

FIRAS Explanatory Supplement Appendix G

Concatenated Primary and Extension Headers for FIRAS FITS Format Files

This Appendix contains concatenated primary and extension headers for the following FIRAS FITS format files:

- Coadded Calibration Interferograms
- Coadded Sky Interferograms
- Calibrated Calibration Spectra
- Calibrated Sky Spectra
- Differential Calibration Spectra
- Differential Sky Spectra
- Destriped Sky Spectra
- Coadd-Based Zodiacal Light Model
- Pixel-Based Zodiacal Light Model
- DIRBE Gradient Kernel
- Physical Stripes
- Orthogonal Stripes
- C Vector
- A Vector
- Covariance Matrix
- Chi-Squared
- Calibration Model Solution
- Calibration Errors
- Combined Calibration Errors
- Model Selection Errors
- Low Frequency Line Profiles
- High Frequency Line Profiles
- Low Frequency Line Map
- High Frequency Line Map
- Dust Spectrum Map
- CMBR Temperature Map

While the number of channels and scan modes varies for each dataset, the header for only one channel and scan mode in each dataset is included in this Appendix.

Coadded Calibration Interferograms

SIMPLE = T / specifies FITS standard file
BITPIX = 32 / if rasterized array follows, data 32-bit int
NAXIS = 0 / no rasterized arrays follow
EXTEND = T / Table extensions may follow
ORIGIN = 'CDAC' / Cosmology Data Analysis Center
TELESCOP= 'COBE' / COsmic Background Explorer satellite
INSTRUME= 'FIRAS' / COBE instrument [DIRBE, DMR, FIRAS]
OBJECT = 'ALL-SKY' / part of sky given [ALL-SKY, GAL-SLICE]
PRODUCT = 'CAL-IFG' / Coadded calibration interferograms
EQUINOX = 2000.0 / equinox of coords in following tables

COMMENT
REFERENC= 'For additional information, please refer to the'
REFERENC= 'COBE Far Infrared Absolute Spectrophotometer (FIRAS)'
REFERENC= 'Explanatory Supplement, ed. J.C. Mather et al,'
REFERENC= 'COBE Ref. Pub. No. 97-C (Greenbelt, MD: NASA/GSFC),'
REFERENC= 'available in electronic form from the NSSDC.'
COMMENT
COMMENT COBE specific keywords
DATE-BEG= '24/11/89' / date of initial data represented (dd/mm/yy)
DATE-END= '21/09/90' / date of final data represented (dd/mm/yy)
PIXRESOL= 6 / Quad tree pixel resolution [6, 9]
COMMENT
COMMENT FIRAS specific keywords
CHANSCAN= 'LLSS' / Channel and mirror transport mechanism scan
COMMENT / mode identifier. The first two characters
COMMENT / indicate the channel, the first being the
COMMENT / instrument side: right (R) or left (L); and
COMMENT / the second being the frequency: high (H) or
COMMENT / low (L). The third and fourth characters
COMMENT / indicate the scan mode, the third being the
COMMENT / scan length: short (S) or long (L); and the
COMMENT / fourth being the scan speed: slow (S) or
COMMENT / fast (F). In addition, the scan mode may
COMMENT / take the following values for low frequency
COMMENT / data only (channel = RL or LL):
COMMENT / FS: decimated SF data;
COMMENT / FL: truncated LF data.
MODLLABL= 'PASS4' / FIRAS calibration model solution label
MISS_SEG= 'ENTIRE_MISSION' / FIRAS segment of mission represented
NU_ZERO = 68.020812 / Optical frequency of initial variance
COMMENT / point in GHz
DELTA_NU= 13.604162 / Optical frequency interval between variance
COMMENT / points in GHz
NUM_FREQ= 43 / Number of frequency points in variance
COMMENT / with good data
PEAK_POS= 360 / Interferogram peak position
FFT_LENGTH= 640 / Length of Fast Fourier Transform used
END
COMMENT
TIMVERSN= 'OGIP/93-003' / OGIP memo number where the convention
COMMENT / is described
COMMENT The times reported in this file are atomic seconds elapsed
COMMENT since 00:00:00 UTC, 1 January 1981. Time information is
COMMENT recorded in a manner consistent with the convention specified
COMMENT in OGIP/93-003 with the understanding that time is counted
COMMENT in atomic seconds and the origin of time (MJDREF) is quoted
COMMENT in ephemeris MJD.
TIMESYS = '1981.00' / time system (same as IRAS)
MJDREFI = 44605 / Integer portion of ephemeris MJD
COMMENT / corresponding to 0h UTC 1 Jan 1981
MJDREFF = 0.00059240741 / Fractional portion of ephemeris MJD
COMMENT / corresponding to 0h UTC 1 Jan 1981
TIMEUNIT= 's' / unit for TSTART, TSTOP, TIMEZERO = seconds
TSTART = 280713605.000 / observation start time in TIMESYS system

TSTOP = 306806405.990 / observation stop time in TIMESYS system
COMMENT
COMMENT
COMMENT FIRAS Coadded Interferogram
COMMENT Project Dataset Record Structure
COMMENT
COMMENT
COMMENT Instrument Attitude Information
COMMENT
COMMENT FIRAS pixel number (resolution 6)
TFORM1='1J'
TTYPER1='PIXEL' / entire fieldname = PIXEL
OFFSET1=0
TUNIT1=' '
COMMENT Galactic longitude, in deg (0 -> 360)
TFORM2='1E'
TTYPER2='GAL_LON' / entire fieldname = GAL_LON
OFFSET2=4
TUNIT2='deg'
COMMENT Galactic latitude, in deg (-90 -> +90)
TFORM3='1E'
TTYPER3='GAL_LAT' / entire fieldname = GAL_LAT
OFFSET3=8
TUNIT3='deg'
COMMENT Ecliptic longitude, epoch 2000.0, in deg (0 -> 360)
TFORM4='1E'
TTYPER4='ECL_LON' / entire fieldname = ECL_LON
OFFSET4=12
TUNIT4='deg'
COMMENT Ecliptic latitude, epoch 2000.0, in deg (-90 -> +90)
TFORM5='1E'
TTYPER5='ECL_LAT' / entire fieldname = ECL_LAT
OFFSET5=16
TUNIT5='deg'
COMMENT Right ascension, in deg (0 -> 360)
TFORM6='1E'
TTYPER6='RA' / entire fieldname = RA
OFFSET6=20
TUNIT6='deg'
COMMENT Declination, in deg (-90 -> +90)
TFORM7='1E'
TTYPER7='DEC' / entire fieldname = DEC
OFFSET7=24
TUNIT7='deg'
COMMENT
COMMENT Coadded Interferogram and Variances
COMMENT
COMMENT Coadded interferogram, in counts
TFORM8='512E'
TDIM8='(512)'
TTYPER8='COADDED_' / entire fieldname = COADDED_IFG
OFFSET8=28
TUNIT8=' '
COMMENT Variance of real part of coadd spectrum, in (MJy/sr)^2

TFORM9='210E'
 TDIM9='(210)'
 TTYPE9='REAL_VAR' / entire fieldname = REAL_VARIANCE
 OFFSET9=2076
 TUNIT9='(MJy/sr)^2'
 COMMENT Variance of imaginary part of coadd spectrum, in (MJy/sr)^2
 TFORM10='210E'
 TDIM10='(210)'
 TTYPE10='IMAG_VAR' / entire fieldname = IMAG_VARIANCE
 OFFSET10=2916
 TUNIT10='(MJy/sr)^2'
 COMMENT Covariance between real and imaginary
 COMMENT parts of coadd spectrum, in (MJy/sr)^2
 TFORM11='210E'
 TDIM11='(210)'
 TTYPE11='REAL_IMA' / entire fieldname = REAL_IMAG_VARIANCE
 OFFSET11=3756
 TUNIT11='(MJy/sr)^2'
 COMMENT
 COMMENT Number and Times of IFGs
 COMMENT
 COMMENT Number of IFGs in coadd
 TFORM12='1J'
 TTYPE12='NUM_IFGS' / entire fieldname = NUM_IFGS
 OFFSET12=4596
 TUNIT12=' '
 COMMENT Glitch rate for coadded IFG, in glitches/s
 TFORM13='1E'
 TTYPE13='GLITCH_R' / entire fieldname = GLITCH_RATE
 OFFSET13=4600
 TUNIT13='gl/s '
 COMMENT Glitch rate weighted number of IFGs in coadd
 TFORM14='1E'
 TTYPE14='ADJ_NUM_' / entire fieldname = ADJ_NUM_IFGS
 OFFSET14=4604
 TUNIT14=' '
 COMMENT Average data collection time in seconds since
 COMMENT 00:00.00 UTC, 1 January 1981
 TFORM15='1D'
 TTYPE15='TIME' / entire fieldname = TIME
 OFFSET15=4608
 TUNIT15='s'
 COMMENT Observation times of IFGs in the coadd;
 COMMENT in hundredths of days since ejection of the
 COMMENT FIRAS aperture cover at
 COMMENT 11:18.00 UTC, 21 November 1989
 TFORM16='100J'
 TDIM16='(100)'
 TTYPE16='IFG_TIME' / entire fieldname = IFG_TIMES
 OFFSET16=4616
 TUNIT16='d*100'
 COMMENT Flag indicating orphan IFGs, which occur
 COMMENT when a coadd is composed of only 1 or
 COMMENT 2 IFGs. In all other cases, the coadd

COMMENT is composed of three or more IFGs;
 COMMENT applicable only to sky data.
 COMMENT Flag = 1 indicates 1 or 2 IFGs in the coadd;
 COMMENT flag = 0 indicates 3 or more IFGs in the coadd.
 TFORM17='1B'
 TTYPE17='ORPHANS' / entire fieldname = ORPHANS
 OFFSET17=5016
 TUNIT17=' '
 COMMENT
 COMMENT Template Information
 COMMENT
 COMMENT Number of templates subtracted from coadded IFG
 TFORM18='1J'
 TTYPE18='NUM_TEMP' / entire fieldname = NUM_TEMPLATES
 OFFSET18=5017
 TUNIT18=' '
 COMMENT Number of IFGs used in forming the templates
 TFORM19='1J'
 TTYPE19='TPL_NUM_' / entire fieldname = TPL_NUM_IFGS
 OFFSET19=5021
 TUNIT19=' '
 COMMENT Flag indicating use of IFGs from neighboring
 COMMENT pixels in template formation (suitable
 COMMENT IFGs from 8 neighboring pixels);
 COMMENT applicable only to sky data.
 COMMENT Flag = 1 indicates neighbor IFGs were used;
 COMMENT flag = 0 indicates neighbor IFGs were not used.
 TFORM20='1B'
 TTYPE20='NEIGHBOR' / entire fieldname = NEIGHBORS
 OFFSET20=5025
 TUNIT20=' '
 COMMENT Number of IFGs from neighboring pixels used in
 COMMENT forming the templates; only for sky data
 TFORM21='1J'
 TTYPE21='NBR_NUM_' / entire fieldname = NBR_NUM_IFGS
 OFFSET21=5026
 TUNIT21=' '
 COMMENT Observation times of IFGs used in template
 COMMENT formation; in seconds since
 COMMENT 00:00.00 UTC, 1 January 1981
 TFORM22='100D'
 TDIM22='(100)'
 TTYPE22='TPL_TIME' / entire fieldname = TPL_TIMES
 OFFSET22=5030
 TUNIT22='s'
 COMMENT Pixel numbers of IFGs used in templates
 TFORM23='100J'
 TDIM23='(100)'
 TTYPE23='TPL_PIXE' / entire fieldname = TPL_PIXELS
 OFFSET23=5830
 TUNIT23=' '
 COMMENT
 COMMENT Bolometer Bias and Voltage
 COMMENT

COMMENT Commanded bolometer bias, in V
TFORM24='1E'
TTYPER24='BOLOM_BI' / entire fieldname = BOLOM_BIAS
OFFSET24=6230
TUNIT24='V'
COMMENT Bolometer readout voltage, in V
TFORM25='1E'
TTYPER25='BOLOM_VO' / entire fieldname = BOLOM_VOLTAGE
OFFSET25=6234
TUNIT25='V'
COMMENT
COMMENT Instrument Temperatures
COMMENT
COMMENT External calibrator temperature, in K
TFORM26='1E'
TTYPER26='XCAL_TEM' / entire fieldname = XCAL_TEMP
OFFSET26=6238
TUNIT26='K'
COMMENT Internal calibrator temperature, in K
TFORM27='1E'
TTYPER27='ICAL_TEM' / entire fieldname = ICAL_TEMP
OFFSET27=6242
TUNIT27='K'
COMMENT Sky horn temperature, in K
TFORM28='1E'
TTYPER28='SKYHORN_' / entire fieldname = SKYHORN_TEMP
OFFSET28=6246
TUNIT28='K'
COMMENT Reference horn temperature, in K
TFORM29='1E'
TTYPER29='REFHORN_' / entire fieldname = REFHORN_TEMP
OFFSET29=6250
TUNIT29='K'
COMMENT Dihedral mirror temperature, in K
TFORM30='1E'
TTYPER30='DIHEDRAL' / entire fieldname = DIHEDRAL_TEMP
OFFSET30=6254
TUNIT30='K'
COMMENT Collimator mirror temperature, in K
TFORM31='1E'
TTYPER31='MIRROR_T' / entire fieldname = MIRROR_TEMP
OFFSET31=6258
TUNIT31='K'
COMMENT Bolometer bath temperature, in K
TFORM32='1E'
TTYPER32='BATH_TEM' / entire fieldname = BATH_TEMP
OFFSET32=6262
TUNIT32='K'
COMMENT
END

Coadded Sky Interferograms

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NAXIS = 0 / no rasterized arrays follow
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TELESCOP= 'COBE' / COsmic Background Explorer satellite
INSTRUME= 'FIRAS' / COBE instrument [DIRBE, DMR, FIRAS]
OBJECT = 'ALL-SKY' / part of sky given [ALL-SKY, GAL-SLICE]
PRODUCT = 'SKY-IFG' / Coadded sky interferograms
EQUINOX = 2000.0 / equinox of coords in following tables
COMMENT
REFERENC= 'For additional information, please refer to the'
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COMMENT
COMMENT FIRAS specific keywords
CHANSCAN= 'LLSS' / Channel and mirror transport mechanism scan
COMMENT / mode identifier. The first two characters
COMMENT / indicate the channel, the first being the
COMMENT / instrument side: right (R) or left (L); and
COMMENT / the second being the frequency: high (H) or
COMMENT / low (L). The third and fourth characters
COMMENT / indicate the scan mode, the third being the
COMMENT / scan length: short (S) or long (L); and the
COMMENT / fourth being the scan speed: slow (S) or
COMMENT / fast (F). In addition, the scan mode may
COMMENT / take the following values for low frequency
COMMENT / data only (channel = RL or LL):
COMMENT / FS: decimated SF data;
COMMENT / FL: truncated LF data.
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MISS_SEG= 'ENTIRE_MISSION' / FIRAS segment of mission represented
NU_ZERO = 68.020812 / Optical frequency of initial variance
COMMENT / point in GHz
DELTA_NU= 13.604162 / Optical frequency interval between variance
COMMENT / points in GHz
NUM_FREQ= 43 / Number of frequency points in variance
COMMENT / with good data
PEAK_POS= 360 / Interferogram peak position
FFT_LENGTH= 640 / Length of Fast Fourier Transform used
END
COMMENT
TIMVERSN= 'OGIP/93-003' / OGIP memo number where the convention
COMMENT / is described
COMMENT The times reported in this file are atomic seconds elapsed
COMMENT since 00:00:00 UTC, 1 January 1981. Time information is

COMMENT recorded in a manner consistent with the convention specified
COMMENT in OGIP/93-003 with the understanding that time is counted
COMMENT in atomic seconds and the origin of time (MJDREF) is quoted
COMMENT in ephemeris MJD.
TIMESYS = '1981.00' / time system (same as IRAS)
MJDREFI = 44605 / Integer portion of ephemeris MJD
COMMENT / corresponding to 0h UTC 1 Jan 1981
MJDREFF = 0.00059240741 / Fractional portion of ephemeris MJD
COMMENT / corresponding to 0h UTC 1 Jan 1981
TIMEUNIT='s' / unit for TSTART, TSTOP, TIMEZERO = seconds
TSTART = 280713605.000 / observation start time in TIMESYS system
TSTOP = 306806405.990 / observation stop time in TIMESYS system
COMMENT
COMMENT
COMMENT FIRAS Coadded Interferogram
COMMENT Project Dataset Record Structure
COMMENT
COMMENT
COMMENT Instrument Attitude Information
COMMENT
COMMENT FIRAS pixel number (resolution 6)
TFORM1='1J'
TTYPER1='PIXEL' / entire fieldname = PIXEL
OFFSET1=0
TUNIT1=''
COMMENT Galactic longitude, in deg (0 -> 360)
TFORM2='1E'
TTYPER2='GAL_LON' / entire fieldname = GAL_LON
OFFSET2=4
TUNIT2='deg'
COMMENT Galactic latitude, in deg (-90 -> +90)
TFORM3='1E'
TTYPER3='GAL_LAT' / entire fieldname = GAL_LAT
OFFSET3=8
TUNIT3='deg'
COMMENT Ecliptic longitude, epoch 2000.0, in deg (0 -> 360)
TFORM4='1E'
TTYPER4='ECL_LON' / entire fieldname = ECL_LON
OFFSET4=12
TUNIT4='deg'
COMMENT Ecliptic latitude, epoch 2000.0, in deg (-90 -> +90)
TFORM5='1E'
TTYPER5='ECL_LAT' / entire fieldname = ECL_LAT
OFFSET5=16
TUNIT5='deg'
COMMENT Right ascension, in deg (0 -> 360)
TFORM6='1E'
TTYPER6='RA' / entire fieldname = RA
OFFSET6=20
TUNIT6='deg'
COMMENT Declination, in deg (-90 -> +90)
TFORM7='1E'
TTYPER7='DEC' / entire fieldname = DEC
OFFSET7=24

TUNIT7='deg'
COMMENT
COMMENT Coadded Interferogram and Variances
COMMENT
COMMENT Coadded interferogram, in counts
TFORM8='512E'
TDIM8='(512)'
TTYPER8='COADDED_' / entire fieldname = COADDED_IFG
OFFSET8=28
TUNIT8=' '
COMMENT Variance of real part of coadd spectrum, in (MJy/sr)^2
TFORM9='210E'
TDIM9='(210)'
TTYPER9='REAL_VAR' / entire fieldname = REAL_VARIANCE
OFFSET9=2076
TUNIT9='(MJy/sr)^2'
COMMENT Variance of imaginary part of coadd spectrum, in (MJy/sr)^2
TFORM10='210E'
TDIM10='(210)'
TTYPER10='IMAG_VAR' / entire fieldname = IMAG_VARIANCE
OFFSET10=2916
TUNIT10='(MJy/sr)^2'
COMMENT Covariance between real and imaginary
COMMENT parts of coadd spectrum, in (MJy/sr)^2
TFORM11='210E'
TDIM11='(210)'
TTYPER11='REAL_IMA' / entire fieldname = REAL_IMAG_VARIANCE
OFFSET11=3756
TUNIT11='(MJy/sr)^2'
COMMENT
COMMENT Number and Times of IFGs
COMMENT
COMMENT Number of IFGs in coadd
TFORM12='1J'
TTYPER12='NUM_IFGS' / entire fieldname = NUM_IFGS
OFFSET12=4596
TUNIT12=' '
COMMENT Glitch rate for coadded IFG, in glitches/s
TFORM13='1E'
TTYPER13='GLITCH_R' / entire fieldname = GLITCH_RATE
OFFSET13=4600
TUNIT13='gl/s '
COMMENT Glitch rate weighted number of IFGs in coadd
TFORM14='1E'
TTYPER14='ADJ_NUM_' / entire fieldname = ADJ_NUM_IFGS
OFFSET14=4604
TUNIT14=' '
COMMENT Average data collection time in seconds since
COMMENT 00:00.00 UTC, 1 January 1981
TFORM15='1D'
TTYPER15='TIME' / entire fieldname = TIME
OFFSET15=4608
TUNIT15='s'
COMMENT Observation times of IFGs in the coadd;

COMMENT in hundredths of days since ejection of the
 COMMENT FIRAS aperture cover at
 COMMENT 11:18.00 UTC, 21 November 1989
 TFORM16='100J'
 TDIM16='(100)'
 TTYPE16='IFG_TIME' / entire fieldname = IFG_TIMES
 OFFSET16=4616
 TUNIT16='d*100'
 COMMENT Flag indicating orphan IFGs, which occur
 COMMENT when a coadd is composed of only 1 or
 COMMENT 2 IFGs. In all other cases, the coadd
 COMMENT is composed of three or more IFGs;
 COMMENT applicable only to sky data.
 COMMENT Flag = 1 indicates 1 or 2 IFGS in the coadd;
 COMMENT flag = 0 indicates 3 or more IFGs in the coadd.
 TFORM17='1B'
 TTYPE17='ORPHANS' / entire fieldname = ORPHANS
 OFFSET17=5016
 TUNIT17=' '
 COMMENT
 COMMENT Template Information
 COMMENT
 COMMENT Number of templates subtracted from coadded IFG
 TFORM18='1J'
 TTYPE18='NUM_TEMP' / entire fieldname = NUM_TEMPLATES
 OFFSET18=5017
 TUNIT18=' '
 COMMENT Number of IFGS used in forming the templates
 TFORM19='1J'
 TTYPE19='TPL_NUM_' / entire fieldname = TPL_NUM_IFGS
 OFFSET19=5021
 TUNIT19=' '
 COMMENT Flag indicating use of IFGs from neighboring
 COMMENT pixels in template formation (suitable
 COMMENT IFGs from 8 neighboring pixels);
 COMMENT applicable only to sky data.
 COMMENT Flag = 1 indicates neighbor IFGs were used;
 COMMENT flag = 0 indicates neighbor IFGs were not used.
 TFORM20='1B'
 TTYPE20='NEIGHBOR' / entire fieldname = NEIGHBORS
 OFFSET20=5025
 TUNIT20=' '
 COMMENT Number of IFGS from neighboring pixels used in
 COMMENT forming the templates; only for sky data
 TFORM21='1J'
 TTYPE21='NBR_NUM_' / entire fieldname = NBR_NUM_IFGS
 OFFSET21=5026
 TUNIT21=' '
 COMMENT Observation times of IFGs used in template
 COMMENT formation; in seconds since
 COMMENT 00:00.00 UTC, 1 January 1981
 TFORM22='100D'
 TDIM22='(100)'
 TTYPE22='TPL_TIME' / entire fieldname = TPL_TIMES

