

## INTREAD

INTREAD is a modification of the existing interferometer data reduction program IREAD. With the addition of the 42' telescope to the interferometer system the existing data formats were inadequate to handle the data from the four correlators. IREAD was then modified to use variable formatting for the data output, with default formats already in INTREAD. The default formats are used whenever an observer does not want to write his own formats, or when he is satisfied with the type of formatting done with the default formats.

The primary input for INTREAD is the 7-track tape from the interferometer in Green Bank. On this tape there are four types of records: a Header record, an Analog to Digital Converter record, a Data record, and the Operator's comments. The observer has complete control of the output formats used to print the data record and the remaining three types of records are printed with standard formats. Next follows a description of what is contained in each type of record.

### (1) Header records:

- A) This record appears once per scan and in it are found a source description, the Besselian Day number for the day on which the scan took place, the L.S.T. of the start of the scan, HA and DEC corrections for 85-1, 85-2, and 85-3, the setting of the console switches and the observer's and operator's initials.
- B) The Baseline parameters for all four pairs of telescopes are given.

### (2) (2) Analog to Digital converter records:

- A) This type of record appears every five minutes throughout the scan.
- B) This record is a 100-word block consisting of the last 54 line feed from the A/D converter and a few other items read from the digital input lines.
- C) This record is printed as a 100-word block with 10 words per line.

( (3) Data records:

- A) This record consists of a 16-word preface containing the scan number, L.S.T., Hour Angle, gain, system sensitivities, and 84 words of data from the four correlators.
- B) The data from the correlator comes in four blocks. The data from each block is taken from a 15-second portion of the minute covered by the data record.
- C) The existing default formats in INTREAD will print the output from correlators 1, 2 and 3.

(4) Operator's Comments:

These comments occur only when the operator feels that there is something worth noting, i.e., when one of the telescopes is down, etc.

Next follows a list of the formats that can be changed by the observer, with a description of their functions and their corresponding sequence number.

<u>FORMAT NAME</u>	<u>SEQUENCE NUMBER</u>	<u>DESCRIPTION</u>
FMT1	1	This format controls the printing of the L.S.T., hour angle and total power.
FMT2	2	This format controls the printing of the data from correlator 1.
FMT3	3	This format controls the printing of the data from correlator 2.
FMT4	4	This format controls the printing of the data from correlator 3.

<u>FORMAT NAME</u>	<u>SEQUENCE NUMBER</u>	<u>DESCRIPTION</u>
FMT5	5	This format controls the printing of the data from correlator 4.
FMT6	6	This format controls the printing of the polarization.
FMT10	7	This format controls the printing of the 1st line of the data headings.
FMT20	8	This format controls the printing of the 2nd line of the data headings.
FMT30	9	This format controls the printing of the system sensitivities, the gain and the offset.

The data cards for formats FMT10, FMT20, and FMT30 have the following form:

- (1) In the fifth column, punched as an integer, will be a number which corresponds to the sequence number of the format to be changed.
- (2) In the sixth column will be a continuation number. This number will either be a blank, a 1, or a 2 depending upon whether the card is the first, second or third data card for that particular format.
- (3) In columns 7 - 78 of each data card is punched the new format in the form of (.....), where the ( will be punched in column 7 of the first data card, and where the ) will be the last character punched on the last data card for that particular format.

Formats FMT1, FMT2, FMT3, FMT4, FMT5, FMT6, and FMTB have slightly different data card formats than those listed above. These formats are described on the following page:

- (1) In the fifth column, punched as an integer, will be a number which corresponds to the sequence number of the format to be changed.
- (2) Starting in the 7th column and continuing through to the 54th column the new format may be punched with the following restrictions:
  - A) On the data card for FMT1, in column 7 a ( must appear and in column 54 a / must appear, with all the columns not being used left as blanks.
  - B) On the data cards for FMT6 a , must appear in column 7 and a ) must appear in column 53 and a / in column 54 with all the columns not being used left as blanks.
  - C) On the data cards for the remaining formats a , must appear in column 7 and a / must appear in column 54, with all the columns not being used left as blanks.

FMT1, FMT2, FMT3, FMT4, FMT5, FMT6, and FMTB are used as character strings by the subroutine BLDFMT to build a format based on the flag word found in the data record. Whenever the output from a correlator is flagged dummy, the output from that correlator is printed with 5F1.0 formats contained in FMTB. Otherwise the format for each correlator is built using the default formats or the formats which are read in. Then, all the output from the correlators is written with one WRITE statement using the format which was built prior to the writing.

Since the data from the correlators is written with one generalized write statement, the variables that were not to be written had to be formatted with a F1.0 format specification. This format then gives one asterisk per variable. These asterisks are then placed in columns 128 and 129 using the T format. Then in FMT6, the format which controls the printing of polarization, columns 128 and 129 were overwritten with 2Hob, to override the asterisks. This must be done in the new formats written by the observer.

INTREAD is to be disk resident in the private program library and it will be called using a cataloged procedure named INTREAD.

