	Spec	Det	140	710	Circ	20.000						

Axis directions:

X	-Zsyno	Tow. tel
Y	Xsyno	Tow. Spectro
Z	Ysyno	Tow. PAX

ThisCol		SystemPart	CompName	System	Flag	Xvertex	Yvertex	Zvertex	XnormP	YnormP	ZnormP	NormDir	NextIndex		Xnorm	Ynorm	Znorm	Xsag	Ysag	Zsag	Xtang	Ytang	Ztang	TangDotNorm		SagDotNorm		SagDotTan	
IDPhot	(BOLPHT155D)		Dummy	Phot	Ignore								1	#VALEUR!															
IDSpec	(BOLSP508)	Telescope	M1	Phot	Mirror	1252.0000	0.0000	0.0000	-1.0000	0.0000	0.0000	-1	1	0	1.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	1.0000	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
			M2	Phot	Mirror	2839.9980	0.0000	0.0000	-1.0000	0.0000	0.0000	**#VALEUR!**	-1	**#VALEUR!**	#VALEUR!	#VALEUR!	#VALEUR!	0.0000	1.0000	0.0000	#VALEUR!	#VALEUR!	#VALEUR!	#VALEUR!	*#VALEUR!*	#VALEUR!	*#VALEUR!*	#VALEUR!	*#VALEUR!*
		Common optics	CFP	Phot	Ignore								1	**#VALEUR!**															
			CM3	Phot	Mirror	123.6207	0.0000	-243.0659	-0.9885	0.0000	-0.1510	-1	1	0	0.9885	0.0000	0.1510	0.0000	1.0000	0.0000	-0.1510	0.0000	0.9885	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
			CM4	Phot	Mirror	316.1254	0.0000	-200.0930	-0.9514	0.0000	0.3081	1	-1	0	-0.9514	0.0000	0.3081	0.0000	1.0000	0.0000	-0.3081	0.0000	-0.9514	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
			CM5	Phot	Mirror	119.7829	0.0000	-179.6873	-0.9653	0.0000	0.2613	-1	1	0	0.9653	0.0000	-0.2613	0.0000	1.0000	0.0000	0.2613	0.0000	0.9653	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
SPIRE vertex coordinates		Photometer optics	PM6	Phot	Mirror	296.1507	0.0000	-259.5332	-0.9867	0.0000	0.1626	1	-1	0	-0.9867	0.0000	0.1626	0.0000	1.0000	0.0000	-0.1626	0.0000	-0.9867	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
X=X0+Xfact*Zsyno			PM7	Phot	Mirror	94.2338	0.0000	-279.4829	-0.9581	0.0000	0.2865	-1	1	0	0.9581	0.0000	-0.2865	0.0000	1.0000	0.0000	0.2865	0.0000	0.9581	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
Y=Y0+Yfact*Xsyno			PM8	Phot	Mirror	240.4664	0.0000	-397.6355	-0.9974	0.0000	-0.0717	1	-1	0	-0.9974	0.0000	-0.0717	0.0000	1.0000	0.0000	0.0717	0.0000	-0.9974	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
Z=Z0+Zfact*Ysyno			PCS	Phot	Hole	192.8684	0.0000	-448.9622	-0.6800	0.0000	-0.7332	-1	1	0	0.6800	0.0000	0.7332	0.0000	1.0000	0.0000	-0.7332	0.0000	0.6800	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
where:			PM9	Phot	Mirror	104.4722	0.0000	-544.2832	-0.8897	0.0000	-0.4565	-1	1	0	0.8897	0.0000	0.4565	0.0000	1.0000	0.0000	-0.4565	0.0000	0.8897	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
X0	202	Short wave	PDIC1	Phot	Hole	238.4198	0.0000	-527.4600	-0.9051	0.0000	-0.4251	1	-1	0	-0.9051	0.0000	-0.4251	0.0000	1.0000	0.0000	0.4251	0.0000	-0.9051	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
Y0	0		PM10	Phot	Mirror	139.9423	0.0000	-619.8027	-0.5158	0.7071	-0.4837	-1	1	0	0.5158	-0.7071	0.4837	0.5158	0.7071	0.4837	-0.6840	0.0000	0.7295	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
Z0	0		PSW	Phot	Det	139.9423	-50.0000	-619.8027	0.0000	1.0000	0.0000	1	-1	0	0.0000	1.0000	0.0000	0.7295	0.0000	0.6840	0.6840	0.0000	-0.7295	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
Xfact	-1		PDIC1	Phot	Ignore								-1	**#VALEUR!**															
Yfact	1	Medium wave	PDIC2	Phot	Hole	337.6403	0.0000	-514.9984	-0.8992	-0.4226	-0.1129	1	-1	0	-0.8992	-0.4226	-0.1129	-0.4193	0.9063	-0.0527	0.1246	0.0000	-0.9922	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
Zfact	1		PMW	Phot	Det	283.4293	-65.1138	-521.8070	-0.6378	-0.7660	-0.0801	-1	1	0	0.6378	0.7660	0.0801	-0.7601	0.6428	-0.0955	-0.1246	0.0000	0.9922	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
			PDIC2	Phot	Ignore								-1	**#VALEUR!**															
SPIRE local axes direction vectors		Long wave	PM11	Phot	Mirror	381.2974	0.0000	-509.5152	-0.7499	0.0000	0.6616	1	-1	0	-0.7499	0.0000	0.6616	0.0000	1.0000	0.0000	-0.6616	0.0000	-0.7499	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
X=Xfact*Zsyno			PLW	Phot	Det	381.2984	0.0000	-468.5152	0.0000	0.0000	1.0000	-1	1	0	0.0000	0.0000	-1.0000	0.0000	1.0000	0.0000	1.0000	0.0000	0.0000	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
Y=Yfact*Xsyno			CM5	Spec	Ignore								1	**#VALEUR!**															
Z=Zfact*Ysyno		Spectrometer optics	SM6	Spec	Mirror	306.1507	33.8200	-263.9752	-0.5448	0.7100	0.4463	1	-1	0	-0.5448	0.7100	0.4463	0.6876	0.6828	-0.2469	-0.4800	0.1724	-0.8602	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
where:			SCS	Spec	Hole	314.9828	141.6957	-233.0424	0.4964	0.7528	0.4322	-1	1	0	-0.4964	-0.7528	-0.4322	0.1055	0.4418	-0.8909	0.8616	-0.4879	-0.1399	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
Xfact	-1		SM7	Spec	Mirror	317.3703	170.8567	-224.6806	0.6506	-0.6879	-0.3219	1	1	2	0.6506	-0.6879	-0.3219	0.7554	0.6299	0.1806	0.0785	-0.3607	0.9294	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
Yfact	1		SM8A	Spec	Mirror	373.5044	170.8567	-234.5785	-0.9848	0.0000	-0.1736	1	-1	0	-0.9848	0.0000	-0.1736	-0.0188	0.9941	0.1067	0.1726	0.1083	-0.9790	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
Zfact	1	Upper arm	SBS1	Spec	Hole	223.1277	170.8567	-321.3985	-1.0000	0.0000	0.0000	-1	1	0	1.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	1.0000	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
			SM9A	Spec	Mirror	373.1233	170.8567	-407.9985	-0.9659	0.0000	0.2588	1	-1	0	-0.9659	0.0000	0.2588	0.0000	1.0000	0.0000	-0.2588	0.0000	-0.9659	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
NormDir rotates local axes			SRTA1	Spec	Mirror	248.1233	170.8567	-407.9985	-0.7071	0.0000	0.7071	-1	1	0	0.7071	0.0000	-0.7071	0.0000	1.0000	0.0000	0.7071	0.0000	0.7071	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
about local Sag vector:			SRTA2	Spec	Mirror	248.1233	170.8567	-457.9985	0.7071	0.0000	0.7071	1	-1	0	0.7071	0.0000	0.7071	0.0000	1.0000	0.0000	-0.7071	0.0000	0.7071	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
Tang is inveresed for RHS			SM10A	Spec	Mirror	373.1233	170.8567	-457.9985	0.9659	0.0000	0.2588	-1	1	0	-0.9659	0.0000	-0.2588	0.0000	1.0000	0.0000	0.2588	0.0000	-0.9659	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
Norm=Norm*NormDir			SBS2	Spec	Hole	223.1277	170.8567	-544.5985	1.0000	0.0000	0.0000	1	-1	0	1.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	1.0000	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
Sag=Sag			SM11A	Spec	Mirror	354.7463	170.8567	-620.5885	0.9848	0.0000	-0.1736	-1	1	0	-0.9848	0.0000	0.1736	0.0000	1.0000	0.0000	-0.1736	0.0000	-0.9848	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
Tang=-1*Tang*NormDir			SM12A	Spec	Mirror	263.5826	170.8567	-636.6631	0.6964	0.7071	0.1228	1	-1	0	0.6964	0.7071	0.1228	-0.6964	0.7071	-0.1228	-0.1736	0.0000	0.9848	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
			SFLA	Spec	Hole	263.5826	236.7567	-636.6631	0.0000	1.0000	0.0000	-1	1	0	0.0000	-1.0000	0.0000	-0.9848	0.0000	-0.1736	0.1736	0.0000	-0.9848	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
			SSW	Spec	Det	263.5826	250.8567	-636.6631	0.0000	1.0000	0.0000	-1	1	0	0.0000	-1.0000	0.0000	-1.0000	0.0000	0.0000	0.0000	0.0000	-1.0000	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
		Lower arm	SCAL	Spec	Hole	158.8528	170.8567	-219.3965	-0.9848	0.0000	-0.1736	-1	1	0	0.9848	0.0000	0.1736	0.0000	1.0000	0.0000	-0.1736	0.0000	0.9848	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
			SM8B	Spec	Mirror	72.7511	170.8567	-234.5785	-0.9848	0.0000	0.1736	-1	-1	-2	0.9848	0.0000	-0.1736	0.0188	0.9941	0.1067	0.1726	-0.1083	0.9790	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
LeftHandCorr	-1		SBS1	Spec	Hole	223.1277	170.8567	-321.3985	-1.0000	0.0000	0.0000	-1	1	0	1.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	1.0000	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
NormDirCorr	-1		SM9B	Spec	Mirror	73.1321	170.8567	-407.9985	-0.9659	0.0000	-0.2588	-1	1	0	0.9659	0.0000	0.2588	0.0000	1.0000	0.0000	-0.2588	0.0000	0.9659	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
			SRTB1	Spec	Mirror	198.1321	170.8567	-407.9985	-0.7071	0.0000	-0.7071	1	-1	0	-0.7071	0.0000	-0.7071	0.0000	1.0000	0.0000	0.7071	0.0000	-0.7071	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
			SRTB2	Spec	Mirror	198.1321	170.8567	-457.9985	0.7071	0.0000	-0.7071	-1	1	0	-0.7071	0.0000	0.7071	0.0000	1.0000	0.0000	-0.7071	0.0000	-0.7071	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
			SM10B	Spec	Mirror	73.1321	170.8567	-457.9985	0.9659	0.0000	-0.2588	1	-1	0	0.9659	0.0000	-0.2588	0.0000	1.0000	0.0000	0.2588	0.0000	0.9659	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
			SBS2	Spec	Hole	223.1277	170.8567	-544.5985	1.0000	0.0000	0.0000	1	-1	0	1.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	1.0000	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
			SM11B	Spec	Mirror	91.5092	170.8567	-620.5885	0.9848	0.0000	0.1736	1	-1	0	0.9848	0.0000	0.1736	0.0000	1.0000	0.0000	-0.1736	0.0000	0.9848	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
			SM12B	Spec	Mirror	182.6728	170.8567	-636.6631	0.6964	-0.7071	-0.1228	-1	1	0	-0.6964	0.7071	0.1228	0.6964	0.7071	-0.1228	-0.1736	0.0000	-0.9848	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
			SFLB	Spec	Hole	182.6728	246.9567	-636.6631	0.0000	-1.0000	0.0000	1	-1	0	0.0000	-1.0000	0.0000	0.9848	0.0000	-0.1736	0.1736	0.0000	0.9848	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
			SLW	Spec	Det	182.6728	250.8567	-636.6631	0.0000	-1.0000	0.0000	1	-1	0	0.0000	-1.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
Axe						X	Y	Z	X	Y	Z				X	Y	Z	X	Y	Z	X	Y	Z						
AxeSyno						z	x	y	z	x	y				z	x	y	z	x	y	z	x	y						
Local		*Axis directions:*				Vert	Vert	Vert	Norm	Norm	Norm				Norm	Norm	Norm	Sag	Sag	Sag	Tang	Tang	Tang						
		X	-Zsyno	Tow. tel																									
		Y	Xsyno	Tow. Spectro																									
		Z	Ysyno	Tow. PAX																									