OFFSET22=5030
TUNIT22='s'
COMMENT Pixel numbers of IFGs used in templates
TFORM23='100J'
TDIM23='(100)'
TTYPER23='TPL_PIXE' / entire fieldname = TPL_PIXELS
OFFSET23=5830
TUNIT23=' '
COMMENT
COMMENT Bolometer Bias and Voltage
COMMENT
COMMENT Commanded bolometer bias, in V
TFORM24='1E'
TTYPER24='BOLOM_BI' / entire fieldname = BOLOM_BIAS
OFFSET24=6230
TUNIT24='V'
COMMENT Bolometer readout voltage, in V
TFORM25='1E'
TTYPER25='BOLOM_VO' / entire fieldname = BOLOM_VOLTAGE
OFFSET25=6234
TUNIT25='V'
COMMENT
COMMENT Instrument Temperatures
COMMENT
COMMENT External calibrator temperature, in K
TFORM26='1E'
TTYPER26='XCAL_TEM' / entire fieldname = XCAL_TEMP
OFFSET26=6238
TUNIT26='K'
COMMENT Internal calibrator temperature, in K
TFORM27='1E'
TTYPER27='ICAL_TEM' / entire fieldname = ICAL_TEMP
OFFSET27=6242
TUNIT27='K'
COMMENT Sky horn temperature, in K
TFORM28='1E'
TTYPER28='SKYHORN_' / entire fieldname = SKYHORN_TEMP
OFFSET28=6246
TUNIT28='K'
COMMENT Reference horn temperature, in K
TFORM29='1E'
TTYPER29='REFHORN_' / entire fieldname = REFHORN_TEMP
OFFSET29=6250
TUNIT29='K'
COMMENT Dihedral mirror temperature, in K
TFORM30='1E'
TTYPER30='DIHEDRAL' / entire fieldname = DIHEDRAL_TEMP
OFFSET30=6254
TUNIT30='K'
COMMENT Collimator mirror temperature, in K
TFORM31='1E'
TTYPER31='MIRROR_T' / entire fieldname = MIRROR_TEMP
OFFSET31=6258
TUNIT31='K'

```
COMMENT Bolometer bath temperature, in K
TFORM32='1E'
TTYPE32='BATH_TEM' / entire fieldname = BATH_TEMP
OFFSET32=6262
TUNIT32='K'
COMMENT
END
```

Calibrated Calibration Spectra

```
SIMPLE =          T / specifies FITS standard file
BITPIX =         32 / if rasterized array follows, data 32-bit int
NAXIS  =          0 / no rasterized arrays follow
EXTEND =          T / Table extensions may follow
ORIGIN  = 'CDAC'   / Cosmology Data Analysis Center
TELESCOP= 'COBE'   / COsmic Background Explorer satellite
INSTRUME= 'FIRAS'  / COBE instrument [DIRBE, DMR, FIRAS]
OBJECT  = 'ALL-SKY' / part of sky given [ALL-SKY, GAL-SLICE]
PRODUCT = 'CAL-SPEC' / Calibrated calibration spectra
EQUINOX =         2000.0 / equinox of coords in following tables
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CHANSCAN= 'LLSS'      / Channel and mirror transport mechanism scan
COMMENT              / mode identifier. The first two characters
COMMENT              / indicate the channel, the first being the
COMMENT              / instrument side: right (R) or left (L); and
COMMENT              / the second being the frequency: high (H) or
COMMENT              / low (L). The third and fourth characters
COMMENT              / indicate the scan mode, the third being the
COMMENT              / scan length: short (S) or long (L); and the
COMMENT              / fourth being the scan speed: slow (S) or
COMMENT              / fast (F). In addition, the scan mode may
COMMENT              / take the following values for low frequency
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COMMENT              /   FS: decimated SF data;
COMMENT              /   FL: truncated LF data.
MODLLABL= 'PASS4'     / FIRAS calibration model solution label
MISS_SEG= 'ENTIRE_MISSION' / FIRAS segment of mission represented
NU_ZERO =         68.020812 / Optical frequency of initial data point in GHz
DELTA_NU=         13.604162 / Optical frequency interval between data points
COMMENT              / in GHz
```

NUM_FREQ= 43 / Number of frequency points with good data
 FFT_LENGTH= 640 / Length of Fast Fourier Transform used
 END
 COMMENT
 TIMVERSN= 'OGIP/93-003' / OGIP memo number where the convention
 COMMENT / is described
 COMMENT The times reported in this file are atomic seconds elapsed
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 COMMENT in ephemeris MJD.
 TIMESYS = '1981.00' / time system (same as IRAS)
 MJDREFI = 44605 / Integer portion of ephemeris MJD
 COMMENT / corresponding to 0h UTC 1 Jan 1981
 MJDREFF = 0.00059240741 / Fractional portion of ephemeris MJD
 COMMENT / corresponding to 0h UTC 1 Jan 1981
 TIMEUNIT= 's' / unit for TSTART, TSTOP, TIMEZERO = seconds
 TSTART = 280713605.000 / observation start time in TIMESYS system
 TSTOP = 306806405.990 / observation stop time in TIMESYS system
 COMMENT
 COMMENT
 COMMENT FIRAS Spectrum
 COMMENT Project Dataset Record Structure
 COMMENT
 COMMENT
 COMMENT Instrument Attitude Information
 COMMENT
 COMMENT FIRAS pixel number (resolution 6)
 TFORM1='1J'
 TTYPE1='PIXEL' / entire fieldname = PIXEL
 OFFSET1=0
 TUNIT1=''

COMMENT Galactic longitude, in deg (0 -> 360)
 TFORM2='1E'
 TTYPE2='GAL_LON' / entire fieldname = GAL_LON
 OFFSET2=4
 TUNIT2='deg'
 COMMENT Galactic latitude, in deg (-90 -> +90)
 TFORM3='1E'
 TTYPE3='GAL_LAT' / entire fieldname = GAL_LAT
 OFFSET3=8
 TUNIT3='deg'
 COMMENT Ecliptic longitude, epoch 2000.0, in deg (0 -> 360)
 TFORM4='1E'
 TTYPE4='ECL_LON' / entire fieldname = ECL_LON
 OFFSET4=12
 TUNIT4='deg'
 COMMENT Ecliptic latitude, epoch 2000.0, in deg (-90 -> +90)
 TFORM5='1E'
 TTYPE5='ECL_LAT' / entire fieldname = ECL_LAT
 OFFSET5=16
 TUNIT5='deg'
 COMMENT Right ascension, in deg (0 -> 360)

TFORM6='1E'
 TTYPE6='RA' / entire fieldname = RA
 OFFSET6=20
 TUNIT6='deg'
 COMMENT Declination, in deg (-90 -> +90)
 TFORM7='1E'
 TTYPE7='DEC' / entire fieldname = DEC
 OFFSET7=24
 TUNIT7='deg'
 COMMENT
 COMMENT Spectrum and Sigmas
 COMMENT
 COMMENT Real part of spectrum, in MJy/sr
 TFORM8='210E'
 TDIM8='(210)'
 TTYPE8='REAL_SPE' / entire fieldname = REAL_SPECTRUM
 OFFSET8=28
 TUNIT8='MJy/sr'
 COMMENT Imaginary part of spectrum, in MJy/sr
 TFORM9='210E'
 TDIM9='(210)'
 TTYPE9='IMAG_SPE' / entire fieldname = IMAG_SPECTRUM
 OFFSET9=868
 TUNIT9='MJy/sr'
 COMMENT Sigmas of spectrum, in MJy/sr
 TFORM10='210E'
 TDIM10='(210)'
 TTYPE10='SIGMAS' / entire fieldname = SIGMAS
 OFFSET10=1708
 TUNIT10='MJy/sr'
 COMMENT
 COMMENT Number and Times of IFGs
 COMMENT
 COMMENT Number of IFGs in spectrum
 TFORM11='1J'
 TTYPE11='NUM_IFGS' / entire fieldname = NUM_IFGS
 OFFSET11=2548
 TUNIT11=' '
 COMMENT Glitch rate for spectrum, in glitches/s
 TFORM12='1E'
 TTYPE12='GLITCH_R' / entire fieldname = GLITCH_RATE
 OFFSET12=2552
 TUNIT12='gl/s'
 COMMENT Glitch rate weighted number of IFGs in spectrum
 TFORM13='1E'
 TTYPE13='ADJ_NUM_' / entire fieldname = ADJ_NUM_IFGS
 OFFSET13=2556
 TUNIT13=' '
 COMMENT Average data collection time in seconds since
 COMMENT 00:00.00 UTC, 1 January 1981
 TFORM14='1D'
 TTYPE14='TIME' / entire fieldname = TIME
 OFFSET14=2560
 TUNIT14='s'

COMMENT Observation times of IFGs in the spectrum;
 COMMENT in hundredths of days since ejection of the
 COMMENT FIRAS aperture cover at
 COMMENT 11:18.00 UTC, 21 November 1989
 TFORM15='100J'
 TDIM15='(100)'
 TTYPE15='IFG_TIME' / entire fieldname = IFG_TIMES
 OFFSET15=2568
 TUNIT15='d*100'
 COMMENT Flag indicating orphan IFGs, which occur
 COMMENT when a spectrum is composed of only 1 or
 COMMENT 2 IFGs. In all other cases, the spectrum
 COMMENT is composed of three or more IFGs;
 COMMENT applicable only to sky data.
 COMMENT Flag = 1 indicates 1 or 2 IFGS in the spectrum;
 COMMENT flag = 0 indicates 3 or more IFGs in the spectrum.
 TFORM16='1B'
 TTYPE16='ORPHANS' / entire fieldname = ORPHANS
 OFFSET16=2968
 TUNIT16=' '
 COMMENT
 COMMENT Template Information
 COMMENT
 COMMENT Number of templates subtracted from spectrum
 TFORM17='1J'
 TTYPE17='NUM_TEMP' / entire fieldname = NUM_TEMPLATES
 OFFSET17=2969
 TUNIT17=' '
 COMMENT Number of IFGS used in forming the templates
 TFORM18='1J'
 TTYPE18='TPL_NUM_' / entire fieldname = TPL_NUM_IFGS
 OFFSET18=2973
 TUNIT18=' '
 COMMENT Flag indicating use of IFGs from neighboring
 COMMENT pixels in template formation (suitable
 COMMENT IFGs from 8 neighboring pixels);
 COMMENT applicable only to sky data.
 COMMENT Flag = 1 indicates neighbor IFGs were used;
 COMMENT flag = 0 indicates neighbor IFGs were not used.
 TFORM19='1B'
 TTYPE19='NEIGHBOR' / entire fieldname = NEIGHBORS
 OFFSET19=2977
 TUNIT19=' '
 COMMENT Number of IFGS from neighboring pixels used in
 COMMENT forming the templates; only for sky data
 TFORM20='1J'
 TTYPE20='NBR_NUM_' / entire fieldname = NBR_NUM_IFGS
 OFFSET20=2978
 TUNIT20=' '
 COMMENT Observation times of IFGs used in template
 COMMENT formation; in seconds since
 COMMENT 00:00.00 UTC, 1 January 1981
 TFORM21='100D'
 TDIM21='(100)'

TTYPE21='TPL_TIME' / entire fieldname = TPL_TIMES
 OFFSET21=2982
 TUNIT21='s'
 COMMENT Pixel numbers of IFGs used in templates
 TFORM22='100J'
 TDIM22='(100)'
 TTYPE22='TPL_PIXE' / entire fieldname = TPL_PIXELS
 OFFSET22=3782
 TUNIT22=' '
 COMMENT
 COMMENT Bolometer Response Function
 COMMENT
 COMMENT Commanded bolometer bias, in V
 TFORM23='1E'
 TTYPE23='BOLOM_BI' / entire fieldname = BOLOM_BIAS
 OFFSET23=4182
 TUNIT23='V'
 COMMENT Bolometer readout voltage, in V
 TFORM24='1E'
 TTYPE24='BOLOM_VO' / entire fieldname = BOLOM_VOLTAGE
 OFFSET24=4186
 TUNIT24='V'
 COMMENT Bolometer DC response, in V/W
 TFORM25='1E'
 TTYPE25='DC_RESPO' / entire fieldname = DC_RESPONSE
 OFFSET25=4190
 TUNIT25='V/W'
 COMMENT Bolometer time constant, in s
 TFORM26='1E'
 TTYPE26='TIME_CON' / entire fieldname = TIME_CONSTANT
 OFFSET26=4194
 TUNIT26='s'
 COMMENT Linear autophase correction, in rad
 TFORM27='1E'
 TTYPE27='PHASE_CO' / entire fieldname = PHASE_CORR
 OFFSET27=4198
 TUNIT27='rad'
 COMMENT
 COMMENT Instrument Temperatures
 COMMENT
 COMMENT External calibrator temperature, in K
 TFORM28='1E'
 TTYPE28='XCAL_TEM' / entire fieldname = XCAL_TEMP
 OFFSET28=4202
 TUNIT28='K'
 COMMENT Internal calibrator temperature, in K
 TFORM29='1E'
 TTYPE29='ICAL_TEM' / entire fieldname = ICAL_TEMP
 OFFSET29=4206
 TUNIT29='K'
 COMMENT Sky horn temperature, in K
 TFORM30='1E'
 TTYPE30='SKYHORN_' / entire fieldname = SKYHORN_TEMP
 OFFSET30=4210


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TUNIT30='K'
COMMENT Reference horn temperature, in K
TFORM31='1E'
TTYPE31='REFHORN_' / entire fieldname = REFHORN_TEMP
OFFSET31=4214
TUNIT31='K'
COMMENT Dihedral mirror temperature, in K
TFORM32='1E'
TTYPE32='DIHEDRAL_' / entire fieldname = DIHEDRAL_TEMP
OFFSET32=4218
TUNIT32='K'
COMMENT Collimator mirror temperature, in K
TFORM33='1E'
TTYPE33='MIRROR_T' / entire fieldname = MIRROR_TEMP
OFFSET33=4222
TUNIT33='K'
COMMENT Bolometer operating temperature, in K
TFORM34='1E'
TTYPE34='BOLOM_TE' / entire fieldname = BOLOM_TEMP
OFFSET34=4226
TUNIT34='K'
COMMENT Bolometer bath temperature, in K
TFORM35='1E'
TTYPE35='BATH_TEM' / entire fieldname = BATH_TEMP
OFFSET35=4230
TUNIT35='K'
COMMENT
END

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Calibrated Sky Spectra

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SIMPLE =          T / specifies FITS standard file
BITPIX =          32 / if rasterized array follows, data 32-bit int
NAXIS =           0 / no rasterized arrays follow
EXTEND =          T / Table extensions may follow
ORIGIN = 'CDAC'   / Cosmology Data Analysis Center
TELESCOP= 'COBE'  / COsmic Background Explorer satellite
INSTRUME= 'FIRAS' / COBE instrument [DIRBE, DMR, FIRAS]
OBJECT = 'ALL-SKY' / part of sky given [ALL-SKY, GAL-SLICE]
PRODUCT = 'SKY-SPEC' / Calibrated sky spectra
EQUINOX =         2000.0 / equinox of coords in following tables
COMMENT
REFERENC= 'For additional information, please refer to the'
REFERENC= 'COBE Far Infrared Absolute Spectrophotometer (FIRAS)'
REFERENC= 'Explanatory Supplement, ed. J.C. Mather et al,'
REFERENC= 'COBE Ref. Pub. No. 97-C (Greenbelt, MD: NASA/GSFC),'
REFERENC= 'available in electronic form from the NSSDC.'
COMMENT
COMMENT COBE specific keywords
DATE-BEG= '24/11/89' / date of initial data represented (dd/mm/yy)
DATE-END= '21/09/90' / date of final data represented (dd/mm/yy)
PIXRESOL=        6 / Quad tree pixel resolution [6, 9]

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COMMENT
COMMENT  FIRAS specific keywords
CHANSCAN= 'LLSS'          / Channel and mirror transport mechanism scan
COMMENT          / mode identifier. The first two characters
COMMENT          / indicate the channel, the first being the
COMMENT          / instrument side: right (R) or left (L); and
COMMENT          / the second being the frequency: high (H) or
COMMENT          / low (L). The third and fourth characters
COMMENT          / indicate the scan mode, the third being the
COMMENT          / scan length: short (S) or long (L); and the
COMMENT          / fourth being the scan speed: slow (S) or
COMMENT          / fast (F). In addition, the scan mode may
COMMENT          / take the following values for low frequency
COMMENT          / data only (channel = RL or LL):
COMMENT          /   FS: decimated SF data;
COMMENT          /   FL: truncated LF data.
MODLLABL= 'PASS4'        / FIRAS calibration model solution label
MISS_SEG= 'ENTIRE_MISSION' / FIRAS segment of mission represented
NU_ZERO =      68.020812 / Optical frequency of initial data point in GHz
DELTA_NU=     13.604162 / Optical frequency interval between data points
COMMENT          / in GHz
NUM_FREQ=      43 / Number of frequency points with good data
FFT_LENGTH=    640 / Length of Fast Fourier Transform used
END
COMMENT
TIMVERSN= 'OGIP/93-003'  / OGIP memo number where the convention
COMMENT          / is described
COMMENT  The times reported in this file are atomic seconds elapsed
COMMENT  since 00:00:00 UTC, 1 January 1981. Time information is
COMMENT  recorded in a manner consistent with the convention specified
COMMENT  in OGIP/93-003 with the understanding that time is counted
COMMENT  in atomic seconds and the origin of time (MJDREF) is quoted
COMMENT  in ephemeris MJD.
TIMESYS = '1981.00'     / time system (same as IRAS)
MJDREFI =      44605 / Integer portion of ephemeris MJD
COMMENT          / corresponding to 0h UTC 1 Jan 1981
MJDREFF = 0.00059240741 / Fractional portion of ephemeris MJD
COMMENT          / corresponding to 0h UTC 1 Jan 1981
TIMEUNIT= 's'          / unit for TSTART, TSTOP, TIMEZERO = seconds
TSTART  = 280713605.000 / observation start time in TIMESYS system
TSTOP   = 306806405.990 / observation stop time in TIMESYS system
COMMENT
COMMENT
COMMENT  FIRAS Spectrum
COMMENT  Project Dataset Record Structure
COMMENT
COMMENT
COMMENT  Instrument Attitude Information
COMMENT
COMMENT  FIRAS pixel number (resolution 6)
TFORM1='1J'
TTYPE1='PIXEL' / entire fieldname = PIXEL
OFFSET1=0
TUNIT1=''

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COMMENT Galactic longitude, in deg (0 -> 360)
 TFORM2='1E'
 TTYPE2='GAL_LON' / entire fieldname = GAL_LON
 OFFSET2=4
 TUNIT2='deg'
 COMMENT Galactic latitude, in deg (-90 -> +90)
 TFORM3='1E'
 TTYPE3='GAL_LAT' / entire fieldname = GAL_LAT
 OFFSET3=8
 TUNIT3='deg'
 COMMENT Ecliptic longitude, epoch 2000.0, in deg (0 -> 360)
 TFORM4='1E'
 TTYPE4='ECL_LON' / entire fieldname = ECL_LON
 OFFSET4=12
 TUNIT4='deg'
 COMMENT Ecliptic latitude, epoch 2000.0, in deg (-90 -> +90)
 TFORM5='1E'
 TTYPE5='ECL_LAT' / entire fieldname = ECL_LAT
 OFFSET5=16
 TUNIT5='deg'
 COMMENT Right ascension, in deg (0 -> 360)
 TFORM6='1E'
 TTYPE6='RA' / entire fieldname = RA
 OFFSET6=20
 TUNIT6='deg'
 COMMENT Declination, in deg (-90 -> +90)
 TFORM7='1E'
 TTYPE7='DEC' / entire fieldname = DEC
 OFFSET7=24
 TUNIT7='deg'
 COMMENT
 COMMENT Spectrum and Sigmas
 COMMENT
 COMMENT Real part of spectrum, in MJy/sr
 TFORM8='210E'
 TDIM8='(210)'
 TTYPE8='REAL_SPE' / entire fieldname = REAL_SPECTRUM
 OFFSET8=28
 TUNIT8='MJy/sr'
 COMMENT Imaginary part of spectrum, in MJy/sr
 TFORM9='210E'
 TDIM9='(210)'
 TTYPE9='IMAG_SPE' / entire fieldname = IMAG_SPECTRUM
 OFFSET9=868
 TUNIT9='MJy/sr'
 COMMENT Sigmas of spectrum, in MJy/sr
 TFORM10='210E'
 TDIM10='(210)'
 TTYPE10='SIGMAS' / entire fieldname = SIGMAS
 OFFSET10=1708
 TUNIT10='MJy/sr'
 COMMENT
 COMMENT Number and Times of IFGs
 COMMENT

COMMENT Number of IFGs in spectrum
 TFORM11='1J'
 TTYPE11='NUM_IFGS' / entire fieldname = NUM_IFGS
 OFFSET11=2548
 TUNIT11=' '
 COMMENT Glitch rate for spectrum, in glitches/s
 TFORM12='1E'
 TTYPE12='GLITCH_R' / entire fieldname = GLITCH_RATE
 OFFSET12=2552
 TUNIT12='gl/s'
 COMMENT Glitch rate weighted number of IFGs in spectrum
 TFORM13='1E'
 TTYPE13='ADJ_NUM_' / entire fieldname = ADJ_NUM_IFGS
 OFFSET13=2556
 TUNIT13=' '
 COMMENT Average data collection time in seconds since
 COMMENT 00:00.00 UTC, 1 January 1981
 TFORM14='1D'
 TTYPE14='TIME' / entire fieldname = TIME
 OFFSET14=2560
 TUNIT14='s'
 COMMENT Observation times of IFGs in the spectrum;
 COMMENT in hundredths of days since ejection of the
 COMMENT FIRAS aperture cover at
 COMMENT 11:18.00 UTC, 21 November 1989
 TFORM15='100J'
 TDIM15='(100)'
 TTYPE15='IFG_TIME' / entire fieldname = IFG_TIMES
 OFFSET15=2568
 TUNIT15='d*100'
 COMMENT Flag indicating orphan IFGs, which occur
 COMMENT when a spectrum is composed of only 1 or
 COMMENT 2 IFGs. In all other cases, the spectrum
 COMMENT is composed of three or more IFGs;
 COMMENT applicable only to sky data.
 COMMENT Flag = 1 indicates 1 or 2 IFGS in the spectrum;
 COMMENT flag = 0 indicates 3 or more IFGs in the spectrum.
 TFORM16='1B'
 TTYPE16='ORPHANS' / entire fieldname = ORPHANS
 OFFSET16=2968
 TUNIT16=' '
 COMMENT
 COMMENT Template Information
 COMMENT
 COMMENT Number of templates subtracted from spectrum
 TFORM17='1J'
 TTYPE17='NUM_TEMP' / entire fieldname = NUM_TEMPLATES
 OFFSET17=2969
 TUNIT17=' '
 COMMENT Number of IFGS used in forming the templates
 TFORM18='1J'
 TTYPE18='TPL_NUM_' / entire fieldname = TPL_NUM_IFGS
 OFFSET18=2973
 TUNIT18=' '

