

Running the FFT Programme (TRANSFORM)

The Programme TRANSFORM will request the following information:
(Typical answers are highlighted)

```
C 01 : #ENTER INPUT FILE NAME      (NAME) :
C
C      ENTER THE NAME OF THE INPUT FILE (a 64 character long string)
C
C 02 : #ENTER OUTPUT FILE NAME      (NAME) :
C
C      ENTER THE NAME OF THE OUTPUT FILE (a 64 character long string)
C
C 03> : #SUBTRACT DC ?              (Y/N) :
C
C      IF Y IS ENTERED, THE AVERAGE VALUE OF THE DATA IS SUBTRACTED
C      BEFORE TRANSFORM. THIS IS GENERALLY A GOOD IDEA .
C
C      IF N IS ENTERED, NOTHING IS SUBTRACTED. THIS IS APPROPRIATE
C      FOR NOISE AUTOCORRELATIONS OR OTHER DATA WHERE THE DC LEVEL
C      IS SIGNIFICANT.
C
C 04> : #SELECT INTEGRATION UNIT (SMPL/DELX) :
C
C      IF SMPL IS ENTERED, THE SAMPLE LENGTH IS TAKEN AS 1.
C      THIS IS OK IF THE DATA WILL BE CORRECTED WITH LOCAL
C      CALIBRATION SPECTRA.
C
C      IF DELX IS ENTERED, THE DATA IS MULTIPLIED BY THE SAMPLE
C      LENGTH IN SLIDE CENTIMETERS OR SECONDS. THIS PROVIDES THE
C      MOST TRANSPORTABLE UNIT FOR CALIBRATION.
C
C 05> : #APODIZATION TYPE           (0/1/2/3/4/5) :
C
C      SIX APODIZATIONS ARE CURRENTLY OFFERED:
C
C      FOR BOX CAR (SINC FUNCTION), ENTER 0 .
C      FOR KAISER BESSEL WITH SIDE LOBES .1 OF SINC, ENTER 1 .
C      FOR KAISER BESSEL WITH SIDE LOBES .01 OF SINC, ENTER 2 .
C      FOR KAISER BESSEL WITH SIDE LOBES .001 OF SINC, ENTER 3 .
C      FOR KAISER BESSEL WITH SIDE LOBES .0001 OF SINC, ENTER 4 .
C      FOR KAISER BESSEL WITH SIDE LOBES .00001 OF SINC, ENTER 5 .
C
C      AN ENTRY OF 1 USUALLY PROVIDES ADEQUATE APODIZATION.
C
C 06> : #INTERPOLATION ?            (Y/N) :
C
C      IF Y IS ENTERED, THE DATA IS ZERO FILLED TO ALLOW ACCURATE
C      INTERPOLATION.
C
C      IF N IS ENTERED, NO ZERO FILL IS PERFORMED
C
C 07> : #OUTPUT PRECISION           (LO/HI/RE) :
C
C      FOR INTEGER*2 OUTPUT FILES, ENTER L(O)
C      FOR INTEGER*4 OUTPUT FILES, ENTER H(I)
C      FOR REAL*4   OUTPUT FILES, ENTER R(E)
C
C      LO IS USUALLY ADEQUATE, AND SAVES SPACE .
C
C 08> : #OUTPUT COMPONENTS          (RE/IM/CMPLX) :
C
C      TO OUTPUT THE REAL PART ONLY, ENTER RE .
C      TO OUTPUT THE IMAGINARY PART ONLY, ENTER IM .
C      TO OUTPUT THE COMPLEX SPECTRUM, ENTER CMPLX .
C
C      FOR PHASE CORRECTED SPECTRA, USE RE.
C      FOR AMPLITUDE SPECTRA, USE CMPLX .
C      FOR LOOKING AT PHASES, USE CMPLX
C
C 09> : #OUTPUT FREQUENCY RANGE     (FROM,TO) :
C
C      ENTER A RANGE OF WAVENUMBERS OR HZ FOR WHICH DATA IS TO BE
C      OUTPUT. A RANGE WHICH ALIASES DOWN INTO LOWER FREQUENCIES
C      MAY BE ENTERED, AND THE SPECTRAL INFORMATION WILL BE
C      REARRANGED AS REQUIRED, BUT THE ALIASED RANGE MUST NOT
C      CROSS OUT OF THE FREQUENCY INTERVAL FROM 0 TO THE NYQUIST
C      FREQUENCY.
```

Note that for the Bomems with the InGaAs detectors,
5000,10000 gets you about all there is to see