ThisCol		SystemPart	CompName	System	Flag	SurfNum	Line	ListLine		NextIndex	Xvert	Yvert	Zvert	aEuler	bEuler	cEuler	xNorm	yNorm	zNorm	xTang	yTang	zTang	xSag	ySag	zSag	angDotNorm		SagDotNorm		SagDotTan	
			Dummy	Phot	Ignore	5	245	50	AIR	1.000	0.000	0.000	-3050.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	1.000	0.000	1.000	0.000	0.000	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
GlobalCoords		Telescope	M1	Phot	Mirror	6	246	51	AIR	1	0.000	0.000	-1050.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	1.000	0.000	1.000	0.000	0.000	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
Line0Phot	240		M2	Phot	Mirror	7	247	52	#NOM?	-1	0.000	0.000	-2637.998	0.000	0.000	0.000	0.000	0.000	1.000	0.000	1.000	0.000	1.000	0.000	0.000	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
Line0Spec	420	Common optics	CFP	Phot	Ignore	9	249	54	AIR	1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	1.000	0.000	1.000	0.000	0.000	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
Xcol	c		CM3	Phot	Mirror	11	251	56	AIR	1	0.000	-243.066	78.379	-8.683	0.000	0.000	0.000	-0.151	0.989	0.000	0.989	0.151	1.000	0.000	0.000	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
Ycol	d		CM4	Phot	Mirror	14	254	59	#NOM?	-1	0.000	-200.093	-114.125	17.943	0.000	0.000	0.308	0.951	0.000	0.951	-0.308	1.000	0.000	0.000	0.000	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
Zcol	e		CM5	Phot	Mirror	17	257	62	AIR	1	0.000	-179.687	82.217	15.145	0.000	0.000	0.000	0.261	0.965	0.000	0.965	-0.261	1.000	0.000	0.000	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
aCol	f	Photometer optics	PM6	Phot	Mirror	20	260	65	#NOM?	-1	0.000	-259.533	-94.151	9.357	0.000	0.000	0.000	0.163	0.987	0.000	0.987	-0.163	1.000	0.000	0.000	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
bCol	g		PM7	Phot	Mirror	22	262	67	AIR	1	0.000	-279.483	107.766	16.647	0.000	0.000	0.000	0.286	0.958	0.000	0.958	-0.286	1.000	0.000	0.000	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
cCol	h		PM8	Phot	Mirror	24	264	69	#NOM?	-1	0.000	-397.635	-38.466	-4.111	0.000	0.000	0.000	-0.072	0.997	0.000	0.997	0.072	1.000	0.000	0.000	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
			PCS	Phot	Hole	26	266	71	AIR	1	0.000	-448.962	9.132	-47.159	0.000	0.000	0.000	-0.733	0.680	0.000	0.680	0.733	1.000	0.000	0.000	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
			PM9	Phot	Mirror	27	267	72	AIR	1	0.000	-544.283	97.528	-27.159	0.000	0.000	0.000	-0.456	0.890	0.000	0.890	0.456	1.000	0.000	0.000	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
Listing		Short wave	PDIC1	Phot	Hole	31	271	76	#NOM?	-1	0.000	-527.460	-36.420	-25.159	0.000	0.000	0.000	-0.425	0.905	0.000	0.905	0.425	1.000	0.000	0.000	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
ListLine0Phot	45		PM10	Phot	Mirror	36	276	81	AIR	1	0.000	-619.803	62.058	-43.159	-45.000	0.000	0.707	-0.484	0.516	0.000	0.729	0.684	0.707	0.484	-0.516	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
ListLine0Spec	45		PSW	Phot	Det	38	278	83	#NOM?	-1	-50.000	-619.803	62.058	-43.159	-90.000	0.000	1.000	0.000	0.000	0.000	0.729	0.684	0.000	0.684	-0.729	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
IndexCol	e		PDIC1	Phot	Ignore	31	271	76	#NOM?	-1	0.000	-527.460	-36.420	-25.159	0.000	0.000	0.000	-0.425	0.905	0.000	0.905	0.425	1.000	0.000	0.000	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
		Medium wave	PDIC2	Phot	Hole	46	286	91	#NOM?	-1	0.000	-514.998	-135.640	-7.159	25.000	0.000	-0.423	-0.113	0.899	0.000	0.992	0.125	0.906	-0.053	0.419	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
			PMW	Phot	Det	51	291	96	AIR	1	-65.114	-521.807	-81.429	-7.159	50.000	0.000	-0.766	-0.080	0.638	0.000	0.992	0.125	0.643	-0.095	0.760	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
			PDIC2	Phot	Ignore	46	286	91	#NOM?	-1	0.000	-514.998	-135.640	-7.159	25.000	0.000	-0.423	-0.113	0.899	0.000	0.992	0.125	0.906	-0.053	0.419	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
		Long wave	PM11	Phot	Mirror	57	297	102	#NOM?	-1	0.000	-509.515	-179.297	41.421	0.000	0.000	0.000	0.662	0.750	0.000	0.750	-0.662	1.000	0.000	0.000	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
			PLW	Phot	Det	59	299	104	AIR	1	0.000	-468.515	-179.298	90.001	0.000	0.000	0.000	1.000	0.000	0.000	0.000	-1.000	1.000	0.000	0.000	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
			CM5	Spec	Ignore	17	437	62	AIR	1	0.000	-179.687	82.217	15.145	0.000	0.000	0.000	0.261	0.965	0.000	0.965	-0.261	1.000	0.000	0.000	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
		Spectrometer optics	SM6	Spec	Mirror	22	442	67	#NOM?	-1	33.820	-263.975	-104.151	39.322	-45.231	-14.167	0.710	0.446	0.545	-0.172	0.860	-0.480	0.683	-0.247	-0.688	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
			SCS	Spec	Hole	26	446	71	AIR	1	141.696	-233.042	-112.983	138.960	-48.837	-47.836	0.753	0.432	-0.496	-0.488	-0.140	-0.862	0.442	-0.891	-0.106	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
			SM7	Spec	Mirror	30	450	75	AIR	1	170.857	-224.681	-115.370	-153.674	43.461	29.794	-0.688	-0.322	-0.651	0.361	-0.929	0.079	0.630	0.181	-0.755	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
			SM8A	Spec	Mirror	36	456	81	#NOM?	-1	170.857	-234.579	-171.504	-10.000	0.000	-6.220	0.000	-0.174	0.985	-0.108	0.979	0.173	0.994	0.107	0.019	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
		Upper arm	SBS1	Spec	Hole	39	459	84	AIR	1	170.857	-321.399	-21.128	0.000	0.000	0.000	0.000	0.000	1.000	0.000	1.000	0.000	1.000	0.000	0.000	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
			SM9A	Spec	Mirror	43	463	88	#NOM?	-1	170.857	-407.999	-171.123	15.000	0.000	0.000	0.000	0.259	0.966	0.000	0.966	-0.259	1.000	0.000	0.000	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
			SRTA1	Spec	Mirror	46	466	91	AIR	1	170.857	-407.999	-46.123	45.000	0.000	0.000	0.000	0.707	0.707	0.000	0.707	-0.707	1.000	0.000	0.000	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
			SRTA2	Spec	Mirror	51	471	96	#NOM?	-1	170.857	-457.999	-46.123	135.000	0.000	0.000	0.000	0.707	-0.707	0.000	-0.707	-0.707	1.000	0.000	0.000	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
			SM10A	Spec	Mirror	56	476	101	AIR	1	170.857	-457.999	-171.123	165.000	0.000	0.000	0.000	0.259	-0.966	0.000	-0.966	-0.259	1.000	0.000	0.000	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
			SBS2	Spec	Hole	60	480	105	#NOM?	-1	170.857	-544.599	-21.128	180.000	0.000	0.000	0.000	0.000	-1.000	0.000	-1.000	0.000	1.000	0.000	0.000	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
			SM11A	Spec	Mirror	63	483	108	AIR	1	170.857	-620.589	-152.746	-170.000	0.000	0.000	0.000	-0.174	-0.985	0.000	-0.985	0.174	1.000	0.000	0.000	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
			SM12A	Spec	Mirror	67	487	112	#NOM?	-1	170.857	-636.663	-61.583	170.000	-45.000	0.000	0.707	0.123	-0.696	0.000	-0.985	-0.174	0.707	-0.123	0.696	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
			SFLA	Spec	Hole	69	489	114	AIR	1	236.757	-636.663	-61.583	170.000	-90.000	0.000	1.000	0.000	0.000	0.000	-0.985	-0.174	0.000	-0.174	0.985	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
			SSW	Spec	Det	71	491	116	AIR	1	250.857	-636.663	-61.583	-180.000	-90.000	0.000	1.000	0.000	0.000	0.000	-1.000	0.000	0.000	0.000	1.000	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
		Lower arm	SCAL	Spec	Hole	102	522	147	AIR	1	170.857	-219.396	43.147	-10.000	0.000	0.000	0.000	-0.174	0.985	0.000	0.985	0.174	1.000	0.000	0.000	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
			SM8B	Spec	Mirror	98	518	143	#NOM?	-1	170.857	-234.579	129.249	10.000	0.000	-6.220	0.000	0.174	0.985	-0.108	0.979	-0.173	0.994	0.107	-0.019	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
			SBS1	Spec	Hole	39	459	84	AIR	1	170.857	-321.399	-21.128	0.000	0.000	0.000	0.000	0.000	1.000	0.000	1.000	0.000	1.000	0.000	0.000	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
			SM9B	Spec	Mirror	111	531	156	AIR	1	170.857	-407.999	128.868	-15.000	0.000	0.000	0.000	-0.259	0.966	0.000	0.966	0.259	1.000	0.000	0.000	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
			SRTB1	Spec	Mirror	114	534	159	#NOM?	-1	170.857	-407.999	3.868	-45.000	0.000	0.000	0.000	-0.707	0.707	0.000	0.707	0.707	1.000	0.000	0.000	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
			SRTB2	Spec	Mirror	119	539	164	AIR	1	170.857	-457.999	3.868	-135.000	0.000	0.000	0.000	-0.707	-0.707	0.000	-0.707	0.707	1.000	0.000	0.000	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
			SM10B	Spec	Mirror	124	544	169	#NOM?	-1	170.857	-457.999	128.868	-165.000	0.000	0.000	0.000	-0.259	-0.966	0.000	-0.966	0.259	1.000	0.000	0.000	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
			SBS2	Spec	Hole	60	480	105	#NOM?	-1	170.857	-544.599	-21.128	180.000	0.000	0.000	0.000	0.000	-1.000	0.000	-1.000	0.000	1.000	0.000	0.000	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
			SM11B	Spec	Mirror	131	551	176	#NOM?	-1	170.857	-620.589	110.491	170.000	0.000	0.000	0.174	-0.985	0.000	-0.985	-0.174	1.000	0.000	0.000	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
			SM12B	Spec	Mirror	136	556	181	AIR	1	170.857	-636.663	19.327	-170.000	45.000	0.000	-0.707	-0.123	-0.696	0.000	-0.985	0.174	0.707	-0.123	-0.696	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
			SFLB	Spec	Hole	138	558	183	#NOM?	-1	246.957	-636.663	19.327	-170.000	90.000	0.000	-1.000	0.000	0.000	0.000	-0.985	0.174	0.000	-0.174	-0.985	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
			SLW	Spec	Det	140	560	185	#NOM?	-1	250.857	-636.663	19.327	180.000	90.000	0.000	-1.000	0.000	0.000	0.000	-1.000	0.000	0.000	0.000	-1.000	0.000	*90.000*	0.000	*90.000*	0.000	*90.000*
Axe											x	y	z	a	b	c															

Axis directions:

X	-Zsyno	Tow. tel
Y	Xsyno	Tow. Spectro
Z	Ysyno	Tow. PAX

ThisCol		SystemPart	CompName	System	Flag	XPhotGut	YPhotGut	ZPhotGut	XSpecGut	YSpecGut	ZSpecGut	XCM3Cent	YCM3Cent	ZCM3Cent	XCM5Cent	YCM5Cent	ZCM5Cent
			Dummy	Phot	Ignore	3252.0000	0.0000	61.1768				3252.1620	12.7595	62.3054	3252.1620	13.8175	60.2982
		Telescope	M1	Phot	Mirror	1252.428903	0.000000	54.793441				1252.625517	11.427923	55.803431	1252.600535	12.375513	54.005491
			M2	Phot	Mirror	2839.998000	0.000000	0.000000				2840.131000	0.000000	0.000000	2840.131000	0.000000	0.000000
SPIRE coordinates		Common optics	CFP	Phot	Ignore	228.382552	0.000000	-90.137429				230.680790	-18.784562	-91.726470	229.022003	-20.354767	-88.826152
X=X0+Xfact*Zsyno			CM3	Phot	Mirror	131.141660	0.000000	-93.493606				131.229806	-19.500476	-95.222336	132.089046	-21.110403	-92.123671
Y=Y0+Yfact*Xsyno			CM4	Phot	Mirror	316.125099	0.000000	-200.093860				316.117194	-0.002619	-200.118270	316.115744	0.007040	-200.122747
Z=Z0+Zfact*Ysyno			CM5	Phot	Mirror	119.782557	0.000000	-179.688568				120.717899	18.029700	-178.482563	120.054658	19.499867	-181.314796
where:		Photometer optics	PM6	Phot	Mirror	296.150670	0.000000	-259.533208				296.485541	10.973657	-258.542261	296.201070	11.832463	-260.433321
X0	202		PM7	Phot	Mirror	94.234236	0.000000	-279.481485				95.212653	15.521875	-277.506548	94.245810	16.690589	-280.923961
Y0	0		PM8	Phot	Mirror	240.466330	0.000000	-397.634151				240.450296	3.403216	-397.122812	240.511584	3.639387	-397.939241
Z0	0		PCS	Phot	Hole	192.867380	0.000000	-448.961193				192.856362	0.087781	-448.950976	192.852850	0.080828	-448.947719
Xfact	-1		PM9	Phot	Mirror	104.471035	0.000000	-544.281002				104.811354	-6.045510	-544.828974	104.270608	-6.533386	-543.756057
Yfact	1	Short wave	PDIC1	Phot	Hole	238.419239	0.000000	-527.458720				238.733246	-8.033705	-528.127272	238.116781	-8.679048	-526.814757
Zfact	1		PM10	Phot	Mirror	139.942078	0.000000	-619.802462				133.090238	-10.168951	-627.361870	131.354880	-11.004597	-626.732892
			PSW	Phot	Det	139.942327	-50.000000	-619.802728				132.685890	-50.000000	-627.788504	130.876814	-50.000000	-627.129735
			PDIC1	Phot	Ignore	238.419239	0.000000	-527.458720				238.733246	-8.033705	-528.127272	238.116781	-8.679048	-526.814757
		Medium wave	PDIC2	Phot	Hole	337.640264	0.000000	-514.997754				342.166446	-9.569267	-515.227885	342.331781	-10.349698	-513.623960
			PMW	Phot	Det	283.429289	-65.113778	-521.807023				291.711826	-72.027431	-521.635326	292.158272	-72.586040	-519.847765
			PDIC2	Phot	Ignore	337.640264	0.000000	-514.997754				342.166446	-9.569267	-515.227885	342.331781	-10.349698	-513.623960
		Long wave	PM11	Phot	Mirror	381.297659	0.000000	-509.514911				380.472020	-10.137949	-510.450710	382.115035	-10.987456	-508.588478
			PLW	Phot	Det	381.298363	0.000000	-468.515249				380.436583	-10.755735	-468.515228	382.154575	-11.624777	-468.515270
			CM5	Spec	Ignore				125.120533	58.001413	-183.378925	120.717899	18.029700	-178.482563	120.054658	19.499867	-181.314796
		Spectrometer optics	SM6	Spec	Mirror				306.147355	33.819095	-263.977827	95.212653	15.521875	-277.506548	94.245810	16.690589	-280.923961
			SCS	Spec	Hole				314.984032	141.695796	-233.044025	192.856362	0.087781	-448.950976	192.852850	0.080828	-448.947719
			SM7	Spec	Mirror				317.372966	170.859510	-224.681288	422.085158	-10.755735	-505.261042	421.871068	-11.624777	-503.556441
			SM8A	Spec	Mirror				373.504392	170.860517	-234.578711	133.090238	-10.168951	-627.361870	131.354880	-11.004597	-626.732892
		Upper arm	SBS1	Spec	Hole				223.127710	170.857397	-321.398300	132.846894	-34.140000	-627.618626	131.071251	-34.140000	-626.968333
			SM9A	Spec	Mirror				373.123463	170.854284	-407.997960	140.502065	-10.019144	-620.399652	139.389571	-10.829581	-619.213249
			SRTA1	Spec	Mirror				248.123579	170.854265	-407.998264	342.166446	-9.569267	-515.227885	342.331781	-10.349698	-513.623960
			SRTA2	Spec	Mirror				248.123457	170.854258	-457.998681	291.711826	-72.027431	-521.635326	292.158272	-72.586040	-519.847765
			SM10A	Spec	Mirror				373.123268	170.854239	-457.998377	337.738523	-9.503531	-515.780101	337.543836	-10.272944	-514.229985
			SBS2	Spec	Hole				223.127710	170.857352	-544.598115	380.444180	-10.623296	-477.505228	382.145705	-11.481801	-477.505270
			SM11A	Spec	Mirror				354.746350	170.860083	-620.587965	380.436583	-10.755735	-468.515228	382.154575	-11.624777	-468.515270
			SM12A	Spec	Mirror				263.581021	170.858259	-636.663312	202.000000	0.000000	0.000000	202.000000	0.000000	0.000000
			SFLA	Spec	Hole				263.582353	236.756678	-636.663389	202.000000	0.000000	0.000000	202.000000	0.000000	0.000000
			SSW	Spec	Det				263.582671	250.856678	-636.663366	202.000000	0.000000	0.000000	202.000000	0.000000	0.000000
		Lower arm	SCAL	Spec	Hole				158.852846	170.858972	-219.396733	202.000000	0.000000	0.000000	202.000000	0.000000	0.000000
			SM8B	Spec	Mirror				72.751027	170.860517	-234.578711	202.000000	0.000000	0.000000	202.000000	0.000000	0.000000
			SBS1	Spec	Hole				223.127710	170.857397	-321.398300	132.846894	-34.140000	-627.618626	131.071251	-34.140000	-626.968333
			SM9B	Spec	Mirror				73.131956	170.854284	-407.997960	202.000000	0.000000	0.000000	202.000000	0.000000	0.000000
			SRTB1	Spec	Mirror				198.131841	170.854265	-407.998264	202.000000	0.000000	0.000000	202.000000	0.000000	0.000000
			SRTB2	Spec	Mirror				198.131962	170.854258	-457.998681	202.000000	0.000000	0.000000	202.000000	0.000000	0.000000
			SM10B	Spec	Mirror				73.132152	170.854239	-457.998377	202.000000	0.000000	0.000000	202.000000	0.000000	0.000000
			SBS2	Spec	Hole				223.127710	170.857352	-544.598115	380.444180	-10.623296	-477.505228	382.145705	-11.481801	-477.505270
			SM11B	Spec	Mirror				91.509069	170.860083	-620.587965	202.000000	0.000000	0.000000	202.000000	0.000000	0.000000
			SM12B	Spec	Mirror				182.674398	170.858259	-636.663312	202.000000	0.000000	0.000000	202.000000	0.000000	0.000000
			SFLB	Spec	Hole				182.672860	246.956678	-636.663401	202.000000	0.000000	0.000000	202.000000	0.000000	0.000000
			SLW	Spec	Det				182.672787	250.856678	-636.663396	202.000000	0.000000	0.000000	202.000000	0.000000	0.000000
Axe						X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z
Syst						Phot	Phot	Phot	Spec	Spec	Spec	CM3	CM3	CM3	CM5	CM5	CM5
Ray		*Axis directions:*				Gut	Gut	Gut	Gut	Gut	Gut	Cent	Cent	Cent	Cent	Cent	Cent
AxeSyno		X	-Zsyno	Tow. tel		z	x	y	z	x	y	z	x	y	z	x	y
		Y	Xsyno	Tow. Spectro													
		Z	Ysyno	Tow. PAX													