COMMENT Flag indicating use of IFGs from neighboring
 COMMENT pixels in template formation (suitable
 COMMENT IFGs from 8 neighboring pixels);
 COMMENT applicable only to sky data.
 COMMENT Flag = 1 indicates neighbor IFGs were used;
 COMMENT flag = 0 indicates neighbor IFGs were not used.
 TFORM19='1B'
 TTYPE19='NEIGHBOR' / entire fieldname = NEIGHBORS
 OFFSET19=2977
 TUNIT19=''
 COMMENT Number of IFGS from neighboring pixels used in
 COMMENT forming the templates; only for sky data
 TFORM20='1J'
 TTYPE20='NBR_NUM_' / entire fieldname = NBR_NUM_IFGS
 OFFSET20=2978
 TUNIT20=''
 COMMENT Observation times of IFGs used in template
 COMMENT formation; in seconds since
 COMMENT 00:00.00 UTC, 1 January 1981
 TFORM21='100D'
 TDIM21='(100)'
 TTYPE21='TPL_TIME' / entire fieldname = TPL_TIMES
 OFFSET21=2982
 TUNIT21='s'
 COMMENT Pixel numbers of IFGs used in templates
 TFORM22='100J'
 TDIM22='(100)'
 TTYPE22='TPL_PIXE' / entire fieldname = TPL_PIXELS
 OFFSET22=3782
 TUNIT22=''
 COMMENT
 COMMENT Bolometer Response Function
 COMMENT
 COMMENT Commanded bolometer bias, in V
 TFORM23='1E'
 TTYPE23='BOLOM_BI' / entire fieldname = BOLOM_BIAS
 OFFSET23=4182
 TUNIT23='V'
 COMMENT Bolometer readout voltage, in V
 TFORM24='1E'
 TTYPE24='BOLOM_VO' / entire fieldname = BOLOM_VOLTAGE
 OFFSET24=4186
 TUNIT24='V'
 COMMENT Bolometer DC response, in V/W
 TFORM25='1E'
 TTYPE25='DC_RESPO' / entire fieldname = DC_RESPONSE
 OFFSET25=4190
 TUNIT25='V/W'
 COMMENT Bolometer time constant, in s
 TFORM26='1E'
 TTYPE26='TIME_CON' / entire fieldname = TIME_CONSTANT
 OFFSET26=4194
 TUNIT26='s'
 COMMENT Linear autophase correction, in rad

TFORM27='1E'
TTYPE27='PHASE_CO' / entire fieldname = PHASE_CORR
OFFSET27=4198
TUNIT27='rad'
COMMENT
COMMENT Instrument Temperatures
COMMENT
COMMENT External calibrator temperature, in K
TFORM28='1E'
TTYPE28='XCAL_TEM' / entire fieldname = XCAL_TEMP
OFFSET28=4202
TUNIT28='K'
COMMENT Internal calibrator temperature, in K
TFORM29='1E'
TTYPE29='ICAL_TEM' / entire fieldname = ICAL_TEMP
OFFSET29=4206
TUNIT29='K'
COMMENT Sky horn temperature, in K
TFORM30='1E'
TTYPE30='SKYHORN_' / entire fieldname = SKYHORN_TEMP
OFFSET30=4210
TUNIT30='K'
COMMENT Reference horn temperature, in K
TFORM31='1E'
TTYPE31='REFHORN_' / entire fieldname = REFHORN_TEMP
OFFSET31=4214
TUNIT31='K'
COMMENT Dihedral mirror temperature, in K
TFORM32='1E'
TTYPE32='DIHEDRAL_' / entire fieldname = DIHEDRAL_TEMP
OFFSET32=4218
TUNIT32='K'
COMMENT Collimator mirror temperature, in K
TFORM33='1E'
TTYPE33='MIRROR_T' / entire fieldname = MIRROR_TEMP
OFFSET33=4222
TUNIT33='K'
COMMENT Bolometer operating temperature, in K
TFORM34='1E'
TTYPE34='BOLOM_TE' / entire fieldname = BOLOM_TEMP
OFFSET34=4226
TUNIT34='K'
COMMENT Bolometer bath temperature, in K
TFORM35='1E'
TTYPE35='BATH_TEM' / entire fieldname = BATH_TEMP
OFFSET35=4230
TUNIT35='K'
COMMENT
END

Differential Calibration Spectra

SIMPLE = T / specifies FITS standard file
BITPIX = 32 / if rasterized array follows, data 32-bit int
NAXIS = 0 / no rasterized arrays follow
EXTEND = T / Table extensions may follow
ORIGIN = 'CDAC' / Cosmology Data Analysis Center
TELESCOP= 'COBE' / COsmic Background Explorer satellite
INSTRUME= 'FIRAS' / COBE instrument [DIRBE, DMR, FIRAS]
OBJECT = 'ALL-SKY' / part of sky given [ALL-SKY, GAL-SLICE]
PRODUCT = 'CAL-DIFF' / Differential calibration spectra
EQUINOX = 2000.0 / equinox of coords in following tables
COMMENT
REFERENC= 'For additional information, please refer to the'
REFERENC= 'COBE Far Infrared Absolute Spectrophotometer (FIRAS)'
REFERENC= 'Explanatory Supplement, ed. J.C. Mather et al,'
REFERENC= 'COBE Ref. Pub. No. 97-C (Greenbelt, MD: NASA/GSFC),'
REFERENC= 'available in electronic form from the NSSDC.'
COMMENT
COMMENT COBE specific keywords
DATE-BEG= '24/11/89' / date of initial data represented (dd/mm/yy)
DATE-END= '21/09/90' / date of final data represented (dd/mm/yy)
PIXRESOL= 6 / Quad tree pixel resolution [6, 9]
COMMENT
COMMENT FIRAS specific keywords
CHANSCAN= 'LLSS' / Channel and mirror transport mechanism scan
COMMENT / mode identifier. The first two characters
COMMENT / indicate the channel, the first being the
COMMENT / instrument side: right (R) or left (L); and
COMMENT / the second being the frequency: high (H) or
COMMENT / low (L). The third and fourth characters
COMMENT / indicate the scan mode, the third being the
COMMENT / scan length: short (S) or long (L); and the
COMMENT / fourth being the scan speed: slow (S) or
COMMENT / fast (F). In addition, the scan mode may
COMMENT / take the following values for low frequency
COMMENT / data only (channel = RL or LL):
COMMENT / FS: decimated SF data;
COMMENT / FL: truncated LF data.
MODLLABL= 'PASS4' / FIRAS calibration model solution label
MISS_SEG= 'ENTIRE_MISSION' / FIRAS segment of mission represented
NU_ZERO = 68.020812 / Optical frequency of initial data point in GHz
DELTA_NU= 13.604162 / Optical frequency interval between data points
COMMENT / in GHz
NUM_FREQ= 43 / Number of frequency points with good data
FFT_LENGTH= 640 / Length of Fast Fourier Transform used
END
COMMENT
TIMVERSN= 'OGIP/93-003' / OGIP memo number where the convention
COMMENT / is described
COMMENT The times reported in this file are atomic seconds elapsed
COMMENT since 00:00:00 UTC, 1 January 1981. Time information is
COMMENT recorded in a manner consistent with the convention specified
COMMENT in OGIP/93-003 with the understanding that time is counted
COMMENT in atomic seconds and the origin of time (MJDREF) is quoted
COMMENT in ephemeris MJD.

TIMESYS = '1981.00' / time system (same as IRAS)
 MJDREFI = 44605 / Integer portion of ephemeris MJD
 COMMENT / corresponding to 0h UTC 1 Jan 1981
 MJDREFF = 0.00059240741 / Fractional portion of ephemeris MJD
 COMMENT / corresponding to 0h UTC 1 Jan 1981
 TIMEUNIT='s' / unit for TSTART, TSTOP, TIMEZERO = seconds
 TSTART = 280713605.000 / observation start time in TIMESYS system
 TSTOP = 306806405.990 / observation stop time in TIMESYS system
 COMMENT
 COMMENT
 COMMENT FIRAS Spectrum
 COMMENT Project Dataset Record Structure
 COMMENT
 COMMENT
 COMMENT Instrument Attitude Information
 COMMENT
 COMMENT FIRAS pixel number (resolution 6)
 TFORM1='1J'
 TTYPE1='PIXEL' / entire fieldname = PIXEL
 OFFSET1=0
 TUNIT1=''

COMMENT Galactic longitude, in deg (0 -> 360)
 TFORM2='1E'
 TTYPE2='GAL_LON' / entire fieldname = GAL_LON
 OFFSET2=4
 TUNIT2='deg'

COMMENT Galactic latitude, in deg (-90 -> +90)
 TFORM3='1E'
 TTYPE3='GAL_LAT' / entire fieldname = GAL_LAT
 OFFSET3=8
 TUNIT3='deg'

COMMENT Ecliptic longitude, epoch 2000.0, in deg (0 -> 360)
 TFORM4='1E'
 TTYPE4='ECL_LON' / entire fieldname = ECL_LON
 OFFSET4=12
 TUNIT4='deg'

COMMENT Ecliptic latitude, epoch 2000.0, in deg (-90 -> +90)
 TFORM5='1E'
 TTYPE5='ECL_LAT' / entire fieldname = ECL_LAT
 OFFSET5=16
 TUNIT5='deg'

COMMENT Right ascension, in deg (0 -> 360)
 TFORM6='1E'
 TTYPE6='RA' / entire fieldname = RA
 OFFSET6=20
 TUNIT6='deg'

COMMENT Declination, in deg (-90 -> +90)
 TFORM7='1E'
 TTYPE7='DEC' / entire fieldname = DEC
 OFFSET7=24
 TUNIT7='deg'

COMMENT
 COMMENT Spectrum and Sigmas
 COMMENT

COMMENT Real part of spectrum, in MJy/sr
 TFORM8='210E'
 TDIM8=(210)
 TTYPE8='REAL_SPE' / entire fieldname = REAL_SPECTRUM
 OFFSET8=28
 TUNIT8='MJy/sr'
 COMMENT Imaginary part of spectrum, in MJy/sr
 TFORM9='210E'
 TDIM9=(210)
 TTYPE9='IMAG_SPE' / entire fieldname = IMAG_SPECTRUM
 OFFSET9=868
 TUNIT9='MJy/sr'
 COMMENT Sigmas of spectrum, in MJy/sr
 TFORM10='210E'
 TDIM10=(210)
 TTYPE10='SIGMAS' / entire fieldname = SIGMAS
 OFFSET10=1708
 TUNIT10='MJy/sr'
 COMMENT
 COMMENT Number and Times of IFGs
 COMMENT
 COMMENT Number of IFGs in spectrum
 TFORM11='1J'
 TTYPE11='NUM_IFGS' / entire fieldname = NUM_IFGS
 OFFSET11=2548
 TUNIT11=' '
 COMMENT Glitch rate for spectrum, in glitches/s
 TFORM12='1E'
 TTYPE12='GLITCH_R' / entire fieldname = GLITCH_RATE
 OFFSET12=2552
 TUNIT12='gl/s'
 COMMENT Glitch rate weighted number of IFGs in spectrum
 TFORM13='1E'
 TTYPE13='ADJ_NUM_' / entire fieldname = ADJ_NUM_IFGS
 OFFSET13=2556
 TUNIT13=' '
 COMMENT Average data collection time in seconds since
 COMMENT 00:00.00 UTC, 1 January 1981
 TFORM14='1D'
 TTYPE14='TIME' / entire fieldname = TIME
 OFFSET14=2560
 TUNIT14='s'
 COMMENT Observation times of IFGs in the spectrum;
 COMMENT in hundredths of days since ejection of the
 COMMENT FIRAS aperture cover at
 COMMENT 11:18.00 UTC, 21 November 1989
 TFORM15='100J'
 TDIM15=(100)
 TTYPE15='IFG_TIME' / entire fieldname = IFG_TIMES
 OFFSET15=2568
 TUNIT15='d*100'
 COMMENT Flag indicating orphan IFGs, which occur
 COMMENT when a spectrum is composed of only 1 or
 COMMENT 2 IFGs. In all other cases, the spectrum

COMMENT is composed of three or more IFGs;
 COMMENT applicable only to sky data.
 COMMENT Flag = 1 indicates 1 or 2 IFGs in the spectrum;
 COMMENT flag = 0 indicates 3 or more IFGs in the spectrum.
 TFORM16='1B'
 TTYPE16='ORPHANS' / entire fieldname = ORPHANS
 OFFSET16=2968
 TUNIT16=' '
 COMMENT
 COMMENT Template Information
 COMMENT
 COMMENT Number of templates subtracted from spectrum
 TFORM17='1J'
 TTYPE17='NUM_TEMP' / entire fieldname = NUM_TEMPLATES
 OFFSET17=2969
 TUNIT17=' '
 COMMENT Number of IFGs used in forming the templates
 TFORM18='1J'
 TTYPE18='TPL_NUM_' / entire fieldname = TPL_NUM_IFGS
 OFFSET18=2973
 TUNIT18=' '
 COMMENT Flag indicating use of IFGs from neighboring
 COMMENT pixels in template formation (suitable
 COMMENT IFGs from 8 neighboring pixels);
 COMMENT applicable only to sky data.
 COMMENT Flag = 1 indicates neighbor IFGs were used;
 COMMENT flag = 0 indicates neighbor IFGs were not used.
 TFORM19='1B'
 TTYPE19='NEIGHBOR' / entire fieldname = NEIGHBORS
 OFFSET19=2977
 TUNIT19=' '
 COMMENT Number of IFGs from neighboring pixels used in
 COMMENT forming the templates; only for sky data
 TFORM20='1J'
 TTYPE20='NBR_NUM_' / entire fieldname = NBR_NUM_IFGS
 OFFSET20=2978
 TUNIT20=' '
 COMMENT Observation times of IFGs used in template
 COMMENT formation; in seconds since
 COMMENT 00:00.00 UTC, 1 January 1981
 TFORM21='100D'
 TDIM21='(100)'
 TTYPE21='TPL_TIME' / entire fieldname = TPL_TIMES
 OFFSET21=2982
 TUNIT21='s'
 COMMENT Pixel numbers of IFGs used in templates
 TFORM22='100J'
 TDIM22='(100)'
 TTYPE22='TPL_PIXE' / entire fieldname = TPL_PIXELS
 OFFSET22=3782
 TUNIT22=' '
 COMMENT
 COMMENT Bolometer Response Function
 COMMENT

COMMENT Commanded bolometer bias, in V
TFORM23='1E'
TTYPER23='BOLOM_BI' / entire fieldname = BOLOM_BIAS
OFFSET23=4182
TUNIT23='V'
COMMENT Bolometer readout voltage, in V
TFORM24='1E'
TTYPER24='BOLOM_VO' / entire fieldname = BOLOM_VOLTAGE
OFFSET24=4186
TUNIT24='V'
COMMENT Bolometer DC response, in V/W
TFORM25='1E'
TTYPER25='DC_RESPO' / entire fieldname = DC_RESPONSE
OFFSET25=4190
TUNIT25='V/W'
COMMENT Bolometer time constant, in s
TFORM26='1E'
TTYPER26='TIME_CON' / entire fieldname = TIME_CONSTANT
OFFSET26=4194
TUNIT26='s'
COMMENT Linear autophase correction, in rad
TFORM27='1E'
TTYPER27='PHASE_CO' / entire fieldname = PHASE_CORR
OFFSET27=4198
TUNIT27='rad'
COMMENT
COMMENT Instrument Temperatures
COMMENT External calibrator temperature, in K
TFORM28='1E'
TTYPER28='XCAL_TEM' / entire fieldname = XCAL_TEMP
OFFSET28=4202
TUNIT28='K'
COMMENT Internal calibrator temperature, in K
TFORM29='1E'
TTYPER29='ICAL_TEM' / entire fieldname = ICAL_TEMP
OFFSET29=4206
TUNIT29='K'
COMMENT Sky horn temperature, in K
TFORM30='1E'
TTYPER30='SKYHORN_' / entire fieldname = SKYHORN_TEMP
OFFSET30=4210
TUNIT30='K'
COMMENT Reference horn temperature, in K
TFORM31='1E'
TTYPER31='REFHORN_' / entire fieldname = REFHORN_TEMP
OFFSET31=4214
TUNIT31='K'
COMMENT Dihedral mirror temperature, in K
TFORM32='1E'
TTYPER32='DIHEDRAL' / entire fieldname = DIHEDRAL_TEMP
OFFSET32=4218
TUNIT32='K'
COMMENT Collimator mirror temperature, in K

```

TFORM33='1E'
TTYPER33='MIRROR_T' / entire fieldname = MIRROR_TEMP
OFFSET33=4222
TUNIT33='K'
COMMENT Bolometer operating temperature, in K
TFORM34='1E'
TTYPER34='BOLOM_TE' / entire fieldname = BOLOM_TEMP
OFFSET34=4226
TUNIT34='K'
COMMENT Bolometer bath temperature, in K
TFORM35='1E'
TTYPER35='BATH_TEM' / entire fieldname = BATH_TEMP
OFFSET35=4230
TUNIT35='K'
COMMENT
END

```

Differential Sky Spectra

```

SIMPLE =          T / specifies FITS standard file
BITPIX =         32 / if rasterized array follows, data 32-bit int
NAXIS  =         0 / no rasterized arrays follow
EXTEND =         T / Table extensions may follow
ORIGIN  = 'CDAC'   / Cosmology Data Analysis Center
TELESCOP= 'COBE'   / COsmic Background Explorer satellite
INSTRUME= 'FIRAS'  / COBE instrument [DIRBE, DMR, FIRAS]
OBJECT  = 'ALL-SKY' / part of sky given [ALL-SKY, GAL-SLICE]
PRODUCT = 'SKY-DIFF' / Differential sky spectra
EQUINOX =         2000.0 / equinox of coords in following tables
COMMENT
REFERENC= 'For additional information, please refer to the'
REFERENC= 'COBE Far Infrared Absolute Spectrophotometer (FIRAS)'
REFERENC= 'Explanatory Supplement, ed. J.C. Mather et al,'
REFERENC= 'COBE Ref. Pub. No. 97-C (Greenbelt, MD: NASA/GSFC),'
REFERENC= 'available in electronic form from the NSSDC.'
COMMENT
COMMENT COBE specific keywords
DATE-BEG= '24/11/89'   / date of initial data represented (dd/mm/yy)
DATE-END= '21/09/90'   / date of final data represented (dd/mm/yy)
PIXRESOL=          6 / Quad tree pixel resolution [6, 9]
COMMENT
COMMENT FIRAS specific keywords
CHANSCAN= 'LLSS'      / Channel and mirror transport mechanism scan
COMMENT              / mode identifier. The first two characters
COMMENT              / indicate the channel, the first being the
COMMENT              / instrument side: right (R) or left (L); and
COMMENT              / the second being the frequency: high (H) or
COMMENT              / low (L). The third and fourth characters
COMMENT              / indicate the scan mode, the third being the
COMMENT              / scan length: short (S) or long (L); and the
COMMENT              / fourth being the scan speed: slow (S) or
COMMENT              / fast (F). In addition, the scan mode may

```

```

COMMENT          / take the following values for low frequency
COMMENT          / data only (channel = RL or LL):
COMMENT          /   FS: decimated SF data;
COMMENT          /   FL: truncated LF data.
MODLLABL='PASS4      '/ FIRAS calibration model solution label
MISS_SEG='ENTIRE_MISSION  '/ FIRAS segment of mission represented
NU_ZERO =      68.020812 / Optical frequency of initial data point in GHz
DELTA_NU=      13.604162 / Optical frequency interval between data points
COMMENT          / in GHz
NUM_FREQ=      43 / Number of frequency points with good data
FFT_LENGTH=    640 / Length of Fast Fourier Transform used
END
COMMENT
TIMVERSN='OGIP/93-003' / OGIP memo number where the convention
COMMENT          / is described
COMMENT The times reported in this file are atomic seconds elapsed
COMMENT since 00:00:00 UTC, 1 January 1981. Time information is
COMMENT recorded in a manner consistent with the convention specified
COMMENT in OGIP/93-003 with the understanding that time is counted
COMMENT in atomic seconds and the origin of time (MJDREF) is quoted
COMMENT in ephemeris MJD.
TIMESYS = '1981.00' / time system (same as IRAS)
MJDREFI =      44605 / Integer portion of ephemeris MJD
COMMENT          / corresponding to 0h UTC 1 Jan 1981
MJDREFF = 0.00059240741 / Fractional portion of ephemeris MJD
COMMENT          / corresponding to 0h UTC 1 Jan 1981
TIMEUNIT='s      ' / unit for TSTART, TSTOP, TIMEZERO = seconds
TSTART = 280713605.000 / observation start time in TIMESYS system
TSTOP  = 306806405.990 / observation stop time in TIMESYS system
COMMENT
COMMENT
COMMENT FIRAS Spectrum
COMMENT Project Dataset Record Structure
COMMENT
COMMENT Instrument Attitude Information
COMMENT
COMMENT FIRAS pixel number (resolution 6)
TFORM1='1J'
TTYPER1='PIXEL' / entire fieldname = PIXEL
OFFSET1=0
TUNIT1=''
COMMENT Galactic longitude, in deg (0 -> 360)
TFORM2='1E'
TTYPER2='GAL_LON' / entire fieldname = GAL_LON
OFFSET2=4
TUNIT2='deg'
COMMENT Galactic latitude, in deg (-90 -> +90)
TFORM3='1E'
TTYPER3='GAL_LAT' / entire fieldname = GAL_LAT
OFFSET3=8
TUNIT3='deg'
COMMENT Ecliptic longitude, epoch 2000.0, in deg (0 -> 360)
TFORM4='1E'

