FIRAS Explanatory Supplement Appendix I

FIRAS ASCII Format Reference Datasets

This appendix contains the following FIRAS ASCII Format Reference Datasets

FEX_GLTCHCOR.TXT	Glitchrate correction parameters
FEX_VIBCORRL.TXT	Vibration correction frequency offset indices
FEX_CMDGAIN.TXT	Actual values of commanded instrument gains
FEX_SAMPRATE.TXT	Mirror Transport Mechanism sampling rate
FEX_MTMSWEEP.TXT	Mirror Transport Mechanism scan times
FEX_CTH.TXT	Coaddition consistency check thresholds
FEX_MINCOADD.TXT	Minimum number of IFGs
FEX_GRTCOAWT.TXT	GRT weights for coadded IFGs
FEX_GRTRAWWT.TXT	GRT weights for raw IFGs
FEX_GRTTRANS.TXT	GRT low/high current transition temperatures

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!
!  Reference Dataset FEX_GLTCHCOR Text File:
!     Glitchrate correction parameters
!
!      This file contains the glitchrate correction slopes and intercepts
!      for the FIRAS data.  These corrections were computed for each channel
!      and scan mode by a linear least squares fit to the average variance and
!      glitch rate of each calibrated sky spectrum.  The average variance for
!      a spectrum is defined to be:  ((Nifgs * Real_Var) / D-Vector^2) / Nfreq.
!
!      These corrections are used in the following manner:
!            Nifgs' = Nifgs / (Intercept + Slope * Glitchrate)
!
!      The spectra used in these computations were calibrated with the
!      F16_93HYBRID calibration model solutions.
!
!      For each row above, entries are in the order short slow, short fast,
!      and long fast.
!
!
!      Author:   Gene Eplee
!                General Sciences Corp.
!                513-7768
!                2 December 1993
!                SER 11702

  0.3181130953125  0.2140692412586  0.0966526586767  !  RH slopes
  1.4352805363822  0.8577051984544  0.5659091990933  !  RL slopes
  1.5191090347109  0.7266698341443  0.2082700179341  !  LH slopes
  0.9033791223006  1.1911192067644  0.7500055772031  !  LL slopes

  0.8077706519285  0.8747664977663  0.9388613541838  !  RH intercepts
  0.4982031329753  0.7114551425149  0.8027039679998  !  RL intercepts
  0.8917235659124  0.9526830996467  0.9840390263056  !  LH intercepts
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 0.6036605718068  0.6089863134529  0.6825380479394  !  LL intercepts

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!  Reference Dataset FEX_VIBCORRL Text File
!
!      This file contains the frequency offsets for which FSL corrects voltage
!      spectra for MTM vibrations.  The coefficients of the vibration
!      correction terms are contained in the calibration model solution.
!      The vibration frequencies are based on an FFT length of 720.
!
!      The first two lines are primary offsets for the following channels and
!      scan modes:
!
!      RHSS RHSF RHLF RLSS RLFS/FL RLLF
!      LHSS LHSF LHLF LLSS LLFS/FL LLLF
!
!      The next two lines are secondary offsets in the same order.
!
!      Author:   Gene Eplee
!                General Sciences Corp.
!
 182.486 121.657 121.657  26.373  17.582 70.327
 182.486 121.657 121.657  26.373  17.582 70.327
  26.373  17.582  17.582 182.486 58.343 233.372
  26.373  17.582  17.582 182.486 58.343 233.372

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!
!  Reference Dataset FEX_CMDGAIN Text File:
!     Actual values of commanded instrument gains
!
!  Purpose: To be used for making a reference file containing the commanded
!           gain values for the four bolometer preamps. The data will be used
!           to normalize IFGs. These gains were obtained from:
!           John Sutton, Code 728.1, x6-5454
!
!           The gains are listed in columns below for each channel in the order
!           RH, RL, LH, and LL.
!
!  Written by: Gene Eplee
!              Applied Research Corp.
!              286-2437
!              30 Nov 1988
!