ThisCol		SystemPart	CompName	System	Flag	SurfNum	Line	XPhotGut	YPhotGut	ZPhotGut	XSpecGut	YSpecGut	ZSpecGut	XCM3Cent	YCM3Cent	ZCM3Cent	XCM5Cent	YCM5Cent	ZCM5Cent
			Dummy	Phot	Ignore	5	27	0.000000	61.176845	-3050.000000				12.759450	62.305383	-3050.162000	13.817514	60.298241	-3050.162000
		Telescope	M1	Phot	Mirror	6	28	0.000000	54.793441	-1050.428903				11.427923	55.803431	-1050.625517	12.375513	54.005491	-1050.600535
			M2	Phot	Mirror	7	29	0.000000	0.000000	-2637.998000				0.000000	0.000000	-2638.131000	0.000000	0.000000	-2638.131000
		Common optics	CFP	Phot	Ignore	9	31	0.000000	-90.137429	-26.382552				-18.784562	-91.726470	-28.680790	-20.354767	-88.826152	-27.022003
			CM3	Phot	Mirror	11	33	0.000000	-93.493606	70.858340				-19.500476	-95.222336	70.770194	-21.110403	-92.123671	69.910954
Line0	22		CM4	Phot	Mirror	14	36	0.000000	-200.093860	-114.125099				-0.002619	-200.118270	-114.117194	0.007040	-200.122747	-114.115744
			CM5	Phot	Mirror	17	39	0.000000	-179.688568	82.217443				18.029700	-178.482563	81.282101	19.499867	-181.314796	81.945342
Xcol	c	Photometer optics	PM6	Phot	Mirror	20	42	0.000000	-259.533208	-94.150670				10.973657	-258.542261	-94.485541	11.832463	-260.433321	-94.201070
Ycol	d		PM7	Phot	Mirror	22	44	0.000000	-279.481485	107.765764				15.521875	-277.506548	106.787347	16.690589	-280.923961	107.754190
Zcol	e		PM8	Phot	Mirror	24	46	0.000000	-397.634151	-38.466330				3.403216	-397.122812	-38.450296	3.639387	-397.939241	-38.511584
			PCS	Phot	Hole	26	48	0.000000	-448.961193	9.132620				0.087781	-448.950976	9.143638	0.080828	-448.947719	9.147150
			PM9	Phot	Mirror	27	49	0.000000	-544.281002	97.528965				-6.045510	-544.828974	97.188646	-6.533386	-543.756057	97.729392
		Short wave	PDIC1	Phot	Hole	31	53	0.000000	-527.458720	-36.419239				-8.033705	-528.127272	-36.733246	-8.679048	-526.814757	-36.116781
			PM10	Phot	Mirror	36	58	0.000000	-619.802462	62.057922				-10.168951	-627.361870	68.909762	-11.004597	-626.732892	70.645120
			PSW	Phot	Det	38	60	-50.000000	-619.802728	62.057673				-50.000000	-627.788504	69.314110	-50.000000	-627.129735	71.123186
			PDIC1	Phot	Ignore	31	53	0.000000	-527.458720	-36.419239				-8.033705	-528.127272	-36.733246	-8.679048	-526.814757	-36.116781
		Medium wave	PDIC2	Phot	Hole	46	68	0.000000	-514.997754	-135.640264				-9.569267	-515.227885	-140.166446	-10.349698	-513.623960	-140.331781
			PMW	Phot	Det	51	73	-65.113778	-521.807023	-81.429289				-72.027431	-521.635326	-89.711826	-72.586040	-519.847765	-90.158272
			PDIC2	Phot	Ignore	46	68	0.000000	-514.997754	-135.640264				-9.569267	-515.227885	-140.166446	-10.349698	-513.623960	-140.331781
		Long wave	PM11	Phot	Mirror	57	79	0.000000	-509.514911	-179.297659				-10.137949	-510.450710	-178.472020	-10.987456	-508.588478	-180.115035
			PLW	Phot	Det	59	81	0.000000	-468.515249	-179.298363				-10.755735	-468.515228	-178.436583	-11.624777	-468.515270	-180.154575
			CM5	Spec	Ignore	17	39				58.001413	-183.378925	76.879467	18.029700	-178.482563	81.282101	19.499867	-181.314796	81.945342
		Spectrometer optics	SM6	Spec	Mirror	22	44				33.819095	-263.977827	-104.147355	15.521875	-277.506548	106.787347	16.690589	-280.923961	107.754190
			SCS	Spec	Hole	26	48				141.695796	-233.044025	-112.984032	0.087781	-448.950976	9.143638	0.080828	-448.947719	9.147150
			SM7	Spec	Mirror	30	52				170.859510	-224.681288	-115.372966	-10.755735	-505.261042	-220.085158	-11.624777	-503.556441	-219.871068
			SM8A	Spec	Mirror	36	58				170.860517	-234.578711	-171.504392	-10.168951	-627.361870	68.909762	-11.004597	-626.732892	70.645120
		Upper arm	SBS1	Spec	Hole	39	61				170.857397	-321.398300	-21.127710	-34.140000	-627.618626	69.153106	-34.140000	-626.968333	70.928749
			SM9A	Spec	Mirror	43	65				170.854284	-407.997960	-171.123463	-10.019144	-620.399652	61.497935	-10.829581	-619.213249	62.610429
			SRTA1	Spec	Mirror	46	68				170.854265	-407.998264	-46.123579	-9.569267	-515.227885	-140.166446	-10.349698	-513.623960	-140.331781
			SRTA2	Spec	Mirror	51	73				170.854258	-457.998681	-46.123457	-72.027431	-521.635326	-89.711826	-72.586040	-519.847765	-90.158272
			SM10A	Spec	Mirror	56	78				170.854239	-457.998377	-171.123268	-9.503531	-515.780101	-135.738523	-10.272944	-514.229985	-135.543836
			SBS2	Spec	Hole	60	82				170.857352	-544.598115	-21.127710	-10.623296	-477.505228	-178.444180	-11.481801	-477.505270	-180.145705
			SM11A	Spec	Mirror	63	85				170.860083	-620.587965	-152.746350	-10.755735	-468.515228	-178.436583	-11.624777	-468.515270	-180.154575
			SM12A	Spec	Mirror	67	89				170.858259	-636.663312	-61.581021	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
			SFLA	Spec	Hole	69	91				236.756678	-636.663389	-61.582353	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
			SSW	Spec	Det	71	93				250.856678	-636.663366	-61.582671	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
		Lower arm	SCAL	Spec	Hole	102	124				170.858972	-219.396733	43.147154	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
			SM8B	Spec	Mirror	98	120				170.860517	-234.578711	129.248973	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
			SBS1	Spec	Hole	39	61				170.857397	-321.398300	-21.127710	-34.140000	-627.618626	69.153106	-34.140000	-626.968333	70.928749
			SM9B	Spec	Mirror	111	133				170.854284	-407.997960	128.868044	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
			SRTB1	Spec	Mirror	114	136				170.854265	-407.998264	3.868159	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
			SRTB2	Spec	Mirror	119	141				170.854258	-457.998681	3.868038	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
			SM10B	Spec	Mirror	124	146				170.854239	-457.998377	128.867848	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
			SBS2	Spec	Hole	60	82				170.857352	-544.598115	-21.127710	-10.623296	-477.505228	-178.444180	-11.481801	-477.505270	-180.145705
			SM11B	Spec	Mirror	131	153				170.860083	-620.587965	110.490931	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
			SM12B	Spec	Mirror	136	158				170.858259	-636.663312	19.325602	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
			SFLB	Spec	Hole	138	160				246.956678	-636.663401	19.327140	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
			SLW	Spec	Det	140	162				250.856678	-636.663396	19.327213	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
					Axe			X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z
					Syst			Phot	Phot	Phot	Spec	Spec	Spec	CM3	CM3	CM3	CM5	CM5	CM5
Axis directions:					**Ray**			Gut	Gut	Gut	Gut	Gut	Gut	Cent	Cent	Cent	Cent	Cent	Cent
X		-Zsyno	Tow. tel																
Y		Xsyno	Tow. Spectro																
Z		Ysyno	Tow. PAX																

--- ID?

The current lens ID is: ID SPIRE PHOT (BOLPHT155D)

--- TIME
04-janv-02 14:23:18

--- !GRAY 2 0 0 0 SURF 0 Z1
--- SPEC GLOB Z1

ID SPIRE PHOT (BOLPHT155D 288 04-janv-02 14:23:18
LENS SPECIFICATIONS:

SYSTEM SPECIFICATIONS

OBJECT	DISTANCE	(TH0)	INFINITE	FOCAL	LENGTH	(FOCL)	18375.2607
OBJECT	HEIGHT	(YPP0)	INFINITE	BACK	FOCAL	LENGTH	16.8202
MARG	RAY	HEIGHT	(YMP1)	1641.705	IMAGE	DISTANCE	(BACK) 0
MARG	RAY	ANGLE	(UMP0)	0	CELL	LENGTH	(TOTL) 888.1
CHIEF	RAY	HEIGHT	(YPP1)	-4.99	F/NUMBER	(FNUM)	5.5964
CHIEF	RAY	ANGLE	(UPP0)	0.0167	GAUSSIAN	IMAGE	HT(GIHT) 5.2322
ENTR	PUPIL	SEMI-APERT	1641.705	EXIT	PUPIL	SEMI-APERT	71.0326
ENTR	PUPIL	LOCATION	17154.0876	EXIT	PUPIL	LOCATION	-778.2332

X-OBJECT	HEIGHT	(XPP0)	INFINITE					
X-MARG	RAY	HEIGHT	(XMP1)	1641.705	X-CHIEF	RAY	HT	(XPP1) -4.99
X-MARG	RAY	ANGLE	(VMP0)	0	X-CHIEF	RAY	ANGLE(VPP(	0.0167

WAVL	(uM)	200	400	600	250	0.6328
WEIGHTS	1	1	1	1	1	
COLOR	ORDER	2	1	3	4	5
UNITS	MM					
APERTURE	STOP	SURFACE	(APS)	7	SEMI-APERT	-154.06
REAL	PUPIL	OPTION	ON			
FOCAL	MODE	ON				
MAGNIFICAT	-1.80E-08					
GLOBAL	OPTION	ON				
VIGNETTING	OPTION	(VIG)	OFF			
POLARIZATI	AND	COATINGS	ARE	IGNORED.		

SURFACE DATA

SURF	RADIUS	THICKNESS	MEDIUM	INDEX	V-NUMBER
0	INFINITE	INFINITE	AIR		
1	INFINITE	17771.1	AIR		
2	INFINITE	0	AIR		
3	INFINITE	-17771.1	AIR		
4	INFINITE	-2000	AIR		
5	INFINITE	2000	AIR		
6	-3500	-1587.998	#NOM?		
APS	-345.2	1587.998	AIR		
8	INFINITE	1050	AIR		
9	-167.171	0	AIR		
10	INFINITE	70.9	AIR		
11	-365.963	0	#NOM?		
12	INFINITE	-213.5	#NOM?		
13	INFINITE	0	#NOM?		
14	INFINITE	0	AIR		
15	INFINITE	0	AIR		
16	INFINITE	197.4	AIR		
17	-294.638	0	#NOM?		
18	INFINITE	-193.6	#NOM?		
19	INFINITE	0	#NOM?		
20	-307.49	0	AIR		
21	INFINITE	202.9	AIR		
22	-330.7	0	#NOM?		
23	INFINITE	-188	#NOM?		
24	-286.651	0	AIR		
25	INFINITE	70	AIR		
26	INFINITE	130	AIR		
27	-350.851	0	#NOM?		
28	INFINITE	-320	#NOM?		
29	INFINITE	0	#NOM?		
30	INFINITE	185	#NOM?		
31	INFINITE	0	AIR		
32	INFINITE	0	AIR		
33	INFINITE	0	AIR		
34	INFINITE	0	AIR		
35	INFINITE	135	AIR		
36	INFINITE	0	#NOM?		
37	INFINITE	-50	#NOM?		
38	INFINITE	0	#NOM?		
39	INFINITE	0	#NOM?		
40	INFINITE	0	#NOM?		
41	INFINITE	50	#NOM?		
42	INFINITE	0	AIR		
43	INFINITE	-135	AIR		
44	INFINITE	0	#NOM?		
45	INFINITE	-100	#NOM?		
46	INFINITE	0	AIR		
47	INFINITE	0	AIR		
48	INFINITE	0	AIR		
49	INFINITE	0	AIR		
50	INFINITE	85	AIR		
51	INFINITE	0	AIR		
52	INFINITE	0	AIR		
53	INFINITE	0	AIR		
54	INFINITE	-85	AIR		
55	INFINITE	0	#NOM?		
56	INFINITE	-44	#NOM?		
57	INFINITE	0	AIR		
58	INFINITE	41	AIR		
59	INFINITE	0	AIR		
60	INFINITE	0	AIR		
61	INFINITE	0	AIR		

62 INFINITE 0 AIR
IMG INFINITE

KEY TO SYMBOLS
A SURFACE HAS TILTS AND DECENTERS B TAG ON SURFACE
G SURFACE IS IN GLOBAL COORDINATL SURFACE IS IN LOCAL COORDINATES
O SPECIAL SURFACE TYPE P ITEM IS SUBJECT TO PICKUP
S ITEM IS SUBJECT TO SOLVE

SPECIAL SURFACE DATA

SURFACE NO. 6 -- CONIC SURFACE
CONIC CONSTANT (CC) -1
SEMI-MAJORAXIS (b) -3.50E+13 SEMI-MINORAXIS (a) 3.50E+08

SURFACE NO. 7 -- CONIC SURFACE
CONIC CONSTANT (CC) -1.279
SEMI-MAJORAXIS (b) 1237.275986 SEMI-MINORAXIS (a) -653.534751

SURFACE NO. 11 -- CONIC SURFACE
CONIC CONSTANT (CC) -0.5095
SEMI-MAJORAXIS (b) -746.101937 SEMI-MINORAXIS (a) 522.537753

SURFACE NO. 17 -- TORIC SURFACE
RX -278.418

SURFACE NO. 20 -- TORIC SURFACE
RX -359.42

TILT AND DECENTER DATA
LEFT-HANDEDCOORDINATES

SURF	TYPE	X	Y	Z	ALPHA	BETA	GAMMA
2	REL	0	0	0	0.1829	0	0
10	REL	0	-91.048	0	-1.9766	0	0
11	REL	0	-149.224	12.676	-6.7066	0	0
12	REL	0	0	0	31.93	0	0
13	REL	0	0	0	-12.01	0	0
16	REL	0	0	0	-24.02	0	0
17	REL	0	0	0	9.212	0	0
18	REL	0	0	0	18.424	0	0
19	REL	0	0	0	-32.897	0	0
20	REL	0	0	0	-15	0	0
21	REL	0	0	0	-30	0	0
22	REL	0	0	0	22.29	0	0
23	REL	0	0	0	44.58	0	0
24	REL	0	0	0	-43.048	0	0
25	REL	0	0	0	-86.096	0	0
26	REL	0	0	0	0	0	0
27	REL	0	0	0	20	0	0
28	REL	0	0	0	40	0	0
29	REL	0	0	0	0	0	0
30	REL	0	0	0	0	0	0
31	REL	0	0	0	-18	0	0
32	REL	0	0	-5	0	0	0
33	REL	0	0	5	0	0	0
35	REL	0	0	0	-36	0	0
36	REL	0	0	0	0	-45	0
37	REL	0	0	0	0	-90	0
39	REL	0	0	15.86	0	0	0
40	REL	0	0	5	0	0	0
42	REL	0	0	0	0	45	0
43	REL	0	0	0	0	90	0
44	REL	0	0	0	18	0	0
45	REL	0	0	0	36	0	0
46	REL	0	0	0	0	25	0
47	REL	0	0	-5	0	0	0
48	REL	0	0	5	0	0	0
50	REL	0	0	0	0	50	0
52	REL	0	0	-8.5	0	0	0
53	REL	0	0	-5	0	0	0
55	REL	0	0	0	0	-25	0
56	REL	0	0	0	0	-50	0
57	REL	0	0	0	48.58	0	0
58	REL	0	0	0	97.16	0	0
60	REL	0	0	-8.99	0	0	0
61	REL	0	0	-5	0	0	0

KEY TO SURFACE TYPES
GLB GLOBAL COORDINATLOC LOCAL COORDINATES
REL RELATIVE COORDINATREM REMOTE TILTS IN RELATIVE COORD.