```

TTYPE4='ECL_LON' / entire fieldname = ECL_LON
 OFFSET4=12
 TUNIT4='deg'
 COMMENT Ecliptic latitude, epoch 2000.0, in deg (-90 -> +90)
 TFORM5='1E'
 TTYPE5='ECL_LAT' / entire fieldname = ECL_LAT
 OFFSET5=16
 TUNIT5='deg'
 COMMENT Right ascension, in deg (0 -> 360)
 TFORM6='1E'
 TTYPE6='RA' / entire fieldname = RA
 OFFSET6=20
 TUNIT6='deg'
 COMMENT Declination, in deg (-90 -> +90)
 TFORM7='1E'
 TTYPE7='DEC' / entire fieldname = DEC
 OFFSET7=24
 TUNIT7='deg'
 COMMENT
 COMMENT Spectrum and Sigmas
 COMMENT
 COMMENT Real part of spectrum, in MJy/sr
 TFORM8='210E'
 TDIM8='(210)'
 TTYPE8='REAL_SPE' / entire fieldname = REAL_SPECTRUM
 OFFSET8=28
 TUNIT8='MJy/sr'
 COMMENT Imaginary part of spectrum, in MJy/sr
 TFORM9='210E'
 TDIM9='(210)'
 TTYPE9='IMAG_SPE' / entire fieldname = IMAG_SPECTRUM
 OFFSET9=868
 TUNIT9='MJy/sr'
 COMMENT Sigmas of spectrum, in MJy/sr
 TFORM10='210E'
 TDIM10='(210)'
 TTYPE10='SIGMAS' / entire fieldname = SIGMAS
 OFFSET10=1708
 TUNIT10='MJy/sr'
 COMMENT
 COMMENT Number and Times of IFGs
 COMMENT
 COMMENT Number of IFGs in spectrum
 TFORM11='1J'
 TTYPE11='NUM_IFGS' / entire fieldname = NUM_IFGS
 OFFSET11=2548
 TUNIT11=' '
 COMMENT Glitch rate for spectrum, in glitches/s
 TFORM12='1E'
 TTYPE12='GLITCH_R' / entire fieldname = GLITCH_RATE
 OFFSET12=2552
 TUNIT12='gl/s'
 COMMENT Glitch rate weighted number of IFGs in spectrum
 TFORM13='1E'

TTYPE13='ADJ_NUM_' / entire fieldname = ADJ_NUM_IFGS
 OFFSET13=2556
 TUNIT13=' '
 COMMENT Average data collection time in seconds since
 COMMENT 00:00.00 UTC, 1 January 1981
 TFORM14='1D'
 TTYPE14='TIME' / entire fieldname = TIME
 OFFSET14=2560
 TUNIT14='s'
 COMMENT Observation times of IFGs in the spectrum;
 COMMENT in hundredths of days since ejection of the
 COMMENT FIRAS aperture cover at
 COMMENT 11:18.00 UTC, 21 November 1989
 TFORM15='100J'
 TDIM15='(100)'
 TTYPE15='IFG_TIME' / entire fieldname = IFG_TIMES
 OFFSET15=2568
 TUNIT15='d*100'
 COMMENT Flag indicating orphan IFGs, which occur
 COMMENT when a spectrum is composed of only 1 or
 COMMENT 2 IFGs. In all other cases, the spectrum
 COMMENT is composed of three or more IFGs;
 COMMENT applicable only to sky data.
 COMMENT Flag = 1 indicates 1 or 2 IFGS in the spectrum;
 COMMENT flag = 0 indicates 3 or more IFGs in the spectrum.
 TFORM16='1B'
 TTYPE16='ORPHANS' / entire fieldname = ORPHANS
 OFFSET16=2968
 TUNIT16=' '
 COMMENT
 COMMENT Template Information
 COMMENT
 COMMENT Number of templates subtracted from spectrum
 TFORM17='1J'
 TTYPE17='NUM_TEMP' / entire fieldname = NUM_TEMPLATES
 OFFSET17=2969
 TUNIT17=' '
 COMMENT Number of IFGS used in forming the templates
 TFORM18='1J'
 TTYPE18='TPL_NUM_' / entire fieldname = TPL_NUM_IFGS
 OFFSET18=2973
 TUNIT18=' '
 COMMENT Flag indicating use of IFGs from neighboring
 COMMENT pixels in template formation (suitable
 COMMENT IFGs from 8 neighboring pixels);
 COMMENT applicable only to sky data.
 COMMENT Flag = 1 indicates neighbor IFGs were used;
 COMMENT flag = 0 indicates neighbor IFGs were not used.
 TFORM19='1B'
 TTYPE19='NEIGHBOR' / entire fieldname = NEIGHBORS
 OFFSET19=2977
 TUNIT19=' '
 COMMENT Number of IFGS from neighboring pixels used in
 COMMENT forming the templates; only for sky data

TFORM20='1J'
 TTYPE20='NBR_NUM_' / entire fieldname = NBR_NUM_IFGS
 OFFSET20=2978
 TUNIT20=' '
 COMMENT Observation times of IFGs used in template
 COMMENT formation; in seconds since
 COMMENT 00:00.00 UTC, 1 January 1981
 TFORM21='100D'
 TDIM21='(100)'
 TTYPE21='TPL_TIME' / entire fieldname = TPL_TIMES
 OFFSET21=2982
 TUNIT21='s'
 COMMENT Pixel numbers of IFGs used in templates
 TFORM22='100J'
 TDIM22='(100)'
 TTYPE22='TPL_PIXE' / entire fieldname = TPL_PIXELS
 OFFSET22=3782
 TUNIT22=' '
 COMMENT
 COMMENT Bolometer Response Function
 COMMENT
 COMMENT Commanded bolometer bias, in V
 TFORM23='1E'
 TTYPE23='BOLOM_BI' / entire fieldname = BOLOM_BIAS
 OFFSET23=4182
 TUNIT23='V'
 COMMENT Bolometer readout voltage, in V
 TFORM24='1E'
 TTYPE24='BOLOM_VO' / entire fieldname = BOLOM_VOLTAGE
 OFFSET24=4186
 TUNIT24='V'
 COMMENT Bolometer DC response, in V/W
 TFORM25='1E'
 TTYPE25='DC_RESPO' / entire fieldname = DC_RESPONSE
 OFFSET25=4190
 TUNIT25='V/W'
 COMMENT Bolometer time constant, in s
 TFORM26='1E'
 TTYPE26='TIME_CON' / entire fieldname = TIME_CONSTANT
 OFFSET26=4194
 TUNIT26='s'
 COMMENT Linear autophase correction, in rad
 TFORM27='1E'
 TTYPE27='PHASE_CO' / entire fieldname = PHASE_CORR
 OFFSET27=4198
 TUNIT27='rad'
 COMMENT
 COMMENT Instrument Temperatures
 COMMENT
 COMMENT External calibrator temperature, in K
 TFORM28='1E'
 TTYPE28='XCAL_TEM' / entire fieldname = XCAL_TEMP
 OFFSET28=4202
 TUNIT28='K'

COMMENT Internal calibrator temperature, in K
 TFORM29='1E'
 TTYPE29='ICAL_TEM' / entire fieldname = ICAL_TEMP
 OFFSET29=4206
 TUNIT29='K'
 COMMENT Sky horn temperature, in K
 TFORM30='1E'
 TTYPE30='SKYHORN_' / entire fieldname = SKYHORN_TEMP
 OFFSET30=4210
 TUNIT30='K'
 COMMENT Reference horn temperature, in K
 TFORM31='1E'
 TTYPE31='REFHORN_' / entire fieldname = REFHORN_TEMP
 OFFSET31=4214
 TUNIT31='K'
 COMMENT Dihedral mirror temperature, in K
 TFORM32='1E'
 TTYPE32='DIHEDRAL' / entire fieldname = DIHEDRAL_TEMP
 OFFSET32=4218
 TUNIT32='K'
 COMMENT Collimator mirror temperature, in K
 TFORM33='1E'
 TTYPE33='MIRROR_T' / entire fieldname = MIRROR_TEMP
 OFFSET33=4222
 TUNIT33='K'
 COMMENT Bolometer operating temperature, in K
 TFORM34='1E'
 TTYPE34='BOLOM_TE' / entire fieldname = BOLOM_TEMP
 OFFSET34=4226
 TUNIT34='K'
 COMMENT Bolometer bath temperature, in K
 TFORM35='1E'
 TTYPE35='BATH_TEM' / entire fieldname = BATH_TEMP
 OFFSET35=4230
 TUNIT35='K'
 COMMENT
 END

Destriped Sky Spectra

SIMPLE = T / specifies FITS standard file
 BITPIX = 32 / if rasterized array follows, data 32-bit int
 NAXIS = 0 / no rasterized arrays follow
 EXTEND = T / Table extensions may follow
 ORIGIN = 'CDAC' / Cosmology Data Analysis Center
 TELESCOP= 'COBE' / COsmic Background Explorer satellite
 INSTRUME= 'FIRAS' / COBE instrument [DIRBE, DMR, FIRAS]
 OBJECT = 'ALL-SKY' / part of sky given [ALL-SKY, GAL-SLICE]
 PRODUCT = 'SKY-DEST' / Destriped sky spectra
 EQUINOX = 2000.0 / equinox of coords in following tables
 COMMENT
 REFERENC= 'For additional information, please refer to the'

REFERENC= 'COBE Far Infrared Absolute Spectrophotometer (FIRAS)'
 REFERENC= 'Explanatory Supplement, ed. J.C. Mather et al,'
 REFERENC= 'COBE Ref. Pub. No. 97-C (Greenbelt, MD: NASA/GSFC),'
 REFERENC= 'available in electronic form from the NSSDC.'
 COMMENT
 COMMENT COBE specific keywords
 DATE-BEG= '24/11/89 / date of initial data represented (dd/mm/yy)
 DATE-END= '21/09/90 / date of final data represented (dd/mm/yy)
 PIXRESOL= 6 / Quad tree pixel resolution [6, 9]
 COMMENT
 COMMENT FIRAS specific keywords
 CHANSCAN= 'LOWF' / Field indicating combination of data from
 COMMENT / various channels and mirror transport
 COMMENT / mechanism scan modes. LOWF is a combination
 COMMENT / of the low frequency RLSS, RLFS, RLFL, LLSS,
 COMMENT / LLFS, and LLFL data. HIGH is a combination of
 COMMENT / the high frequency RHSS, RHSF, RHLF, LHSS,
 COMMENT / LHSF, and LHLF data. HIF2, HIF3, and HIF4
 COMMENT / divide the HIGH data into three frequency
 COMMENT / bands, as indicated by the NU_ZERO and
 COMMENT / NUM_FREQ fields. HRES is a combination of the
 COMMENT / high resolution RLLF and LLLF data. For the
 COMMENT / uncombined channel/scan mode labels, the first
 COMMENT / two characters of the label indicate the
 COMMENT / channel, the first being the instrument side:
 COMMENT / right (R) or left (L); and the second being
 COMMENT / the frequency: high (H) or low (L). The
 COMMENT / third and fourth characters indicate the scan
 COMMENT / mode, the third being the scan length: short
 COMMENT / (S) or long (L); and the fourth being the scan
 COMMENT / speed: slow (S) or fast (F). In addition,
 COMMENT / the scan mode may take the following values
 COMMENT / for low frequency data only (channel = RL or
 COMMENT / LL):
 COMMENT / FS: decimated SF data;
 COMMENT / FL: truncated LF data.
 MODLLABL= 'PASS4' / FIRAS calibration model solution label
 MISS_SEG= 'ENTIRE_MISSION' / FIRAS segment of mission represented
 NU_ZERO = 68.020812 / Optical frequency of initial data point in GHz
 DELTA_NU= 13.604162 / Optical frequency interval between data points
 COMMENT / in GHz
 NUM_FREQ= 43 / Number of frequency points with good data
 END
 COMMENT
 COMMENT
 COMMENT FIRAS Destriped Sky Spectrum
 COMMENT Project Dataset Record Structure
 COMMENT
 COMMENT
 COMMENT FIRAS pixel number (resolution 6)
 TFORM1='1J'
 TTYPE1='PIXEL' / entire fieldname = PIXEL
 OFFSET1=0
 TUNIT1=''

```

COMMENT Galactic longitude, in deg (0 -> 360)
TFORM2='1E'
TTYPER2='GAL_LON' / entire fieldname = GAL_LON
OFFSET2=4
TUNIT2='deg'
COMMENT Galactic latitude, in deg (-90 -> 90)
TFORM3='1E'
TTYPER3='GAL_LAT' / entire fieldname = GAL_LAT
OFFSET3=8
TUNIT3='deg'
COMMENT Pixel weight
TFORM4='1E'
TTYPER4='WEIGHT' / entire fieldname = WEIGHT
OFFSET4=12
TUNIT4=' '
COMMENT Flag indicating whether or not the
COMMENT calibrated spectra in this pixel
COMMENT were used for destriping:
COMMENT 1 = spectra were used;
COMMENT 0 = spectra were not used.
TFORM5='1B'
TTYPER5='STR_USED' / entire fieldname = STR_USED
OFFSET5=16
TUNIT5=' '
COMMENT Destriped spectrum, in MJy/sr
TFORM6='182E'
TDIM6='(182)'
TTYPER6='SPECTRUM' / entire fieldname = SPECTRUM
OFFSET6=17
TUNIT6='MJy/sr'
COMMENT
END

```

Coadd-Based Zodiacal Light Model

```

SIMPLE =          T / specifies FITS standard file
BITPIX =         32 / if rasterized array follows, data 32-bit int
NAXIS  =         0 / no rasterized arrays follow
EXTEND =         T / Table extensions may follow
ORIGIN  = 'CDAC'   / Cosmology Data Analysis Center
TELESCOP= 'COBE'   / COsmic Background Explorer satellite
INSTRUME= 'FIRAS'  / COBE instrument [DIRBE, DMR, FIRAS]
OBJECT  = 'ALL-SKY' / part of sky given [ALL-SKY, GAL-SLICE]
PRODUCT = 'COADD-ZM' / Coadd-based zodiacal light model
EQUINOX =        2000.0 / equinox of coords in following tables
COMMENT
REFERENC= 'For additional information, please refer to the'
REFERENC= 'COBE Far Infrared Absolute Spectrophotometer (FIRAS)'
REFERENC= 'Explanatory Supplement, ed. J.C. Mather et al,'
REFERENC= 'COBE Ref. Pub. No. 97-C (Greenbelt, MD: NASA/GSFC),'
REFERENC= 'available in electronic form from the NSSDC.'
COMMENT

```

COMMENT COBE specific keywords
 DATE-BEG= '24/11/89 '/ date of initial data represented (dd/mm/yy)
 DATE-END= '21/09/90 '/ date of final data represented (dd/mm/yy)
 PIXRESOL= 6 / Quad tree pixel resolution [6, 9]
 COMMENT
 COMMENT FIRAS specific keywords
 CHANSCAN= 'HIGH' / Field indicating combination of data from
 COMMENT / various channels and mirror transport
 COMMENT / mechanism scan modes. HIGH is a combination
 COMMENT / of the high frequency RHSS, RHSF, RHLF, LHSS,
 COMMENT / LHSF, and LHLF data. For the uncombined
 COMMENT / channel/scan mode labels, the first two
 COMMENT / characters of the label indicate the channel,
 COMMENT / the first being the instrument side:
 COMMENT / right (R) or left (L); and the second being
 COMMENT / the frequency: high (H) or low (L). The
 COMMENT / third and fourth characters indicate the scan
 COMMENT / mode, the third being the scan length: short
 COMMENT / (S) or long (L); and the fourth being the scan
 COMMENT / speed: slow (S) or fast (F).
 MISS_SEG= 'ENTIRE_MISSION '/ FIRAS segment of mission represented
 END
 COMMENT
 COMMENT
 COMMENT FIRAS Coadd Zodi Model
 COMMENT Project Dataset Record Structure
 COMMENT
 COMMENT
 COMMENT FIRAS pixel number (resolution 6)
 TFORM1='1J'
 TTYPE1='PIXEL' / entire fieldname = PIXEL
 OFFSET1=0
 TUNIT1=''
 COMMENT Field indicating the channel and
 COMMENT scan mode of the coadded sky
 COMMENT interferogram corresponding to
 COMMENT this zodi model spectrum;
 COMMENT together with REC_NUM, establishes
 COMMENT a correspondence between the
 COMMENT coadded sky interferograms (or
 COMMENT calibrated sky spectra) and
 COMMENT the zodi model spectra.
 TFORM2='4A'
 TTYPE2='CHANSCAN' / entire fieldname = CHANSCAN
 OFFSET2=4
 TUNIT2=''
 COMMENT Field indicating the record number
 COMMENT of the coadded sky interferogram
 COMMENT corresponding to this zodi model
 COMMENT spectrum; together with CHANSCAN,
 COMMENT establishes a correspondence between
 COMMENT the coadded sky interferograms (or
 COMMENT calibrated sky spectra) and
 COMMENT the zodi model spectra.

```

TFORM3='1J'
TTYPER3='REC_NUM' / entire fieldname = REC_NUM
OFFSET3=8
TUNIT3=' '
COMMENT Pixel weight
TFORM4='1E'
TTYPER4='WEIGHT' / entire fieldname = WEIGHT
OFFSET4=12
TUNIT4=' '
COMMENT Zodi model spectrum, in MJy/sr
TFORM5='170E'
TDIM5='(170)'
TTYPER5='ZODI_MOD' / entire fieldname = ZODI_MOD
OFFSET5=16
TUNIT5='MJy/sr'
COMMENT
END

```

Pixel-Based Zodiacal Light Model

```

SIMPLE =          T / specifies FITS standard file
BITPIX =         32 / if rasterized array follows, data 32-bit int
NAXIS  =          0 / no rasterized arrays follow
EXTEND =          T / Table extensions may follow
ORIGIN  = 'CDAC'   / Cosmology Data Analysis Center
TELESCOP= 'COBE'   / COsmic Background Explorer satellite
INSTRUME= 'FIRAS'  / COBE instrument [DIRBE, DMR, FIRAS]
OBJECT  = 'ALL-SKY' / part of sky given [ALL-SKY, GAL-SLICE]
PRODUCT = 'PIXEL-ZM' / Pixel-based zodiacal light model
EQUINOX =         2000.0 / equinox of coords in following tables
COMMENT
REFERENC= 'For additional information, please refer to the'
REFERENC= 'COBE Far Infrared Absolute Spectrophotometer (FIRAS)'
REFERENC= 'Explanatory Supplement, ed. J.C. Mather et al,'
REFERENC= 'COBE Ref. Pub. No. 97-C (Greenbelt, MD: NASA/GSFC),'
REFERENC= 'available in electronic form from the NSSDC.'
COMMENT
COMMENT COBE specific keywords
DATE-BEG= '24/11/89' / date of initial data represented (dd/mm/yy)
DATE-END= '21/09/90' / date of final data represented (dd/mm/yy)
PIXRESOL=         6 / Quad tree pixel resolution [6, 9]
COMMENT
COMMENT FIRAS specific keywords
CHANSCAN= 'HIGH'   / Field indicating combination of data from
COMMENT           / various channels and mirror transport
COMMENT           / mechanism scan modes. HIGH is a combination
COMMENT           / of the high frequency RHSS, RHSF, RHLF, LHSS,
COMMENT           / LHSF, and LHLF data. For the uncombined
COMMENT           / channel/scan mode labels, the first two
COMMENT           / characters of the label indicate the channel,
COMMENT           / the first being the instrument side:
COMMENT           / right (R) or left (L); and the second being

```

```

COMMENT          / the frequency: high (H) or low (L). The
COMMENT          / third and fourth characters indicate the scan
COMMENT          / mode, the third being the scan length: short
COMMENT          / (S) or long (L); and the fourth being the scan
COMMENT          / speed: slow (S) or fast (F).
MISS_SEG= 'ENTIRE_MISSION' / FIRAS segment of mission represented
END
COMMENT
COMMENT
COMMENT FIRAS Pixel Zodi Model
COMMENT Project Dataset Record Structure
COMMENT
COMMENT
COMMENT FIRAS pixel number (resolution 6)
TFORM1='1J'
TTYPER1='PIXEL' / entire fieldname = PIXEL
OFFSET1=0
TUNIT1=' '
COMMENT Galactic longitude, in deg (0 -> 360)
TFORM2='1E'
TTYPER2='GAL_LON' / entire fieldname = GAL_LON
OFFSET2=4
TUNIT2='deg'
COMMENT Galactic latitude, in deg (-90 -> 90)
TFORM3='1E'
TTYPER3='GAL_LAT' / entire fieldname = GAL_LAT
OFFSET3=8
TUNIT3='deg'
COMMENT Zodi model spectrum, in MJy/sr
TFORM4='170E'
TDIM4='(170)'
TTYPER4='ZODI_MOD' / entire fieldname = ZODI_MOD
OFFSET4=12
TUNIT4='MJy/sr'
COMMENT
END

```

DIRBE Gradient Kernel

```

SIMPLE =          T / specifies FITS standard file
BITPIX =          32 / if rasterized array follows, data 32-bit int
NAXIS =           0 / no rasterized arrays follow
EXTEND =          T / Table extensions may follow
ORIGIN = 'CDAC'   / Cosmology Data Analysis Center
TELESCOP= 'COBE'  / COsmic Background Explorer satellite
INSTRUME= 'FIRAS' / COBE instrument [DIRBE, DMR, FIRAS]
OBJECT = 'ALL-SKY' / part of sky given [ALL-SKY, GAL-SLICE]
PRODUCT = 'DIRBE-GK' / DIRBE gradient kernel
EQUINOX =          2000.0 / equinox of coords in following tables
COMMENT
REFERENC= 'For additional information, please refer to the'
REFERENC= 'COBE Far Infrared Absolute Spectrophotometer (FIRAS)'

```

REFERENC= 'Explanatory Supplement, ed. J.C. Mather et al,'
 REFERENC= 'COBE Ref. Pub. No. 97-C (Greenbelt, MD: NASA/GSFC),'
 REFERENC= 'available in electronic form from the NSSDC.'
 COMMENT
 COMMENT COBE specific keywords
 DATE-BEG= '24/11/89' / date of initial data represented (dd/mm/yy)
 DATE-END= '21/09/90' / date of final data represented (dd/mm/yy)
 PIXRESOL= 6 / Quad tree pixel resolution [6, 9]
 COMMENT
 COMMENT FIRAS specific keywords
 CHANSCAN= 'LOWF' / Field indicating combination of data from
 COMMENT / various channels and mirror transport
 COMMENT / mechanism scan modes. LOWF is a combination
 COMMENT / of the low frequency RLSS, RLFS, RLFL, LLSS,
 COMMENT / LLFS, and LLFL data. HIGH is a combination of
 COMMENT / the high frequency RHSS, RHSF, RHLF, LHSS,
 COMMENT / LHSF, and LHLF data. HRES is a combination of
 COMMENT / the high resolution RLLF and LLLF data. For
 COMMENT / the uncombined channel/scan mode labels, the
 COMMENT / first two characters of the label indicate the
 COMMENT / channel, the first being the instrument side:
 COMMENT / right (R) or left (L); and the second being
 COMMENT / the frequency: high (H) or low (L). The
 COMMENT / third and fourth characters indicate the scan
 COMMENT / mode, the third being the scan length: short
 COMMENT / (S) or long (L); and the fourth being the scan
 COMMENT / speed: slow (S) or fast (F). In addition,
 COMMENT / the scan mode may take the following values
 COMMENT / for low frequency data only (channel = RL or
 COMMENT / LL):
 COMMENT / FS: decimated SF data;
 COMMENT / FL: truncated LF data.
 MISS_SEG= 'ENTIRE_MISSION' / FIRAS segment of mission represented
 END
 COMMENT
 COMMENT
 COMMENT FIRAS DIRBE Gradient Kernel
 COMMENT Project Dataset Record Structure
 COMMENT
 COMMENT
 COMMENT FIRAS pixel number (resolution 6)
 TFORM1='1J'
 TTYPE1='PIXEL' / entire fieldname = PIXEL
 OFFSET1=0
 TUNIT1=' '
 COMMENT Field indicating the channel and
 COMMENT scan mode of the coadded sky
 COMMENT interferogram corresponding to
 COMMENT these DIRBE values; together
 COMMENT with REC_NUM, establishes a
 COMMENT correspondence between the
 COMMENT coadded sky interferograms (or
 COMMENT calibrated sky spectra) and
 COMMENT the DIRBE values.

```

TFORM2='4A'
TTYPE2='CHANSCAN' / entire fieldname = CHANSCAN
OFFSET2=4
TUNIT2=' '
COMMENT Field indicating the record number
COMMENT of the coadded sky interferogram
COMMENT corresponding to these DIRBE values;
COMMENT together with CHANSCAN, establishes
COMMENT a correspondence between the coadded
COMMENT sky interferograms (or calibrated
COMMENT sky spectra) and the DIRBE values.
TFORM3='1J'
TTYPE3='REC_NUM' / entire fieldname = REC_NUM
OFFSET3=8
TUNIT3=' '
COMMENT Pixel weight
TFORM4='1E'
TTYPE4='WEIGHT' / entire fieldname = WEIGHT
OFFSET4=12
TUNIT4=' '
COMMENT DIRBE band 8 gradient kernel
TFORM5='1E'
TTYPE5='BAND_8' / entire fieldname = BAND_8
OFFSET5=16
TUNIT5=' '
COMMENT DIRBE band 9 gradient kernel
TFORM6='1E'
TTYPE6='BAND_9' / entire fieldname = BAND_9
OFFSET6=20
TUNIT6=' '
COMMENT DIRBE band 10 gradient kernel
TFORM7='1E'
TTYPE7='BAND_10' / entire fieldname = BAND_10
OFFSET7=24
TUNIT7=' '
COMMENT
END

