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HYTRAN

Operating Manual

HYTRAN

Operating Manual

Data transfer program for ASCII data files

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CONTENTS

	Page
1. Introduction	1.1
1.1 Getting started	1.2
2. Single file automatic transfer	2.1
2.1 Datafiles and format files	2.1
2.2 How automatic is the transfer to be?	2.2
2.3 Transferring the data	2.3
2.4 Predefined files supplied with HYTRAN	2.3
2.4.1 Format for an event datafile	2.4
2.4.2 Format for a daily datafile	2.6
2.4.3 Format for a monthly datafile	2.8
3. Transferring data manually	3.1
3.1 The Input Data Menu	3.1
3.2 The Check and Transfer Menu	3.4
4. Creating a new format	4.1
4.1 The / command	4.2
4.2 The Format (F) command	4.9
4.2.1 V and C subcommands	4.10
4.2.2 I subcommand	4.12
4.2.3 Y, M, D, h, m, s subcommands	4.12
4.2.4 N subcommand	4.14
4.2.5 L subcommand	4.14
4.2.6 R subcommand	4.15
4.3 The View (V) command	4.16
4.4 The Order (O) command	4.18
4.5 The Clear (C) command	4.19
4.6 Example of creating a format file	4.22
5. Batch transfers	5.1
5.1 Modes of operation	5.3
5.2 Output	5.11

CONTENTS

	Page
Appendix A Installing HYTRAN	A.1
Appendix B Limitations on the input datafile	B.1
Appendix C Demonstration data	C.1
Appendix D The \$\$\$ line	D.1
Appendix E Error and information messages	E.1

List of tables

Table 2.1	Example of an event datafile - Event96.dat	2.5
2.2	Example of a daily datafile - Daily.dat	2.7
2.3	Example of a monthly datafile - Monthly.dat	2.9
Table 4.1	Summary of formatting options available within HYTRAN	4.20
Table 4.1	continued	4.21
Table 5.1	Summary of batch modes of operation	5.10
Table 5.2	Example of the first entry in a HYTRAN.REM file	5.13

1. INTRODUCTION

HYTRAN is a data input program that forms part of the Institute of Hydrology's HYDATA database system. HYTRAN has been designed to read data files containing continuous time series data and to transfer the data automatically to a HYDATA database. Many different types of datafile can be handled, including files produced by loggers, telemetry systems, and other database systems. The types of data that can be read include:

- * Event data (stage, rainfall, lockage)
- * Daily or monthly data (flow, rainfall, storage, general)
- * Missing data
- * Multiple blocks of data
- * Yearbook style data (columns of time series data)

Date and time information can either be specified by the user, or read directly from the file.

HYTRAN is operated using screen menus of the type used in HYDATA. Datafile formats are defined interactively and, once defined, can be stored for use with other files from the same data source. Data can be transferred either automatically, using a stored format, or can first be checked on the screen, using HYTRAN's screen display facilities. Full error checking is performed before the start of each transfer. A batch facility is available for use when more than one file is to be transferred.

This manual describes all the facilities available within HYTRAN. Section 2 describes how to transfer data automatically, with examples, Section 3 describes how to transfer data manually, Section 4 describes how to create a new format, and Section 5 describes the batch mode of operation. Installation instructions for HYTRAN are given in Appendix A, and limitations on the input datafiles are listed in Appendix B. Several demonstration datasets are provided and are described in Appendix C. Appendix D describes the optional first line in format files - the \$\$\$ line.

Note that this manual does not describe how to operate the HYTRAN menus. The commands used are the same as for the HYDATA system and are described fully in Section 2 of the HYDATA operating

CHAPTER 1 INTRODUCTION

manual, although a mouse may not be used with HYTRAN.

1.1 Getting started

HYTRAN should be installed following the instructions given in Appendix A. On starting a HYTRAN session, the following menu is displayed:

Menu A1 - Mode

[1] Quit
[2] Single file
[3] Batch mode

The required mode of operation should be selected. Option [1], 'Quit', returns control to the operating system, Option [2] allows a manual data transfer of a single datafile to be attempted (see Section 2) and Option [3] gives access to the batch transfer menu allowing transfer of several datafiles in one operation (see Section 5).

First time users should begin by reading through Sections 2 and 3 and the introduction to Section 4, and then attempt a transfer. The transfer can be performed automatically using the example files in Section 2, manually using one of the demonstration datasets (see Appendix C), or using some of your own data. If you are using your own data it will be necessary to create a format file. Sections 4.1 to 4.5 explain how to do this.

The steps required to perform a data transfer are:

- a) Check that the current directory contains the input datafile and the HYDATA database.
- b) Check that the database has sufficient space allocated for the data to be transferred. Note that, for event data, the times at which data are stored must be separated by equal intervals in time (e.g., every 15 minutes).

1.1 Getting started

- c) Check that the current directory contains the appropriate format file if a stored format is being used OR create (or edit) the format if a suitable stored format is not available.
- d) Scan the data, to check that the HYDATA station exists and that HYTRAN is interpreting the data correctly. If the results of the scan are unsatisfactory, the input data or the specified format may need to be changed. There is no check at this stage that the water year exists on HYTRAN; this check occurs at transfer.
- e) Transfer the data.

Steps a) and b) should be performed using the appropriate DOS and HYDATA commands. The remaining steps are discussed in Sections 2, 3 and 4.

In the batch mode of operation, Steps d) and e) are performed automatically for each of the specified datafiles. For each batch job, the datafile names must be provided in a separate 'batch job' file. Before using the batch mode it is good practice to perform at least one manual transfer to check that the file format is defined correctly.

Note that it is advisable to make a back-up copy of your HYDATA database at regular intervals and, preferably, before the start of each transfer. This is because, if a major problem occurs during the transfer (e.g., power failure, accidental rebooting), the database files may be corrupted and parts of the database might no longer be accessible. If this occurs, the database should be restored from the most recent back-up copy and the transfer attempted again. This warning is particularly important for batch transfers since, during a batch transfer, the computer may be left unattended for long periods, so increasing the risk of an interruption to the transfer. Back-up copies of the database can be made either to floppy disk, using the facilities in HYDATA, or (more quickly) to hard disk, using the DOS COPY command.



2. SINGLE FILE AUTOMATIC TRANSFER

This section describes the most efficient way to set up datafiles so that single file transfer is as automatic as possible, using as examples the files supplied with HYTRAN.

A full description of the menus and formatting procedures will be found in Sections 3 and 4, and in Appendix D.

Batch mode transfer is described in Section 5.

2.1 Datafiles and format files

Data should be in blocks, each with its date/time information. There can also be any number of header records.

The datafile must be accompanied by a format file which defines its structure (eg. number and position of header records, block length, end of block markers, position of date/time information, number of readings per day). Optionally, the format file may define the position of the station identifier in the datafile. Once specified, this format file can relate to any datafile written in exactly the same format.

The name of the format file and other information (data type, data period and the HYDATA station number to which the data relates or its identifier) can optionally be stored in the datafile in a line known as the \$\$\$ line. HYTRAN reads the information in this line and uses it to fill in much of the initial menu. If used, the \$\$\$ line must be the first line in the file and it must conform exactly to the format described in Appendix D, but fields may be left blank if required. The \$\$\$ line counts as a header record for formatting purposes. If a \$\$\$ line is not used, this information can be supplied when the menu appears on the screen.

CHAPTER 2 SINGLE FILE AUTOMATIC TRANSFER

It should be noted that information on station identifier defined in the format file will override any similar information contained in the \$\$\$ line.

2.2 How automatic is the transfer to be?

Transfer of data can be automatic to a degree depending on the completeness of the \$\$\$ line and the existence of a related predefined format file:

- a) For fully automated transfer the datafile should contain a \$\$\$ line AND a related format file should already exist; the \$\$\$ line should supply the name of the format file, data type and data period. The station identifier can be defined in either the format file or the \$\$\$ line. Alternatively a station number can be supplied in the \$\$\$ line. Then only the name of the datafile is required to initiate transfer.
- b) It may be useful to leave some fields undefined (eg. a generalised input for loggers). The initial menu will be partially filled, leaving the remaining information to be supplied on the screen.
- c) If there is no \$\$\$ line in the datafile, the name of the format file must be supplied on the screen. The format file in turn may optionally define the identifier and hence the station number. The remainder of the information should be supplied on the screen.
- d) If there is no predefined format file, the format of the datafile must be specified manually as described in Section 4.

2.4 Predefined files supplied with HYTRAN

2.3 Transferring the data

The transfer of data is briefly outlined here, but a full description of the menus will be found in Section 3.