SURF MESSAGES

12	UNDO	TILTS/DECENOF	SURFACE	NO.	11
16	UNDO	TILTS/DECENOF	SURFACE	NO.	13
18	UNDO	TILTS/DECENOF	SURFACE	NO.	17
20	UNDO	TILTS/DECENOF	SURFACE	NO.	19
21	UNDO	TILTS/DECENOF	SURFACE	NO.	20
23	UNDO	TILTS/DECENOF	SURFACE	NO.	22
25	UNDO	TILTS/DECENOF	SURFACE	NO.	24
27	UNDO	TILTS/DECENOF	SURFACE	NO.	26
28	UNDO	TILTS/DECENOF	SURFACE	NO.	27
30	UNDO	TILTS/DECENOF	SURFACE	NO.	29
31	UNDO	TILTS/DECENOF	SURFACE	NO.	30
33	UNDO	TILTS/DECENOF	SURFACE	NO.	32
34	UNDO	TILTS/DECENOF	SURFACE	NO.	33
35	UNDO	TILTS/DECENOF	SURFACE	NO.	31
37	UNDO	TILTS/DECENOF	SURFACE	NO.	36

41	UNDO	TILTS/DECEN	OF	SURFACE	NO.	40
42	UNDO	TILTS/DECEN	OF	SURFACE	NO.	39
42	TILTS/DECEN	PICKUP	FROM	SURFACE	NO.	-36
43	UNDO	TILTS/DECEN	OF	SURFACE	NO.	42
43	TILTS/DECEN	PICKUP	FROM	SURFACE	NO.	-37
44	TILTS/DECEN	PICKUP	FROM	SURFACE	NO.	-31
45	UNDO	TILTS/DECEN	OF	SURFACE	NO.	44
45	TILTS/DECEN	PICKUP	FROM	SURFACE	NO.	-35
48	UNDO	TILTS/DECEN	OF	SURFACE	NO.	47
49	UNDO	TILTS/DECEN	OF	SURFACE	NO.	48
50	UNDO	TILTS/DECEN	OF	SURFACE	NO.	46
54	UNDO	TILTS/DECEN	OF	SURFACE	NO.	53
55	UNDO	TILTS/DECEN	OF	SURFACE	NO.	52
55	TILTS/DECEN	PICKUP	FROM	SURFACE	NO.	-46
56	UNDO	TILTS/DECEN	OF	SURFACE	NO.	55
56	TILTS/DECEN	PICKUP	FROM	SURFACE	NO.	-50
58	UNDO	TILTS/DECEN	OF	SURFACE	NO.	57
62	UNDO	TILTS/DECEN	OF	SURFACE	NO.	61
63	UNDO	TILTS/DECEN	OF	SURFACE	NO.	60

GLOBAL COORDINAT DATA

GLOBAL COORDINAT SURFACE LOCATION IN COORDINAT SYSTEM OF SURFACE 9

SURF	X	Y	Z	NOTES	ALPHA	BETA	GAMMA
1	0	56.731939	-1049.90945	-0.18291	0	0	
2	0	0	1.67E+04	0	0	0	
3	0	0	1.67E+04	0	0	0	
4	0	0	-1.05E+03	0	0	0	
5	0	0	-3050	0	0	0	
6	0	0	-1050	0	0	0	
APS	0	0	-2637.998	0	0	0	
8	0	0	-1050	0	0	0	
9	0	0	0	0	0	0	
10	0	-91.048	0	-1.9766	0	0	
11	0	-243.065859	78.379337	-8.6832	0	0	
12	0	-93.493436	70.857814	29.9534	0	0	
13	0	-200.09302	-114.125371	17.9434	0	0	
14	0	-200.09302	-114.125371	17.9434	0	0	
15	0	-200.09302	-114.125371	17.9434	0	0	
16	0	-200.09302	-114.125371	5.9334	0	0	
17	0	-179.687314	82.217104	15.1454	0	0	
18	0	-179.687314	82.217104	24.3574	0	0	
19	0	-259.533222	-94.150668	-8.5396	0	0	
20	0	-259.533222	-94.150668	9.3574	0	0	
21	0	-259.533222	-94.150668	-5.6426	0	0	
22	0	-279.482925	107.766194	16.6474	0	0	
23	0	-279.482925	107.766194	38.9374	0	0	
24	0	-397.635459	-38.466424	-4.1106	0	0	
25	0	-397.635459	-38.466424	-47.1586	0	0	
26	0	-448.96217	9.131566	-47.1586	0	0	
27	0	-544.283205	97.527835	-27.1586	0	0	
28	0	-544.283205	97.527835	-7.1586	0	0	
29	0	-504.405979	-219.977766	-7.1586	0	0	
30	0	-504.405979	-219.977766	-7.1586	0	0	
31	0	-527.460001	-36.419841	-25.1586	0	0	
32	0	-525.334374	-40.945513	-25.1586	0	0	
33	0	-529.585628	-31.894168	-25.1586	0	0	
34	0	-527.460001	-36.419841	-25.1586	0	0	
35	0	-527.460001	-36.419841	-43.1586	0	0	
36	1.82E-14	-619.802728	62.057673	-43.1586	-45	0	
37	-3.85E-15	-619.802728	62.057673	-43.1586	-90	0	
38	-5.00E+01	-619.802728	62.057673	-43.1586	-90	0	
39	-34.14	-619.802728	62.057673	-43.1586	-90	0	
40	-29.14	-619.802728	62.057673	-43.1586	-90	0	
41	-34.14	-619.802728	62.057673	-43.1586	-90	0	
42	1.82E-14	-619.802728	62.057673	-43.1586	-45	0	
43	-3.44E-15	-619.802728	62.057673	-43.1586	0	0	
44	2.02E-15	-527.460001	-36.419841	-25.1586	0	0	
45	2.02E-15	-527.460001	-36.419841	-7.1586	0	0	
46	7.15E-15	-514.998367	-135.640341	-7.1586	25	0	
47	2.11E+00	-514.433664	-140.136557	-7.1586	25	0	
48	-2.113091	-515.563071	-131.144126	-7.1586	25	0	
49	7.15E-15	-514.998367	-135.640341	-7.1586	25	0	
50	0.00E+00	-514.998367	-135.640341	-7.1586	50	0	
51	-65.113778	-521.807023	-81.429289	-7.1586	50	0	
52	-58.6024	-521.126158	-86.850394	-7.1586	50	0	
53	-54.772178	-520.725649	-90.03928	-7.1586	50	0	
54	-58.6024	-521.126158	-86.850394	-7.1586	50	0	
55	-7.15E-15	-514.998367	-135.640341	-7.1586	25	0	
56	-7.91E-15	-514.998367	-135.640341	-7.1586	0	0	
57	-1.28E-14	-509.515249	-179.297361	41.4214	0	0	
58	-1.28E-14	-509.515249	-179.297361	90.0014	0	0	
59	-1.34E-14	-468.515249	-179.298363	90.0014	0	0	
60	-1.33E-14	-477.505249	-179.298143	90.0014	0	0	
61	-1.32E-14	-482.505249	-179.298021	90.0014	0	0	
62	-1.33E-14	-477.505249	-179.298143	90.0014	0	0	
63	-1.34E-14	-468.515249	-179.298363	90.0014	0	0	

Unless noted, Euler angles are taken in the order alpha, beta, gamma
---
CAP
ID SPIRE PHOT (BOLPHT155D 288 04-janv-02 14:23:20

CLEAR APERTURE DATA
(Y-coordinate only)

SURF	X	OR	R-APER.	Y-APER.	REMARK	X-OFFSET	Y-OFFSET
1	1650.7121	Soft	CAO				
2	1643.8966	Soft	CAO				
3	1643.8966	Soft	CAO				
4	1703.5776	Soft	CAO				
5	1710.7852	Soft	CAO				
6	1750	User	CAO				
7	154.06	User	CAO				
8	122.3149	Soft	CAO				

9	124	User		CAO				
10	13.9413	Soft		CAO				
11	139		62	User	RAO	-19.5	145	
12	18.5633	Soft		CAO				
13	12.7086	Soft		CAO				
14	15		16	User	EAO			
15	12.7086	Soft		CAO				
16	12.3736	Soft		CAO				
17	161		85	User	RAO	19.5	-1.5	
18	29.6189	Soft		CAO				
19	9.1357	Soft		CAO				
20	46		27	User	RAO			
21	8.0804	Soft		CAO				
22	118		101	User	RAO	0	-1	
23	34.0856	Soft		CAO				
24	32	User		CAO				
25	16.0174	Soft		CAO				
26	23.064		19.904	User	EAO	0	0.738	
27	56	User		CAO				
28	37.619	Soft		CAO				
29	7.2672	Soft		CAO				
30	44		22	User	RAO			
31	40	User		CAO				
32	50	User		CAO				
33	50	User		CAO				
34	25.4656	Soft		CAO				
35	24.7592	Soft		CAO				
36	78		40	User	RAO	2.5	0	
37	11.8994	Soft		CAO				
38	40		22	User	RAO			
39	32.5	User		CAO				
40	32.5	User		CAO				
41	8.6473	Soft		CAO				
42	11.8994	Soft		CAO				
43	11.8994	Soft		CAO				
44	50	User		CAO				
45	24.7592	Soft		CAO				
46	36	User		CAO				
47	46	User		CAO				
48	46	User		CAO				
49	15.2334	Soft		CAO				
50	15.2334	Soft		CAO				
51	40		22	User	RAO			
52	32.5	User		CAO				
53	32.5	User		CAO				
54	7.9462	Soft		CAO				
55	15.2334	Soft		CAO				
56	15.2334	Soft		CAO				
57	56		53	User	RAO	0	-2.75	
58	11.042	Soft		CAO				
59	40		22	User	RAO			
60	32.5	User		CAO				
61	32.5	User		CAO				
62	7.9928	Soft		CAO				
63	7.2672	Soft		CAO				

```
NOTE:       CAO,        CAI,        EAO,        and         EAI         input       is          semi-aperture.
RAO         and         RAI         input       is          full        aperture.
---         PMA         BOLSPECGLOB03
**********MACRO        LIST        **************************
BOLSPECGLOB03
!bolgutglob01      210700 Glob        coords      of          gut         ray         impacts
!           to          import      into        XL
!bolspecglob01      10900 Clob        coords      of          surface     summits
!                       2      270901 Include     CAP         listing
!                       3      121101 Switch              74 ON,         list        macro       at          the         end

on                     74
fnm:        specglob.txt

!Origin     surf        num
z1          =                   9

pon         fnm

id?
time

!gray                  2           0           0           0 surf                  0 z1
spec        glob        z1
cap
pma         bolspecglob03

pof         c

off                    74
*****************************************************************
---
---         POF         C
```

--- ID?

The current lens ID is: ID SPIRE SPECTRO (BOLSP508)

--- TIME
04-janv-02 16:20:39

--- !GRAY 2 0 0 0 SURF 0 Z1
--- SPEC GLOB Z1

ID SPIRE SPECTRO (BOLSP508) 288 04-janv-02 16:20:39
LENS SPECIFICATIONS:

SYSTEM SPECIFICATIONS

OBJECT	DISTANCE	(TH0)	INFINITE	FOCAL	LENGTH	(FOCL)	18821.9822		
OBJECT	HEIGHT	(YPP0)	INFINITE	BACK	FOCAL	LENGTH	-55.7783		
MARG	RAY	HEIGHT	(YMP1)	1641.705	IMAGE	DISTANCE	(BACK)	-2.9	
MARG	RAY	ANGLE	(UMP0)	0	CELL	LENGTH	(TOTL)	1170.73	
CHIEF	RAY	HEIGHT	(YPP1)	-4.99	F/NUMBER	(FNUM)	-5.7324		
CHIEF	RAY	ANGLE	(UPP0)	0.0167	GAUSSIAN	IMAGE	HT(GIHT)	5.4458	
ENTR	PUPIL	SEMI-APERT	1641.705	EXIT	PUPIL	SEMI-APERT	857.7327		
ENTR	PUPIL	LOCATION	17154.0876	EXIT	PUPIL	LOCATION	9778.0408		
X-OBJECT	HEIGHT	(XPP0)	INFINITE						
X-MARG	RAY	HEIGHT	(XMP1)	1641.705	X-CHIEF	RAY	HT	(XPP1)	-4.99
X-MARG	RAY	ANGLE	(VMP0)	0	X-CHIEF	RAY	ANGLE(VPP	0.0167	

WAVL	(uM)		200	400	600	250	0.6328
WEIGHTS		1	1	1	1	1	
COLOR	ORDER		2	1	3	4	5

UNITS MM
APERTURE STOP SURFACE (APS) 7 SEMI-APERT 154.95167
REAL PUPIL OPTION ON
FOCAL MODE ON
MAGNIFICA -1.87E-08
GLOBAL OPTION ON
VIGNETTINGOPTION (VIG) OFF
POLARIZAT AND COATINGS ARE IGNORED.