The DD cards needed to run the program are included in the procedure. Some of the DD cards use variable parameters, which the observer supplies to specify the DSNAME of the archive tape, the tape serial numbers for all three tapes, and the data set dispositions for TAPE1 and the archive tape. In the cataloged procedure, a default value of MØD exists for both TAPE1 and the archive tape. The following is a list of variable names and their functions as used in the cataloged procedure:

<u>VARIABLE NAME</u>	<u>FUNCTION</u>
ARCHNUMB	This supplies the tape number for the archive tape presently being used.
TAP1NUMB	This supplies the tape number for the TAPE1 presently being used.
INTRTAPE	This supplies the tape number for the telescope tape to be used.
ARCHNAME	This supplies the DSNAME for the archive tape. DD statement in the procedure.
ARCHDISP	This supplies the disposition of the archive data set to the DD card in the procedure.
TAP1DISP	This supplies the disposition of the TAPE1 data set to the DD card in the procedure.

The variables TAP1DISP and ARCHDISP do not have to be present on the //bbEXEC card of the calling sequence if the dispositions are to be assured MØD. The variable can be in any order on the card. The calling sequence for INTREAD using tapes 1617, 1099 and 1100, and with the archive DSNAME of ARCHVG, and the two dispositions as NEW would be as follows:

```
//INTREADbbbJØBbb
//JØBLIBbbDDbbDSNAME=STDRDUCT.JØBLIB,DISP=OLD
//bbbbbbbbbEXECbbINTREAD,ARCHNAME=ARCHV6,
//          ARCHNUMB=1100,TAP1NUMB=1099,INTRTAPE=1617
//          ARCHDISP=NEW,TAP1DISP=NEW
//INTR.SYSIN  DD*
```

DATA CARDS

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/*
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A typical run for INTREAD would be preformed by the cards shown in example 1. The default formats would be used so only the output from correlators 1, 2, and 3 would be printed. The card setup shown in example 2 would provide new formats for the data so that correlators 1, 2, and 4 would be printed.

Following the output from the telescope tape there is a table of edit notes and calibration sources. The edit notes check the data on the telescope tape for the following items:

- 1) Clock correction varies less than 10 ms.
- 2) Agreement of scan numbers in the data and header records.
- 3) Total power within the range of 200 to 500.
- 4) Total power varies less than 10% during a 15 second period.
- 5) RMS less than 500 with a gain setting of 0.
- 6) RMS less than 100 with a gain setting of 1.
- 7) System sensitivities greater than 475 and varies less than 10%.
- 8) Cable pressure is -16100. + or -200.
- 9) The L.O. Frequency is 2695 MHZ + or - 1500 HZ.

- 10) The L.O. phase changes less than 5 degrees in 5 minutes.
- 11) The amplitude of the calibrator sources is averaged and the number of counts per flux unit is printed.

If the data is within the limits stated above, then no comments are printed. If the data is out of limits then a line is printed stating what was wrong and in what scan and at what time it happened. Following the edit note table, a table consisting of the scan numbers, the source name, the Besselian Day number, and the start time of the scan is printed. This table provides the observer with a list of all the scans included on that telescope tape.

INTREAD is designed to accomplish the same things as three of the existing interferometer programs, IREAD, IREAD41, and COPYTP1. INTREAD will now read the telescope tape, print an output for the observer, then write TAPE1, and then copy TAPE1 onto a blocked archive tape.







```

BLOCK DATA
REAL*8 FMT10(27)/'(///24X,'SENS1    2    3    4 NOM.G'',16X,'DC1
+2'',16X,'DC13'',16X,'DC23'',16X,'DC14''),'/,
+ FMT20(27)/'(1H ,41H    L.S.T.    HOUR ANGLE    TP1 TP2 TP3,5X,
+ 18H AMP12 PHASE RMS,6X,18H AMP13 PHASE RMS,6X,18H AMP23 PHA
+SE RMS,5X,4H1234)'/,
+ FMT30(27)/'(1HQ,24X,4F5.0,14,16X,3(F6.0,14X),F6.0)'/,
+ FMT1 (6)/'(1H ,2R12.1,5X,3I4,T128,I1
+ FMT2 (6)/' ,T48,(F7.1,2F6.0,3X),T128,2F1.0
+ FMT3 (6)/' ,T72,(F7.1,2F6.0),T128,2F1.0
+ FMT4 (6)/' ,T96,(F7.1,2F6.0),T128,2F1.0
+ FMT5 (6)/' ,T128,2F1.0,T128,2F1.0,T128,F1.0
+ FMT6(6)/' ,T119,4A1,T128,2H )
+ FMTB (6)/' ,T128,2F1.0,T128,2F1.0,T128,F1.0
COMMON/FORM/ FMT1,FMT2,FMT3,FMT4,FMT5,FMT6,FMT10,FMT20,FMT30,
+FMTB
END

```

In this Block Data Subprogram are contained the default formats as found in the program INTREAD. FMT1, FMT2, FMT3, FMT4, FMT5, FMT6, and FMTB are used as character strings to build the format used. These formats will print the data from correlators 1,2, and 3 in the form shown by the output from Example 1, as shown in the listings of INTREAD. These listings are kept in room 211 by Oscar Rhudy or Russel Bosserman, both of whom will be able to answer questions about INTREAD.