From the first menu A1 - Mode, select option [2], Single file, which includes the automatic facility.

Menu MM1 - Input Data asks for the name of the datafile. If the datafile includes a \$\$\$ line the information contained in it will be added automatically to menu MM1. Any information not supplied by the \$\$\$ line should be entered on the screen. If entering data type or data period a list of alternatives will appear near the bottom of the screen, of which one should be selected. Then select option [8], Continue.

Menu MM2 - Check and Transfer will be displayed. If a predefined format file has not been supplied, the format of the datafile must be defined by selecting option [2], Inspect format; this procedure is described in Section 4. Next select option [4], Scan data, which orders and checks the data, and transfer cannot proceed until this is done. Finally select option [6]. Transfer to HYDATA.

2.4 Predefined files supplied with HYTRAN

HYTRAN is supplied with three examples of datafiles, Event96.dat, Daily.dat and Monthly.dat, and their related predefined format files Event96.frm, Daily.frm and Monthly.frm. These files facilitate the automatic transfer of event, daily and monthly data.

The data must be written in the particular format given; eg. event data at 15 minute intervals should have the form Event96.dat and be accompanied by the format file Event.96.frm. Any changes to the format of the datafile (eg. number of header records, date/time format) would mean that a new format file would be needed.

CHAPTER 2 SINGLE FILE AUTOMATIC TRANSFER

Each of the three datafiles contains a \$\$\$ line. The fields in the \$\$\$ line can be changed to suit requirements, but must conform exactly to the format described in Appendix D. In the descriptions and tables which follow, it is assumed that the station number/identifier fields are left blank in all three examples; also that the data type field is left blank in the daily and monthly examples.

2.4.1 Format for an event datafile

The first line in the example (shown in Table 2.1) is known as the \$\$\$ line and issues special instructions to HYTRAN to fill in some of the initial menu options. It must be the first line of the file and must conform exactly to the format given in Appendix D. The number line is not required in the datafile and is only provided here to help identify column numbers throughout the file. In this example it is assumed that only the fields for data type and period, and for the format file name, are filled in the \$\$\$ line.

The next 5 lines of header are for your use and can be filled with your own information describing the data, as this will not affect the program.

The data should be arranged with a block for each day, with a header showing the date and time of the first value. For example the first data value in the example file is for 1st May 1990 at 9 am. The first and last day do not have to be complete days, but each one should be finished by the end of block marker. The data should be arranged sequentially across the page in lines up to 132 characters long. At the end of the block there should be written an end of block marker, which we have chosen as END OF DAY. A general block description should include:

```
DD MM YYYY hh mm ss  
.  
. lines of data  
.  
END OF DAY
```

where DD = day, MM = month, YYYY = year, hh = hours,
mm = minutes, ss = seconds describing the first value.

2.4 Predefined files supplied with HYTRAN

1234567890123456789012345678901234567890123456789012

```

$$$ 1 1                                     Event96.frm
HYDATA LOGGER/OUT STATION LOG FILE
DATA SOURCE : HYTEL via WS3000 MODEM
OUTSTATION REF : 7102 - COOPER BRIDGE
CURRENT TIME : 11:24:57 ON THU 03/05/90
LOG REFERENCE : LG1
 1 5 1990 9 0 0
983 984 985 985 986 986 986 988 987 988 987 988
987 988 991 988 975 987 987 987 984 986 993 990
985 985 986 985 983 982 976 985 984 985 985 984
986 986 987 987 987 987 986 983 982 981 981 981
981 981 982 983 983 983 983 983 983 982 982 982
982 983 984 983 985 985 985 985 985 984 984 983
983 982 982 981 980 980 980 979 979 979 978 978
978 978 978 978 978 978 978 979 979 979 979 980
END OF DAY
 2 5 1990 9 0 0
980 979 980 979 979 978 986 987 981 982 982 982
981 982 982 984 981 984 981 983 985 985 995 989
988 987 986 982 982 982 984 981 982 982 982 982
983 982 982 981 983 982 981 980 980 978 978 977
978 978 979 979 979 979 979 979 978 978 978 977
977 977 977 977 977 978 978 978 979 979 978 978
978 977 977 976 976 975 975 974 974 974 974 974
973 973 973 974 974 974 973 975 975 975 975 978
END OF DAY
 3 5 1990 9 0 0
983 981 982 978 973 972 971 971 972 974
END OF DATA

```

Table 2.1 Example of an event data file - Event 96.dat

CHAPTER 2 SINGLE FILE AUTOMATIC TRANSFER

If your file of data is written exactly in the format described, and accompanied by its related format file, then HYTRAN will be able to write the information to HYDATA, providing that the appropriate station space has been allocated within HYDATA for the period of data, with the correct number of readings/day to be transferred.

The steps required for the transfer of the datafile are described briefly in Section 2.3. After entering the name of the datafile in menu MM1 (Event96.dat) only the station number will be required, since the \$\$\$ line will have defined everything else. In menu MM2 only Scan data and Transfer are required.

2.4.2 Format for a daily datafile

The first line in the example (shown in Table 2.2) is known as the \$\$\$ line and issues special instructions to HYTRAN to fill in some of the initial menu options. If it is convenient to edit the file you may find this line useful. It must be the first line of the file and must conform exactly to the format described in Appendix D. In this example it is assumed that only the fields for data period and the format file are filled in the \$\$\$ line. The number line is not required in the datafile and is only provided here for ease of column identification.

The next 4 lines of header are for your use and can be filled with your own information describing the data, as this will not affect the program.

The data should be arranged with a block for each month and a header showing the date of the first value. For example the first data value in the example file is for 1st May 1980. The first and last month do not have to be complete months but should be finished by the end of block marker. The data should be arranged sequentially across the page in lines up to 132 characters long. At the end of the block there should be written an end of block marker, which we have chosen as END OF MONTH.

2.4 Predefined files supplied with HYTRAN

1234567890123456789012345678901234567890123456789012

```

$$$      2                                DAILY.FRM
STATION NUMBER : 98050301
STATION : RIVER THAMES, WALLINGFORD
ORGANISATION : INSTITUTE OF HYDROLOGY
--SPARE LINE FOR YOUR OWN INFORMATION--
 1  5 1980
6.370 6.370 6.370 6.320 6.320 7.700 7.990 7.140 7.140 8.610
15.400 8.500 13.900 9.540 8.130 13.300 8.610 8.550 9.120 9.690
9.120 7.420 5.950 6.060 7.990 5.950 4.500 3.430 2.970 3.990
5.950
END OF MONTH
 1  6 1980
7.700 5.210 7.990 8.550 12.100 11.700 7.420 5.810 5.210 4.390
3.510 3.060 3.230 3.140 2.890 2.010 3.060 3.710 10.300 9.970
9.630 13.100 38.200 21.000 13.300 15.400 14.900 13.700 25.695 15.706
END OF MONTH
 1  7 1980
15.600 11.000 11.900 21.200 29.700 20.400 24.100 13.200 17.800 22.400
40.500 28.300 19.800 19.300 17.000 15.300 24.600 28.300 20.700 18.100
44.700 48.100 36.000 35.400 22.400 15.900 11.300 10.200 11.900 10.200
7.560
END OF MONTH
 1  8 1980
6.030 4.980 6.460 7.560 7.560 9.860 8.410 8.270 6.030 6.710
7.990 12.700 11.000 9.660 9.800 9.520 8.690 7.840 7.420 6.060
4.980 4.420 3.790 3.340 3.170 3.000 2.780 2.720 2.780 3.790
5.264
END OF MONTH
 1  9 1980
4.530 3.910 3.430 2.970 2.860 2.660 2.460 2.660 2.660 2.180
2.100 2.010 1.840 1.840 1.760 1.840 1.590 1.530 1.440 1.360
1.300 1.220 1.080 1.080 1.160 1.220 1.160 1.160 1.080 1.160
END OF MONTH

```

Table 2.2 Example of a daily data file - Daily.dat

CHAPTER 2 SINGLE FILE AUTOMATIC TRANSFER

A generalised block should include the following:

```
DD MM YYYY
.
. lines of data
.
END OF MONTH
```

where DD = day, MM = month, YYYY = year describing the first value.

If your file of data is written exactly in the format described, and accompanied by its related format file then HYTRAN will be able to write the information to HYDATA providing that the appropriate station has been allocated within HYDATA for the period of data to be transferred.

The steps required for the transfer of the datafile are described briefly in Section 2.3. After entering the name of the datafile in menu MM1 (Daily.dat) the menu will become partially filled. The station number and data type should be added (a selection of data types appears near the bottom of the screen). In menu MM2 only Scan data and Transfer are required.