SURFACE DATA

SURF	RADIUS	THICKNESS	MEDIUM	INDEX	V-NUMBER
0	INFINITE	INFINITE	AIR		
1	INFINITE	17771.1	AIR		
2	INFINITE	0	AIR		
3	INFINITE	-17771.1	AIR		
4	INFINITE	-2000	AIR		
5	INFINITE	2000	AIR		
6	-3500	-1587.998	#NOM?		
APS	-345.2	1587.998	AIR		
8	INFINITE	1050	AIR		
9	-167.171	0	AIR		
10	INFINITE	70.9	AIR		
11	-365.963	0	#NOM?		
12	INFINITE	-213.5	#NOM?		
13	INFINITE	0	#NOM?		
14	INFINITE	0	AIR		
15	INFINITE	0	AIR		
16	INFINITE	197.4	AIR		
17	-294.638	0	#NOM?		
18	INFINITE	-193.6	#NOM?		
19	INFINITE	-10	#NOM?		
20	INFINITE	0	#NOM?		
21	INFINITE	0	#NOM?		
22	269.92	-2.34E-13	AIR		
23	INFINITE	0	AIR		
24	INFINITE	112.57	AIR		
25	INFINITE	0	AIR		
26	INFINITE	-5.86E-14	AIR		
27	INFINITE	30.43	AIR		
28	INFINITE	0	AIR		
29	INFINITE	0	AIR		
30	INFINITE	1.61E-13	#NOM?		
31	INFINITE	0	#NOM?		
32	INFINITE	0	#NOM?		
33	INFINITE	0	#NOM?		
34	INFINITE	-57	#NOM?		
35	INFINITE	0	#NOM?		
36	230.34	0	AIR		
37	INFINITE	0	AIR		
38	INFINITE	173.64	AIR		
39	INFINITE	0	#NOM?		
40	INFINITE	-40	#NOM?		
41	INFINITE	0	#NOM?		
42	INFINITE	-133.2	#NOM?		
43	259.5	0	AIR		
44	INFINITE	150	AIR		
45	INFINITE	-25	AIR		
46	INFINITE	0	#NOM?		
47	INFINITE	-25	#NOM?		
48	INFINITE	0	#NOM?		
49	INFINITE	-25	#NOM?		
50	INFINITE	0	#NOM?		
51	INFINITE	0	AIR		
52	INFINITE	0	AIR		
53	INFINITE	0	AIR		
54	INFINITE	-25	AIR		
55	INFINITE	150	AIR		
56	-260	0	#NOM?		
57	INFINITE	-133.2	#NOM?		
58	INFINITE	0	#NOM?		
59	INFINITE	-40	#NOM?		
60	INFINITE	0	AIR		
61	INFINITE	151.98	AIR		
62	INFINITE	0	AIR		
63	-196.99	0	#NOM?		
64	INFINITE	0	#NOM?		
65	INFINITE	-60	#NOM?		
66	INFINITE	-32.57	#NOM?		
67	INFINITE	0	AIR		
68	INFINITE	65.9	AIR		
69	47.2	1	LDPE	1.5555	1.00E+10
70	INFINITE	13.1	AIR		
71	INFINITE	-13.1	AIR		
72	INFINITE	-1	PICKUP	1.5555	1.00E+10
73	47.2	-65.9	AIR		
74	INFINITE	0	#NOM?		
75	INFINITE	32.57	#NOM?		
76	INFINITE	60	#NOM?		
77	INFINITE	0	#NOM?		
78	-196.99	0	AIR		
79	INFINITE	0	AIR		
80	INFINITE	-151.98	AIR		
81	INFINITE	0	#NOM?		
82	INFINITE	40	#NOM?		
83	INFINITE	133.2	#NOM?		
84	-260	0	AIR		
85	INFINITE	-150	AIR		
86	INFINITE	25	AIR		
87	INFINITE	0	#NOM?		
88	INFINITE	25	#NOM?		
89	INFINITE	25	#NOM?		
90	INFINITE	0	AIR		
91	INFINITE	25	AIR		
92	INFINITE	-150	AIR		
93	259.5	0	#NOM?		
94	INFINITE	133.2	#NOM?		
95	INFINITE	40	#NOM?		
96	INFINITE	173.64	#NOM?		
97	INFINITE	0	#NOM?		
98	-230.34	0	AIR		
99	INFINITE	0	AIR		
100	INFINITE	-57	AIR		
101	INFINITE	-30.43	AIR		
102	INFINITE	30.43	AIR		
103	INFINITE	57	AIR		
104	INFINITE	0	AIR		
105	-230.34	0	#NOM?		
106	INFINITE	0	#NOM?		
107	INFINITE	-173.64	#NOM?		
108	INFINITE	0	AIR		
109	INFINITE	40	AIR		
110	INFINITE	133.2	AIR		
111	-259.5	0	#NOM?		
112	INFINITE	-150	#NOM?		
113	INFINITE	25	#NOM?		
114	INFINITE	0	AIR		
115	INFINITE	25	AIR		
116	INFINITE	0	AIR		
117	INFINITE	25	AIR		
118	INFINITE	0	AIR		
119	INFINITE	0	#NOM?		
120	INFINITE	0	#NOM?		
121	INFINITE	0	#NOM?		
122	INFINITE	25	#NOM?		
123	INFINITE	-150	#NOM?		
124	260	0	AIR		
125	INFINITE	133.2	AIR		
126	INFINITE	0	#NOM?		
127	INFINITE	40	AIR		
128	INFINITE	0	#NOM?		
129	INFINITE	-151.98	#NOM?		
130	INFINITE	0	#NOM?		
131	196.99	0	AIR		
132	INFINITE	0	AIR		
133	INFINITE	0	AIR		
134	INFINITE	60	AIR		
135	INFINITE	32.57	AIR		
136	INFINITE	0	#NOM?		
137	INFINITE	-76.1	#NOM?		
138	-53.2	-1	#NOM?	-1.5555	1.00E+10
139	INFINITE	-2.9	#NOM?		
IMG	INFINITE				

KEY TO SYMBOLS

A	SURFACE	HAS	TILTS	AND	DECENTERS	B	TAG	ON	SURFACE		
G	SURFACE	IS	IN	GLOBAL	COORDINAT	L	SURFACE	IS	IN	LOCAL	COORDINATES
O	SPECIAL	SURFACE	TYPE	P	ITEM	IS	SUBJECT	TO	PICKUP		
S	ITEM	IS	SUBJECT	TO	SOLVE						

SPECIAL SURFACE DATA

SURFACE NO. 6 -- CONIC SURFACE
CONIC CONSTANT (CC) -1
SEMI-MAJORAXIS (b) -3.50E+13 SEMI-MINORAXIS (a) 3.50E+08

SURFACE NO. 7 -- CONIC SURFACE
CONIC CONSTANT (CC) -1.279
SEMI-MAJORAXIS (b) 1237.275986 SEMI-MINORAXIS (a) -653.534751

SURFACE NO. 11 -- CONIC SURFACE
CONIC CONSTANT (CC) -0.5095
SEMI-MAJORAXIS (b) -746.101937 SEMI-MINORAXIS (a) 522.537753

SURFACE NO. 17 -- TORIC SURFACE
RX -278.418

SURFACE NO. 22 -- TORIC SURFACE
RX 523.79

SURFACE	NO.		36 --	TORIC	SURFACE
RX		202			

SURFACE	NO.		63 --	TORIC	SURFACE
RX		-169.84			

SURFACE	NO.		78 --	TORIC	SURFACE
RX		-169.84			

SURFACE	NO.		98 --	TORIC	SURFACE
RX		-202			

SURFACE	NO.		105 --	TORIC	SURFACE
RX		-202			

SURFACE	NO.		131 --	TORIC	SURFACE
RX		169.84			

TILT AND DECENTER DATA
LEFT-HAND COORDINATES

SURF	TYPE	X	Y	Z	ALPHA	BETA	GAMMA
2	REL	0	0	0	0.1829	0	0
3	REL	0	0	0	0	-0.123	0
10	REL	0	-91.048	0	-1.9766	0	0
11	REL	0	-149.224	12.676	-6.7066	0	0
12	REL	0	0	0	31.93	0	0
13	REL	0	0	0	-12.01	0	0
14	REL	0	0	0	0	0	0
16	REL	0	0	0	-24.02	0	0
17	REL	0	0	0	9.212	0	0
18	REL	0	0	0	18.424	0	0
19	REL	0	0	0	-24.3574	0	0
20	REL	33.82	-4.442	0	0	0	74
21	REL	0	0	0	45	0	0
22	LOC	ABG	0	0	0	10.926	13.491	-64.05
24	REL	0	0	0	49.5	0	0
26	LOC	ABG	0	0	0	26	12	0
28	REL	0	0	0	-45	0	0
30	LOC	ABG	0	0	0	-8.441	-173.118	-90
32	REL	0	0	0	-49.5	0	0
33	REL	0	0	0	0	0	-74
34	REL	0	0	0	10	0	0
35	REL	0	0	0	-20	0	0
36	REL	0	0	0	0	0	-6.22
38	REL	0	0	0	-40	0	0
39	REL	0	0	0	30	0	0
40	REL	0	0	0	60	0	0
43	REL	0	0	0.00E+00	-15	0.00E+00	0
44	REL	0	0	0.00E+00	-30	0.00E+00	0
46	REL	0	0	0	45	0	0
47	REL	0	0	0	90	0	0
51	REL	0	0	0	45	0	0
54	REL	0	0	0	45	0	0
56	REL	0	0	0.00E+00	-15	0.00E+00	0
57	REL	0	0	0.00E+00	-30	0.00E+00	0
60	REL	0	0	0	30	0	0
61	REL	0	0	0	60	0	0
62	REL	0	0	0	-20	0	0
63	REL	0	0	0.00E+00	0	0.00E+00	0
65	REL	0	0	0.00E+00	-40	0.00E+00	0
67	REL	0	0	0.00E+00	0	-4.50E+01	0
68	REL	0	0	0	0	-90	0
71	REL	0	0	0	0	0	10
74	REL	0	0	0	0	45	0
75	REL	0	0	0	0	90	0
77	REL	0	0	0	-20	0	0
78	REL	0	0	0	0	0	0
80	REL	0	0	0	40	0	0
81	REL	0	0	0	-30	0.00E+00	0
82	REL	0	0	0	-60	0.00E+00	0
84	REL	0	0	0	15	0.00E+00	0
85	REL	0	0	0	30	0	0
87	REL	0	0	0	-45	0	0
88	REL	0	0	0	-45	0	0
90	REL	0	0	0	-45	0.00E+00	0
91	REL	0	0	0	-90	0.00E+00	0
93	REL	0	0	0	15	0	0
94	REL	0	0	0	30	0	0
97	REL	0	0	0	-20	0	0
98	REL	0	0	0	0	0	-6.22
100	REL	0	0	0	-40	0	0
104	REL	0	0	0	20	0	0
105	REL	0	0	0	0	0	-6.22
107	REL	0	0	0	40	0	0
108	REL	0	0	0	-30	0	0
109	REL	0	0	0	-60	0	0
111	REL	0	0	0	15	0	0
112	REL	0	0	0	30	0	0
114	REL	0	0	0	-45	0	0
115	REL	0	0	0	-90	0	0
119	REL	0	0	0	-45	0	0
122	REL	0	0	0	-45	0	0
124	REL	0	0	0	15	0	0
125	REL	0	0	0	30	0	0
128	REL	0	0	0	-30	0	0
129	REL	0	0	0	-60	0	0
130	REL	0	0	0	20	0	0
131	REL	0	0	0	0	0	0
134	REL	0	0	0	40	0	0
136	REL	0	0	0	0	45	0
137	REL	0	0	0	0	90	0
140	REL	0	0	0	0	0	10

KEY TO SURFACE TYPES

GLB	GLOBAL	COORDINATE	LOC	LOCAL	COORDINATES		
REL	RELATIVE	COORDINATE	M	REMOTE	TILTS	IN	RELATIVE COORD.

SURF MESSAGES

12	UNDO	TILTS/DECE	OF	SURFACE	NO.	11
15	UNDO	TILTS/DECE	OF	SURFACE	NO.	14
16	UNDO	TILTS/DECE	OF	SURFACE	NO.	13
18	UNDO	TILTS/DECE	OF	SURFACE	NO.	17
23	COINCIDEN	WITH	SURFACE	NO.	21	
27	COINCIDEN	WITH	SURFACE	NO.	25	
31	COINCIDEN	WITH	SURFACE	NO.	29	
37	UNDO	TILTS/DECE	OF	SURFACE	NO.	36
38	UNDO	TILTS/DECE	OF	SURFACE	NO.	35
40	UNDO	TILTS/DECE	OF	SURFACE	NO.	39
44	UNDO	TILTS/DECE	OF	SURFACE	NO.	43
47	UNDO	TILTS/DECE	OF	SURFACE	NO.	46
57	UNDO	TILTS/DECE	OF	SURFACE	NO.	56
61	UNDO	TILTS/DECE	OF	SURFACE	NO.	60
64	UNDO	TILTS/DECE	OF	SURFACE	NO.	63
65	UNDO	TILTS/DECE	OF	SURFACE	NO.	62
68	UNDO	TILTS/DECE	OF	SURFACE	NO.	67
72	UNDO	TILTS/DECE	OF	SURFACE	NO.	71
74	TILTS/DECE	PICKUP	FROM	SURFACE	NO.	-67
75	UNDO	TILTS/DECE	OF	SURFACE	NO.	74
75	TILTS/DECE	PICKUP	FROM	SURFACE	NO.	-68
77	TILTS/DECE	PICKUP	FROM	SURFACE	NO.	-62
78	TILTS/DECE	PICKUP	FROM	SURFACE	NO.	63
79	UNDO	TILTS/DECE	OF	SURFACE	NO.	78
80	UNDO	TILTS/DECE	OF	SURFACE	NO.	77
80	TILTS/DECE	PICKUP	FROM	SURFACE	NO.	-65
81	TILTS/DECE	PICKUP	FROM	SURFACE	NO.	-60
82	UNDO	TILTS/DECE	OF	SURFACE	NO.	81
82	TILTS/DECE	PICKUP	FROM	SURFACE	NO.	-61
84	TILTS/DECE	PICKUP	FROM	SURFACE	NO.	-56
85	UNDO	TILTS/DECE	OF	SURFACE	NO.	84
85	TILTS/DECE	PICKUP	FROM	SURFACE	NO.	-57
87	TILTS/DECE	PICKUP	FROM	SURFACE	NO.	-51
88	TILTS/DECE	PICKUP	FROM	SURFACE	NO.	-54
90	TILTS/DECE	PICKUP	FROM	SURFACE	NO.	-46
91	UNDO	TILTS/DECE	OF	SURFACE	NO.	90
91	TILTS/DECE	PICKUP	FROM	SURFACE	NO.	-47
93	TILTS/DECE	PICKUP	FROM	SURFACE	NO.	-43
94	UNDO	TILTS/DECE	OF	SURFACE	NO.	93
94	TILTS/DECE	PICKUP	FROM	SURFACE	NO.	-44
97	TILTS/DECE	PICKUP	FROM	SURFACE	NO.	35
98	TILTS/DECE	PICKUP	FROM	SURFACE	NO.	36
99	UNDO	TILTS/DECE	OF	SURFACE	NO.	98
100	UNDO	TILTS/DECE	OF	SURFACE	NO.	9.70E+01
100	TILTS/DECE	PICKUP	FROM	SURFACE	NO.	38
104	TILTS/DECE	PICKUP	FROM	SURFACE	NO.	-9.70E+01
105	TILTS/DECE	PICKUP	FROM	SURFACE	NO.	9.80E+01
106	UNDO	TILTS/DECE	OF	SURFACE	NO.	105
107	UNDO	TILTS/DECE	OF	SURFACE	NO.	104
107	TILTS/DECE	PICKUP	FROM	SURFACE	NO.	-100
108	TILTS/DECE	PICKUP	FROM	SURFACE	NO.	-39
109	UNDO	TILTS/DECE	OF	SURFACE	NO.	108
109	TILTS/DECE	PICKUP	FROM	SURFACE	NO.	-4.00E+01
111	TILTS/DECE	PICKUP	FROM	SURFACE	NO.	-4.30E+01
112	UNDO	TILTS/DECE	OF	SURFACE	NO.	1.11E+02
112	TILTS/DECE	PICKUP	FROM	SURFACE	NO.	-4.40E+01
114	TILTS/DECE	PICKUP	FROM	SURFACE	NO.	-4.60E+01
115	UNDO	TILTS/DECE	OF	SURFACE	NO.	1.14E+02
115	TILTS/DECE	PICKUP	FROM	SURFACE	NO.	-47
119	TILTS/DECE	PICKUP	FROM	SURFACE	NO.	-5.10E+01
122	TILTS/DECE	PICKUP	FROM	SURFACE	NO.	-5.40E+01
124	TILTS/DECE	PICKUP	FROM	SURFACE	NO.	-56
125	UNDO	TILTS/DECE	OF	SURFACE	NO.	124
125	TILTS/DECE	PICKUP	FROM	SURFACE	NO.	-57
128	TILTS/DECE	PICKUP	FROM	SURFACE	NO.	-60
129	UNDO	TILTS/DECE	OF	SURFACE	NO.	128
129	TILTS/DECE	PICKUP	FROM	SURFACE	NO.	-61
130	TILTS/DECE	PICKUP	FROM	SURFACE	NO.	-62
131	TILTS/DECE	PICKUP	FROM	SURFACE	NO.	63
132	UNDO	TILTS/DECE	OF	SURFACE	NO.	131
133	UNDO	TILTS/DECE	OF	SURFACE	NO.	130
134	TILTS/DECE	PICKUP	FROM	SURFACE	NO.	-65
136	TILTS/DECE	PICKUP	FROM	SURFACE	NO.	-67
137	UNDO	TILTS/DECE	OF	SURFACE	NO.	136
137	TILTS/DECE	PICKUP	FROM	SURFACE	NO.	-68
140	TILTS/DECE	PICKUP	FROM	SURFACE	NO.	71