  1.000000 1.000000 1.000000 1.000000
 2.999940 2.999860 2.999739 2.999850
 10.00000 9.998940 9.998640 9.997999
 29.99940 29.99542 29.99331 29.99250
 100.9165 100.8180 100.9243 100.8040
 302.7434 302.4399 302.7466 302.3967
 1009.165 1008.073 1009.106 1007.838
```

```
 3027.434 3024.078 3027.054 3023.364

------------------------------------------------------------------------------

!
!  Reference Dataset FEX_SAMPRATE Text File:
!     Mirror Transport Mechanism sampling rate
!
!      This file contains the MTM sampling rates for both I&T and on-orbit
!      data.
!
!      Author:   Gene Eplee
!                General Sciences Corp.
!                513-7768
!                25 June 1992
!                SER 9859
!

 673.29          !  I&T MTM Sampling Rate
 681.43          !  Mission MTM Sampling Rate

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!
!
!  Reference Dataset FEX_MTMSWEEP Text File:
!     Mirror Transport Mechanism scan times
!
!  Purpose: To be used for making reference file, for FPP to use, containing
!      data for the FULL sweep flyback time.  Times will be used in the
!      computation of the midpoint and end of collect time for the
!      interferograms.  Times in tenths of microsecond for quadword use.
!      This file contains values determined from NFS_ANC data.
!
!  Author: Shirley M. Read, STX, January 1989.
!
!  Notes:  Mike Roberto, NASA, January 1989.
!      Information on MTM sweeps and flyback provided for STX.
!      Assumptions:  1. Total Time = Turn Around + Sweep + Flyback
!                    2. Total Time > Valid Time during Sweep and Flyback
!                    3. The Total Times given in the comments of the data
!                    statements / 2 are the Half Sweep Flyback Times needed
!                    needed for the midpoint of collect computation.
!                    4. The Total Times are the current measured values
!                    for each MTM scan mode. They are not expected to change.
!
!-------------------------Time when data was determined in gmt-----------------
91133000000000
!-------------------------Total Times-------------------------------------------
  34600000      ! Total Time: short-slow, 3.46 sec.
 112300000      ! Total Time: long-slow, 11.23 sec.
  24600000      ! Total Time: short-fast, 2.46 sec.
  79400000      ! Total Time: long-fast, 7.94 sec.
!-------------------------Now just the flyback times:--------------------------
```

```
  4200000      ! FlyBack Time: short-slow, 0.42 sec.
 13500000      ! FlyBack Time: long-slow, 1.35 sec.
  4200000      ! FlyBack Time: short-fast, 0.42 sec.
 13500000      ! FlyBack Time: long-fast, 1.35 sec.

--------------------------------------------------------------------------------

!
!  Reference Dataset FEX_CTH Text File:
!     Coaddition Consistency Check Thresholds
!
!  Author: H. Wang, STX, 12/15/91
!         from information supplied by A. Trenholme, GSC, and J. Gales, ARC