2.4.3 Format for a monthly datafile

The first line in the example (shown in Table 2.3) is known as the \$\$\$ line and issues special instructions to HYTRAN to fill in some of the initial menu options. If it is convenient to edit the file you may find this line useful. It must be the first line of the file and must conform exactly to the format described in Appendix D. In this example it is assumed that only the fields for data period and format file name are filled in the \$\$\$ line. The number line is not required in the datafile and is only provided here for ease of column identification.

The next 4 lines of header are for your use and can be filled with your own information describing the data, as this will not affect the program.

2.4 Predefined files supplied with HYTRAN

```
01234567890123456789012345678901234567890123456789012
$$$      3                                     Monthly.frm
STATION NUMBER : 0274533
STATION NAME : RIVER THAMES, WALLINGFORD
ORGANISATION : INSTITUTE OF HYDROLOGY
--SPARE LINE FOR YOUR OWN INFORMATION--
01 1970
253.45 234.56 645.56 234.87 234.98 133.45
656.98 456.98 765.87 645.78 365.38 475.68
END OF YEAR
01 1971
364.58 375.48 385.47 475.48 384.39 374.48
284.64 294.78 274.37 436.37 273.28 263.40
END OF YEAR
01 1972
173.23 473.29 289.28 263.72 934.28 264.60
237.83 437.83 273.58 375.33 274.38 267.49
END OF YEAR
01 1973
364.28 374.48 283.28 396.34 295.79 795.56
254.80 475.08 475.87 475.49 374.43 475.48
END OF YEAR
01 1974
364.30 163.38 284.57 375.58 243.28 273.28
364.32 724.97 754.48 274.86 465.37 386.58
END OF YEAR
01 1975
263.26 126.98 263.37 364.38 273.67 576.65
436.65 354.96 437.48 374.38 374.93 274.32
END OF YEAR
01 1976
364.26 163.97 476.49 475.58 475.58 364.78
254.86 375.89 475.68 586.58 465.68 485.59
END OF YEAR
```

Table 2.3 Example of a monthly data file - Monthly.dat

CHAPTER 2 SINGLE FILE AUTOMATIC TRANSFER

The data should be arranged with a block for each year with a header showing the date of the first value. For example the first data value in the example file is for Jan 1970. The first and last year do not have to be complete years but should be finished by the end of block marker. The data should be arranged sequentially across the page in lines up to 132 characters long. At the end of the block there should be written an end of block marker, which we have chosen as END OF YEAR. A generalized block of data should include the following:

```
MM YYYY
```

```
. lines of data
```

```
END OF YEAR
```

where MM = month, YYYY = year describing the first value.

If your file of data is written exactly in the format described and accompanied by its related format file, then HYTRAN will be able to write the information to HYDATA providing that the appropriate station has been allocated within HYDATA for the period of data to be transferred.

The steps required for the transfer of the datafile are described briefly in Section 2.3. After entering the name of the datafile in menu MM1 (Monthly.dat) the menu will become partially filled. The station number and data type should be added (a selection of data types appears the bottom of the screen). In MM2 only Scan data and Transfer are required.

3. TRANSFERRING DATA MANUALLY

3.1 The Input Data Menu

The following menu is displayed on selecting Option [2], Single file from Menu A1:

Menu MM1 - Input Data

```

[1]  Quit
[2]  Data file      /                /
[3]  Data type     /      /
[4]  Data period   /      /
[5]  Station number /      /
[6]  Identifier    /      /
[7]  Format file   /                /
[8]  Continue

```

Option [1], Quit, returns control to the Mode menu, Menu A1. The remaining options define the input datafile and its contents. In this section it is assumed that the datafile does not contain a \$\$\$ line, so that all information should be entered into menu MM1 on the screen, even when a stored format is used. The menu options are as follows:

[2] Data file

Option [2] requests the name of the datafile containing the data values that are to be transferred to HYDATA. HYTRAN can accept a wide range of data formats if the datafile is in ASCII format (i.e., normal text) and that it satisfies the limits listed in Appendix B. An error message will appear if HYTRAN cannot read the datafile.

CHAPTER 3 TRANSFERRING DATA MANUALLY

[3] Data type

Option [3] defines the type of data in the datafile. The types of data that can be transferred correspond to the types of data stored by HYDATA:

- 1 - Event data (stage, rainfall or lockage data)
- 2 - Flow data
- 3 - General data
- 4 - Rainfall data
- 5 - Storage data

The appropriate data type should be entered for this option.

[4] Data period

Option [4] defines the intervals at which data are to be stored. The following options are available:

- 1 - < daily
- 2 - daily
- 3 - monthly

The appropriate value should be entered.

The HYDATA station type will be selected according to the values entered for Options [3] and [4] e.g., if 'Data type' is 4 and 'Data period' is 3, the data will be transferred to a monthly rainfall station. For event data, the data period must be specified as '< daily'. Up to 100 values per day may be transferred if sufficient space has been allocated on the HYDATA database.

[5] Station number, [6] Identifier

Options [5] and [6] are used to define the number of the HYDATA station that is to receive the data. The station can be identified in one of three ways:

3.1 The Input Data Menu

- a) The station number can be entered directly using Option [5]. The value entered must be in the range 1 to 99999999, and must correspond to a station of the correct type as defined by Options [3] and [4]. In this case, the entry for Option [6], Identifier, should be left blank.
- b) A name (identifier) can be entered using Option [6]. HYTRAN will then link this name automatically to the appropriate HYDATA station number. To do this, an additional datafile, named HYTRAN.LOG, is required. This file must be present in the current directory, and should contain a list of valid identifiers with the corresponding HYDATA station numbers e.g.,

```
Teddington  
101  
Putney  
104
```

The above format must be used, with each identifier followed on the next line by the corresponding HYDATA station number. The file may contain up to 100 pairs of identifiers and station numbers. Identifiers may be any combination of letters and numbers, and may be up to 16 characters long. HYTRAN distinguishes between upper and lower case letters, so the correct case must be used for each identifier.

When an identifier is entered, HYTRAN immediately attempts to read the HYTRAN.LOG file. If the file is present, and the file contains the specified identifier, the corresponding HYDATA station number will appear in the entry for Option [5]. In the above example, if the identifier 'Teddington' was entered for Option [6], the station number 101 would be displayed in the entry for Option [5]. A message will appear if a suitable version of HYTRAN.LOG cannot be located.

- c) An identifier may be read directly from the datafile and then linked automatically to a HYDATA station number. In this case the entries for both Option [5] and Option [6] should be left blank. To use this facility the format for the file should specify where in the file the identifier may be found. A HYTRAN.LOG file is also required.

3.2 The Check and transfer menu

[2] Inspect format

Option [2], Inspect format, is used to inspect, create or alter a specified file format. The use of this option is described fully in Section 4. There is no need to select this option if a stored format is being used.

[3] Save format

Option [3], Save format, allows a new, or changed, format to be saved to file, or allows an existing format to be saved under a different filename. This entry is optional. To execute this option the name of the file to be used should be entered in the menu box. The format will then be saved when the [ENTER] key is pressed. The default filename will be that provided for Format file in Menu MM1.

[4] Scan data

Option [4], Scan data, causes HYTRAN to perform some preliminary checks on the input datafile. These checks must be performed before the data can be transferred to a HYDATA database. During the checks, a message is displayed showing the percentage of the checking completed. Also, before the checks start, a message may appear showing that the file is being sorted into order. This occurs if the file has not already been sorted using the procedure described in Section 4.4.

Two types of check are performed during a scan. Firstly, the HYDATA database is searched to check that the specified HYDATA station exists and is of the correct type. Once this has been done, the name and number of the station are displayed on the screen. Then, the station limits for the station are obtained automatically, and each data value in the input data file is checked against these limits. A table is displayed at the end of the scan showing the limits read from the database; the maximum and minimum values, the maximum difference between successive values found in the datafile, the number of values found, the date of the first value, and the numbers of values falling outside the station limits. For example:

CHAPTER 3 TRANSFERRING DATA MANUALLY

	HYDATA	FILE
Max	10.000	9.400
Min	0.000	0.200
Diff	2.000	1.400
Number of values		2880
Start date		1988 Jan 4
Times max exceeded		18
Times min exceeded		0
Times max change exceeded		2

This information should be sufficient to determine whether a suitable HYDATA station exists, and whether the datafile is being read and interpreted correctly. These checks are particularly important when a stored format is being used. The scan does not check that the water year exists - this check occurs at transfer.