GLOBAL COORDINATE DATA

GLOBAL COORDINATE SURFACE LOCATION IN COORDINATE SYSTEM OF SURFACE 9

SURF	X	Y	Z	NOTES	ALPHA	BETA	GAMMA
1	38.144766	56.731939	-1049.86851	-0.18291	0.12298	-0.00039	
2	0	0	1.67E+04	0	0.12298	0	
3	0	0	1.67E+04	0	0	0	
4	0	0	-1050	0	0	0.00E+00	
5	0	0	-3050	0	0	0.00E+00	
6	0	0	-1050	0	0	0.00E+00	
APS	0	0	-2637.998	0	0	0.00E+00	
8	0	0	-1050	0	0	0.00E+00	
9	0	0	0	0	0	0	
10	0	-91.048	0	-1.9766	0	0.00E+00	
11	0	-243.063859	78.379337	-8.6832	0	0	
12	0	-93.493436	70.857814	29.9534	0	0.00E+00	
13	0	-200.09302	-114.125371	17.9434	0	0.00E+00	
14	0	-200.09302	-114.125371	17.9434	0	0	

15	0	-200.09302	-114.125371	17.9434	0	0
16	0	-200.09302	-114.125371	5.9334	0	0
17	0	-179.687314	82.217104	15.1454	0	0
18	0	-179.687314	82.217104	24.3574	0	0
19	0	-259.533222	-94.150668	0	0	0
20	33.82	-263.975222	-104.150668	0	0	74
21	33.82	-263.975222	-104.150668	15.4102	-42.82135	67.9265
22	33.82	-263.975222	-104.150668	3.93E+01	-45.23104	-1.42E-01
23	33.82	-263.975222	-104.150668	15.4102	-42.82135	67.9265
24	33.82	-263.975222	-104.150668	105.93544	-73.39516	-15.30268
25	141.695656	-233.042376	-112.982809	105.93544	-73.39516	-15.30268
26	141.695656	-233.042376	-112.982809	138.95995	-48.8373	-47.8363
27	141.695656	-233.042376	-112.982809	105.93544	-73.39516	-15.30268
28	170.856678	-224.680587	-115.370319	17.88644	-46.96602	66.1775
29	170.856678	-224.680587	-115.370319	1.79E+01	-46.96602	6.62E+01
30	170.856678	-224.680587	-115.370319	-1.54E+02	43.46114	2.98E+01
31	170.856678	-224.680587	-115.370319	1.79E+01	-46.96602	6.62E+01
32	170.856678	-224.680587	-115.370319	0.00E+00	0	7.40E+01
33	170.856678	-224.680587	-115.370319	8.54E-07	0	8.54E-07
34	170.856678	-224.680587	-115.370319	10	0	0.00E+00
35	170.856678	-234.578533	-171.504361	-1.00E+01	0	0.00E+00
36	170.856678	-234.578533	-171.504361	-1.00E+01	0	-6.22E+00
37	170.856678	-234.578533	-171.504361	-10	0	0
38	170.856678	-234.578533	-171.504361	-30	0	0.00E+00
39	170.856678	-321.398533	-21.12771	1.05E-06	0	1.05E-06
40	170.856678	-321.398533	-21.12771	3.00E+01	0	0.00E+00
41	170.856678	-341.398533	-55.768726	3.00E+01	0	0.00E+00
42	170.856678	-341.398533	-55.768726	3.00E+01	0	0.00E+00
43	170.856678	-407.998533	-171.12331	15	0	0
44	170.856678	-407.998533	-171.12331	1.21E-06	0	1.21E-06
45	170.856678	-407.998533	-21.12331	1.21E-06	0	1.21E-06
46	170.856678	-407.998533	-46.12331	45	0	0
47	170.856678	-407.998533	-46.12331	90	0	0
48	170.856678	-432.998533	-46.12331	90	0	0
49	170.856678	-432.998533	-46.12331	90	0	0
50	170.856678	-457.998533	-46.12331	90	00-janv-00	0.00E+00
51	170.856678	-457.998533	-46.12331	135	0	0.00E+00
52	170.856678	-457.998533	-46.12331	135	00-janv-00	0.00E+00
53	170.856678	-457.998533	-46.12331	135	00-janv-00	00:00:00
54	170.856678	-457.998533	-46.12331	180	0	1.21E-06
55	170.856678	-457.998533	-21.12331	1.80E+02	0	1.21E-06
56	170.856678	-457.998533	-171.12331	1.65E+02	0	0.00E+00
57	170.856678	-457.998533	-171.12331	150	0	0.00E+00
58	170.856678	-524.598533	-55.768726	150	0	0
59	170.856678	-524.598533	-55.768726	150	0	0
60	170.856678	-544.598533	-21.12771	180	0	1.21E-06
61	170.856678	-544.598533	-21.12771	-150	0	0
62	170.856678	-620.588533	-152.74625	-170	0	0
63	170.856678	-620.588533	-152.74625	-170	0	0
64	170.856678	-620.588533	-152.74625	-170	0	0
65	170.856678	-620.588533	-152.74625	170	0	0.00E+00
66	170.856678	-631.007424	-93.657785	170	0	0.00E+00
67	170.856678	-636.663145	-61.582597	170	-45	0
68	170.856678	-636.663145	-61.582597	170	-90	0
69	236.756678	-636.663145	-61.582597	170	-90	0
70	237.756678	-636.663145	-61.582597	170	-90	0
71	250.856678	-636.663145	-61.582597	-180	-90	0.00E+00
72	237.756678	-636.663145	-61.582597	170	-90	0
73	236.756678	-636.663145	-61.582597	170	-90	0
74	170.856678	-636.663145	-61.582597	170	-45	0
75	170.856678	-636.663145	-61.582597	170	0	0
76	170.856678	-631.007424	-93.657785	170	0	0
77	170.856678	-620.588533	-152.74625	-170	0	0.00E+00
78	170.856678	-620.588533	-152.74625	-170	0	0.00E+00
79	170.856678	-620.588533	-152.74625	-170	0	0
80	170.856678	-620.588533	-152.74625	-150	0	0
81	170.856678	-544.598533	-21.12771	180	0	1.05E-06
82	170.856678	-544.598533	-21.12771	150	0	0.00E+00
83	170.856678	-524.598533	-55.768726	150	0	0.00E+00
84	170.856678	-457.998533	-171.12331	165	0	0
85	170.856678	-457.998533	-171.12331	180	0	1.21E-06
86	170.856678	-457.998533	-21.12331	180	0	1.21E-06
87	170.856678	-457.998533	-46.12331	1.35E+02	0	0.00E+00
88	170.856678	-457.998533	-46.12331	9.00E+01	0	0.00E+00
89	170.856678	-432.998533	-46.12331	9.00E+01	0	0.00E+00
90	170.856678	-407.998533	-46.12331	45	0	0
91	170.856678	-407.998533	-46.12331	1.21E-06	0	1.21E-06
92	170.856678	-407.998533	-21.12331	1.21E-06	0	1.21E-06
93	170.856678	-407.998533	-171.12331	15	0	0.00E+00
94	170.856678	-407.998533	-171.12331	30	0	0
95	170.856678	-341.398533	-55.768726	30	0	0
96	170.856678	-321.398533	-21.12771	30	0	0
97	170.856678	-234.578533	129.248941	10	0	0.00E+00
98	170.856678	-234.578533	129.248941	10	0	-6.22
99	170.856678	-234.578533	129.248941	10	0	0
100	170.856678	-234.578533	129.248941	-10	0	0
101	170.856678	-224.680587	73.1149	-10	0	0
102	170.856678	-219.396473	43.1472	-10	0	0
103	170.856678	-224.680587	73.1149	-10	0	0
104	170.856678	-234.578533	129.248941	1.00E+01	0	0.00E+00
105	170.856678	-234.578533	129.248941	1.00E+01	0	-6.22E+00
106	170.856678	-234.578533	129.248941	10	0	0
107	170.856678	-234.578533	129.248941	30	0	0
108	170.856678	-321.398533	-21.12771	1.35E-06	0	1.35E-06
109	170.856678	-321.398533	-21.12771	-3.00E+01	0	0.00E+00
110	170.856678	-341.398533	13.513306	-3.00E+01	0	0.00E+00
111	170.856678	-407.998533	128.86789	-15	0	00:00:00
112	170.856678	-407.998533	128.86789	1.35E-06	0	1.35E-06
113	170.856678	-407.998533	-21.13211	1.35E-06	0	1.35E-06
114	170.856678	-407.998533	3.86789	-45	0	0
115	170.856678	-407.998533	3.86789	-90	0	0
116	170.856678	-432.998533	3.86789	-90	0	0
117	170.856678	-432.998533	3.86789	-90	0	0
118	170.856678	-457.998533	3.86789	-90	0	0.00E+00
119	170.856678	-457.998533	3.86789	-135	0	0.00E+00
120	170.856678	-457.998533	3.86789	-135	0	0.00E+00
121	170.856678	-457.998533	3.86789	-135	0	0
122	170.856678	-457.998533	3.86789	180	0	1.35E-06
123	170.856678	-457.998533	-21.13211	180	0	1.35E-06
124	170.856678	-457.998533	128.86789	-165	0	0.00E+00
125	170.856678	-457.998533	128.86789	-150	0	0.00E+00
126	170.856678	-524.598533	13.513306	-150	0	0
127	170.856678	-524.598533	13.513306	-150	0	0
128	170.856678	-544.598533	-21.12771	180	0	1.35E-06
129	170.856678	-544.598533	-21.12771	150	0	0
130	170.856678	-620.588533	110.490831	170	0	0
131	170.856678	-620.588533	110.490831	170	0	0
132	170.856678	-620.588533	110.490831	170	0	0
133	170.856678	-620.588533	110.490831	150	0	0
134	170.856678	-620.588533	110.490831	-170	0	0
135	170.856678	-631.007424	51.402366	-170	0	0
136	170.856678	-636.663145	19.327177	-170	45	0
137	170.856678	-636.663145	19.327177	-170	90	0
138	246.956678	-636.663145	19.327177	-170	90	0
139	247.956678	-636.663145	19.327177	-170	90	0
140	250.856678	-636.663145	19.327177	180	90	00:00:00

Unless noted, Euler angles are taken in the order alpha, beta, gamma
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CAP
ID SPIRE SPECTRO (BOLSP508) 288 04-janv-02 16:20:42

CLEAR APERTURE DATA
(Y-coordinate only)

SURF	X	OR	R-APER.	Y-APER.	REMARK	X-OFFSET	Y-OFFSET
1	1650.701 Soft	CAO					
2	1643.8819 Soft	CAO					
3	1643.8819 Soft	CAO					
4	1703.9915 Soft	CAO					
5	1711.2952 Soft	CAO					
6	1750 User	CAO					
7	154.9517 Soft	CAO					
8	127.5675 Soft	CAO					
9	124 User	CAO					
10	63.1364 Soft	CAO					
11	139	62 User	RAO		-19.5	145	
12	68.1247 Soft	CAO					
13	13.0587 Soft	CAO					
14	15	16 User	EAO				
15	13.0587 Soft	CAO					
16	12.5104 Soft	CAO					
17	161	85 User	RAO		19.5	-1.5	
18	66.4563 Soft	CAO					
19	37.0709 Soft	CAO					
20	8.9196 Soft	CAO					
21	8.3652 Soft	CAO					
22	12	9 User	EAO		1	0	
23	10.5503 Soft	CAO					
24	8.4236 Soft	CAO					
25	11.4267 Soft	CAO					
26	11.95	12.57 User	EAO		0.4	-0.82	
27	11.4267 Soft	CAO					
28	21.2242 Soft	CAO					
29	21.2242 Soft	CAO					
30	57	40 User	RAO		4	0	
31	18.3802 Soft	CAO					
32	16.0385 Soft	CAO					
33	16.0385 Soft	CAO					
34	16.0337 Soft	CAO					
35	26.7898 Soft	CAO					
36	30 User	CAO					
37	25.9942 Soft	CAO					
38	24.7971 Soft	CAO					
39	15 User	CAO		0	1.5		
40	12.183 Soft	CAO					
41	9.4815 Soft	CAO					
42	9.4815 Soft	CAO					
43	25 User	CAO					
44	21.448 Soft	CAO					
45	11.5256 Soft	CAO					
46	18.404 Soft	CAO					
47	12.5414 Soft	CAO					
48	16 User	CAO					
49	11.5256 Soft	CAO					
50	12.9205 Soft	CAO					
51	19.1308 Soft	CAO					
52	19.1308 Soft	CAO					
53	19.1308 Soft	CAO					
54	12.9205 Soft	CAO					
55	11.5256 Soft	CAO					
56	30 User	CAO					
57	20.5581 Soft	CAO					
58	10 User	CAO					
59	9.8696 Soft	CAO					
60	18 User	CAO		0	2		
61	12.5446 Soft	CAO					
62	24.6786 Soft	CAO					
63	37 User	CAO		0	1		
64	24.2228 Soft	CAO					
65	23.8682 Soft	CAO					
66	18.5 User	CAO		0	2		
67	12.4	9 User	EAO		-0.63	-0.5	
68	9.5011 Soft	CAO					
69	7.5102 Soft	CAO					
70	7.4831 Soft	CAO					
71	10 User	CAO					
72	7.4831 Soft	CAO					
73	7.5102 Soft	CAO					
74	9.7109 Soft	CAO					
75	9.5011 Soft	CAO					
76	13.0142 Soft	CAO					
77	24.2228 Soft	CAO					
78	24.0367 Soft	CAO					
79	24.6786 Soft	CAO					
80	22.7083 Soft	CAO					
81	14.9571 Soft	CAO					

82	12.5446	Soft	CAO			
83	9.8696	Soft	CAO			
84	21.4591	Soft	CAO			
85	20.9882	Soft	CAO			
86	11.5256	Soft	CAO			
87	19.1308	Soft	CAO			
88	12.9205	Soft	CAO			
89	11.5256	Soft	CAO			
90	18.404	Soft	CAO			
91	12.5414	Soft	CAO			
92	11.5256	Soft	CAO			
93	21.9133	Soft	CAO			
94	20.9961	Soft	CAO			
95	9.4815	Soft	CAO			
96	12.183	Soft	CAO			
97	25.9942	Soft	CAO			
98	30	User	CAO			
99	26.7898	Soft	CAO			
100	24.9955	Soft	CAO			
101	16.0337	Soft	CAO			
102	12.5	User	CAO			
103	16.0337	Soft	CAO			
104	26.7898	Soft	CAO			
105	25.9924	Soft	CAO			
106	25.9942	Soft	CAO			
107	24.7971	Soft	CAO			
108	14.5408	Soft	CAO			
109	12.183	Soft	CAO			
110	9.4815	Soft	CAO			
111	25	User	CAO			
112	21.448	Soft	CAO			
113	11.5256	Soft	CAO			
114	18.404	Soft	CAO			
115	12.5414	Soft	CAO			
116	16	User	CAO			
117	11.5256	Soft	CAO			
118	12.9205	Soft	CAO			
119	19.1308	Soft	CAO			
120	19.1308	Soft	CAO			
121	19.1308	Soft	CAO			
122	12.9205	Soft	CAO			
123	11.5256	Soft	CAO			
124	30	User	CAO			
125	20.5581	Soft	CAO			
126	10	User	CAO			
127	9.8696	Soft	CAO			
128	18	User	CAO	0	2	
129	12.5446	Soft	CAO			
130	24.6786	Soft	CAO			
131	37	User	CAO	0	1	
132	24.2228	Soft	CAO			
133	32.0159	Soft	CAO			
134	23.8682	Soft	CAO			
135	18.5	User	CAO	0	2	
136	12.4	9 User	EAO		-0.63	-0.5
137	9.5011	Soft	CAO			
138	7.3434	Soft	CAO			
139	7.3138	Soft	CAO			
140	10	User	CAO			

NOTE: CAO, CAI, EAO, and EAI input is semi-aperture.
RAO and RAI input is full aperture.