0.02 0.02 0.02 0.02  ! Bolometer voltage fractional tolerances
0.005 0.005 0.005 0.005 0.05 0.05 0.005 0.005 0.005 0.005  ! GRT fractional tolerances
6.83421079E-01 9.50153229E-02 9.50153229E-02 ! XCAL S5 vs. S6 |B-A| <= X+Y*A+Z*B; X units degrees K
4.66147089E+00 2.09719441E-01 2.09719441E-01 ! XCAL tip vs. horn
5.76738409E-01 2.41855781E-01 2.41855781E-01 ! ICAL
5.31837506E-01 3.09347058E-02 3.09347058E-02 ! skyhorn
9.50488986E-02 8.48032507E-02 8.48032507E-02 ! refhorn
2500 2500 2500 2500 2500 2500 2500 2500 2500 2500  ! Absolute tolerances for bracketing major frame temp diff - A
side; units tenth of a milliK
2500 2500 2500 2500 2500 2500 2500 2500 2500 2500  ! Absolute tolerances for bracketing major frame temp diff - B
side; units tenth of a milliK
10.0 10.0 10.0 10.0 ! Galactic latitude cutoff for choosing neighbors
0.75 0.75 0.75 0.75  ! Upper fractional bounds for secondary template
0.25 0.25 0.25 0.25  ! Lower fractional bounds for secondary template
21 21 21 21  ! Number of points around and including IFG peak for secondary template fitting
0.0 3.910437E-03 0.0 3.200282E-03 ! Prim temp amplitude cutoff; RH values by scan mode
0.0 9.437958E-03 0.0 3.647456E-03 ! Prim temp amplitude cutoff; RL values by scan mode
3.004505E-02 0.0 0.0 8.729302E-02 ! Prim temp amplitude cutoff; LH values by scan mode
0.172503 4.713346E-02 0.0 0.0 ! Prim temp amplitude cutoff; LL values by scan mode
0.0 0.0 0.0 0.0 ! Prim temp signal/noise cutoff; RH values by scan mode
45.6246 0.0 0.0 2.38662 ! Prim temp signal/noise cutoff; RL values by scan mode
0.351102 8.55462 0.0 0.813985 ! Prim temp signal/noise cutoff; LH values by scan mode
0.0 6.69978 0.0 0.0 ! Prim temp signal/noise cutoff; LL values by scan mode
0.0 3.229239E-03 0.0 1.402862E-04 ! Sec temp amplitude cutoff; RH values by scan mode
3.120842E-03 6.070071E-03 0.0 6.562931E-04 ! Sec temp amplitude cutoff; RL values by scan mode
6.819824E-05 2.930424E-03 0.0 0.0 ! Sec temp amplitude cutoff; LH values by scan mode
0.0 0.0 0.0 0.0 ! Sec temp amplitude cutoff; LL values by scan mode
0.422241 0.788206 0.0 0.0 ! Sec temp signal/noise cutoff; RH values by scan mode
0.0 6.84626 0.0 0.0 ! Sec temp signal/noise cutoff; RL values by scan mode
4.508498E-02 1.77851 0.0 0.0 ! Sec temp signal/noise cutoff; LH values by scan mode
1.86342 1.16900 0.0 4.90552 ! Sec temp signal/noise cutoff; LL values by scan mode
0.5 0.5 0.5 0.5  ! Minimum IFG noise
1.5 1.5 1.5 1.5  ! Maximum IFG noise
2 2 2 2  ! Value below which to disregard IFG: high frequency, four scan modes
2 2 2 2  ! Value below which to disregard IFG: low frequency, four scan modes
6.0 6.0 6.0 6.0  ! Maximum point deviation
6 6 6 6  ! Maximum number of bad points

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!
!  Reference Dataset FEX_MINCOADD Text File:
!     Minimum number of ifgs
!
!    Contains minimum number of IFGs needed to form templates
!    in each channel (RH, RL, LH, LL).  Used by FIL
!
!  Author:  S. Brodd, Hughes STX, 12/3/91
!
3 3 3 3                  ! Minimum number of IFGs

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!
!  Reference Dataset FEX_GRTCOAWT Text File:
!     GRT weights for coadded IFGs
!
!   Sets relative weights of GRT's for instrument components to values
!   determined by calibration program that minimize the chi-square of the
!   calibration model solutions.  The implication of these relative weights is
!   that the calibration of the GRT's has drifted since launch.
!
!   Nilo Gonzales/STX, August 21, 1991.
!

0.0   !XCAL GRT - A side            *** A SIDE ***
0.5   !Skyhorn GRT - A side
0.5   !Reference Horn GRT - A side
0.1   !ICAL GRT - A side
0.5   !Dihederal GRT - A side
0.5   !Bolometer RH - A side
0.5   !Bolometer RL - A side
0.5   !Bolometer LH - A side
0.5   !Bolometer LL - A side
0.0   !Mirror Mount GRT - A side
0.0   !Cal Res RH - A side
0.0   !Cal Res RL - A side
0.0   !Cal Res LH - A side
0.0   !Cal Res LL - A side
0.5   !XCAL S5 GRT - A side
0.5   !Collimator - A side

0.0   !XCAL GRT - B side            *** B SIDE ***
0.0   !Skyhorn GRT - B side
0.5   !Reference Horn GRT - B side
0.9   !ICAL GRT - B side
0.5   !Dihederal GRT - B side
0.5   !Bolometer RH - B side
0.5   !Bolometer RL - B side
0.5   !Bolometer LH - B side
0.5   !Bolometer LL - B side
0.0   !Mirror Mount GRT - B side
0.0   !Cal Res RH - B side
0.0   !Cal Res RL - B side
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```
0.0   !Cal Res LH - B side
0.0   !Cal Res LL - B side
0.5   !XCAL S6 GRT - B side
0.0   !Collimator - B side