If the results of the scan are unsatisfactory, it may be necessary to change the format, or use a different format file. The contents of the input datafile may also be examined. This can be done in two ways. Firstly, the 'Inspect format' option may be selected with the 'View' option switched on. The display will then show the first ten lines of the datafile. The date and time of each value - as assigned by HYTRAN - may then be examined using the [Arrow], [Page Up/Down], and [Home/End] keys (as explained in the introduction to Section 4). The [*] key (i.e., [F2]) should be used to return to Menu MM2.

The alternative method of examining the data is to select Option [5] from Menu MM2:

[5] Write check file

Option [5], Write check file, allows a check file to be generated. The check file gives a permanent record (i.e., disk file) of the input data as interpreted by HYTRAN. If this option is selected, HYTRAN writes a datafile HYTRAN.CHK that contains all the data values found in the input datafile with the corresponding dates and times shown against each reading. Also, the following flags are written against values that fall outside the station limits:

3.2 The Check and transfer menu

- > Station maximum exceeded
- < Station minimum exceeded
- * Maximum change for station exceeded

As mentioned above, it is recommended that the contents of this file are examined if the results of the scan operation are unsatisfactory. The file is most easily displayed on the screen by exiting from HYTRAN and using a word processor package. Note that the contents of the HYTRAN.CHK file are overwritten every time the Write check file option is selected.

It is possible to produce a check file without having specified a HYDATA station number. This facility might be useful when checking a file format before having allocated space on the database. Sometimes the check file itself may prove useful. For example, HYTRAN could be used solely to organise a datafile without transferring the data to HYDATA. The check file could then be read into a word processor or spreadsheet package to allow further processing of the data.

[6] Transfer to HYDATA

Option [6], Transfer to HYDATA, causes the contents of the input datafile to be transferred to HYDATA using the specified format to interpret the data. The transfer cannot be initiated unless the Scan data option has previously been selected for the current datafile and data format. During the transfer, a message appears showing the percentage of the transfer completed. Once the transfer is finished, the HYTRAN session can be ended or another datafile may be selected for transfer to HYDATA.

The decision whether to transfer the data to the database is left to the user. The results of the Scan Data operation should show if the data are acceptable. If any data values are outside the station limits, a warning message will appear before the transfer starts. The transfer can then be aborted by pressing any key other than the [ENTER] key.

During the data transfer, the data values are transferred exactly as read from the datafile, despite the station limits. As each value is transferred, HYTRAN checks that sufficient space has been allocated on the database. The transfer is aborted if no space is available. It is

CHAPTER 3 TRANSFERRING DATA MANUALLY

recommended that, after each data transfer, the data are plotted on the screen using the plotting routines in HYDATA. This should quickly show whether any serious mistakes have occurred during the transfer.

For event data, the possibility arises that the time of a reading differs slightly from that specified in the database (e.g., 11:45:03 instead of 11:45:00). In this case, HYTRAN searches for the nearest available storage location (in time) and places the value at that location. Thus, for example, with storage locations of 11:00:00 and 12:00:00, a data value for 11:45:03 would be placed at the 12:00:00 location. For the first and last values in each day, HYTRAN checks the type of water day in use for the HYDATA station. Three types of water day can be specified in HYDATA:

- a) Last value in day is at 24:00:00, first value after 00:00:00
- b) First value in day is at 00:00:00, last value before 24:00:00
- c) UK water day; first value is at 09:00:00

Before transferring the data, HYTRAN checks the type of water day in use for the station and then allocates the data to the correct storage locations. Thus, for a reading at 00:00:01 on 1988 Nov 10, HYTRAN would assign the value to a) 1988 Nov 9 24:00:00 b) 1988 Nov 10 00:00:00 and c) 1988 Nov 9 00:00:00 for the three types of water day.

It is important to note that the checks on water day type are made only when the 'Transfer to HYDATA' option is selected. At all other times, HYTRAN always uses a type b) water day when calculating the dates and times of readings. Thus the 'Inspect format' and 'Write check file' options in Menu MM2 may show different dates and times to those used in the transfer to HYDATA. In particular, when a UK water day is used in HYDATA, HYTRAN will display the actual date corresponding to each reading. Thus if the display shows a value to be at 08:00:00 on 1988 Nov 10, the value will be stored at 08:00:00 on the water day 1988 Nov 9.

It should also be noted that a check that the water year exists on HYDATA is made only when the 'Transfer to HYDATA' option is selected.

4. CREATING A NEW FORMAT

To transfer data to HYDATA, HYTRAN requires information specifying the format of the input data file. This information can be read from a previously stored format file, or can be typed in before the transfer is started. Once a format has been defined, it can be used to read in further datafiles of exactly the same type (e.g., from the same logger), with the same number of header records, block length, etc.

This section describes how to create a new format for a datafile. The format routines are accessed from the 'Inspect format' option in Menu MM2. When this option is selected, the screen will clear and the first ten lines of the datafile, and their line numbers, will be displayed. In the display, a highlighted block shows the current line in the file. This block can be moved, and the rest of the file examined, using the [Up] and [Down] arrow keys, the [Page Up/Down] keys and the [Home] (top of file) and [End] (bottom of file) keys. Alternatively, the required line number may be entered. The [Left] and [Right] arrow keys switch the display between the 'left' (characters 1-66) and 'right' (characters 67-132) sides of the file. The [*] (i.e., [F2]) key returns control to Menu MM2.

The following commands are available in addition to the [Arrow], [Page Up/Down], [Home], [End] and [*] keys:

Defining the format	/ for access to additional menus F for Format line
Interpreting the data	V for View O for Order
Resetting the format	C for Clear

These commands allow the format of the file to be defined and the results of the formatting to be displayed on the screen. The / command gives access to the menus that are used to define the layout of the datafile. The F command is used to define information (such as dates/times) to be

CHAPTER 4 CREATING A NEW FORMAT

read directly from the datafile. The **V** command is used to display the effects of the formatting. The **O** command is used to calculate the order of the numbers in the datafile according to the specified format. The **C** command resets the format settings to their default values. Table 4.1 summarises the formatting options that are available and Sections 4.1 to 4.5 below describe the various formatting commands.

For most datafiles, it should be possible to define a new file format in a few minutes using only a few keystrokes.

4.1 The / Command

Five menus are used to define the layout of the datafile. These are:

Menu IDF1 - Define format
Menu IDF2 - Define times
Menu IDF3 - Define blocks
Menu IDF4 - Ignore blocks
Menu IDF5 - General

The **/** command displays the first menu, Menu IDF1:

Menu IDF1 - Define format

[1] *Quit*
[2] *Define times*
[3] *Define blocks*
[4] *Ignore blocks*
[5] *General*

This menu gives access to the remaining four menus. Option [1] returns control to the main command line. If selected, the highlighted block will return to the display of the datafile. The remaining options in Menu IDF1 are described below:

[2] Define times

Option [2], Define times, in Menu IDF1 gives access to Menu IDF2:

Menu IDF2 - Define times

```
[1]  Quit
[2]  Start date      [1989 Jul 1  ]
[3]  Start time     [00:00:00  ]
[4]  No. readings/day [1          ]
```

If daily or monthly data are to be entered, only the first two options appear. This menu allows the date and (if applicable) time of the first reading in each block of data to be defined. Also, when appropriate, the number of readings per day can be entered. Note that, alternatively, any or all of these values can, if present, be read directly from the datafile. If this is the case, the relevant entry (or entries) in Menu IDF2 can be ignored and the Format command (see Section 4.2) should be used instead.

When creating a new format, Menu IDF2 initially shows a default date of YYYY Jan 1, where YYYY is the current year, and a default time of midnight (00:00:00). If an existing format file is being used, the values in the file are displayed instead. The number of readings per day is initially set to 1, unless an existing format is being used, in which case the stored value is displayed.

These default values can be changed as required. Option [1], Quit, can then be selected to return to Menu IDF1.

[3] Define blocks

Option [3], Define blocks, in Menu IDF1 gives access to Menu IDF3:

CHAPTER 4 CREATING A NEW FORMAT

Menu IDF3 - Define blocks

[1]	Quit		
[2]	First line	[4]
[3]	First line data	[5]
[4]	End of Block	[Marker]
[5]	...Number	[XXX]
[6]	Maximum in Block	[1 day]

This menu allows the structure of the datafile to be defined.

Generally HYTRAN is easier to operate with ASCII files formatted into blocks of data. A block of data might contain data for, say, one month or one year. Blocks may be separated by markers (e.g., -----, STOP), or contain a specified number of data values, or be of fixed length (i.e., a certain number of lines). It is assumed that all the blocks in a data file are in the same format. There can be any number of header records in a datafile.

The default settings assume that the file contains only one block of data, occupying the entire file from the first to the last line, and that the data start on the first line of the file. Option [5] of Menu IDF3 by default shows the number of the last line in the file. If a stored format is being used, these default settings will be replaced by the stored settings.