UNUSUAL APERTURE DATA

SURF APERTURE SPECIFICATIONS

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43 POLYGON APERTURE WITH 4 VERTICES (OUTSIDE)

X	Y
-30	30
30	30
30	-22.5
-30	-22.5

46 POLYGON APERTURE WITH 7 VERTICES (OUTSIDE)

X	Y
-20	15
-10	25
10	25
20	15
20	-15
0	-35
-20	-15

51 POLYGON APERTURE WITH 7 VERTICES (OUTSIDE)

X	Y
-20	15
-10	25
10	25
20	15
20	-15
0	-35
-20	-15

56 POLYGON APERTURE WITH 4 VERTICES (OUTSIDE)

X	Y
-40	40
40	40
40	-28
-40	-28

111 POLYGON APERTURE WITH 4 VERTICES (OUTSIDE)

X	Y
-30	30
30	30
30	-22.5
-30	-22.5

114 POLYGON APERTURE WITH 7 VERTICES (OUTSIDE)

X	Y
-20	15
-10	25
10	25
20	15
20	-15
0	-35
-20	-15

119 POLYGON APERTURE WITH 7 VERTICES (OUTSIDE)

X	Y
-20	15
-10	25
10	25
20	15
20	-15
0	-35
-20	-15

124 POLYGON APERTURE WITH 4 VERTICES (OUTSIDE)

X	Y
-40	40
40	40
40	-28
-40	-28

```
---          PMA          BOLSPECGLOB03
************MACRO         LIST          *************************
BOLSPECGLOB03
!bolgutglob01     210700 Glob      coords    of     gut       ray       impacts
!            to           import    into      XL
!bolspecglob0      10900 Clob      coords    of     surface   summits
!                     2     270901 Include   CAP    listing
!                     3     121101 Switch      74 ON,    list      macro     at     the     end

on                   74
fnm:         specglob.txt

!Origin      surf         num
z1           =                        9

pon          fnm

id?
time

!gray                 2         0         0         0 surf               0 z1
spec         glob         z1
cap
pma          bolspecglob03

pof          c

off                  74
**************************************************************
---
---          POF          C
```

--- ID?

The current lens ID is: ID SPIRE PHOT (BOLPHT155)

--- TIME
11-MAY-01 14:56:38

--- GRAY 2 0 0 0 SURF 0 Z1
ID SPIRE PHOT (BOLPHT155) 247 11-MAY-01 14:56:38

GLOBAL RAYTRACE ANALYSIS

RAY DATA IN COORDINAT SYSTEM OF SURFACE NO. 9

FRACT. OBJECT HEIGHT HBAR 0 GBAR 0
FRACT. ENTRANCE PUPIL COORD. YEN 0 XEN 0
COLOR NUMBER 2

RAY VECTORS (X DIR TAN) (Y DIR TAN)
SURF X Y Z ZZ HH

1	0	54.791802	-1049.91564	0	-0.003192
2	0	-1.940157	16721.1	0	-0.003192
3	0	-1.940157	16721.1	0	-0.003192
4	0	54.792071	-1050	0	-0.003192
5	0	61.176845	-3050	0	-0.003192
6	0	54.793441	-1050.4289	0	0.034514
7	0	7.11E-15	-2637.998	0	-0.034514
8	0	-54.808244	-1050	0	-0.034514
9	0	-90.137429	-26.382552	0	-0.034514
10	0	-91.047997	8.98E-08	0	-0.034514
11	0	-93.493606	70.85834	0	0.576269
12	0	-93.493791	70.858019	0	0.576269
13	0	-200.09386	-114.125099	0	0.576269
14	0	-200.09386	-114.125099	0	0.103927
15	0	-200.09386	-114.125099	0	0.103927
16	0	-200.093879	-114.125281	0	0.103927
17	0	-179.688568	82.217443	0	0.452716
18	0	-179.688483	82.217633	0	0.452716
19	0	-259.533206	-94.150666	0	0.452716
20	0	-259.533208	-94.15067	0	-0.098795
21	0	-259.533209	-94.150667	0	-0.098795
22	0	-279.481485	107.765764	0	0.80798
23	0	-279.481843	107.76532	0	0.80798
24	0	-397.634151	-38.46633	0	-1.078323
25	0	-397.634808	-38.465722	0	-1.078323
26	0	-448.961193	9.13262	0	-1.078323
27	0	-544.281002	97.528965	0	-0.125588
28	0	-544.280897	97.528125	0	-0.125588
29	0	-504.405979	-219.977766	0	-0.125588
30	0	-504.405979	-219.977766	0	-0.125588
31	0	-527.45872	-36.419239	0	-0.937717
32	0	-523.862577	-40.254237	0	-0.937717
33	0	-531.054864	-32.584242	0	-0.937717
34	0	-527.45872	-36.419239	0	-0.937717
35	0	-527.459019	-36.418921	0	-0.937717
36	1.82E-14	-619.802462	62.057922	2.01E+05	1.06654
37	-3.85E-15	-619.802462	62.057922	2.01E+05	1.06654
38	-50	-619.802728	62.057673	2.01E+05	1.06654
39	-34.14	-619.802643	62.057752	2.01E+05	1.06654
40	-29.14	-619.802617	62.057777	2.01E+05	1.06654
41	-34.14	-619.802643	62.057752	2.01E+05	1.06654
42	1.82E-14	-619.802462	62.057922	3.23E-16	-0.937717
43	-3.44E-15	-619.802462	62.057922	2.42E-16	-0.937717
44	-2.72E-14	-527.45872	-36.419239	-2.74E-16	-0.125588
45	-2.72E-14	-527.458666	-36.419673	-2.74E-16	-0.125588
46	-4.41E-16	-514.997754	-135.640264	-1.201118	-0.125607
47	4.226183	-514.555801	-139.158805	-1.201118	-0.125607
48	-4.226183	-515.439707	-132.121723	-1.201118	-0.125607
49	-5.00E-16	-514.997754	-135.640264	-1.201118	-0.125607
50	-4.92E-15	-514.997754	-135.640264	-1.201118	-0.125607
51	-65.113778	-521.807023	-81.429289	-1.201118	-0.125607
52	-58.6024	-521.126096	-86.850387	-1.201118	-0.125607
53	-54.772178	-520.725551	-90.039268	-1.201118	-0.125607
54	-58.6024	-521.126096	-86.850387	-1.201118	-0.125607
55	-1.48E-14	-514.997754	-135.640264	-3.55E-16	-0.125588
56	-1.56E-14	-514.997754	-135.640264	-2.47E-16	-0.125588
57	-4.78E-15	-509.514911	-179.297659	-2.00E-11	-5.83E+04
58	-4.78E-15	-509.515249	-179.297659	-2.00E-11	-5.83E+04
59	9.28E-15	-468.515249	-179.298363	-2.00E-11	-5.83E+04
60	6.20E-15	-477.505249	-179.298209	-2.00E-11	-5.83E+04
61	4.48E-15	-482.505249	-179.298123	-2.00E-11	-5.83E+04
62	6.20E-15	-477.505249	-179.298209	-2.00E-11	-5.83E+04
63	9.28E-15	-468.515249	-179.298363		

--- POF C

```
---
---             ID?

The             current         lens            ID              is:             ID              SPIRE           SPECTRO         (BOLSP508)

---             TIME
    04-janv-02      15:03:08
---
---             GRAY                    2 Z2                    0               0 SURF          Z3              Z1
ID              SPIRE           SPECTRO         (BOLSP508)              288     04-janv-02          15:03:08

GLOBAL          RAYTRACE        ANALYSIS

RAY             DATA            IN              COORDINATSYSTEM         OF              SURFACE         NO.                     9

FRACT.          OBJECT          HEIGHT          HBAR                    0 GBAR                  0
FRACT.          ENTRANCE        PUPIL           COORD.          YEN                     0 XEN                   0
COLOR           NUMBER                  2

RAY             VECTORS         (X              DIR             TAN)            (Y              DIR             TAN)
SURF            X               Y               Z               ZZ              HH
_____________________________________________________________________________
                1       36.849291       54.805206       -1049.87744     -0.002146       -0.003192
                2       -1.295488       -1.926753       16721.09722     -0.002146       -0.003192
                3       -1.295494       -1.926762       16721.1         -0.002146       -0.003192
                4       36.849554       54.805597       -1050           -0.002146       -0.003192
                5       41.142485       61.190386       -3050           -0.002146       -0.003192
                6       36.850892       54.807586       ##########      0.023215        0.034527
                7       -2.77E-13       -1.71E-13       -2637.998       -0.023215       -0.034527
                8       -36.865358      -54.829101      -1050           -0.023215       -0.034527
                9       -60.320396      -89.713306      -39.659762      -0.023215       -0.034527
                10      -61.241069      -91.082604      -1.19E-03       -0.023215       -0.034527
                11      -62.760964      -93.343113      65.469209       -0.350911       0.59619
                12      -64.14573       -90.990424      69.415413       -0.350911       0.59619
                13      0.229982        -200.363461     -114.037794     -0.350911       0.59619
                14      0.229982        -200.363461     -114.037794     0.302599        0.088963
                15      0.229982        -200.363461     -114.037794     0.302599        0.088963
                16      0.212151        -200.368703     -114.096719     0.302599        0.088963
                17      58.001413       -183.378925     76.879467       0.133584        0.445232
                18      58.78063        -180.781822     82.712614       0.133584        0.445232
                19      35.154494       -259.526983     -94.150668      0.133584        0.445232
                20      33.818652       -263.979302     -104.150668     0.133584        0.445232
                21      33.818911       -263.97844      -104.148734     0.133584        0.445232
                22      33.819095       -263.977827     -104.147355     -12.207836      -3.500615
                23      33.817295       -263.978343     -104.147208     -12.207836      -3.500615
                24      33.820861       -263.97732      -104.1475       -12.207836      -3.500615
                25      141.69601       -233.043964     -112.98405      -12.207836      -3.500615
                26      141.695796      -233.044025     -112.984032     -12.207836      -3.500615
                27      141.69601       -233.043964     -112.98405      -12.207836      -3.500615
                28      170.859234      -224.681367     -1.15E+02       -1.22E+01       -3.500615
                29      170.859234      -224.681367     -115.372944     -12.207836      -3.500615
                30      170.85951       -224.681288     -115.372966     -1.79E-05       0.176326
                31      170.85951       -224.68134      -115.373263     -1.79E-05       0.176326
                32      170.85951       -224.680821     -115.370319     -1.79E-05       0.176326
                33      170.85951       -224.680821     -115.370319     -1.79E-05       0.176326
                34      170.85951       -224.680814     -115.370279     -1.79E-05       0.176326
                35      170.860517      -234.578711     -171.504392     -1.79E-05       0.176326
                36      1.71E+02        -234.578711     -171.504392     -2.08E-05       -0.577347
                37      1.71E+02        -234.578711     -171.504392     -2.08E-05       -0.577347
                38      170.860517      -234.57868      -171.504445     -2.08E-05       -0.577347
                39      170.857397      -321.3983       -21.12771       2.08E-05        0.577347
                40      170.857397      -321.398358     -21.127811      2.08E-05        0.577347
                41      170.856678      -341.398284     -55.76887       2.08E-05        0.577347
                42      1.71E+02        -341.398284     -55.76887       2.08E-05        0.577347
                43      1.71E+02        -407.99796      -171.123463     -1.49E-07       -2.43E-06
                44      1.71E+02        -407.99796      -171.12331      -1.49E-07       -2.43E-06
                45      1.71E+02        -4.08E+02       -21.12331       -1.49E-07       -2.43E-06
                46      1.71E+02        -407.998264     -46.123579      -0.061174       -4.11E+05
                47      170.854265      -407.998533     -4.61E+01       -0.061174       -4.11E+05
                48      170.854261      -432.998533     -46.123518      -0.061174       -4.11E+05
                49      1.71E+02        -432.998533     -46.123518      -0.061174       -4.11E+05
                50      1.71E+02        -4.58E+02       -4.61E+01       -0.061174       -4.11E+05
                51      170.854258      -457.998681     -46.123457      1.49E-07        -2.43E-06
                52      170.854258      -4.58E+02       -4.61E+01       1.49E-07        -2.43E-06
                53      170.854258      -457.998681     -46.123457      1.49E-07        -2.43E-06
                54      170.854258      -4.58E+02       -46.12331       1.49E-07        -2.43E-06
                55      1.71E+02        -4.58E+02       -21.12331       1.49E-07        -2.43E-06
                56      1.71E+02        -457.998377     -171.123268     2.08E-05        -0.577349
                57      1.71E+02        -457.998398     -171.123231     2.08E-05        -0.577349
                58      1.71E+02        -524.598261     -55.768568      2.08E-05        -0.577349
                59      1.71E+02        -524.598261     -55.768568      2.08E-05        -0.577349
                60      1.71E+02        -544.598115     -21.12771       -2.08E-05       0.577349
                61      1.71E+02        -544.59822      -21.127891      -2.08E-05       0.577349
                62      1.71E+02        -620.587965     -152.746351     -2.08E-05       0.577349
                63      1.71E+02        -620.587965     -152.74635      -2.00E-05       -0.176332
                64      170.860083      -620.587965     -152.746351     -2.00E-05       -0.176332
                65      170.860083      -620.588        -152.746156     -2.00E-05       -0.176332
                66      170.858901      -631.007166     -93.65774       -2.00E-05       -0.176332
                67      170.858259      -636.663312     -61.581021      -4.95E+04       0.058223
                68      170.856678      -636.663312     -61.581021      -4.95E+04       0.058223
                69      236.756678      -636.663389     -61.582353      -6.74E+04       -0.073478
                70      237.756678      -636.663388     -61.582368      -43320.7484     -0.073479
                71      250.856678      -636.663366     -61.582671      -43320.7484     -0.073479
                72      237.756678      -636.663388     -61.582368      -67385.9969     -0.073478
                73      236.756678      -636.663389     -61.582353      -49451.9368     0.058223
                74      170.858259      -636.663312     -61.581021      -2.00E-05       -0.176332
                75      170.858259      -636.663037     -61.582578      -2.00E-05       -0.176332
                76      170.858901      -631.007166     -93.65774       -2.00E-05       -0.176332
                77      170.860083      -620.587965     -152.746351     -2.00E-05       -0.176332
                78      170.860083      -620.587965     -152.74635      -2.08E-05       0.577349
                79      170.860083      -620.587965     -152.746351     -2.08E-05       0.577349
                80      170.860083      -620.588064     -152.746521     -2.08E-05       0.577349
                81      170.857352      -544.598115     -21.12771       2.08E-05        -0.577349
                82      170.857352      -544.59822      -21.127529      2.08E-05        -0.577349
                83      170.856633      -524.598261     -55.768568      2.08E-05        -0.577349
                84      170.854239      -457.998377     -171.123268     1.49E-07        -2.43E-06
                85      170.854239      -457.998377     -171.12331      1.49E-07        -2.43E-06
                86      170.854261      -457.998742     -21.12331       1.49E-07        -2.43E-06
                87      170.854258      -457.998681     -46.123457      -0.061174       -4.11E+05
                88      170.854258      -457.998533     -46.123457      -0.061174       -4.11E+05
                89      170.854261      -432.998533     -46.123518      -0.061174       -4.11E+05
                90      170.854265      -407.998264     -46.123579      -1.49E-07       -2.43E-06
                91      170.854265      -407.998264     -46.12331       -1.49E-07       -2.43E-06
                92      170.854261      -407.998325     -21.12331       -1.49E-07       -2.43E-06
                93      170.854284      -407.99796      -171.123463     2.08E-05        0.577347
                94      170.854284      -407.998037     -171.123596     2.08E-05        0.577347
                95      170.856678      -341.398284     -55.76887       2.08E-05        0.577347
                96      170.857397      -321.398358     -21.127811      2.08E-05        0.577347
                97      170.860517      -234.578711     129.248973      2.08E-05        0.577347
                98      170.860517      -234.578711     129.248973      1.79E-05        -0.176326
                99      170.860517      -234.578711     129.248973      1.79E-05        -0.176326
**              170.860517      -234.5787       129.248912      1.79E-05        -0.176326
**              170.859551      -224.680814     73.114859       1.79E-05        -0.176326
**              170.858972      -219.396733     43.147154       1.79E-05        -0.176326
**              170.85951       -224.680814     73.114859       1.79E-05        -0.176326
**              170.860517      -234.578711     129.248973      1.79E-05        -0.176326
**              170.860517      -234.578711     129.248973      2.08E-05        0.577347
**              170.860517      -234.578711     129.248973      2.08E-05        0.577347
**              170.860517      -234.57868      129.249026      2.08E-05        0.577347
**              170.857397      -321.3983       -21.12771       -2.08E-05       -0.577347
**              170.857397      -321.398358     -21.127608      -2.08E-05       -0.577347
**              170.856678      -341.398284     13.513451       -2.08E-05       -0.577347
**              170.854284      -407.99796      128.868044      1.49E-07        2.43E-06
**              170.854284      -407.99796      128.86789       1.49E-07        2.43E-06
**              170.854261      -407.998325     -21.13211       1.49E-07        2.43E-06
**              170.854265      -407.998264     3.868159        0.061174        4.11E+05
**              170.854265      -407.998533     3.868159        0.061174        4.11E+05
**              170.854261      -432.998533     3.868098        0.061174        4.11E+05
**              170.854261      -432.998533     3.868098        0.061174        4.11E+05
**              170.854258      -457.998533     3.868038        0.061174        4.11E+05
**              170.854258      -457.998681     3.868038        -1.49E-07       2.43E-06
**              170.854258      -457.998681     3.868038        -1.49E-07       2.43E-06
**              170.854258      -457.998681     3.868038        -1.49E-07       2.43E-06
**              170.854258      -457.998681     3.86789         -1.49E-07       2.43E-06
**              170.854261      -457.998742     -21.13211       -1.49E-07       2.43E-06
**              170.854239      -457.998377     128.867848      -2.08E-05       0.577349
**              170.854239      -457.998398     128.867812      -2.08E-05       0.577349
**              170.856633      -524.598261     13.513149       2.08E-05        0.577352
**              170.856633      -524.598261     13.513149       -2.08E-05       0.577349
**              170.857352      -544.598115     -21.12771       2.08E-05        -0.577349
**              170.857352      -544.59822      -21.127529      2.08E-05        -0.577349
**              170.860083      -620.587965     110.490931      2.08E-05        -0.577349
**              170.860083      -620.587965     110.490931      2.00E-05        0.176332
**              170.860083      -620.587965     110.490931      2.00E-05        0.176332
**              170.860083      -620.587921     110.491185      2.00E-05        0.176332
**              170.860083      -620.588        110.490737      2.00E-05        0.176332
**              170.858901      -631.007166     51.402232       2.00E-05        0.176332
**              170.858259      -636.663312     19.325602       49451.93677     -0.058223
**              170.856678      -636.663312     19.325602       49451.93677     -0.058223
**              246.956678      -636.663401     19.32714        75484.44655     0.072666
**              247.956678      -636.6634       19.327154       48526.9867      0.072667
**              250.856678      -636.663396     19.327213
---
---             PMA             BOLGUTGLOB03
**********MACRO          LIST            **************************
BOLGUTGLOB03
!bolgurglob01       210700 Glob         coords          of              gut             ray             impacts
!               to              import          into            XL
!                       2       161000 Glob         coords          for             non             gut             ray
!                       3       211201 Add          file            listing         at              the             end


fnm:            gutray.txt

!Origin         surf            num
z1              =                       9

!Ray            coordinates:    z2              is              H,              z3              is              G
!Gut            ray
z2              =                       0
z3              =                       0
!M3
!z2             =                       -0.2026
!z3             =                       -2.2892
!M5
!z2             =                       -0.1464
!z2             =                       -0.1574
!z2             =                       0.1572
!z3             =                       -2.4815
!z3             =                       -2.4791

pon             fnm

id?
time

gray                    2 z2                    0               0 surf          z3              z1

pma             bolgurglob03

pof             c
**********
---
---             POF             C
```