```

Physical Stripes

```

SIMPLE =          T / specifies FITS standard file
BITPIX =         32 / if rasterized array follows, data 32-bit int
NAXIS =          0 / no rasterized arrays follow
EXTEND =         T / Table extensions may follow
ORIGIN = 'CDAC'   / Cosmology Data Analysis Center
TELESCOP= 'COBE'  / COsmic Background Explorer satellite
INSTRUME= 'FIRAS' / COBE instrument [DIRBE, DMR, FIRAS]
OBJECT = 'ALL-SKY' / part of sky given [ALL-SKY, GAL-SLICE]
PRODUCT = 'PHYS-ST' / Physical stripes
EQUINOX =        2000.0 / equinox of coords in following tables
COMMENT
REFERENC= 'For additional information, please refer to the'

```


REFERENC= 'COBE Far Infrared Absolute Spectrophotometer (FIRAS)'
 REFERENC= 'Explanatory Supplement, ed. J.C. Mather et al.'
 REFERENC= 'COBE Ref. Pub. No. 97-C (Greenbelt, MD: NASA/GSFC),'
 REFERENC= 'available in electronic form from the NSSDC.'
 COMMENT
 COMMENT COBE specific keywords
 DATE-BEG= '24/11/89 ' / date of initial data represented (dd/mm/yy)
 DATE-END= '21/09/90 ' / date of final data represented (dd/mm/yy)
 PIXRESOL= 6 / Quad tree pixel resolution [6, 9]
 COMMENT
 COMMENT FIRAS specific keywords
 CHANSCAN= 'LOWF' / Field indicating combination of data from
 COMMENT / various channels and mirror transport
 COMMENT / mechanism scan modes. LOWF is a combination
 COMMENT / of the low frequency RLSS, RLFS, RLFL, LLSS,
 COMMENT / LLFS, and LLFL data. HIGH is a combination of
 COMMENT / the high frequency RHSS, RHSF, RHLF, LHSS,
 COMMENT / LHSF, and LHLF data. HIF2, HIF3, and HIF4
 COMMENT / divide the HIGH data into three frequency
 COMMENT / bands, as indicated by the NU_ZERO and
 COMMENT / NUM_FREQ fields. HRES is a combination of the
 COMMENT / high resolution RLLF and LLLF data. For the
 COMMENT / uncombined channel/scan mode labels, the first
 COMMENT / two characters of the label indicate the
 COMMENT / channel, the first being the instrument side:
 COMMENT / right (R) or left (L); and the second being
 COMMENT / the frequency: high (H) or low (L). The
 COMMENT / third and fourth characters indicate the scan
 COMMENT / mode, the third being the scan length: short
 COMMENT / (S) or long (L); and the fourth being the scan
 COMMENT / speed: slow (S) or fast (F). In addition,
 COMMENT / the scan mode may take the following values
 COMMENT / for low frequency data only (channel = RL or
 COMMENT / LL):
 COMMENT / FS: decimated SF data;
 COMMENT / FL: truncated LF data.
 MODLLABL= 'PASS4 ' / FIRAS calibration model solution label
 MISS_SEG= 'ENTIRE_MISSION' / FIRAS segment of mission represented
 NU_ZERO = 68.020812 / Optical frequency of initial data point in GHz
 DELTA_NU= 13.604162 / Optical frequency interval between data points
 COMMENT / in GHz
 NUM_FREQ= 43 / Number of frequency points with good data
 END
 COMMENT
 COMMENT
 COMMENT FIRAS Physical Stripe
 COMMENT Project Dataset Record Structure
 COMMENT
 COMMENT
 COMMENT Stripe identifier
 TFORM1='40A'
 TTYPE1='STR_ID' / entire fieldname = STR_ID
 OFFSET1=0
 TUNIT1=''

```

COMMENT Stripe spectrum, in MJy/sr
TFORM2='182E'
TDIM2='(182)'
TTYPER2='STR_SPEC' / entire fieldname = STR_SPEC
OFFSET2=40
TUNIT2='MJy/sr'
COMMENT Stripe rect array (dimensionless)
TFORM3='6144E'
TDIM3='(6144)'
TTYPER3='STR_RECT' / entire fieldname = STR_RECT
OFFSET3=768
TUNIT3=' '
COMMENT Stripe covariance (dimensionless)
TFORM4='30E'
TDIM4='(30)'
TTYPER4='STR_COVR' / entire fieldname = STR_COVR
OFFSET4=25344
TUNIT4=' '
COMMENT
END

```

Orthogonal Stripes

```

SIMPLE =          T / specifies FITS standard file
BITPIX =         32 / if rasterized array follows, data 32-bit int
NAXIS =          0 / no rasterized arrays follow
EXTEND =         T / Table extensions may follow
ORIGIN = 'CDAC'   / Cosmology Data Analysis Center
TELESCOP= 'COBE'  / COsmic Background Explorer satellite
INSTRUME= 'FIRAS' / COBE instrument [DIRBE, DMR, FIRAS]
OBJECT = 'ALL-SKY' / part of sky given [ALL-SKY, GAL-SLICE]
PRODUCT = 'ORTHO-ST' / Orthogonal stripes
EQUINOX =        2000.0 / equinox of coords in following tables
COMMENT
REFERENC= 'For additional information, please refer to the'
REFERENC= 'COBE Far Infrared Absolute Spectrophotometer (FIRAS)'
REFERENC= 'Explanatory Supplement, ed. J.C. Mather et al,'
REFERENC= 'COBE Ref. Pub. No. 97-C (Greenbelt, MD: NASA/GSFC),'
REFERENC= 'available in electronic form from the NSSDC.'
COMMENT
COMMENT COBE specific keywords
DATE-BEG= '24/11/89' / date of initial data represented (dd/mm/yy)
DATE-END= '21/09/90' / date of final data represented (dd/mm/yy)
PIXRESOL=        6 / Quad tree pixel resolution [6, 9]
COMMENT
COMMENT FIRAS specific keywords
CHANSCAN= 'LOWF'  / Field indicating combination of data from
COMMENT          / various channels and mirror transport
COMMENT          / mechanism scan modes. LOWF is a combination
COMMENT          / of the low frequency RLSS, RLFS, RLFL, LLSS,
COMMENT          / LLFS, and LLFL data. HIGH is a combination of
COMMENT          / the high frequency RHSS, RHSF, RHLF, LHSS,

```

```

COMMENT          / LHSF, and LHLF data. HIF2, HIF3, and HIF4
COMMENT          / divide the HIGH data into three frequency
COMMENT          / bands, as indicated by the NU_ZERO and
COMMENT          / NUM_FREQ fields. HRES is a combination of the
COMMENT          / high resolution RLLF and LLLF data. For the
COMMENT          / uncombined channel/scan mode labels, the first
COMMENT          / two characters of the label indicate the
COMMENT          / channel, the first being the instrument side:
COMMENT          / right (R) or left (L); and the second being
COMMENT          / the frequency: high (H) or low (L). The
COMMENT          / third and fourth characters indicate the scan
COMMENT          / mode, the third being the scan length: short
COMMENT          / (S) or long (L); and the fourth being the scan
COMMENT          / speed: slow (S) or fast (F). In addition,
COMMENT          / the scan mode may take the following values
COMMENT          / for low frequency data only (channel = RL or
COMMENT          / LL):
COMMENT          /   FS: decimated SF data;
COMMENT          /   FL: truncated LF data.
MODLLABL='PASS4          '/ FIRAS calibration model solution label
MISS_SEG='ENTIRE_MISSION  '/ FIRAS segment of mission represented
NU_ZERO =      68.020812 / Optical frequency of initial data point in GHz
DELTA_NU=      13.604162 / Optical frequency interval between data points
COMMENT          / in GHz
NUM_FREQ=      43 / Number of frequency points with good data
END
COMMENT
COMMENT
COMMENT FIRAS Orthogonal Stripe
COMMENT Project Dataset Record Structure
COMMENT
COMMENT
COMMENT Stripe gammas, in MJy/sr
TFORM1='182E'
TDIM1='(182)'
TTYPE1='STR_GAMA' / entire fieldname = STR_GAMA
OFFSET1=0
TUNIT1='MJy/sr'
COMMENT Stripe betas (dimensionless)
TFORM2='6144E'
TDIM2='(6144)'
TTYPE2='STR_BETA' / entire fieldname = STR_BETA
OFFSET2=728
TUNIT2=' '
COMMENT
END

```

C Vector

```

SIMPLE =          T / specifies FITS standard file
BITPIX =         32 / if rasterized array follows, data 32-bit int
NAXIS =          0 / no rasterized arrays follow

```

EXTEND = T / Table extensions may follow
 ORIGIN = 'CDAC' / Cosmology Data Analysis Center
 TELESCOP= 'COBE' / COsmic Background Explorer satellite
 INSTRUME= 'FIRAS' / COBE instrument [DIRBE, DMR, FIRAS]
 OBJECT = 'ALL-SKY' / part of sky given [ALL-SKY, GAL-SLICE]
 PRODUCT = 'C-VEC' / C vector
 EQUINOX = 2000.0 / equinox of coords in following tables
 COMMENT
 REFERENC= 'For additional information, please refer to the'
 REFERENC= 'COBE Far Infrared Absolute Spectrophotometer (FIRAS)'
 REFERENC= 'Explanatory Supplement, ed. J.C. Mather et al,'
 REFERENC= 'COBE Ref. Pub. No. 97-C (Greenbelt, MD: NASA/GSFC),'
 REFERENC= 'available in electronic form from the NSSDC.'
 COMMENT
 COMMENT COBE specific keywords
 DATE-BEG= '24/11/89' / date of initial data represented (dd/mm/yy)
 DATE-END= '21/09/90' / date of final data represented (dd/mm/yy)
 PIXRESOL= 6 / Quad tree pixel resolution [6, 9]
 COMMENT
 COMMENT FIRAS specific keywords
 CHANSCAN= 'LOWF' / Field indicating combination of data from
 COMMENT / various channels and mirror transport
 COMMENT / mechanism scan modes. LOWF is a combination
 COMMENT / of the low frequency RLSS, RLFS, RLFL, LLSS,
 COMMENT / LLFS, and LLFL data. HIGH is a combination of
 COMMENT / the high frequency RHSS, RHSF, RHLF, LHSS,
 COMMENT / LHSF, and LHLF data. HIF2, HIF3, and HIF4
 COMMENT / divide the HIGH data into three frequency
 COMMENT / bands, as indicated by the NU_ZERO and
 COMMENT / NUM_FREQ fields. HRES is a combination of the
 COMMENT / high resolution RLLF and LLLF data. For the
 COMMENT / uncombined channel/scan mode labels, the first
 COMMENT / two characters of the label indicate the
 COMMENT / channel, the first being the instrument side:
 COMMENT / right (R) or left (L); and the second being
 COMMENT / the frequency: high (H) or low (L). The
 COMMENT / third and fourth characters indicate the scan
 COMMENT / mode, the third being the scan length: short
 COMMENT / (S) or long (L); and the fourth being the scan
 COMMENT / speed: slow (S) or fast (F). In addition,
 COMMENT / the scan mode may take the following values
 COMMENT / for low frequency data only (channel = RL or
 COMMENT / LL):
 COMMENT / FS: decimated SF data;
 COMMENT / FL: truncated LF data.
 MODLLABL= 'PASS4' / FIRAS calibration model solution label
 MISS_SEG= 'ENTIRE_MISSION' / FIRAS segment of mission represented
 NU_ZERO = 68.020812 / Optical frequency of initial data point in GHz
 DELTA_NU= 13.604162 / Optical frequency interval between data points
 COMMENT / in GHz
 NUM_FREQ= 43 / Number of frequency points with good data
 GALATEXC= 15 / Absolute value of galactic latitude in degrees
 COMMENT / below which input data was excluded in
 COMMENT / producing this dataset

```

END
COMMENT
COMMENT
COMMENT FIRAS C Vector
COMMENT Project Dataset Record Structure
COMMENT
COMMENT
COMMENT C vector, in MJy/sr
TFORM1='182E'
TDIM1='(182)'
TTYPER1='C_VECTOR' / entire fieldname = C_VECTOR
OFFSET1=0
TUNIT1='MJy/sr'
COMMENT
END

```

A Vector

```

SIMPLE =          T / specifies FITS standard file
BITPIX =         32 / if rasterized array follows, data 32-bit int
NAXIS  =          0 / no rasterized arrays follow
EXTEND =          T / Table extensions may follow
ORIGIN = 'CDAC'   / Cosmology Data Analysis Center
TELESCOP='COBE'   / COBE Cosmic Background Explorer satellite
INSTRUME='FIRAS'  / COBE instrument [DIRBE, DMR, FIRAS]
OBJECT  = 'ALL-SKY' / part of sky given [ALL-SKY, GAL-SLICE]
PRODUCT = 'A-VEC' / A vector
EQUINOX =         2000.0 / equinox of coords in following tables
COMMENT
REFERENC='For additional information, please refer to the'
REFERENC='COBE Far Infrared Absolute Spectrophotometer (FIRAS)'
REFERENC='Explanatory Supplement, ed. J.C. Mather et al,'
REFERENC='COBE Ref. Pub. No. 97-C (Greenbelt, MD: NASA/GSFC),'
REFERENC='available in electronic form from the NSSDC.'
COMMENT
COMMENT COBE specific keywords
DATE-BEG='24/11/89' / date of initial data represented (dd/mm/yy)
DATE-END='21/09/90' / date of final data represented (dd/mm/yy)
PIXRESOL=         6 / Quad tree pixel resolution [6, 9]
COMMENT
COMMENT FIRAS specific keywords
CHANSCAN='LOWF'   / Field indicating combination of data from
COMMENT           / various channels and mirror transport
COMMENT           / mechanism scan modes. LOWF is a combination
COMMENT           / of the low frequency RLSS, RLFS, RLFL, LLSS,
COMMENT           / LLFS, and LLFL data. HIGH is a combination of
COMMENT           / the high frequency RHSS, RHSF, RHLF, LHSS,
COMMENT           / LHSF, and LHLF data. HIF2, HIF3, and HIF4
COMMENT           / divide the HIGH data into three frequency
COMMENT           / bands: HIF2 from 612.18729 to 1346.8120 GHz,
COMMENT           / HIF3 from 1360.4162 to 2095.0410 GHz, and
COMMENT           / HIF4 from 2108.6451 to 2911.2907 GHz. HRES is

```

```

COMMENT          / a combination of the high resolution RLLF and
COMMENT          / LLLF data. For the uncombined channel/scan
COMMENT          / mode labels, the first two characters of the
COMMENT          / label indicate the channel, the first being
COMMENT          / the instrument side: right (R) or left (L);
COMMENT          / and the second being the frequency: high (H)
COMMENT          / or low (L). The third and fourth characters
COMMENT          / indicate the scan mode, the third being the
COMMENT          / scan length: short (S) or long (L); and the
COMMENT          / fourth being the scan speed: slow (S) or fast
COMMENT          / (F). In addition, the scan mode may take the
COMMENT          / following values for low frequency data only
COMMENT          / (channel = RL or LL):
COMMENT          /   FS: decimated SF data;
COMMENT          /   FL: truncated LF data.
MODLLABL='PASS4      '/ FIRAS calibration model solution label
MISS_SEG='ENTIRE_MISSION  '/ FIRAS segment of mission represented
NU_ZERO =          0.0 / Optical frequency of initial data point in GHz
DELTA_NU=         13.604162 / Optical frequency interval between data points
COMMENT          / in GHz
NUM_FREQ=         32 / Number of frequency points with good data
GALATEXC=         15 / Absolute value of galactic latitude in degrees
COMMENT          / below which input data was excluded in
COMMENT          / producing this dataset
END

```

```

COMMENT
COMMENT
COMMENT FIRAS A Vector
COMMENT Project Dataset Record Structure
COMMENT
COMMENT
COMMENT A vector, in MJy/sr
TFORM1='32E'
TDIM1='(32)'
TTYPER1='A_VECTOR' / entire fieldname = A_VECTOR
OFFSET1=0
TUNIT1='MJy/sr'
COMMENT
END

```

Covariance Matrix

```

SIMPLE =          T / specifies FITS standard file
BITPIX =         32 / if rasterized array follows, data 32-bit int
NAXIS =          0 / no rasterized arrays follow
EXTEND =         T / Table extensions may follow
ORIGIN = 'CDAC'   / Cosmology Data Analysis Center
TELESCOP='COBE'   / COsmic Background Explorer satellite
INSTRUME='FIRAS'  / COBE instrument [DIRBE, DMR, FIRAS]
OBJECT = 'ALL-SKY' / part of sky given [ALL-SKY, GAL-SLICE]
PRODUCT = 'COV-MAT' / Covariance matrix
EQUINOX =        2000.0 / equinox of coords in following tables

```

COMMENT
REFERENC= 'For additional information, please refer to the'
REFERENC= 'COBE Far Infrared Absolute Spectrophotometer (FIRAS)'
REFERENC= 'Explanatory Supplement, ed. J.C. Mather et al,'
REFERENC= 'COBE Ref. Pub. No. 97-C (Greenbelt, MD: NASA/GSFC),'
REFERENC= 'available in electronic form from the NSSDC.'
COMMENT
COMMENT COBE specific keywords
DATE-BEG= '24/11/89 ' / date of initial data represented (dd/mm/yy)
DATE-END= '21/09/90 ' / date of final data represented (dd/mm/yy)
PIXRESOL= 6 / Quad tree pixel resolution [6, 9]
COMMENT
COMMENT FIRAS specific keywords
CHANSCAN= 'LOWF' / Field indicating combination of data from
COMMENT / various channels and mirror transport
COMMENT / mechanism scan modes. LOWF is a combination
COMMENT / of the low frequency RLSS, RLFS, RLFL, LLSS,
COMMENT / LLFS, and LLFL data. HIGH is a combination of
COMMENT / the high frequency RHSS, RHSF, RHLF, LHSS,
COMMENT / LHSF, and LHLF data. HIF2, HIF3, and HIF4
COMMENT / divide the HIGH data into three frequency
COMMENT / bands, as indicated by the NU_ZERO and
COMMENT / NUM_FREQ fields. HRES is a combination of the
COMMENT / high resolution RLLF and LLLF data. For the
COMMENT / uncombined channel/scan mode labels, the first
COMMENT / two characters of the label indicate the
COMMENT / channel, the first being the instrument side:
COMMENT / right (R) or left (L); and the second being
COMMENT / the frequency: high (H) or low (L). The
COMMENT / third and fourth characters indicate the scan
COMMENT / mode, the third being the scan length: short
COMMENT / (S) or long (L); and the fourth being the scan
COMMENT / speed: slow (S) or fast (F). In addition,
COMMENT / the scan mode may take the following values
COMMENT / for low frequency data only (channel = RL or
COMMENT / LL):
COMMENT / FS: decimated SF data;
COMMENT / FL: truncated LF data.
MODLLABL= 'PASS4 ' / FIRAS calibration model solution label
MISS_SEG= 'ENTIRE_MISSION' / FIRAS segment of mission represented
NU_ZERO = 68.020812 / Optical frequency of initial data point in GHz
DELTA_NU= 13.604162 / Optical frequency interval between data points
COMMENT / in GHz
NUM_FREQ= 43 / Number of frequency points with good data
GALATEXC= 15 / Absolute value of galactic latitude in degrees
COMMENT / below which input data was excluded in
COMMENT / producing this dataset
END
COMMENT
COMMENT
COMMENT FIRAS Covariance Matrix
COMMENT Project Dataset Record Structure
COMMENT
COMMENT

```

COMMENT Row number of covariance matrix
TFORM1='1I'
TTYPER1='ROW_NUM' / entire fieldname = ROW_NUM
OFFSET1=0
TUNIT1=' '
COMMENT Row of covariance matrix, in (MJy/sr)^2
TFORM2='182E'
TDIM2='(182)'
TTYPER2='ROW_COVR' / entire fieldname = ROW_COVR
OFFSET2=2
TUNIT2='(MJy/sr)^2'
COMMENT
END