The displayed settings can be changed by selecting the various options in Menu IDF3. Options [2] and [3] define the start of each block (or of the file, if there is only one block). For example, if the file contains 5 lines of header text, Option [2], First line, should be set to 6. If the data do not begin until line 9, then Option [3], First line of data, should be set to 9. Options [4], [5] and [6] define how HYTRAN should recognise the end of each block, and can be left unchanged if there is only one block (although Option [6] may still be required; see below).

Option [4] is a switch providing three possibilities - Line No. (the default), Marker and Implicit. The required setting is obtained by repeatedly pressing the [ENTER] key until it appears. Blocks are defined as follows:

4.1 The / command

Line No. should be selected if each block in the file contains a fixed number of lines of data. If selected, Option [5] will request the number of the last line of the first block. This should be the very last line of the first block, irrespective of whether that line contains data.

The Marker option allows blocks to be defined by some unambiguous marker that appears after each block. Common examples include a line of dashes (----) or the characters STOP, END or 9999. If the Marker option is selected, sufficient characters from the marker (up to 8) should be entered in Option [5] to define it fully.

The Implicit option is used with Option [6]. If set, HYTRAN assumes that each block contains a specified number of data values, as given in Option [6]. A new block is assumed to start once the specified number of values has been found for the current block. Option [5] can be ignored.

Options [6] and [7] allow the maximum number of data values in each block to be defined, and can be used with any of the three ways of defining the end of blocks (Line number, Marker and Implicit).

The number of data values can be defined in 5 different ways; 'As found', '1 year', '1 month', '1 day', 'Specify'. The method to be used is defined by selecting Option [6] and pressing the [ENTER] key repeatedly until the required method is displayed. The default option, 'As found', tells HYTRAN to take all the data values it finds within each block. The remaining options restrict the number in each block (or the block length, when 'Implicit' is used). The settings '1 year', '1 month' and '1 day' restrict the number to the appropriate multiple of the number of readings per day specified in Menu IDF2. For example, if 4 readings/day were specified, the 1 year setting assumes that leap years contain 366 x 4 data values, and other years 365 x 4 data values. The 1 month setting multiplies the number of readings per day by the number of days in the month (again accounting for leap years), and the 1 day setting uses the number of readings per day as the maximum. The final option, 'Specify', allows the maximum to be set to a constant value, which should be entered using Option [7]. This maximum must be in the range 1 to 999999.

CHAPTER 4 CREATING A NEW FORMAT

In the case of the Line No. and Marker settings, HYTRAN discards any data values found beyond the number specified. The maximum value is ignored if the blocks contain fewer values than specified. With the Implicit setting, all data values are retained, and a new block starts once the maximum is reached.

Note that the maximum number of readings per block can also be read directly from the datafile using the Format command (see below). If this command is used, the values read from file will override those entered in Options [6] and [7] of Menu IDF3.

Once all the block settings are as required, Option [1], Quit, should be selected to return to Menu IDF1.

[4] Ignore Blocks

The 'Ignore blocks' option in Menu IDF1 gives access to Menu IDF4:

Menu IDF4 - Ignore blocks

[1]	Quit		
[2]	Characters	[]
[3]	No. lines before	[0]
[4]	No. lines after	[0]

This menu allows specified blocks of material in the file to be ignored during the formatting. This facility should be used only when the file contains text information that cannot be excluded using the options in Menu IDF3. These options are usually sufficient to remove any header material at the start of the file, and header information at the start of every block.

When the Ignore blocks option is selected, the blocks to be ignored are defined using Options [2], [3] and [4]. The entry for Option [2] should have some character, or string of characters, which appears in the same place in each of the blocks (e.g., THAMES). The start and end of the

CHAPTER 4 CREATING A NEW FORMAT

[4]	Ignore flag	[]
[5]	Multiplier	[1.0]
[6]	Constant	[0.0]

This menu allows various additional parameters to be set that define the format of the datafile. Option [1] returns control to Menu IDF1; the remaining options are described below:

Option [2], Time line, is a toggle switch with two settings; 'Across' and 'Down'. HYTRAN assumes by default that the datafile should be read from left to right, a line at a time. The 'Time line' setting is then said to be 'Across'. However, in some datafiles, e.g., hydrological yearbooks, data are tabulated into columns that should be read one at a time, from top to bottom. In this case, the 'Time line' should be set to 'Down' by toggling Option [2] using the [ENTER] key.

Option [3], Missing flag, allows a flag for missing values to be defined. Hydrological datafiles often contain missing records, usually identified by specific characters e.g., -9999, *, -1.000. The 'Missing characters' option, if selected, causes the characters given to be replaced in the data by the letter 'm' (used in HYDATA as the symbol for missing data). When the datafile is processed, these missing values will appear in the data at the appropriate dates and times. Note that if the file uses the '*' symbol for missing data, then the missing flag must be entered as '_*', where '_' represents a blank. This is because HYTRAN interprets the * character on its own as an instruction to abort the current operation. Note also that if a single minus sign i.e., '-' is entered as the missing character, then all negative numbers appearing in the file will be set to 'missing'. One common use of this facility is in interpreting the output from loggers. Some makes of logger output arbitrary negative numbers when an electrical or mechanical error occurs.

Option [4], Ignore flag, allows a string of characters to be defined that is to be ignored if it appears in the datafile. When this option is selected, the string defined is removed before the data are displayed or output. Sometimes, e.g., when the Time line is 'Down', this will cause an unwanted change in the relative positions of data values as they appear on the screen. To avoid this, the characters to ignore should be prefixed by the '&' symbol. They will then be replaced in the display by the letter 'i'.

4.1 The / command

block are then defined by entering the number of lines remaining in the block either side of the line that contains the characters specified in Option [2]. For example, if the block to be ignored is:

```
#0007 00
#THAMES AT TEDDINGTON
#LOGCO. LOGGER
#Site B
```

and the characters chosen are 'THAMES', then a value 1 should be entered for Option [3], and a value 2 for Option [4]. Then, every time a block appears in the file containing the characters THAMES, the previous line, the line containing THAMES, and the next two lines will be ignored. Note that, on entry, the default values for Options [3] and [4] are zero.

When several datafiles of the same format are to be transferred, it may not be desirable to specify a specific set of characters identifying the blocks to be ignored. This might be the case, say, when the only string of characters that appears in every block to be ignored is a logger number which, of course, will change between datafiles. In this situation, the position of the identifying characters should be defined using the Format command with the R subcommand (see below). HYTRAN will then read the characters from the specified position in the datafile and will use them to identify all subsequent blocks to be ignored in that datafile. If this method is used, the entry for Option [2] may be left blank but values must still be entered for Options [3] and [4].

[5] General

Option [5], General, in Menu IDF1 gives access to Menu IDF5:

Menu IDF5 - General

```
[1]  Quit
[2]  Time line  [Across  ]
[3]  Missing flag [      ]
```

4.2 The format (F) command

Thus, if the characters 9999 were to be ignored, a flag of 9999 would strip the four 9 characters from the text wherever they occur, but &9999 would replace them with a letter 'i'. Note that, if an entire column (or columns) of text is to be ignored from the file, the Format command (see Section 4.2) can be used instead of the Ignore flag option.

Option [5], Multiplier, allows a multiplying factor to be applied to each data value before it is output. This might be required, for example, for a units conversion. The default multiplying factor is 1.0. Option [6] allows a constant to be added to each data value. The constant can be positive or negative. The default value is 0.0. The constant is added after the multiplying factor has been applied. A possible use of this option is to correct for changes in datum or zero level.

4.2 The Format (F) command

The Format command has several functions:

- It allows columns of data to be included, or ignored, when processing the data (V and C subcommands).
- It allows unwanted characters that occur in a specific place in each block to be removed from the datafile (I subcommand).
- It allows dates and times to be read directly from the datafile (Y, M, D, h, m, s subcommands).
- It allows the number of readings per block to be read directly from the datafile. This value overrides any value set in Menu IDF3 (N subcommand).
- It allows an identifier (e.g., logger code number) to be read from the file and identified with a HYDATA station number (L subcommand).
- It allows the characters for the 'Ignore blocks' option (Menu IDF4) to be defined by their position in the datafile (R subcommand).

CHAPTER 4 CREATING A NEW FORMAT

These characters over-ride any characters defined in Menu IDF4.

The Format command can only be used when the View option is off (see Section 4.3) and must NOT be used until the Define block settings (Menu IDF3) are as required. The Format command applies to the side of the datafile ('left' or 'right') that is being displayed. If the Format command is selected, HYTRAN will clear all data from the screen from beneath the highlighted block. It will then wait for one or more of the above subcommands (V, C, I etc) to be typed in. Up to 66 characters and blanks may be entered.