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C
C      TO START AT 0, ENTER U FOR FROM .
C      TO END AT THE NYQUIST FREQUENCY, ENTER U FOR TO.
C
C 10> : #CENTER POINT          (SAMPLE) :
C
C      ENTER THE CENTER POINT.
C
C      TO DEFAULT TO THE POSITION OF THE MAXIMUM, ENTER U.

```

Sometimes the signals are so low that allowing the default will not get the centre, rather a noise spike somewhere. Thus, I generally set this myself. Will vary with the Bomem resolution.

For resolution 2, 16384
 For resolution 4 (typical), **8192**
 For resolution 8, 4096...

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C
C 11> : #TRANSFORM RANGE      (SHORT, LONG) :
C
C      IN ORDER TO SPECIFY THE RANGE OF DATA POINTS TO BE USED
C      IN THE TRANSFORM, TWO NUMBERS MUST BE ENTERED. THE FIRST,
C      SHORT SIDE DATA POINTS, IS THE NUMBER OF SAMPLES INCLUDING
C      THE CENTER POINT TO BE USED FROM THE SIDE OF THE
C      INTERFEROGRAM WITH THE FEWEST POINTS. THE SECOND, LONG SIDE
C      DATA POINTS, IS THE NUMBER OF DATA SAMPLES INCLUDING
C      THE CENTER TO BE USED FROM THE SIDE OF THE INTERFEROGRAM
C      WITH THE MOST POINTS. NOTE THAT THE TOTAL NUMBER OF
C      POINTS WILL BE SHORT + LONG - 1
C
C      FOR DOUBLE SIDED TRANSFORMS, ENTER X,X
C      FOR SINGLE SIDED TRANSFORMS, ENTER Y,X
C      FOR SINGLE SIDED SYMMETRIC TRANSFORMS, ENTER 1,X
C
C      WHERE X AND Y ARE INTEGERS > 0 .
C
C      THE TRANSFORM WILL OPERATE MOST EFFICIENTLY IF X IS A
C      POWER OF 2.
C
C      DEFAULTS (U) ARE NOT ALLOWED IN THIS ENTRY

```

Note, This will also depend on the Bomem resolution. Because the scan may not be exactly centred, it can be dangerous to make it double sided, X,Y as above (even though the Bomem scans are nominally symmetrical). It is better to use one side the same as the center point (in item 10), and the other side 100 to 200 points shorter.

Thus:

For Resolution 2, 16100, 16384
 For Resolution 4 (typical) **8000,8192**
 For Resolution 8 3900, 4096

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C
C 12> : #SINGLE SIDED PHASE POINTS (SAMPLES) :
C
C      THE NUMBER OF DATA UP TO AND INCLUDING THE CENTER TO BE
C      USED IN PHASE CORRECTION THE TOTAL POINTS WILL BE
C      2*SAMPLES - 1.
C
C      FOR NO PHASE CORRECTION, ENTER U .
C      FOR TWO SIDED SYMMETRIC DATA, ENTER U .
C      FOR ONE SIDED SYMMETRIC DATA, ENTER 1 .
C
C      AN ENTRY OF 32 USUALLY WORKS. IF THE SIGNAL IS MORE
C      DYNAMIC OR CHANGING, 64 OR HIGHER MAY BE NECESSARY
C
C 13> : #PHASE WEIGHT TYPE      (FL/ST/RA) :
C
C      WEIGHTS FOR USE IN PHASE CORRECTION. IF THERE IS NO
C      PHASE CORRECTION, THIS ENTRY IS REQUIRED, BUT IGNORED.
C
C      FOR DOUBLE SIDED TRANSFORMS, ENTER FL(AT)
C      FOR SINGLE SIDED TRANSFORMS, ENTER ST(EP) OR RA(MP)
C
C      FL WEIGHTS EVERY POINT BY 1 (NO WEIGHTING) .
C
C      ST WEIGHTS THE CENTRAL POINTS BY 1 AND THE REMAINING
C      POINTS BY 2 .
C

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C      RA WEIGHTS THE CENTRAL POINTS WITH A RAMP, 0 AT ONE END,
C      1 AT THE CENTER, AND 2 AT THE OTHER END. THE REMAINING
C      POINTS ARE WEIGHTED BY 2 .
C
C      GENERALLY, ST IS TO BE PREFERRED TO RA. IF THERE ARE
C      SOME PROBLEMS WITH PHASE CORRECTION RA MAY BE TRIED,
C      BUT NO CASES HAVE YET BEEN FOUND WHERE IT MADE A
C      SIGNIFICANT DIFFERENCE.
C
C 14> : #ACCESS SCANS          (#FROM,#TO) :
C
C      ENTER THE RANGE OF SCANS TO BE PROCESSED.
C      THIS QUERY IS REPEATED UNTIL 0,0 IS ENTERED.
C
C      IF 'U' IS ENTERED FOR FROM, 1 IS USED.
C      IF 'U' IS ENTERED FOR TO , 10000 IS USED.
C
C      AN END OF FILE IS TRAPPED, SO THAT ALL INTERFEROGRAMS
C      MAY BE TRANSFORMED BY ENTERING 1,BIG_NUMBER
C
C
C END : END EXECUTION BY ENTERING 0,0 AT XX .

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Example of running the programme:

>~/sunfts/trnsform

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#ENTER INPUT FILE NAME          (NAME): 99341x1.ifg
#ENTER OUTPUT FILE NAME         (NAME): 99341x1.fft
#SUBTRACT DC ?                  (Y/N): y
#SELECT INTEGRATION UNIT        (SMPL/DELX): d
#APODIZATION TYPE               (0/1/2/3/4/5): 1
#INTERPOLATION ?                (Y/N): y
#OUTPUT PRECISION               (LO/HI/RE): l
#OUTPUT COMPONENTS              (RE/IM/CMPLX): r
#OUTPUT FREQUENCY RANGE         (FROM,TO): 5000,10000
#CENTER POINT                   (SAMPLE): 8192
#TRANSFORM RANGE                (SHORT,LONG): 8000,8192
#PHASE DATA POINTS             (SAMPLES): 64
#PHASE WEIGHT TYPE              (FL/ST/RA): r
#TRANSFORM SCANS                (#FROM,#TO): u,u
#GETHDR 03> - EOF AFTER SCAN 000020
#TRNSFORM 15> - END OF INPUT
STOP: #TRNSFORM - OK
>

```