```

Chi-Squared

```

SIMPLE =          T / specifies FITS standard file
BITPIX =         32 / if rasterized array follows, data 32-bit int
NAXIS  =          0 / no rasterized arrays follow
EXTEND =          T / Table extensions may follow
ORIGIN  = 'CDAC'   / Cosmology Data Analysis Center
TELESCOP= 'COBE'   / COsmic Background Explorer satellite
INSTRUME= 'FIRAS'  / COBE instrument [DIRBE, DMR, FIRAS]
OBJECT  = 'ALL-SKY' / part of sky given [ALL-SKY, GAL-SLICE]
PRODUCT = 'CHI-SQ' / Chi-squared
EQUINOX =         2000.0 / equinox of coords in following tables
COMMENT
REFERENC= 'For additional information, please refer to the'
REFERENC= 'COBE Far Infrared Absolute Spectrophotometer (FIRAS)'
REFERENC= 'Explanatory Supplement, ed. J.C. Mather et al,'
REFERENC= 'COBE Ref. Pub. No. 97-C (Greenbelt, MD: NASA/GSFC),'
REFERENC= 'available in electronic form from the NSSDC.'
COMMENT
COMMENT COBE specific keywords
DATE-BEG= '24/11/89' / date of initial data represented (dd/mm/yy)
DATE-END= '21/09/90' / date of final data represented (dd/mm/yy)
PIXRESOL=         6 / Quad tree pixel resolution [6, 9]
COMMENT
COMMENT FIRAS specific keywords
CHANSCAN= 'LOWF'   / Field indicating combination of data from
COMMENT           / various channels and mirror transport
COMMENT           / mechanism scan modes. LOWF is a combination
COMMENT           / of the low frequency RLSS, RLFS, RLFL, LLSS,
COMMENT           / LLFS, and LLFL data. HIGH is a combination of
COMMENT           / the high frequency RHSS, RHSF, RHLF, LHSS,
COMMENT           / LHSF, and LHLF data. HIF2, HIF3, and HIF4
COMMENT           / divide the HIGH data into three frequency
COMMENT           / bands, as indicated by the NU_ZERO and
COMMENT           / NUM_FREQ fields. HRES is a combination of the
COMMENT           / high resolution RLLF and LLLF data. For the
COMMENT           / uncombined channel/scan mode labels, the first
COMMENT           / two characters of the label indicate the

```



```

COMMENT          / channel, the first being the instrument side:
COMMENT          / right (R) or left (L); and the second being
COMMENT          / the frequency: high (H) or low (L). The
COMMENT          / third and fourth characters indicate the scan
COMMENT          / mode, the third being the scan length: short
COMMENT          / (S) or long (L); and the fourth being the scan
COMMENT          / speed: slow (S) or fast (F). In addition,
COMMENT          / the scan mode may take the following values
COMMENT          / for low frequency data only (channel = RL or
COMMENT          / LL):
COMMENT          /   FS: decimated SF data;
COMMENT          /   FL: truncated LF data.
MODLLABL='PASS4          '/ FIRAS calibration model solution label
MISS_SEG='ENTIRE_MISSION  '/ FIRAS segment of mission represented
END
COMMENT
COMMENT
COMMENT FIRAS Chi-Squared
COMMENT Project Dataset Record Structure
COMMENT
COMMENT
COMMENT FIRAS pixel number (resolution 6)
TFORM1='1J'
TTYPER1='PIXEL' / entire fieldname = PIXEL
OFFSET1=0
TUNIT1=''
COMMENT Galactic longitude, in deg (0 -> 360)
TFORM2='1E'
TTYPER2='GAL_LON' / entire fieldname = GAL_LON
OFFSET2=4
TUNIT2='deg'
COMMENT Galactic latitude, in deg (-90 -> 90)
TFORM3='1E'
TTYPER3='GAL_LAT' / entire fieldname = GAL_LAT
OFFSET3=8
TUNIT3='deg'
COMMENT Pixel weight
TFORM4='1E'
TTYPER4='WEIGHT' / entire fieldname = WEIGHT
OFFSET4=12
TUNIT4=''
COMMENT Degrees of freedom
TFORM5='1J'
TTYPER5='DOF' / entire fieldname = DOF
OFFSET5=16
TUNIT5=''
COMMENT Chi-squared
TFORM6='1E'
TTYPER6='COMB_CSQ' / entire fieldname = COMB_CSQ
OFFSET6=20
TUNIT6=''
COMMENT
END

```

Calibration Model Solution

SIMPLE = T / specifies FITS standard file
BITPIX = 32 / if rasterized array follows, data 32-bit int
NAXIS = 0 / no rasterized arrays follow
EXTEND = T / Table extensions may follow
ORIGIN = 'CDAC' / Cosmology Data Analysis Center
TELESCOP= 'COBE' / COsmic Background Explorer satellite
INSTRUME= 'FIRAS' / COBE instrument [DIRBE, DMR, FIRAS]
OBJECT = 'ALL-SKY' / part of sky given [ALL-SKY, GAL-SLICE]
PRODUCT = 'CAL-MOD' / Calibration model solution
EQUINOX = 2000.0 / equinox of coords in following tables
COMMENT
REFERENC= 'For additional information, please refer to the'
REFERENC= 'COBE Far Infrared Absolute Spectrophotometer (FIRAS)'
REFERENC= 'Explanatory Supplement, ed. J.C. Mather et al,'
REFERENC= 'COBE Ref. Pub. No. 97-C (Greenbelt, MD: NASA/GSFC),'
REFERENC= 'available in electronic form from the NSSDC.'
COMMENT
COMMENT COBE specific keywords
DATE-BEG= '24/11/89' / date of initial data represented (dd/mm/yy)
DATE-END= '21/09/90' / date of final data represented (dd/mm/yy)
PIXRESOL= 6 / Quad tree pixel resolution [6, 9]
COMMENT
COMMENT FIRAS specific keywords
CHANSCAN= 'LLSS' / Channel and mirror transport mechanism scan
COMMENT / mode identifier. The first two characters
COMMENT / indicate the channel, the first being the
COMMENT / instrument side: right (R) or left (L); and
COMMENT / the second being the frequency: high (H) or
COMMENT / low (L). The third and fourth characters
COMMENT / indicate the scan mode, the third being the
COMMENT / scan length: short (S) or long (L); and the
COMMENT / fourth being the scan speed: slow (S) or
COMMENT / fast (F). In addition, the scan mode may
COMMENT / take the following values for low frequency
COMMENT / data only (channel = RL or LL):
COMMENT / FS: decimated SF data;
COMMENT / FL: truncated LF data.
COMMENT / The scan mode value FA indicates: for high
COMMENT / frequency data (channel = RH or LH), a
COMMENT / combination of SF and LF data; and for low
COMMENT / frequency data (channel = RL or LL), a
COMMENT / combination of FS and FL data.
MODLLABL= 'PASS4' / FIRAS calibration model solution label
MISS_SEG= 'ENTIRE_MISSION' / FIRAS segment of mission represented
NU_ZERO = 68.020812 / Optical frequency of initial data point in GHz
DELTA_NU= 13.604162 / Optical frequency interval between data points
COMMENT / in GHz
OM_ZERO = 11.149872 / Audio frequency of initial data point in rad/s
DELTA_OM= 2.2299744 / Audio frequency interval between data points
COMMENT / in rad/s

NUM_FREQ= 43 / Number of frequency points with good data
 NORMALIZ= 7.479336E 08 / Instrumental gain function normalization,
 COMMENT / in (MJy*V)/(W*sr)
 END
 COMMENT
 COMMENT
 COMMENT FIRAS Calibration Model Solution
 COMMENT Project Dataset Record Structure
 COMMENT
 COMMENT
 COMMENT Electronics Gain Function
 COMMENT
 COMMENT Real part of electronics gain function (dimensionless)
 TFORM1='210E'
 TDIM1='(210)'
 TTYPE1='RELEX_GA' / entire fieldname = RELEX_GAIN
 OFFSET1=0
 TUNIT1=' '
 COMMENT Imaginary part of electronics gain function (dimensionless)
 TFORM2='210E'
 TDIM2='(210)'
 TTYPE2='IELEX_GA' / entire fieldname = IELEX_GAIN
 OFFSET2=840
 TUNIT2=' '
 COMMENT
 COMMENT Optical Transfer Function
 COMMENT
 COMMENT Real part of optical transfer function (dimensionless)
 TFORM3='210E'
 TDIM3='(210)'
 TTYPE3='RTRANSFER' / entire fieldname = RTRANSFER
 OFFSET3=1680
 TUNIT3=' '
 COMMENT Imaginary part of optical transfer function (dimensionless)
 TFORM4='210E'
 TDIM4='(210)'
 TTYPE4='ITRANSFER' / entire fieldname = ITRANSFER
 OFFSET4=2520
 TUNIT4=' '
 COMMENT
 COMMENT Bolometer Response Function
 COMMENT (for the mission average bolometer state;
 COMMENT response function = $(1 + iwT)/S_0$, where
 COMMENT T is the time constant and
 COMMENT S_0 is the DC response)
 COMMENT
 COMMENT Bolometer time constant, in s
 TFORM5='1E'
 TTYPE5='TIME_CON' / entire fieldname = TIME_CONSTANT
 OFFSET5=3360
 TUNIT5='s'
 COMMENT Bolometer DC response, in V/W
 TFORM6='1E'
 TTYPE6='DC_RESPO' / entire fieldname = DC_RESPONSE

OFFSET6=3364
 TUNIT6='V/W'
 COMMENT
 COMMENT Apodization Function
 COMMENT (applied to interferograms in the time domain
 COMMENT prior to Fourier transformation)
 COMMENT
 COMMENT Apodization function (dimensionless)
 TFORM7='512E'
 TDIM7='(512)'
 TTYPE7='APODIZAT' / entire fieldname = APODIZATION
 OFFSET7=3368
 TUNIT7=' '
 COMMENT
 COMMENT Bolometer Model Parameters
 COMMENT
 COMMENT Characteristic resistance, in ohms
 TFORM8='1E'
 TTYPE8='BOLPARAM_' / entire fieldname = BOLPARAM_R0
 OFFSET8=5416
 TUNIT8='ohm'
 COMMENT Characteristic temperature, in K
 TFORM9='1E'
 TTYPE9='BOLPARAM2' / entire fieldname = BOLPARAM_T0
 OFFSET9=5420
 TUNIT9='K'
 COMMENT Coefficient of thermal conductance, in $W/K^{(bolparm_beta+1)}$
 TFORM10='1E'
 TTYPE10='BOLPARAM3' / entire fieldname = BOLPARAM_G1
 OFFSET10=5424
 TUNIT10=' $W/K^{(bolparm_beta+1)}$ '
 COMMENT Index of thermal conductance (dimensionless)
 TFORM11='1E'
 TTYPE11='BOLPARAM4' / entire fieldname = BOLPARAM_BETA
 OFFSET11=5428
 TUNIT11=' '
 COMMENT Resistance due to electric field, in K/V
 TFORM12='1E'
 TTYPE12='BOLPARAM5' / entire fieldname = BOLPARAM_RHO
 OFFSET12=5432
 TUNIT12='K/V'
 COMMENT Heat capacity coefficient for linear temperature term, in J/K^2
 TFORM13='1E'
 TTYPE13='BOLPARAM6' / entire fieldname = BOLPARAM_C1
 OFFSET13=5436
 TUNIT13=' J/K^2 '
 COMMENT Heat capacity coefficient for cubic temperature term, in J/K^4
 TFORM14='1E'
 TTYPE14='BOLPARAM7' / entire fieldname = BOLPARAM_C3
 OFFSET14=5440
 TUNIT14=' J/K^4 '
 COMMENT Readout JFET offset, in V
 TFORM15='1E'
 TTYPE15='BOLPARAM8' / entire fieldname = BOLPARAM_JO

OFFSET15=5444
TUNIT15='V'
COMMENT Readout JFET gain (dimensionless)
TFORM16='1E'
TTYPER16='BOLPARM9' / entire fieldname = BOLPARM_JG
OFFSET16=5448
TUNIT16=' '
COMMENT Load resistance, in ohms
TFORM17='1E'
TTYPER17='BOLPARM10' / entire fieldname = BOLPARM_RL
OFFSET17=5452
TUNIT17='ohm'
COMMENT
COMMENT Mission Average Bolometer State
COMMENT
COMMENT Commanded bolometer bias, in V
TFORM18='1E'
TTYPER18='BOLOM_BI' / entire fieldname = BOLOM_BIAS
OFFSET18=5456
TUNIT18='V'
COMMENT Bolometer readout voltage, in V
TFORM19='1E'
TTYPER19='BOLOM_VO' / entire fieldname = BOLOM_VOLTAGE
OFFSET19=5460
TUNIT19='V'
COMMENT Bolometer operating temperature, in K
TFORM20='1E'
TTYPER20='BOLOM_TE' / entire fieldname = BOLOM_TEMPERATURE
OFFSET20=5464
TUNIT20='K'
COMMENT Bolometer bath temperature, in K
TFORM21='1E'
TTYPER21='BOLOM_B2' / entire fieldname = BOLOM_BATHTEMP
OFFSET21=5468
TUNIT21='K'
COMMENT
COMMENT Optical Model
COMMENT
COMMENT Real part of internal calibrator emissivity (dimensionless)
TFORM22='210E'
TDIM22='(210)'
TTYPER22='RICAL' / entire fieldname = RICAL
OFFSET22=5472
TUNIT22=' '
COMMENT Imaginary part of internal calibrator emissivity (dimensionless)
TFORM23='210E'
TDIM23='(210)'
TTYPER23='IICAL' / entire fieldname = IICAL
OFFSET23=6312
TUNIT23=' '
COMMENT Real part of sky horn emissivity (dimensionless)
TFORM24='210E'
TDIM24='(210)'
TTYPER24='RSKYHORN' / entire fieldname = RSKYHORN

OFFSET24=7152
TUNIT24=' '
COMMENT Imaginary part of sky horn emissivity (dimensionless)
TFORM25='210E'
TDIM25='(210)'
TTYPER25='ISKYHORN' / entire fieldname = ISKYHORN
OFFSET25=7992
TUNIT25=' '
COMMENT Real part of reference horn emissivity (dimensionless)
TFORM26='210E'
TDIM26='(210)'
TTYPER26='RREFHORN' / entire fieldname = RREFHORN
OFFSET26=8832
TUNIT26=' '
COMMENT Imaginary part of reference horn emissivity (dimensionless)
TFORM27='210E'
TDIM27='(210)'
TTYPER27='IREFHORN' / entire fieldname = IREFHORN
OFFSET27=9672
TUNIT27=' '
COMMENT Real part of dihedral emissivity (dimensionless)
TFORM28='210E'
TDIM28='(210)'
TTYPER28='RDIHEDRA' / entire fieldname = RDIHEDRAL
OFFSET28=10512
TUNIT28=' '
COMMENT Imaginary part of dihedral emissivity (dimensionless)
TFORM29='210E'
TDIM29='(210)'
TTYPER29='IDIHEDRA' / entire fieldname = IDIHEDRAL
OFFSET29=11352
TUNIT29=' '
COMMENT Real part of structure emissivity (dimensionless)
TFORM30='210E'
TDIM30='(210)'
TTYPER30='RSTRUCTU' / entire fieldname = RSTRUCTURE
OFFSET30=12192
TUNIT30=' '
COMMENT Imaginary part of structure emissivity (dimensionless)
TFORM31='210E'
TDIM31='(210)'
TTYPER31='ISTRUCTU' / entire fieldname = ISTRUCTURE
OFFSET31=13032
TUNIT31=' '
COMMENT Real part of bolometer emissivity (dimensionless)
TFORM32='210E'
TDIM32='(210)'
TTYPER32='RBOLOMET' / entire fieldname = RBOLOMETER
OFFSET32=13872
TUNIT32=' '
COMMENT Imaginary part of bolometer emissivity (dimensionless)
TFORM33='210E'
TDIM33='(210)'
TTYPER33='IBOLOMET' / entire fieldname = IBOLOMETER

OFFSET33=14712
 TUNIT33=' '
 COMMENT
 COMMENT Optical Model Harmonic Correction Coefficients
 COMMENT
 COMMENT 2nd harmonic correction coefficient (dimensionless)
 TFORM34='1E'
 TTYPE34='OPTPARAM_' / entire fieldname = OPTPARAM_2H
 OFFSET34=15552
 TUNIT34=' '
 COMMENT 3rd harmonic correction coefficient (dimensionless)
 TFORM35='1E'
 TTYPE35='OPTPARAM2' / entire fieldname = OPTPARAM_3H
 OFFSET35=15556
 TUNIT35=' '
 COMMENT
 COMMENT Optical Model Vibration Correction Coefficients
 COMMENT (primary vibration correction is a
 COMMENT quartic polynomial in time)
 COMMENT
 COMMENT Primary vibration correction offset (dimensionless)
 TFORM36='1E'
 TTYPE36='OPTPARAM3' / entire fieldname = OPTPARAM_VP0
 OFFSET36=15560
 TUNIT36=' '
 COMMENT Primary vibration correction linear coefficient, in yr⁽⁻¹⁾
 TFORM37='1E'
 TTYPE37='OPTPARAM4' / entire fieldname = OPTPARAM_VP1
 OFFSET37=15564
 TUNIT37='yr⁽⁻¹⁾'
 COMMENT Primary vibration correction quadratic coefficient, in yr⁽⁻²⁾
 TFORM38='1E'
 TTYPE38='OPTPARAM5' / entire fieldname = OPTPARAM_VP2
 OFFSET38=15568
 TUNIT38='yr⁽⁻²⁾'
 COMMENT Primary vibration correction cubic coefficient, in yr⁽⁻³⁾
 TFORM39='1E'
 TTYPE39='OPTPARAM6' / entire fieldname = OPTPARAM_VP3
 OFFSET39=15572
 TUNIT39='yr⁽⁻³⁾'
 COMMENT Primary vibration correction quartic coefficient, in yr⁽⁻⁴⁾
 TFORM40='1E'
 TTYPE40='OPTPARAM7' / entire fieldname = OPTPARAM_VP4
 OFFSET40=15576
 TUNIT40='yr⁽⁻⁴⁾'
 COMMENT Secondary vibration correction coefficient (dimensionless)
 TFORM41='1E'
 TTYPE41='OPTPARAM8' / entire fieldname = OPTPARAM_VS
 OFFSET41=15580
 TUNIT41=' '
 COMMENT
 COMMENT Internal Calibrator Temperature Correction Parameters
 COMMENT (temperature drift is exponential in time
 COMMENT since COBE aperture cover ejection:

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COMMENT 11:18:00 UTC, 21 November 1989)
COMMENT
COMMENT Ical drift amplitude, in K
TFORM42='1E'
TTYPER42='DRIFT_AM' / entire fieldname = DRIFT_AMP
OFFSET42=15584
TUNIT42='K'
COMMENT Ical drift time constant, in yr
TFORM43='1E'
TTYPER43='DRIFT_TC' / entire fieldname = DRIFT_TC
OFFSET43=15588
TUNIT43='yr'
COMMENT Ical drift offset, in K
TFORM44='1E'
TTYPER44='DRIFT_OF' / entire fieldname = DRIFT_OFFSET
OFFSET44=15592
TUNIT44='K'
COMMENT
COMMENT External Calibrator Temperature Correction
COMMENT
COMMENT Xcal temperature correction, in K
TFORM45='1E'
TTYPER45='XCAL_COR' / entire fieldname = XCAL_CORRECTION
OFFSET45=15596
TUNIT45='K'
COMMENT
END

```

Calibration Errors

```

SIMPLE =          T / specifies FITS standard file
BITPIX =          32 / if rasterized array follows, data 32-bit int
NAXIS  =          0 / no rasterized arrays follow
EXTEND =          T / Table extensions may follow
ORIGIN = 'CDAC'   / Cosmology Data Analysis Center
TELESCOP= 'COBE'  / COsmic Background Explorer satellite
INSTRUME= 'FIRAS' / COBE instrument [DIRBE, DMR, FIRAS]
OBJECT  = 'ALL-SKY' / part of sky given [ALL-SKY, GAL-SLICE]
PRODUCT = 'CAL-ERR' / Calibration errors
EQUINOX =          2000.0 / equinox of coords in following tables
COMMENT
REFERENC= 'For additional information, please refer to the'
REFERENC= 'COBE Far Infrared Absolute Spectrophotometer (FIRAS)'
REFERENC= 'Explanatory Supplement, ed. J.C. Mather et al,'
REFERENC= 'COBE Ref. Pub. No. 97-C (Greenbelt, MD: NASA/GSFC),'
REFERENC= 'available in electronic form from the NSSDC.'
COMMENT
COMMENT COBE specific keywords
DATE-BEG= '24/11/89' / date of initial data represented (dd/mm/yy)
DATE-END= '21/09/90' / date of final data represented (dd/mm/yy)
PIXRESOL=          6 / Quad tree pixel resolution [6, 9]
COMMENT

```



```

COMMENT  FIRAS specific keywords
CHANSCAN= 'LLSS'          / Channel and mirror transport mechanism scan
COMMENT          / mode identifier. The first two characters
COMMENT          / indicate the channel, the first being the
COMMENT          / instrument side: right (R) or left (L); and
COMMENT          / the second being the frequency: high (H) or
COMMENT          / low (L). The third and fourth characters
COMMENT          / indicate the scan mode, the third being the
COMMENT          / scan length: short (S) or long (L); and the
COMMENT          / fourth being the scan speed: slow (S) or
COMMENT          / fast (F). In addition, the scan mode may
COMMENT          / take the following values for low frequency
COMMENT          / data only (channel = RL or LL):
COMMENT          /   FS: decimated SF data;
COMMENT          /   FL: truncated LF data.
COMMENT          / The scan mode value FA indicates: for high
COMMENT          / frequency data (channel = RH or LH), a
COMMENT          / combination of SF and LF data; and for low
COMMENT          / frequency data (channel = RL or LL), a
COMMENT          / combination of FS and FL data.
MODLLABL= 'PASS4          ' / FIRAS calibration model solution label
MISS_SEG= 'ENTIRE_MISSION ' / FIRAS segment of mission represented
NU_ZERO =      68.020812 / Optical frequency of initial data point in GHz
DELTA_NU=     13.604162 / Optical frequency interval between data points
COMMENT          / in GHz
NUM_FREQ=     43 / Number of frequency points with good data
END
COMMENT
COMMENT
COMMENT  FIRAS Calibration Errors
COMMENT  Project Dataset Record Structure
COMMENT
COMMENT
COMMENT  Error Terms
COMMENT
COMMENT  Emissivity gain error (dimensionless)
TFORM1='210E'
TDIM1='(210)'
TTYPER1='PEP_GAIN' / entire fieldname = PEP_GAIN
OFFSET1=0
TUNIT1=' '
COMMENT  Emissivity offset error, in MJy/sr
TFORM2='210E'
TDIM2='(210)'
TTYPER2='PEP_OFFSET' / entire fieldname = PEP_OFFSET
OFFSET2=840
TUNIT2='MJy/sr'
COMMENT  Bolometer parameter gain error (dimensionless)
TFORM3='2730E'
TDIM3='(13,210)'
TTYPER3='JCJ_GAIN' / entire fieldname = JCJ_GAIN
OFFSET3=1680
TUNIT3=' '
COMMENT  Bolometer parameter offset error, in MJy/sr