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!
!  Reference Dataset FEX_GRTRAWWT Text File:
!     GRT weights for raw IFGs
!
!    Set weights to one as RAW weights only do combinations of the XCAL and
!    'structure', and don't combine sides.  The collimator B and XCAL B weights
!    are set to zero (no GRTs), and the Cal resistor weights are always zero.
!    The XCAL A and S5 are set to 0.5 for the XCAL combination, and the A side
!    mirror and collimator are equally weighted for the A side structure
!    measurement.
!
!    Nilo Gonzales/STX, August 21, 1991.
!

0.5   !XCAL GRT - A side            *** A SIDE ***
1.0   !Skyhorn GRT - A side
1.0   !Reference Horn GRT - A side
1.0   !ICAL GRT - A side
1.0   !Dihederal GRT - A side
1.0   !Bolometer RH - A side
1.0   !Bolometer RL - A side
1.0   !Bolometer LH - A side
1.0   !Bolometer LL - A side
0.5   !Mirror Mount GRT - A side
0.0   !Cal Res RH - A side
0.0   !Cal Res RL - A side
0.0   !Cal Res LH - A side
0.0   !Cal Res LL - A side
0.5   !XCAL S5 GRT - A side
0.5   !Collimator - A side

0.0   !XCAL GRT - B side            *** B SIDE ***
1.0   !Skyhorn GRT - B side
1.0   !Reference Horn GRT - B side
1.0   !ICAL GRT - B side
1.0   !Dihederal GRT - B side
1.0   !Bolometer RH - B side
1.0   !Bolometer RL - B side
1.0   !Bolometer LH - B side
1.0   !Bolometer LL - B side
1.0   !Mirror Mount GRT - B side
0.0   !Cal Res RH - B side
0.0   !Cal Res RL - B side
0.0   !Cal Res LH - B side
0.0   !Cal Res LL - B side
1.0   !XCAL S6 GRT - B side
0.0   !Collimator - B side
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!
!  Reference Dataset FEX_GRTTRANS Text File:
!     GRT low/high current transition temperatures
!
!   Transition midpoint and half-width are defined so that the top of the
!   transition region equals 3300 ohm, and the bottom is at 3700 ohm.
!
!      Nilo Gonzales/STX, August 21, 1991.
!

2.431, .051     !XCAL GRT - A side          *** A SIDE ***
2.597, .054     !Skyhorn GRT - A side
2.428, .048     !Reference Horn GRT - A side
2.485, .048     !ICAL GRT - A side
2.487, .049     !Dihederal GRT - A side
2.24, 0.10      !Bolometer RH - A side
2.50, 0.11      !Bolometer RL - A side
2.61, 0.12      !Bolometer LH - A side
2.34, 0.10      !Bolometer LL - A side
2.482, .054     !Mirror Mount GRT - A side
0.00,-1.00      !Cal Res RH - A side
0.00,-1.00      !Cal Res RL - A side
0.00,-1.00      !Cal Res LH - A side
0.00,-1.00      !Cal Res LL - A side
2.482, .047     !XCAL S5 GRT - A side
2.521, .049     !Collimator - A side

2.688, .057     !XCAL GRT - B side          *** B SIDE ***
2.399, .050     !Skyhorn GRT - B side
2.636, .055     !Reference Horn GRT - B side
2.495, .050     !ICAL GRT - B side
2.761, .057     !Dihederal GRT - B side
2.37, 0.10      !Bolometer RH - B side
2.37, 0.11      !Bolometer RL - B side
2.37, 0.10      !Bolometer LH - B side
2.46, 0.10      !Bolometer LL - B side
2.588, .052     !Mirror Mount GRT - B side
0.00,-1.00      !Cal Res RH - B side
0.00,-1.00      !Cal Res RL - B side
0.00,-1.00      !Cal Res LH - B side
0.00,-1.00      !Cal Res LL - B side
2.589, .051     !XCAL S6 GRT - B side
0.00,-1.00      !Collimator - B side
```