--- ID?

The current lens ID is: ID SPIRE PHOT (BOLPHT154C)

--- TIME
16-janv-01 18:16:55

--- GRAY 2 Z2 0 0 SURF Z3 Z1
ID SPIRE PHOT (BOLPHT154C 238 16-janv-01 18:16:55

GLOBAL RAYTRACE ANALYSIS

RAY DATA IN COORDINAT SYSTEM OF SURFACE NO. 9

FRACT. OBJECT HEIGHT HBAR -0.2026 GBAR -2.2892
FRACT. ENTRANCE PUPIL COORD. YEN 0 XEN 0
COLOR NUMBER 2

RAY SURF	VECTORS X	(X Y	DIR Z	TAN) ZZ	(Y HH	DIR	TAN)
1	11.427556	55.801639	-1050.07442	-0.000666	-0.003252		
2	-0.406484	-1.984891	16720.938	-0.000666	-0.003252		
3	-0.406484	-1.984891	16720.938	-0.000666	-0.003252		
4	11.427614	55.801923	-1050.162	-0.000666	-0.003252		
5	12.75945	62.305383	-3050.162	-0.000666	-0.003252		
6	11.427923	55.803431	-1050.62552	0.007199	0.035152		
7	3.55E-15	1.42E-14	-2638.131	-0.007199	-0.035152		
8	-11.431259	-55.819724	-1050.162	-0.007199	-0.035152		
9	-18.784562	-91.72647	-28.68079	-0.007199	-0.035152		
10	-18.990607	-92.732603	-0.058139	-0.007199	-0.035152		
11	-19.500476	-95.222336	70.770194	-0.105458	0.56735		
12	-19.586621	-94.75889	71.587053	-0.105458	0.56735		
13	-0.002619	-200.11827	-114.117194	-0.105458	0.56735		
14	-0.002619	-200.11827	-114.117194	0.092284	0.110726		
15	-0.002619	-200.11827	-114.117194	0.092284	0.110726		
16	-0.003126	-200.118878	-114.122683	0.092284	0.110726		
17	18.0297	-178.482563	81.282101	0.040144	0.455486		
18	18.042666	-178.335449	81.605082	0.040144	0.455486		
19	10.994499	-258.30578	-93.966358	0.040144	0.455486		
20	10.973657	-258.542261	-94.485541	0.022597	-0.094222		
21	10.983347	-258.582662	-94.056751	0.022597	-0.094222		
22	15.521875	-277.506548	106.787347	0.08344	0.82359		
23	15.490912	-277.812169	106.416262	0.08344	0.82359		
24	3.403216	-397.122812	-38.450296	-0.069661	-1.088966		
25	3.386021	-397.391603	-38.203465	-0.069661	-1.088966		
26	0.087781	-448.950976	9.143638	-0.069661	-1.088966		
27	-6.04551	-544.828974	97.188646	0.014846	-0.124712		
28	-6.041554	-544.862206	97.455115	0.014846	-0.124712		
29	-10.755735	-505.261042	-220.085158	0.014846	-0.124712		
30	-10.755735	-505.261042	-220.085158	0.014846	-0.124712		
31	-8.033705	-528.127272	-36.733246	-0.020212	-0.939339		
32	-7.956233	-524.526814	-40.566217	-0.020212	-0.939339		
33	-8.111177	-531.727731	-32.900276	-0.020212	-0.939339		
34	-8.033705	-528.127272	-36.733246	-0.020212	-0.939339		
35	-8.030349	-527.971302	-36.89929	-0.020212	-0.939339		
36	-10.168951	-627.36187	68.909762	-98.506828	-1.055117		
37	3.59E-09	-627.252949	68.806531	-98.506828	-1.055117		
38	-50	-627.788504	69.31411	-98.506828	-1.055117		
39	-34.14	-627.618626	69.153106	-98.506828	-1.055117		
40	-29.14	-627.565071	69.102348	-98.506828	-1.055117		
41	-34.14	-627.618626	69.153106	-98.506828	-1.055117		
42	-10.168951	-627.36187	68.909762	-0.020212	-0.939339		
43	-10.019144	-620.399652	61.497935	-0.020212	-0.939339		
44	-8.033705	-528.127272	-36.733246	0.014846	-0.124712		
45	-8.030349	-528.155465	-36.507188	0.014846	-0.124712		
46	-9.569267	-515.227885	-140.166446	-1.237908	-0.126994		
47	-5.261249	-514.785935	-143.646527	-1.237908	-0.126994		
48	-13.877286	-515.669835	-136.686366	-1.237908	-0.126994		
49	-9.569267	-515.227885	-140.166446	-1.237908	-0.126994		
50	-6.108752	-514.872878	-142.961902	-1.237908	-0.126994		
51	-72.027431	-521.635326	-89.711826	-1.237908	-0.126994		
52	-65.435563	-520.959081	-95.036834	-1.237908	-0.126994		
53	-61.557994	-520.56129	-98.169191	-1.237908	-0.126994		
54	-65.435563	-520.959081	-95.036834	-1.237908	-0.126994		
55	-9.569267	-515.227885	-140.166446	0.014846	-0.124712		
56	-9.503531	-515.780101	-135.738523	0.014846	-0.124712		
57	-10.137949	-510.45071	-178.47202	-17.433341	1183.380263		
58	-10.151731	-509.515229	-178.471229	-17.433341	1183.380263		
59	-10.755735	-468.515228	-178.436583	-17.433341	1183.380263		
60	-10.623296	-477.505228	-178.44418	-17.433341	1183.380263		
61	-10.549637	-482.505228	-178.448405	-17.433341	1183.380263		
62	-10.623296	-477.505228	-178.44418	-17.433341	1183.380263		
63	-10.755735	-468.515228	-178.436583				

--- POF C

--- ID?

The current lens ID is: ID SPIRE PHOT (BOLPHT154C)

--- TIME
16-janv-01 18:41:53

--- GRAY 2 Z2 0 0 SURF Z3 Z1
ID SPIRE PHOT (BOLPHT154C 238 16-janv-01 18:41:53

GLOBAL RAYTRACE ANALYSIS

RAY DATA IN COORDINAT SYSTEM OF SURFACE NO. 9

FRACT. OBJECT HEIGHT HBAR 0.1572 GBAR -2.4791
FRACT. ENTRANCE PUPIL COORD. YEN 0 XEN 0
COLOR NUMBER 2

RAY SURF	VECTORS X	(X Y	DIR Z	TAN) ZZ	(Y HH	DIR	TAN)
1	12.375137	54.003853	-1050.08016	-0.000721	-0.003147		
2	-0.440591	-1.922697	16720.938	-0.000721	-0.003147		
3	-0.440591	-1.922697	16720.938	-0.000721	-0.003147		
4	12.375196	54.00411	-1050.162	-0.000721	-0.003147		
5	13.817514	60.298241	-3050.162	-0.000721	-0.003147		
6	12.375513	54.005491	-1050.60054	0.007795	0.034019		
7	1.78E-15	-7.11E-15	-2638.131	-0.007795	-0.034019		
8	-12.378931	-54.020409	-1050.162	-0.007795	-0.034019		
9	-20.354767	-88.826152	-27.022003	-0.007795	-0.034019		
10	-20.565766	-89.746929	0.044902	-0.007795	-0.034019		
11	-21.110403	-92.123671	69.910954	-0.114752	0.586866		
12	-21.12391	-92.054594	70.028658	-0.114752	0.586866		
13	0.00704	-200.122747	-114.115744	-0.114752	0.586866		
14	0.00704	-200.122747	-114.115744	0.099422	0.095929		
15	0.00704	-200.122747	-114.115744	0.099422	0.095929		
16	0.006397	-200.123368	-114.122216	0.099422	0.095929		
17	19.499867	-181.314796	81.945342	0.043529	0.449163		
18	19.53635	-180.938338	82.783472	0.043529	0.449163		
19	11.828507	-260.474142	-94.291954	0.043529	0.449163		
20	11.832463	-260.433321	-94.20107	0.024055	-0.101461		
21	11.831546	-260.42945	-94.239217	0.024055	-0.101461		
22	16.690589	-280.923961	107.75419	0.089229	0.800018		
23	16.754343	-280.352359	108.468676	0.089229	0.800018		
24	3.639387	-397.939241	-38.511584	-0.074667	-1.070286		
25	3.649176	-397.79892	-38.64269	-0.074667	-1.070286		
26	0.080828	-448.947719	9.14715	-0.074667	-1.070286		
27	-6.533386	-543.756057	97.729392	0.016031	-0.126573		
28	-6.535522	-543.739193	97.59616	0.016031	-0.126573		
29	-11.624777	-503.556441	-219.871068	0.016031	-0.126573		
30	-11.624777	-503.556441	-219.871068	0.016031	-0.126573		
31	-8.679048	-526.814757	-36.116781	-0.021783	-0.935897		
32	-8.595462	-523.223463	-39.954056	-0.021783	-0.935897		
33	-8.762634	-530.40605	-32.279506	-0.021783	-0.935897		
34	-8.679048	-526.814757	-36.116781	-0.021783	-0.935897		
35	-8.682551	-526.965284	-35.955943	-0.021783	-0.935897		
36	-11.004597	-626.732892	70.64512	-81.56915	-0.830102		
37	3.88E-09	-626.620901	70.510209	-81.56915	-0.830102		
38	-50	-627.129735	71.123186	-81.56915	-0.830102		
39	-34.14	-626.968333	70.928749	-81.56915	-0.830102		
40	-29.14	-626.917449	70.867452	-81.56915	-0.830102		
41	-34.14	-626.968333	70.928749	-81.56915	-0.830102		
42	-11.004597	-626.732892	70.64512	-0.021783	-0.935897		
43	-10.829581	-619.213249	62.610429	-0.021783	-0.935897		
44	-8.679048	-526.814757	-36.116781	0.016031	-0.126573		
45	-8.682551	-526.787095	-36.335327	0.016031	-0.126573		
46	-10.349698	-513.62396	-140.331781	-1.240422	-0.124046		
47	-6.03512	-513.192491	-143.810095	-1.240422	-0.124046		
48	-14.664277	-514.05543	-136.853467	-1.240422	-0.124046		
49	-10.349698	-513.62396	-140.331781	-1.240422	-0.124046		
50	-6.603321	-513.249312	-143.352024	-1.240422	-0.124046		
51	-72.58604	-519.847765	-90.158272	-1.240422	-0.124046		
52	-65.987769	-519.18792	-95.477647	-1.240422	-0.124046		
53	-62.106432	-518.799775	-98.606691	-1.240422	-0.124046		
54	-65.987769	-519.18792	-95.477647	-1.240422	-0.124046		
55	-10.349698	-513.62396	-140.331781	0.016031	-0.126573		
56	-10.272944	-514.229985	-135.543836	0.016031	-0.126573		
57	-10.987456	-508.588478	-180.115035	16.118236	-1013.47537		
58	-10.972716	-509.515269	-180.114121	16.118236	-1013.47537		
59	-11.624777	-468.51527	-180.154575	16.118236	-1013.47537		
60	-11.481801	-477.50527	-180.145705	16.118236	-1013.47537		
61	-11.402281	-482.505269	-180.140771	16.118236	-1013.47537		
62	-11.481801	-477.50527	-180.145705	16.118236	-1013.47537		
63	-11.624777	-468.51527	-180.154575				

--- POF C