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TFORM4='2730E'
TDIM4='(13,210)'
TTYPER4='JCJ_OFFSET' / entire fieldname = JCJ_OFFSET
OFFSET4=12600
TUNIT4='MJy/sr'
COMMENT Ical temperature error, in K
TFORM5='1E'
TTYPER5='PUP_TEMP' / entire fieldname = PUP_TEMP
OFFSET5=23520
TUNIT5='K'
COMMENT Ical temperature error spectrum, in MJy/sr
TFORM6='210E'
TDIM6='(210)'
TTYPER6='PUP_SPEC' / entire fieldname = PUP_SPEC
OFFSET6=23524
TUNIT6='MJy/sr'
COMMENT Absolute temperature error, in K
TFORM7='1E'
TTYPER7='PTP_TEMP' / entire fieldname = PTP_TEMP
OFFSET7=24364
TUNIT7='K'
COMMENT Absolute temperature error spectrum, in MJy/sr
TFORM8='210E'
TDIM8='(210)'
TTYPER8='PTP_SPEC' / entire fieldname = PTP_SPEC
OFFSET8=24368
TUNIT8='MJy/sr'
COMMENT
END

```

Combined Calibration Errors

```

SIMPLE =          T / specifies FITS standard file
BITPIX =         32 / if rasterized array follows, data 32-bit int
NAXIS =          0 / no rasterized arrays follow
EXTEND =         T / Table extensions may follow
ORIGIN = 'CDAC'   / Cosmology Data Analysis Center
TELESCOP= 'COBE'  / COsmic Background Explorer satellite
INSTRUME= 'FIRAS' / COBE instrument [DIRBE, DMR, FIRAS]
OBJECT = 'ALL-SKY' / part of sky given [ALL-SKY, GAL-SLICE]
PRODUCT = 'CCAL-ERR' / Combined calibration errors
EQUINOX =        2000.0 / equinox of coords in following tables
COMMENT
REFERENC= 'For additional information, please refer to the'
REFERENC= 'COBE Far Infrared Absolute Spectrophotometer (FIRAS)'
REFERENC= 'Explanatory Supplement, ed. J.C. Mather et al,'
REFERENC= 'COBE Ref. Pub. No. 97-C (Greenbelt, MD: NASA/GSFC),'
REFERENC= 'available in electronic form from the NSSDC.'
COMMENT
COMMENT COBE specific keywords
DATE-BEG= '24/11/89' / date of initial data represented (dd/mm/yy)
DATE-END= '21/09/90' / date of final data represented (dd/mm/yy)

```

```

PIXRESOL=          6 / Quad tree pixel resolution [6, 9]
COMMENT
COMMENT  FIRAS specific keywords
CHANSCAN='LOWF'    / Field indicating combination of data from
COMMENT           / various channels and mirror transport
COMMENT           / mechanism scan modes. LOWF is a combination
COMMENT           / of the low frequency RLSS, RLFS, RLFL, LLSS,
COMMENT           / LLFS, and LLFL data. HIGH is a combination of
COMMENT           / the high frequency RHSS, RHSF, RHLF, LHSS,
COMMENT           / LHSF, and LHLF data. HIF2, HIF3, and HIF4
COMMENT           / divide the HIGH data into three frequency
COMMENT           / bands, as indicated by the NU_ZERO and
COMMENT           / NUM_FREQ fields. HRES is a combination of the
COMMENT           / high resolution RLLF and LLLF data. For the
COMMENT           / uncombined channel/scan mode labels, the first
COMMENT           / two characters of the label indicate the
COMMENT           / channel, the first being the instrument side:
COMMENT           / right (R) or left (L); and the second being
COMMENT           / the frequency: high (H) or low (L). The
COMMENT           / third and fourth characters indicate the scan
COMMENT           / mode, the third being the scan length: short
COMMENT           / (S) or long (L); and the fourth being the scan
COMMENT           / speed: slow (S) or fast (F). In addition,
COMMENT           / the scan mode may take the following values
COMMENT           / for low frequency data only (channel = RL or
COMMENT           / LL):
COMMENT           /   FS: decimated SF data;
COMMENT           /   FL: truncated LF data.
MODLLABL='PASS4'  / FIRAS calibration model solution label
MISS_SEG='ENTIRE_MISSION' / FIRAS segment of mission represented
NU_ZERO =        68.020812 / Optical frequency of initial data point in GHz
DELTA_NU=        13.604162 / Optical frequency interval between data points
COMMENT           / in GHz
NUM_FREQ=        43 / Number of frequency points with good data
END
COMMENT
COMMENT
COMMENT  FIRAS Combined Calibration Errors
COMMENT  Project Dataset Record Structure
COMMENT
COMMENT
COMMENT  Error Terms
COMMENT
COMMENT  Emissivity gain error (dimensionless)
TFORM1='182E'
TDIM1='(182)'
TTYPER1='PEP_GAIN' / entire fieldname = PEP_GAIN
OFFSET1=0
TUNIT1=' '
COMMENT  Bolometer parameter gain error (dimensionless)
TFORM2='182E'
TDIM2='(182)'
TTYPER2='JCJ_GAIN' / entire fieldname = JCJ_GAIN
OFFSET2=728

```

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TUNIT2=' '
COMMENT Ical temperature error, in K
TFORM3='1E'
TTYPER3='PUP_TEMP' / entire fieldname = PUP_TEMP
OFFSET3=1456
TUNIT3='K'
COMMENT Ical temperature error spectrum, in MJy/sr
TFORM4='182E'
TDIM4='(182)'
TTYPER4='PUP_SPEC' / entire fieldname = PUP_SPEC
OFFSET4=1460
TUNIT4='MJy/sr'
COMMENT Absolute temperature error, in K
TFORM5='1E'
TTYPER5='PTP_TEMP' / entire fieldname = PTP_TEMP
OFFSET5=2188
TUNIT5='K'
COMMENT Absolute temperature error spectrum, in MJy/sr
TFORM6='182E'
TDIM6='(182)'
TTYPER6='PTP_SPEC' / entire fieldname = PTP_SPEC
OFFSET6=2192
TUNIT6='MJy/sr'
COMMENT
END

```

Model Selection Errors

```

SIMPLE =          T / specifies FITS standard file
BITPIX =         32 / if rasterized array follows, data 32-bit int
NAXIS =          0 / no rasterized arrays follow
EXTEND =         T / Table extensions may follow
ORIGIN = 'CDAC'   / Cosmology Data Analysis Center
TELESCOP='COBE'   / COsmic Background Explorer satellite
INSTRUME='FIRAS'  / COBE instrument [DIRBE, DMR, FIRAS]
OBJECT = 'ALL-SKY' / part of sky given [ALL-SKY, GAL-SLICE]
PRODUCT = 'MOD-ERRS' / Model selection errors
EQUINOX =        2000.0 / equinox of coords in following tables
COMMENT
REFERENC='For additional information, please refer to the'
REFERENC='COBE Far Infrared Absolute Spectrophotometer (FIRAS)'
REFERENC='Explanatory Supplement, ed. J.C. Mather et al,'
REFERENC='COBE Ref. Pub. No. 97-C (Greenbelt, MD: NASA/GSFC),'
REFERENC='available in electronic form from the NSSDC.'
COMMENT
COMMENT COBE specific keywords
DATE-BEG='24/11/89' / date of initial data represented (dd/mm/yy)
DATE-END='21/09/90' / date of final data represented (dd/mm/yy)
PIXRESOL=        6 / Quad tree pixel resolution [6, 9]
COMMENT
COMMENT FIRAS specific keywords
CHANSCAN='LOWF'   / Field indicating combination of data from

```

```

COMMENT          / various channels and mirror transport
COMMENT          / mechanism scan modes. LOWF is a combination
COMMENT          / of the low frequency RLSS, RLFS, RLFL, LLSS,
COMMENT          / LLFS, and LLFL data. HIGH is a combination of
COMMENT          / the high frequency RHSS, RHSF, RHLF, LHSS,
COMMENT          / LHSF, and LHLF data. HIF2, HIF3, and HIF4
COMMENT          / divide the HIGH data into three frequency
COMMENT          / bands, as indicated by the NU_ZERO and
COMMENT          / NUM_FREQ fields. HRES is a combination of the
COMMENT          / high resolution RLLF and LLLF data. For the
COMMENT          / uncombined channel/scan mode labels, the first
COMMENT          / two characters of the label indicate the
COMMENT          / channel, the first being the instrument side:
COMMENT          / right (R) or left (L); and the second being
COMMENT          / the frequency: high (H) or low (L). The
COMMENT          / third and fourth characters indicate the scan
COMMENT          / mode, the third being the scan length: short
COMMENT          / (S) or long (L); and the fourth being the scan
COMMENT          / speed: slow (S) or fast (F). In addition,
COMMENT          / the scan mode may take the following values
COMMENT          / for low frequency data only (channel = RL or
COMMENT          / LL):
COMMENT          /   FS: decimated SF data;
COMMENT          /   FL: truncated LF data.
MODLLABL='PASS4          '/ FIRAS calibration model solution label
MISS_SEG='ENTIRE_MISSION  '/ FIRAS segment of mission represented
NU_ZERO =      68.020812 / Optical frequency of initial data point in GHz
DELTA_NU=     13.604162 / Optical frequency interval between data points
COMMENT          / in GHz
NUM_FREQ=     43 / Number of frequency points with good data
END
COMMENT
COMMENT
COMMENT FIRAS Comparison Spectrum
COMMENT Project Dataset Record Structure
COMMENT
COMMENT Destriper model description
TFORM1='80A'
TTYPER1='DESCRIP1' / entire fieldname = DESCRIP1
OFFSET1=0
TUNIT1=''
COMMENT Comparison destriper model description
TFORM2='80A'
TTYPER2='DESCRIP2' / entire fieldname = DESCRIP2
OFFSET2=80
TUNIT2=''
COMMENT Channel/scan mode
TFORM3='4A'
TTYPER3='CHANSCAN' / entire fieldname = CHANSCAN1
OFFSET3=160
TUNIT3=''
COMMENT Comparison channel/scan mode
TFORM4='4A'

```

```

TTYTYPE4='CHANSCA2' / entire fieldname = CHANSCAN2
OFFSET4=164
TUNIT4=' '
COMMENT Difference spectrum, in MJy/sr
TFORM5='60E'
TDIM5='(60)'
TTYTYPE5='DIFF_SPE' / entire fieldname = DIFF_SPEC
OFFSET5=168
TUNIT5='MJy/sr'
COMMENT Difference spectrum sigma, in MJy/sr
TFORM6='60E'
TDIM6='(60)'
TTYTYPE6='DIFF_SP2' / entire fieldname = DIFF_SPEC_SIG
OFFSET6=408
TUNIT6='MJy/sr'
COMMENT
END

```

Low Frequency Line Profiles

```

SIMPLE =          T / specifies FITS standard file
BITPIX =         32 / if rasterized array follows, data 32-bit int
NAXIS =          0 / no rasterized arrays follow
EXTEND =         T / Table extensions may follow
ORIGIN = 'CDAC'   / Cosmology Data Analysis Center
TELESCOP='COBE'   / COsmic Background Explorer satellite
INSTRUME='FIRAS'  / COBE instrument [DIRBE, DMR, FIRAS]
OBJECT = 'ALL-SKY' / part of sky given [ALL-SKY, GAL-SLICE]
PRODUCT = 'LLINE-PR' / Low frequency line profiles
EQUINOX =        2000.0 / equinox of coords in following tables
COMMENT
REFERENC='For additional information, please refer to the'
REFERENC='COBE Far Infrared Absolute Spectrophotometer (FIRAS)'
REFERENC='Explanatory Supplement, ed. J.C. Mather et al,'
REFERENC='COBE Ref. Pub. No. 97-C (Greenbelt, MD: NASA/GSFC),'
REFERENC='available in electronic form from the NSSDC.'
COMMENT
COMMENT COBE specific keywords
DATE-BEG='24/11/89' / date of initial data represented (dd/mm/yy)
DATE-END='21/09/90' / date of final data represented (dd/mm/yy)
PIXRESOL=        6 / Quad tree pixel resolution [6, 9]
COMMENT
COMMENT FIRAS specific keywords
CHANSCAN='LLSS'   / Channel and mirror transport mechanism scan
COMMENT           / mode identifier. The first two characters
COMMENT           / indicate the channel, the first being the
COMMENT           / instrument side: right (R) or left (L); and
COMMENT           / the second being the frequency: high (H) or
COMMENT           / low (L). The third and fourth characters
COMMENT           / indicate the scan mode, the third being the
COMMENT           / scan length: short (S) or long (L); and the
COMMENT           / fourth being the scan speed: slow (S) or

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COMMENT          / fast (F). In addition, the scan mode may
COMMENT          / take the following values for low frequency
COMMENT          / data only (channel = RL or LL):
COMMENT          /   FS: decimated SF data;
COMMENT          /   FL: truncated LF data.
COMMENT          / The scan mode value FA indicates: for high
COMMENT          / frequency data (channel = RH or LH), a
COMMENT          / combination of SF and LF data; and for low
COMMENT          / frequency data (channel = RL or LL), a
COMMENT          / combination of FS and FL data.
MODLLABL='PASS4      '/ FIRAS calibration model solution label
MISS_SEG='ENTIRE_MISSION  '/ FIRAS segment of mission represented
NU_ZERO =      68.020812 / Optical frequency of initial data point in GHz
DELTA_NU=      13.604162 / Optical frequency interval between data points
COMMENT          / in GHz
NUM_FREQ=      43 / Number of frequency points with good data
END
COMMENT
COMMENT
COMMENT FIRAS Low Frequency Line Profiles
COMMENT Project Dataset Record Structure
COMMENT
COMMENT
COMMENT 115.27 GHz CO (J=1-0) line profile, in cm*MJy/(nanowatts/m^2)
TFORM1='210E'
TDIM1='(210)'
TTYPER1='CO_115' / entire fieldname = CO_115
OFFSET1=0
TUNIT1='cm*MJy/(nanowatts/m^2)'
COMMENT 230.54 GHz CO (J=2-1) line profile, in cm*MJy/(nanowatts/m^2)
TFORM2='210E'
TDIM2='(210)'
TTYPER2='CO_230' / entire fieldname = CO_230
OFFSET2=840
TUNIT2='cm*MJy/(nanowatts/m^2)'
COMMENT 345.80 GHz CO (J=3-2) line profile, in cm*MJy/(nanowatts/m^2)
TFORM3='210E'
TDIM3='(210)'
TTYPER3='CO_345' / entire fieldname = CO_345
OFFSET3=1680
TUNIT3='cm*MJy/(nanowatts/m^2)'
COMMENT 424.75 GHz O2 line profile, in cm*MJy/(nanowatts/m^2)
TFORM4='210E'
TDIM4='(210)'
TTYPER4='O2_424' / entire fieldname = O2_424
OFFSET4=2520
TUNIT4='cm*MJy/(nanowatts/m^2)'
COMMENT 461.04 GHz CO (J=4-3) line profile, in cm*MJy/(nanowatts/m^2)
TFORM5='210E'
TDIM5='(210)'
TTYPER5='CO_461' / entire fieldname = CO_461
OFFSET5=3360
TUNIT5='cm*MJy/(nanowatts/m^2)'
COMMENT 492.23 GHz [C I] line profile, in cm*MJy/(nanowatts/m^2)

```

```

TFORM6='210E'
TDIM6='(210)'
TTYPER6='C_I_492' / entire fieldname = C_I_492
OFFSET6=4200
TUNIT6='cm*MJy/(nanowatts/m^2)'
COMMENT 556.89 GHz H2O line profile, in cm*MJy/(nanowatts/m^2)
TFORM7='210E'
TDIM7='(210)'
TTYPER7='H2O_556' / entire fieldname = H2O_556
OFFSET7=5040
TUNIT7='cm*MJy/(nanowatts/m^2)'
COMMENT 576.27 GHz CO (J=5-4) line profile, in cm*MJy/(nanowatts/m^2)
TFORM8='210E'
TDIM8='(210)'
TTYPER8='CO_576' / entire fieldname = CO_576
OFFSET8=5880
TUNIT8='cm*MJy/(nanowatts/m^2)'
COMMENT
END

```

High Frequency Line Profiles

```

SIMPLE =          T / specifies FITS standard file
BITPIX =          32 / if rasterized array follows, data 32-bit int
NAXIS =           0 / no rasterized arrays follow
EXTEND =          T / Table extensions may follow
ORIGIN = 'CDAC'   / Cosmology Data Analysis Center
TELESCOP= 'COBE'  / COsmic Background Explorer satellite
INSTRUME= 'FIRAS' / COBE instrument [DIRBE, DMR, FIRAS]
OBJECT = 'ALL-SKY' / part of sky given [ALL-SKY, GAL-SLICE]
PRODUCT = 'HLINE-PR' / High frequency line profiles
EQUINOX =         2000.0 / equinox of coords in following tables
COMMENT
REFERENC= 'For additional information, please refer to the'
REFERENC= 'COBE Far Infrared Absolute Spectrophotometer (FIRAS)'
REFERENC= 'Explanatory Supplement, ed. J.C. Mather et al,'
REFERENC= 'COBE Ref. Pub. No. 97-C (Greenbelt, MD: NASA/GSFC),'
REFERENC= 'available in electronic form from the NSSDC.'
COMMENT
COMMENT COBE specific keywords
DATE-BEG= '24/11/89' / date of initial data represented (dd/mm/yy)
DATE-END= '21/09/90' / date of final data represented (dd/mm/yy)
PIXRESOL=         6 / Quad tree pixel resolution [6, 9]
COMMENT
COMMENT FIRAS specific keywords
CHANSCAN= 'LHSS'  / Channel and mirror transport mechanism scan
COMMENT          / mode identifier. The first two characters
COMMENT          / indicate the channel, the first being the
COMMENT          / instrument side: right (R) or left (L); and
COMMENT          / the second being the frequency: high (H) or
COMMENT          / low (L). The third and fourth characters
COMMENT          / indicate the scan mode, the third being the

```



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COMMENT          / scan length: short (S) or long (L); and the
COMMENT          / fourth being the scan speed: slow (S) or
COMMENT          / fast (F). In addition, the scan mode may
COMMENT          / take the following values for low frequency
COMMENT          / data only (channel = RL or LL):
COMMENT          /   FS: decimated SF data;
COMMENT          /   FL: truncated LF data.
COMMENT          / The scan mode value FA indicates: for high
COMMENT          / frequency data (channel = RH or LH), a
COMMENT          / combination of SF and LF data; and for low
COMMENT          / frequency data (channel = RL or LL), a
COMMENT          / combination of FS and FL data.
MODLLABL='PASS4      '/ FIRAS calibration model solution label
MISS_SEG='ENTIRE_MISSION  '/ FIRAS segment of mission represented
NU_ZERO =      68.020812 / Optical frequency of initial data point in GHz
DELTA_NU=      13.604162 / Optical frequency interval between data points
COMMENT          / in GHz
NUM_FREQ=      210 / Number of frequency points with good data
END
COMMENT
COMMENT
COMMENT FIRAS High Frequency Line Profiles
COMMENT Project Dataset Record Structure
COMMENT
COMMENT
COMMENT 115.27 GHz CO (J=1-0) line profile, in cm*MJy/(nanowatts/m^2)
TFORM1='210E'
TDIM1='(210)'
TTYPER1='CO_115' / entire fieldname = CO_115
OFFSET1=0
TUNIT1='cm*MJy/(nanowatts/m^2)'
COMMENT 230.54 GHz CO (J=2-1) line profile, in cm*MJy/(nanowatts/m^2)
TFORM2='210E'
TDIM2='(210)'
TTYPER2='CO_230' / entire fieldname = CO_230
OFFSET2=840
TUNIT2='cm*MJy/(nanowatts/m^2)'
COMMENT 345.80 GHz CO (J=3-2) line profile, in cm*MJy/(nanowatts/m^2)
TFORM3='210E'
TDIM3='(210)'
TTYPER3='CO_345' / entire fieldname = CO_345
OFFSET3=1680
TUNIT3='cm*MJy/(nanowatts/m^2)'
COMMENT 424.75 GHz O2 line profile, in cm*MJy/(nanowatts/m^2)
TFORM4='210E'
TDIM4='(210)'
TTYPER4='O2_424' / entire fieldname = O2_424
OFFSET4=2520
TUNIT4='cm*MJy/(nanowatts/m^2)'
COMMENT 461.04 GHz CO (J=4-3) line profile, in cm*MJy/(nanowatts/m^2)
TFORM5='210E'
TDIM5='(210)'
TTYPER5='CO_461' / entire fieldname = CO_461
OFFSET5=3360

```

TUNIT5='cm*MJy/(nanowatts/m^2)'
COMMENT 492.23 GHz [C I] line profile, in cm*MJy/(nanowatts/m^2)
TFORM6='210E'
TDIM6='(210)'
TTYPER6='C_I_492' / entire fieldname = C_I_492
OFFSET6=4200
TUNIT6='cm*MJy/(nanowatts/m^2)'
COMMENT 556.89 GHz H2O line profile, in cm*MJy/(nanowatts/m^2)
TFORM7='210E'
TDIM7='(210)'
TTYPER7='H2O_556' / entire fieldname = H2O_556
OFFSET7=5040
TUNIT7='cm*MJy/(nanowatts/m^2)'
COMMENT 576.27 GHz CO (J=5-4) line profile, in cm*MJy/(nanowatts/m^2)
TFORM8='210E'
TDIM8='(210)'
TTYPER8='CO_576' / entire fieldname = CO_576
OFFSET8=5880
TUNIT8='cm*MJy/(nanowatts/m^2)'
COMMENT 691.47 GHz CO (J=6-5) line profile, in cm*MJy/(nanowatts/m^2)
TFORM9='210E'
TDIM9='(210)'
TTYPER9='CO_691' / entire fieldname = CO_691
OFFSET9=6720
TUNIT9='cm*MJy/(nanowatts/m^2)'
COMMENT 809.44 GHz [C I] line profile, in cm*MJy/(nanowatts/m^2)
TFORM10='210E'
TDIM10='(210)'
TTYPER10='C_I_809' / entire fieldname = C_I_809
OFFSET10=7560
TUNIT10='cm*MJy/(nanowatts/m^2)'
COMMENT 1113.3 GHz H2O line profile, in cm*MJy/(nanowatts/m^2)
TFORM11='210E'
TDIM11='(210)'
TTYPER11='H2O_1113' / entire fieldname = H2O_1113
OFFSET11=8400
TUNIT11='cm*MJy/(nanowatts/m^2)'
COMMENT 1461.1 GHz [N II] line profile, in cm*MJy/(nanowatts/m^2)
TFORM12='210E'
TDIM12='(210)'
TTYPER12='N_II_146' / entire fieldname = N_II_1461
OFFSET12=9240
TUNIT12='cm*MJy/(nanowatts/m^2)'
COMMENT 1716.6 GHz H2O (J=2-1) line profile, in cm*MJy/(nanowatts/m^2)
TFORM13='210E'
TDIM13='(210)'
TTYPER13='H2O_1716' / entire fieldname = H2O_1716
OFFSET13=10080
TUNIT13='cm*MJy/(nanowatts/m^2)'
COMMENT 1900.5 GHz [C II] line profile, in cm*MJy/(nanowatts/m^2)
TFORM14='210E'
TDIM14='(210)'
TTYPER14='C_II_190' / entire fieldname = C_II_1900
OFFSET14=10920