For the V and C entries, the position of the highlighted block is not important, since these entries affect the entire file. The highlighted block cannot, however, be on the lowermost line in the screen display. For the remaining entries, the highlighted block MUST be positioned in the first block of data, on the line of data containing the date, time, number of readings, or characters to be ignored. HYTRAN will then assume that these parameters occur in the same positions, on the same lines, in all subsequent blocks. The only exception to this rule is for cases where the start date or time for the data is contained in the header to the file. In this case, these values are read once only from specified position in the header block.

The use of the format command is best illustrated with the aid of some examples:

4.2.1 V and C subcommands

These subcommands allow a column, or columns, of data to be ignored (C), or included (V) at the expense of all other columns. Consider a file containing lines each of the form:

```
AAA 12.3 12.3 12.3 12.3 12.3 12.3
```

The unwanted AAA characters could be removed by entering the letters CCC beneath the AAA, or by entering VVVV beneath each data value i.e.,

4.2 The format (F) command

```
AAA   12.3   12.3   12.3   12.3   12.3   12.3
CCC
```

causing three columns to be ignored throughout the file or,

```
AAA   12.3   12.3   12.3   12.3   12.3   12.3
      VVVV   VVVV   VVVV   VVVV   VVVV   VVVV
```

causing all columns containing a V to be included and all others neglected. The V command has an additional effect, useful for when the Time line is set to 'Down' and the columns of data are of different length (as in a hydrological yearbook, for example). Any blank fields found within a column defined by V's will be replaced by an ignore character 'i'. Thus:

```
      May     Jun     Jul     Aug     Sep     Oct
      ....Line of data
      ....Line of data
AAA   12.3     12.3     12.3     12.3     12.3
      VVVV     VVVV     VVVV     VVVV     VVVV
```

becomes:

```
      May     Jun     Jul     Aug     Sep     Oct
      ....Line of data
      ....Line of data
12.3   i      12.3   i      12.3   12.3
```

The V and C commands can be used to format both the 'left' and 'right' hand sides of the same datafile. The format should be set up for one side of the file, the display switched to the other side (using the left or right arrow), and then the format set up again for the other side. This second formatting operation will add to, rather than overwrite, that resulting from the first.

CHAPTER 4 CREATING A NEW FORMAT

4.2.2 I subcommand

The I subcommand allows a fixed number of characters (whatever they are) to be removed from a specific position, on a specific line, in every block. It is used by moving the highlight block to the line in the first block which contains the unwanted characters, then entering F and typing the letter 'I' below each of the characters. For example, if the letters AAA only occurred in the first line of data in each block, the format command below would remove them from the first line of data in every block:

```
AAA   12.3   12.3   12.3   12.3   12.3   12.3  
III
```

The I subcommand must always be used on its own; one or more separate format commands should be issued if any of the other subcommands are required.

4.2.3 Y, M, D, h, m, s subcommands

This set of subcommands can be used to pickout the date and/or time from a specific place in the first block of data, and will then apply to the same place in every block in a datafile. HYTRAN will then be able to pick out the data/time information from every block in the file, whether the blocks are consecutive in time or not.

Alternatively, the subcommands can be used in cases where the date/time information is contained only in the header to the whole file. The information will be read only once, and in this case HYTRAN will assume that the data are consecutive in time.

Unlike the other format subcommands, this set is case specific (i.e. upper/lower case required as shown). The subcommands stand for Year, Month, Day, hour, minute and second respectively. Until they are used, the start date in each block is either set at the default value (see Section 4.1), or, if applicable, at the date entered in Menu IDF2. Similarly, the time is set at the default time 00:00:00, or at the time entered in Menu

4.2 The format (F) command

IDF2. These current settings are overwritten by any date and time information which is specified to be present in the datafile. Any or all of these subcommands can be used in any order. However, they must not be mixed with the V, C, I, R or N subcommands (these subcommands must be entered using the F command again as many times as necessary).

To use the Y, M, D, h, m and s subcommands, the highlighted block should be moved to the line, or lines, containing the required information. The format command should be entered and the date or time information identified by typing the appropriate letters beneath the information. For example, if a datafile contained the following date and time information at the start of the first block of data:

```
Thames at Teddington  29011987  Restart  10.31:27
```

the format line would be:

```
Thames at Teddington  29011987  Restart  10.31:27
                      DDDMMYYYY          hh mm ss
```

The first reading in the first block would then be assumed to be at 10:31:27 on 29 Jan 1987.

Note that HYTRAN assumes all time and date data to be numeric; thus Jan, for example, would be ignored. With the M, D, h, m and s subcommands, a pair of numbers e.g. 03 or _3 (where _ is a blank) is expected. For the year information, either two or four Y characters can be entered. If YY is used, a value of 1900 is added to the number obtained e.g. 88 becomes 1988. If any of the date or time information is out of range (e.g. a month before 1 or after 12), the incorrect value is ignored and the current setting is left unchanged. Years must be in the range 1900 to 2000.

For files with only partial date and time information (e.g. month but not year information), only the appropriate subcommands need be used. However, in this case, the date/time information will be extracted only from the first block of data, and not for subsequent blocks. Any missing information will be left at the current values (default or user defined). For

CHAPTER 4 CREATING A NEW FORMAT

subsequent data values, HYTRAN then assumes that all values are consecutive in time; thus any further partial date/time information will be ignored. Consequently, files containing blocks of event data (i.e. non consecutive in time) can only be read correctly if full date/time information is given at the start of each block (e.g. year, month and day for daily data; year, month, day, hour, minute, second for stage data).

4.2.4 N subcommand

This subcommand allows the maximum number of data values per block to be read directly from the datafile. It overrides any values set in Options [6] and [7] of Menu IDF3. It is used in the same way as the I command, and again cannot be mixed with any of the other subcommands. Thus, if, for example, a datafile contained the following header information at the start of each block:

```
960 Thames at Teddington 30011987
```

then the format line:

```
960 Thames at Teddington 30011987  
NNN
```

would cause each block to have a maximum of 960 data values.

4.2.5 L subcommand

The L subcommand allows an identifier (text string) in the datafile to be read and linked automatically to a HYDATA station number. It is used in the same way as the I command, and again cannot be mixed with any of the other subcommands. Thus, if, for example, a datafile contained the following header material at the start of each block:

4.2 The format (F) command

```
960 Thames at Teddington 30011987
```

then the format line:

```
960 Thames at Teddington 30011987
      LLLLLLLLLL
```

could be used to identify the data as coming from the location 'Teddington'. As explained in Section 3.1, an extra datafile, named HYTRAN.LOG, is required to link this information to a HYDATA station number. This file must be present in the current directory, and should contain a list of valid identifiers together with the corresponding HYDATA station numbers e.g.

```
Teddington
101
Putney
104
```

The above format must be used, with the identifier followed on the next line by the HYDATA station number. The file may contain up to 100 pairs of identifiers and station numbers. Identifiers may be any combination of letters and numbers, and may be up to 16 characters long.

If the L subcommand is to be used, it is recommended that the HYTRAN.LOG file is prepared using a word processor in 'non document' (i.e. unformatted) mode. If a suitable file cannot be found, or the identifier is invalid, HYTRAN leaves the HYDATA station number at its current value (if specified in Menu MMI).

4.2.6 R subcommand

This subcommand can be used in conjunction with the Ignore Blocks Option (Menu IDF4) to define the position of the characters which identify the blocks to be ignored. HYTRAN then reads the characters from the

CHAPTER 4 CREATING A NEW FORMAT

datafile and uses them to define any subsequent blocks to be ignored. These characters over-ride any defined in Option [2] of Menu IDF4. The subcommand is used in the same way as the I command, and again cannot be mixed with any of the other subcommands. Thus, if, for example, the following block of text is to be ignored wherever it occurs in the datafile:

```
#0007 00  
#THAMES AT TEDDINGTON  
#LOGCO. LOGGER 123456  
#Site B
```

then the format line:

```
#LOGCO. LOGGER NO. 123456  
RRRRRR
```

could be used to specify that any block containing the characters 123456 is to be ignored.

4.3 The View (V) command

Sections 4.1 and 4.2 above describe how the format of a file can be defined within HYTRAN. These settings are stored by the computer, and have no effect on the original (i.e. disk) version of the datafile, which is always left unchanged. In order to see the effects of the format settings, the View command is provided. If selected, the file will then be displayed subject to the constraints imposed by the format settings. For example, if the file contains flags for missing values, e.g. -9999, these will be replaced in the display by the letter 'm' for missing, provided that the missing flag -9999 has been defined as one of the format settings.