```

TUNIT14='cm*MJy/(nanowatts/m^2)'
COMMENT 2060.1 GHz [O I] line profile, in cm*MJy/(nanowatts/m^2)
TFORM15='210E'
TDIM15='(210)'
TTYPER15='O_I_2060' / entire fieldname = O_I_2060
OFFSET15=11760
TUNIT15='cm*MJy/(nanowatts/m^2)'
COMMENT 2311.7 GHz [Si I] line profile, in cm*MJy/(nanowatts/m^2)
TFORM16='210E'
TDIM16='(210)'
TTYPER16='SI_I_231' / entire fieldname = SI_I_2311
OFFSET16=12600
TUNIT16='cm*MJy/(nanowatts/m^2)'
COMMENT 2459.4 GHz [N II] line profile, in cm*MJy/(nanowatts/m^2)
TFORM17='210E'
TDIM17='(210)'
TTYPER17='N_II_245' / entire fieldname = N_II_2459
OFFSET17=13440
TUNIT17='cm*MJy/(nanowatts/m^2)'
COMMENT 2589.6 GHz CH (J=2-1) line profile, in cm*MJy/(nanowatts/m^2)
TFORM18='210E'
TDIM18='(210)'
TTYPER18='CH_2589' / entire fieldname = CH_2589
OFFSET18=14280
TUNIT18='cm*MJy/(nanowatts/m^2)'
COMMENT
END

```

Low Frequency Line Map

```

SIMPLE =          T / specifies FITS standard file
BITPIX =          32 / if rasterized array follows, data 32-bit int
NAXIS  =          0 / no rasterized arrays follow
EXTEND =          T / Table extensions may follow
ORIGIN = 'CDAC'   / Cosmology Data Analysis Center
TELESCOP='COBE'  / COsmic Background Explorer satellite
INSTRUME='FIRAS'  / COBE instrument [DIRBE, DMR, FIRAS]
OBJECT  = 'ALL-SKY' / part of sky given [ALL-SKY, GAL-SLICE]
PRODUCT = 'LLIN-MAP' / Low frequency line map
EQUINOX =          2000.0 / equinox of coords in following tables
COMMENT
REFERENC='For additional information, please refer to the'
REFERENC='COBE Far Infrared Absolute Spectrophotometer (FIRAS)'
REFERENC='Explanatory Supplement, ed. J.C. Mather et al,'
REFERENC='COBE Ref. Pub. No. 97-C (Greenbelt, MD: NASA/GSFC),'
REFERENC='available in electronic form from the NSSDC.'
COMMENT
COMMENT COBE specific keywords
DATE-BEG='24/11/89' / date of initial data represented (dd/mm/yy)
DATE-END='21/09/90' / date of final data represented (dd/mm/yy)
PIXRESOL=          6 / Quad tree pixel resolution [6, 9]
COMMENT

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```

COMMENT FIRAS specific keywords
CHANSCAN= 'LOWF' / Field indicating combination of data from
COMMENT / various channels and mirror transport
COMMENT / mechanism scan modes. LOWF is a combination
COMMENT / of the low frequency RLSS, RLFS, RLFL, LLSS,
COMMENT / LLFS, and LLFL data. HIGH is a combination of
COMMENT / the high frequency RHSS, RHSF, RHLF, LHSS,
COMMENT / LHSF, and LHLF data. HRES is a combination of
COMMENT / the high resolution RLLF and LLLF data. For
COMMENT / the uncombined channel/scan mode labels, the
COMMENT / first two characters of the label indicate the
COMMENT / channel, the first being the instrument side:
COMMENT / right (R) or left (L); and the second being
COMMENT / the frequency: high (H) or low (L). The
COMMENT / third and fourth characters indicate the scan
COMMENT / mode, the third being the scan length: short
COMMENT / (S) or long (L); and the fourth being the scan
COMMENT / speed: slow (S) or fast (F). In addition,
COMMENT / the scan mode may take the following values
COMMENT / for low frequency data only (channel = RL or
COMMENT / LL):
COMMENT / FS: decimated SF data;
COMMENT / FL: truncated LF data.
MODLLABL= 'PASS4' / FIRAS calibration model solution label
MISS_SEG= 'ENTIRE_MISSION' / FIRAS segment of mission represented
COMMENT
COMMENT / Eight line frequencies represented in this map
LINFRQ1 = 115.27 / CO (J=1-0) line frequency, in GHz
LINFRQ2 = 230.54 / CO (J=2-1) line frequency, in GHz
LINFRQ3 = 345.80 / CO (J=3-2) line frequency, in GHz
LINFRQ4 = 424.75 / O2 line frequency, in GHz
LINFRQ5 = 461.04 / CO (J=4-3) line frequency, in GHz
LINFRQ6 = 492.23 / [C I] line frequency, in GHz
LINFRQ7 = 556.89 / H2O line frequency, in GHz
LINFRQ8 = 576.27 / CO (J=5-4) line frequency, in GHz
END
COMMENT
COMMENT
COMMENT FIRAS Low Frequency Line Emission Map
COMMENT Project Dataset Record Structure
COMMENT
COMMENT
COMMENT FIRAS pixel number (resolution 6)
TFORM1='1J'
TTYPER1='PIXEL' / entire fieldname = PIXEL
OFFSET1=0
TUNIT1=' '
COMMENT Galactic longitude, in deg (0 -> 360)
TFORM2='1E'
TTYPER2='GAL_LON' / entire fieldname = GAL_LON
OFFSET2=4
TUNIT2='deg'
COMMENT Galactic latitude, in deg (-90 -> +90)
TFORM3='1E'

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```

TTYTYPE3='GAL_LAT' / entire fieldname = GAL_LAT
OFFSET3=8
TUNIT3='deg'
COMMENT Pixel weight
TFORM4='1E'
TTYTYPE4='WEIGHT' / entire fieldname = WEIGHT
OFFSET4=12
TUNIT4=' '
COMMENT
COMMENT Line Flux Parameters and Uncertainties
COMMENT
COMMENT Line flux, in nano-Watts/(m^2*sr)
TFORM5='8E'
TDIM5='(8)'
TTYTYPE5='LINE_FLU' / entire fieldname = LINE_FLUX
OFFSET5=16
TUNIT5='nano-Watts/(m^2*sr)'
COMMENT Sigmas of line flux, in nano-Watts/(m^2*sr)
TFORM6='8E'
TDIM6='(8)'
TTYTYPE6='LINE_FL2' / entire fieldname = LINE_FLUX_SIGMA
OFFSET6=48
TUNIT6='nano-Watts/(m^2*sr)'
COMMENT PEP gain sigmas of line flux, in nano-Watts/(m^2*sr)
TFORM7='8E'
TDIM7='(8)'
TTYTYPE7='LINE_FL3' / entire fieldname = LINE_FLUX_PSIG
OFFSET7=80
TUNIT7='nano-Watts/(m^2*sr)'
COMMENT
END

```

High Frequency Line Map

```

SIMPLE =          T / specifies FITS standard file
BITPIX =         32 / if rasterized array follows, data 32-bit int
NAXIS  =          0 / no rasterized arrays follow
EXTEND =          T / Table extensions may follow
ORIGIN  = 'CDAC'   / Cosmology Data Analysis Center
TELESCOP= 'COBE'   / COsmic Background Explorer satellite
INSTRUME= 'FIRAS'  / COBE instrument [DIRBE, DMR, FIRAS]
OBJECT  = 'ALL-SKY' / part of sky given [ALL-SKY, GAL-SLICE]
PRODUCT = 'HLIN-MAP' / High frequency line map
EQUINOX =         2000.0 / equinox of coords in following tables
COMMENT
REFERENC= 'For additional information, please refer to the'
REFERENC= 'COBE Far Infrared Absolute Spectrophotometer (FIRAS)'
REFERENC= 'Explanatory Supplement, ed. J.C. Mather et al,'
REFERENC= 'COBE Ref. Pub. No. 97-C (Greenbelt, MD: NASA/GSFC),'
REFERENC= 'available in electronic form from the NSSDC.'
COMMENT
COMMENT COBE specific keywords

```

```

DATE-BEG= '24/11/89      '/ date of initial data represented (dd/mm/yy)
DATE-END= '21/09/90      '/ date of final data represented (dd/mm/yy)
PIXRESOL=                6 / Quad tree pixel resolution [6, 9]
COMMENT
COMMENT  FIRAS specific keywords
CHANSCAN= 'HIGH'         / Field indicating combination of data from
COMMENT                / various channels and mirror transport
COMMENT                / mechanism scan modes. LOWF is a combination
COMMENT                / of the low frequency RLSS, RLFS, RLFL, LLSS,
COMMENT                / LLFS, and LLFL data. HIGH is a combination of
COMMENT                / the high frequency RHSS, RHSF, RHLF, LHSS,
COMMENT                / LHSF, and LHLF data. HRES is a combination of
COMMENT                / the high resolution RLLF and LLLF data. For
COMMENT                / the uncombined channel/scan mode labels, the
COMMENT                / first two characters of the label indicate the
COMMENT                / channel, the first being the instrument side:
COMMENT                / right (R) or left (L); and the second being
COMMENT                / the frequency: high (H) or low (L). The
COMMENT                / third and fourth characters indicate the scan
COMMENT                / mode, the third being the scan length: short
COMMENT                / (S) or long (L); and the fourth being the scan
COMMENT                / speed: slow (S) or fast (F). In addition,
COMMENT                / the scan mode may take the following values
COMMENT                / for low frequency data only (channel = RL or
COMMENT                / LL):
COMMENT                /   FS: decimated SF data;
COMMENT                /   FL: truncated LF data.
MODLLABL= 'PASS4         '/ FIRAS calibration model solution label
MISS_SEG= 'ENTIRE_MISSION '/ FIRAS segment of mission represented
COMMENT
NU_ZERO =                1800.0 / Characteristic freq of optical depth in GHz
DUST_IND=                2.0 / Dust spectral index
COMMENT                / Ten line frequencies represented in this map
LINFREQ1 =              691.47 / CO (J=6-5) line frequency, in GHz
LINFREQ2 =              809.44 / [C I] line frequency, in GHz
LINFREQ3 =              1113.3 / H2O line frequency, in GHz
LINFREQ4 =              1461.1 / [N II] line frequency, in GHz
LINFREQ5 =              1716.6 / H2O (J=2-1) line frequency, in GHz
LINFREQ6 =              1900.5 / [C II] line frequency, in GHz
LINFREQ7 =              2060.1 / [O I] line frequency, in GHz
LINFREQ8 =              2311.7 / [Si I] line frequency, in GHz
LINFREQ9 =              2459.4 / [N II] line frequency, in GHz
LINFREQ10=             2589.6 / CH (J=2-1) line frequency, in GHz
END
COMMENT
COMMENT
COMMENT  FIRAS High Frequency Line Emission Map
COMMENT  Project Dataset Record Structure
COMMENT
COMMENT
COMMENT  FIRAS pixel number (resolution 6)
TFORM1='1J'
TTYPE1='PIXEL' / entire fieldname = PIXEL
OFFSET1=0

```

TUNIT1=' '
COMMENT Galactic longitude, in deg (0 -> 360)
TFORM2='1E'
TTYPER2='GAL_LON' / entire fieldname = GAL_LON
OFFSET2=4
TUNIT2='deg'
COMMENT Galactic latitude, in deg (-90 -> +90)
TFORM3='1E'
TTYPER3='GAL_LAT' / entire fieldname = GAL_LAT
OFFSET3=8
TUNIT3='deg'
COMMENT Pixel weight
TFORM4='1E'
TTYPER4='WEIGHT' / entire fieldname = WEIGHT
OFFSET4=12
TUNIT4=' '
COMMENT
COMMENT Line Flux Parameters and Uncertainties
COMMENT
COMMENT Line flux, in nano-Watts/(m²*sr)
TFORM5='10E'
TDIM5='(10)'
TTYPER5='LINE_FLU' / entire fieldname = LINE_FLUX
OFFSET5=16
TUNIT5='nano-Watts/(m²*sr)'
COMMENT Sigmas of line flux, in nano-Watts/(m²*sr)
TFORM6='10E'
TDIM6='(10)'
TTYPER6='LINE_FL2' / entire fieldname = LINE_FLUX_SIGMA
OFFSET6=56
TUNIT6='nano-Watts/(m²*sr)'
COMMENT PEP gain sigmas of line flux, in nano-Watts/(m²*sr)
TFORM7='10E'
TDIM7='(10)'
TTYPER7='LINE_FL3' / entire fieldname = LINE_FLUX_PSIG
OFFSET7=96
TUNIT7='nano-Watts/(m²*sr)'
COMMENT
COMMENT Dust Model Parameters and Uncertainties
COMMENT
COMMENT Dust temperature, in K
TFORM8='1E'
TTYPER8='DUST_TEM' / entire fieldname = DUST_TEMP
OFFSET8=136
TUNIT8='K'
COMMENT Sigma of dust temperature, in K
TFORM9='1E'
TTYPER9='DUST_TE2' / entire fieldname = DUST_TEMP_SIGMA
OFFSET9=140
TUNIT9='K'
COMMENT Dust optical depth at 1800 GHz
TFORM10='1E'
TTYPER10='DUST_TAU' / entire fieldname = DUST_TAU
OFFSET10=144

```

TUNIT10=''
COMMENT Sigma of dust optical depth at 1800 GHz
TFORM11='1E'
TTYPER11='DUST_TAU' / entire fieldname = DUST_TAU_SIGMA
OFFSET11=148
TUNIT11=''
COMMENT Covariance of dust temperature and optical depth
TFORM12='1E'
TTYPER12='DUST_COV' / entire fieldname = DUST_COVAR
OFFSET12=152
TUNIT12=''
COMMENT
END

```

Dust Spectrum Map

```

SIMPLE =          T / specifies FITS standard file
BITPIX =          32 / if rasterized array follows, data 32-bit int
NAXIS =           0 / no rasterized arrays follow
EXTEND =          T / Table extensions may follow
ORIGIN = 'CDAC'   / Cosmology Data Analysis Center
TELESCOP= 'COBE'  / COsmic Background Explorer satellite
INSTRUME= 'FIRAS' / COBE instrument [DIRBE, DMR, FIRAS]
OBJECT = 'ALL-SKY' / part of sky given [ALL-SKY, GAL-SLICE]
PRODUCT = 'DUST-MAP' / Dust spectrum map
EQUINOX =         2000.0 / equinox of coords in following tables
COMMENT
REFERENC= 'For additional information, please refer to the'
REFERENC= 'COBE Far Infrared Absolute Spectrophotometer (FIRAS)'
REFERENC= 'Explanatory Supplement, ed. J.C. Mather et al,'
REFERENC= 'COBE Ref. Pub. No. 97-C (Greenbelt, MD: NASA/GSFC),'
REFERENC= 'available in electronic form from the NSSDC.'
COMMENT
COMMENT COBE specific keywords
DATE-BEG= '24/11/89' / date of initial data represented (dd/mm/yy)
DATE-END= '21/09/90' / date of final data represented (dd/mm/yy)
PIXRESOL=         6 / Quad tree pixel resolution [6, 9]
COMMENT
COMMENT FIRAS specific keywords
CHANSCAN= 'LOWF'  / Field indicating combination of data from
COMMENT          / various channels and mirror transport
COMMENT          / mechanism scan modes. LOWF is a combination
COMMENT          / of the low frequency RLSS, RLFS, RLFL, LLSS,
COMMENT          / LLFS, and LLFL data. HIGH is a combination of
COMMENT          / the high frequency RHSS, RHSF, RHLF, LHSS,
COMMENT          / LHSF, and LHLF data. For the uncombined
COMMENT          / channel/scan mode labels, the first two
COMMENT          / characters of the label indicate the channel,
COMMENT          / the first being the instrument side:
COMMENT          / right (R) or left (L); and the second being
COMMENT          / the frequency: high (H) or low (L). The
COMMENT          / third and fourth characters indicate the scan

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COMMENT          / mode, the third being the scan length: short
COMMENT          / (S) or long (L); and the fourth being the scan
COMMENT          / speed: slow (S) or fast (F). In addition,
COMMENT          / the scan mode may take the following values
COMMENT          / for low frequency data only (channel = RL or
COMMENT          / LL):
COMMENT          /   FS: decimated SF data;
COMMENT          /   FL: truncated LF data.
MODLLABL='PASS4      '/ FIRAS calibration model solution label
MISS_SEG='ENTIRE_MISSION  '/ FIRAS segment of mission represented
NU_ZERO =      68.020812 / Optical frequency of initial data point in GHz
DELTA_NU=      13.604162 / Optical frequency interval between data points
COMMENT          / in GHz
NUM_FREQ=      43 / Number of frequency points with good data
END
COMMENT
COMMENT
COMMENT FIRAS Dust Spectrum
COMMENT Project Dataset Record Structure
COMMENT
COMMENT
COMMENT FIRAS pixel number (resolution 6)
TFORM1='1J'
TTYPER1='PIXEL' / entire fieldname = PIXEL
OFFSET1=0
TUNIT1=''
COMMENT Galactic longitude, in deg (0 -> 360)
TFORM2='1E'
TTYPER2='GAL_LON' / entire fieldname = GAL_LON
OFFSET2=4
TUNIT2='deg'
COMMENT Galactic latitude, in deg (-90 -> +90)
TFORM3='1E'
TTYPER3='GAL_LAT' / entire fieldname = GAL_LAT
OFFSET3=8
TUNIT3='deg'
COMMENT Pixel weight
TFORM4='1E'
TTYPER4='WEIGHT' / entire fieldname = WEIGHT
OFFSET4=12
TUNIT4=''
COMMENT Spectrum, in MJy/sr
TFORM5='182E'
TDIM5='(182)'
TTYPER5='SPECTRUM' / entire fieldname = SPECTRUM
OFFSET5=16
TUNIT5='MJy/sr'
COMMENT
END

```

CMBR Temperature Map

SIMPLE = T / specifies FITS standard file
BITPIX = 32 / if rasterized array follows, data 32-bit int
NAXIS = 0 / no rasterized arrays follow
EXTEND = T / Table extensions may follow
ORIGIN = 'CDAC' / Cosmology Data Analysis Center
TELESCOP= 'COBE' / COsmic Background Explorer satellite
INSTRUME= 'FIRAS' / COBE instrument [DIRBE, DMR, FIRAS]
OBJECT = 'ALL-SKY' / part of sky given [ALL-SKY, GAL-SLICE]
PRODUCT = 'TEMP-MAP' / CMBR temperature map
EQUINOX = 2000.0 / equinox of coords in following tables
COMMENT
REFERENC= 'For additional information, please refer to the'
REFERENC= 'COBE Far Infrared Absolute Spectrophotometer (FIRAS)'
REFERENC= 'Explanatory Supplement, ed. J.C. Mather et al,'
REFERENC= 'COBE Ref. Pub. No. 97-C (Greenbelt, MD: NASA/GSFC),'
REFERENC= 'available in electronic form from the NSSDC.'
COMMENT
COMMENT COBE specific keywords
DATE-BEG= '24/11/89' / date of initial data represented (dd/mm/yy)
DATE-END= '21/09/90' / date of final data represented (dd/mm/yy)
PIXRESOL= 6 / Quad tree pixel resolution [6, 9]
COMMENT
COMMENT FIRAS specific keywords
CHANSCAN= 'LOWF' / Field indicating combination of data from
COMMENT / various channels and mirror transport
COMMENT / mechanism scan modes. LOWF is a combination
COMMENT / of the low frequency RLSS, RLFS, RLFL, LLSS,
COMMENT / LLFS, and LLFL data. For the uncombined
COMMENT / channel/scan mode labels, the first two
COMMENT / characters of the label indicate the channel,
COMMENT / the first being the instrument side:
COMMENT / right (R) or left (L); and the second being
COMMENT / the frequency: high (H) or low (L). The
COMMENT / third and fourth characters indicate the scan
COMMENT / mode, the third being the scan length: short
COMMENT / (S) or long (L); and the fourth being the scan
COMMENT / speed: slow (S) or fast (F). In addition,
COMMENT / the scan mode may take the following values
COMMENT / for low frequency data only (channel = RL or
COMMENT / LL):
COMMENT / FS: decimated SF data;
COMMENT / FL: truncated LF data.
MODLLABL= 'PASS4' / FIRAS calibration model solution label
MISS_SEG= 'ENTIRE_MISSION' / FIRAS segment of mission represented
GALATEXC= 15 / Absolute value of galactic latitude in degrees
COMMENT / below which input data was excluded in the
COMMENT / dipole fit
COMMENT
COMMENT Results of CMBR temperature and dipole fit to temperature map:
COMMENT
CBR_TEMP= 2.727754 / CMBR temperature, in K
CBR_SIG= 0.002 / CMBR temperature sigma, in mK
DIP_AMP= 3.3506 / Dipole amplitude, in mK
DIP_SIG= 0.006 / Dipole amplitude sigma, in mK

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DIP_LON=      264.98 / Dipole galactic longitude, in deg
DIP_LAT=      47.92 / Dipole galactic latitude, in deg
DIR_SIG=      0.09 / Dipole direction sigma, in deg
RMS_TEMP=    0.214 / RMS temperature residual, in mK
END
COMMENT
COMMENT
COMMENT FIRAS CMBR Temperature Map
COMMENT Project Dataset Record Structure
COMMENT
COMMENT
COMMENT FIRAS pixel number (resolution 6)
TFORM1='1J'
TTYPER1='PIXEL' / entire fieldname = PIXEL
OFFSET1=0
TUNIT1=' '
COMMENT Galactic longitude, in deg (0 -> 360)
TFORM2='1E'
TTYPER2='GAL_LON' / entire fieldname = GAL_LON
OFFSET2=4
TUNIT2='deg'
COMMENT Galactic latitude, in deg (-90 -> +90)
TFORM3='1E'
TTYPER3='GAL_LAT' / entire fieldname = GAL_LAT
OFFSET3=8
TUNIT3='deg'
COMMENT Pixel weight
TFORM4='1E'
TTYPER4='WEIGHT' / entire fieldname = WEIGHT
OFFSET4=12
TUNIT4=' '
COMMENT CMBR temperature in pixel, in K
TFORM5='1E'
TTYPER5='TEMP' / entire fieldname = TEMP
OFFSET5=16
TUNIT5='K'
COMMENT Sigma of CMBR temperature in pixel, in K
TFORM6='1E'
TTYPER6='TEMP_SIG' / entire fieldname = TEMP_SIGMA
OFFSET6=20
TUNIT6='K'
COMMENT CMBR temperature residual in pixel, in K
TFORM7='1E'
TTYPER7='RESID_TE' / entire fieldname = RESID_TEMP
OFFSET7=24
TUNIT7='K'
COMMENT
END

```