4.3 The view (V) command

The View command acts as a toggle switch ; consecutive uses of the command turn the View display 'on' then 'off', and so on. When 'off', the datafile is displayed in its original, unchanged format. The View command can be used in three different circumstances, producing three types of 'on' display:

- a) If the format settings have not yet been defined, the following default format is assumed. All lines containing one or more non numeric characters (except '-' or '.') are assumed to contain no data, and are displayed by View as blank. The remaining lines show the numbers detected, with each number separated by a single blank space.
- b) If the format settings have been defined, but the file has not yet been ordered (see Section 4.4), then the data will be displayed as above but, in addition, missing and ignored characters (if defined) will be shown, and the effects of the V and C subcommands (if used) will be displayed. Also, the effects of multiplier and/or constant values (if defined) will be shown and any header text defined will be omitted from the display.
- c) If the format settings have been defined and the file has been ordered the following additional features appear in the display. The most obvious of these is that the data values are displayed in regular columns and the highlighted block, instead of highlighting entire lines of data, highlights individual data values. This block can be moved between values using the [Page Up/Down], [Arrow], [Home] and [End] keys. An additional display appears, showing the date and time of the data value which is currently highlighted. The display also shows the number of the value (counting from the start of the datafile), the number of the current block, and the number of values in the block (up to and including the highlighted value). These values are, of course, calculated subject to the format defined for the file. If they are incorrect the format probably needs to be modified before the data are transferred to HYDATA. Indeed, the main use of the View command is to show whether the format has been defined correctly. As explained in Section 3.2, for event data HYTRAN assumes that the water day begins at 00:00:00.

CHAPTER 4 CREATING A NEW FORMAT

The View command can be used at any time during a HYTRAN session and should always be used after ordering a file to check that the specified format is correct.

4.4 The Order (O) command

The function of the Order command is to process the entire datafile to determine the data values it contains and the chronological order in which they occur. After using the Order command the effects of the format settings will become visible in the screen display as described in Section 4.3. For a large datafile ordering can take some time. During the process the percentage of the operation completed is displayed on the message line. In some instances (e.g. maximum number per block specified, or the 'ignore block' option selected) the calculation must be performed twice. A message indicates when the second 'pass' begins.

When the order calculation has finished control is returned to the user. If the format settings produce a satisfactory result (as shown using the View command) no further work is required. To return to the Main Menu press the [F2] (or [*]) key. The format settings can then, if required, be saved to disk (Option [3], Menu MM2), and the data values can be transferred to the HYDATA database (Option [6], Menu MM2).

If the format settings are not satisfactory they can be changed. However, if any changes are made HYTRAN assumes that this will affect the ordering of values, so the ordering information shown by View is erased from the screen and will not be displayed until the Order command has been selected again. In some cases, it may be easiest to reset the format settings and start again. The Clear command is provided for this purpose:

4.5 The clear (C) command

4.5 The Clear (C) command

The Clear command can be used at any time during a HYTRAN session to reset the format settings to their original values. If the name of a format file was given earlier, the settings in the file will override the default settings.

CHAPTER 4 CREATING A NEW FORMAT

Feature of datafile	Command	Menu	Option	Remarks
1. Time information				
Start Date				
.....specified by user	/	IDF2	(2)	Enter date
.....read from datafile	f			Use YY (or YYYY), MM and/or DD subcommands
Start Time				
.....specified by user	/	IDF2	(3)	Enter time
.....read from datafile	f			Use hh, m and/or ss subcommands
Number of readings/day				
.....specified by user	/	IDF2	(4)	Enter number
.....read from datafile	f			Use N subcommand
Time increasing across the file	/	IDF5	(2)	Set to 'Across' (default)
<u>or</u> time increasing down the file (yearbook style)	/	IDF5	(2)	Set to 'Down'
2. File structure				
File has header text to be ignored	/	IDF3	(2)	Specify number of first line of first block
.....or file has no header text	/	IDF3	(2)	Enter value of 1
Blocks have header text to be ignored	/	IDF3	(3)	Specify number of first line of data in first block
.....or blocks have no header text	/	IDF3	(3)	Enter same value as in Option (2) of Menu IDF3
Blocks <u>either</u> have fixed number				
.....of lines	/	IDF3	(4)	Set to 'Line No' and set Option (5) to number of last line of first block
.....of data values	/	IDF3	(4)	Set to 'Implicit'. Either set Option (6) to required number or use F with N subcommand to read number from file
<u>or</u> , end of blocks indicated by marker	/	IDF3	(4)	Set to 'Marker' and enter marker in Option (5)

Table 4.1. Summary of formatting options available within HYTRAN

4.5 The clear (C) command

Feature of datafile	Command	Menu	Option	Remarks
3. Options				
File contains characters to be ignored.....				
(a) Whole blocks	/	IDF4		Define blocks by unique character string and no. lines either side of string
.....user specifies string				Enter string in Option (2)
.....read string from file				Use F with R subcommand
(b) Whole columns	F			Use C or V subcommands
(c) Characters at a specific place in each block				Use L subcommand
(d) Specific characters	/	IDF5	(4)	Enter characters to be ignored
File has missing data values	/	IDF5	(3)	Enter characters to be set to 'm'
.....all five numbers are 'missing'				Enter - sign only for Option (3)
Apply multiplying factor to all data values	/	IDF5	(5)	Enter factor
Add constant to all data values	/	IDF5	(6)	Enter constant
Identifier (see Section 2.1)				(Note .LOG file required to identify MYDATA station)
.....user specified		MM1	(6)	Enter characters
.....read from file	F			Use L subcommand

Table 4.1 (cont.)

CHAPTER 4 CREATING A NEW FORMAT

4.6 Example of creating a format file

This section describes briefly the steps required to produce a format file. The formatting menus and commands are described fully earlier in this section.

From menu A1 - Mode select option [2], Single file.

The next menu - Input Data will ask for the name of the datafile to be entered (eg. Dem.dat), and for other information. The name of the format file (option [7]) should be left blank. Select option [8], Continue.

Menu MM2 - Check and Transfer will appear. Select option [2], Inspect format. This will display the data (eg. Dem.dat) on the screen with line numbering down the side.

Pressing [/] [RETURN] reveals a menu IDF1 - Define Format at the top of the screen.

Select option [2] to reveal menu IDF2 - Define Times. For daily and monthly datafiles only the start date is required. For event datafiles the start time and the number of readings per day are also required. Once completed quit this menu using option [1].

Select option [3] of menu IDF1 to reveal menu IDF3 - Define Blocks. This allows the first line of data, the block length, the end of block marker etc. to be defined. Quit from this menu.

Quit also from menu IDF1 (option [1]). The first line of data should now be highlighted. Using the arrow keys move the highlighted bar to the date/time information line in the first block of data. Use the format command to specify the information; press [F] [RETURN]. The selected line will become the last line displayed. The relevant time/date commands selected from Y, M, D, h, m, s (standing for year, month, day, hour, minute, second respectively) should be typed directly beneath their counterparts in the highlighted line. For example:

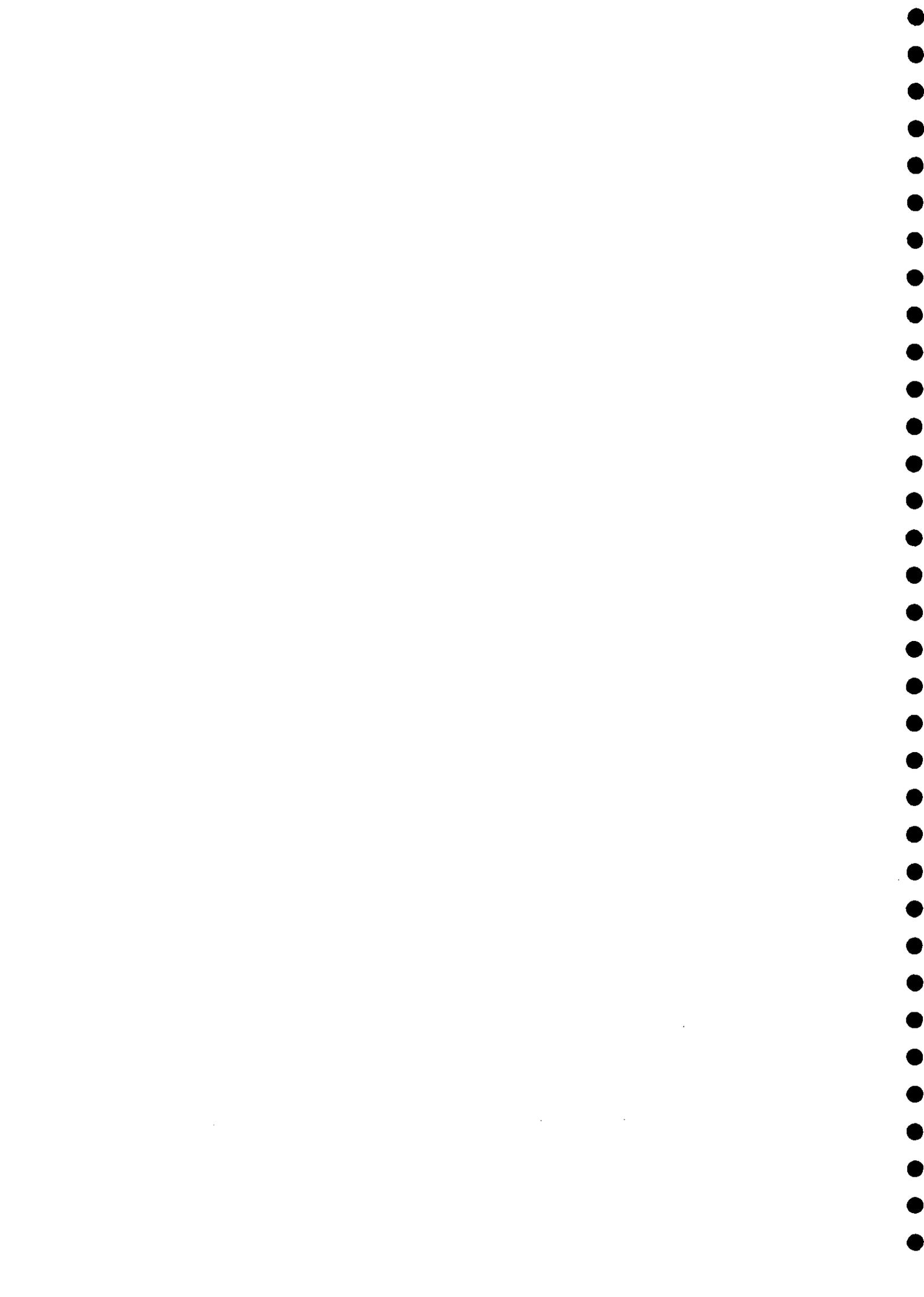
4.6 Example of creating a format file

```
1 5 1990 0 0 0      date/time line  
DD MM YYYY hh mm ss  commands
```

would inform the program of the start time and date of an event datafile. The program assumes that each block will be in the same format.

Use the **[F2]** key to return to menu MM2 - Check and Transfer, and select option [3], Save format. Enter the name of the format file. For event data choose a name that identifies how many readings/day are used (for example Ev96.frm would indicate 96 readings/day).

Saving a format that has been created enables it to be used again with any data in exactly the form specified (and, in the case of event data, the number of readings/day specified).



5. BATCH TRANSFERS

The batch transfer mode allows more than one datafile to be transferred to HYDATA in a single operation. During the transfer, the specified datafiles are checked and transferred in turn. Any resulting errors are reported before proceeding automatically to the next datafile. The checks consist of 'ordering' the data according to the specified format and then 'scanning' to check the data against the limits for the specified HYDATA station. It should be noted that during a batch transfer HYTRAN transfers all values regardless of the station limits. However, the results of the data scan appear in the batch job output and so provide a warning if the values loaded into HYDATA were outside the station limits. As mentioned in the introduction, it is advisable to make a back-up copy of your database before the start of every transfer.

For each batch job the information required to perform the transfer must be supplied in a file called the batch job file. The format of this file can be varied according to the amount of information available. For example, each datafile may require its own format file, or a single format file may be suitable for all of the datafiles. Seven possible modes of operation are available. The corresponding batch file formats are discussed in Section 5.1. Note that in all cases the datafiles must contain sufficient date and time information for the transfer. If this is not available it will be necessary to perform a single file transfer.

Before starting a batch transfer there are several points which should be checked. First, the HYDATA database must have space allocated for each of the specified station numbers. Also, the datafiles must all be in the same directory although, unlike with a manual transfer, this directory need not be the one containing the HYDATA database. The HYDATA database must be in the current directory together with the format file (or files), the batch job file and a valid .LOG file (see Section 3.1). Note that the .LOG file can have either the default name HYTRAN.LOG or can be given any other suitable name. If a .LOG file has not been used previously for manual transfers a 'dummy' file should be created for use in batch transfers and batch modes 6 or 7 should be used (see Section 5.1).

CHAPTER 5 BATCH TRANSFERS

Datafiles should be constructed as described in Section 2.1, and may contain a \$\$\$ line (Appendix D). Format files are also described in Section 2.1; however, batch mode format files may in addition define data type and data period (unlike single file mode format files), as described below.

The ways in which information can be supplied to the program are described as follows:

- a) In all batch modes, data type and data period can be defined by either the format file(s) or by a \$\$\$ line in the datafile.
- b) In batch modes 1 and 3 the station identifier is supplied by either the format file or by a \$\$\$ line in the datafile.
- c) Information supplied by a format file will override any similar information supplied by a \$\$\$ line.
- d) In batch modes 4 to 7 the identifiers or station numbers are defined by the .BAT file. Similar information contained in format file or a \$\$\$ line would be ignored.
- e) In batch mode 2 the identifiers and station numbers are defined in the .LOG file. Similar information contained in a format file or a \$\$\$ line would be ignored.

A batch transfer can be started by selecting Option [3], Batch Mode, from the Mode Menu, Menu A1. The Batch Mode menu, Menu BM1, is then displayed:

Menu BM1 - Batch Mode

```
[ 1]  Quit
[ 2]  Batch file  [          ]
[ 3]  Continue
```

5.1 Modes of operation

Option [1], Quit, returns control to Menu A1 and Option [2] allows the batch job file to be specified. When an entry is made for Option [2], HYTRAN checks that the batch job file exists and that it contains the necessary information for the batch job to proceed. If the checks are successful, Option [3], Continue, can be selected. The batch transfer will then proceed automatically. For a large job the computer may then be left unattended (e.g. overnight) until the transfer has been completed. During the transfer the progress of the job is displayed on the screen. Also, a file HYTRAN.REM is created which contains a full summary of the transfer. This file is described in Section 5.2 together with the screen display which appears during the transfer. A message *BATCH JOB FINISHED* appears on the screen when the job has been completed. The HYTRAN session may then be terminated by pressing the [ENTER] key followed by the [!] ([F1]) key.

5.1 Modes of operation

The format of the batch job file can be varied according to the amount of information available for the transfer. Seven different formats are available and are summarised in Table 5.1. The demonstration data (see Appendix C) includes an example of a batch job file for each mode of operation.

Batch job files should be created using a word processor (in unformatted mode) or your computer's editor. Each batch job file must start with the following general information:

CHAPTER 5 BATCH TRANSFERS

Line 1	Comments (arbitrary)
Line 2	Batch mode (between 1 and 7)
Line 3	DOS Directory which contains the datafiles (must start with disk letter e.g. C:, A:)
Line 4	Name of .LOG file (any valid DOS name)
Line 5	Name of format file (any valid DOS name)

Entries must start in the first column of each line. The subsequent lines, lines 6,7,8....., depend on the batch mode chosen. The following example shows the first five lines of a batch job file (batch mode 6) which transfers some datafiles in directory C:\HYTRAN\DEMO using format file DEMOB.FMT and .LOG file DEMOB.LOG:

Example of batch mode 6: first 5 lines

```
6
C:\HYTRAN\DEMO
DEMOB.LOG
DEMOB.FMT
```

The datafile names (and other information) would be given starting from line 6. This example is used below to illustrate each of the seven batch modes of operation.

Batch mode 1

This mode allows ALL of the datafiles in a specified directory to be transferred. A single format file must be used for all of the datafiles. The datafiles must contain suitable identifiers which, in conjunction with the .LOG file, are sufficient to define the HYDATA station numbers. The identifier is defined by means of the format file or by a \$\$\$ line.

As an example, the following batch job file would transfer all of the datafiles in directory C:\HYTRAN\DEMO according to the identifiers read from the datafiles and the corresponding HYDATA station numbers read from the .LOG file DEMOB.LOG:

5.1 Modes of operation

Batch Mode 1

```
1
C:\HYTRAN\DEMO
DEMOB.LOG
DEMOB.FMT
```

If required the transfer could be restricted to datafiles with a specified extension. For example, if line 3 above was replaced by the line:

```
C:\HYTRAN\DEMO\*.DAT
```

only files with the extension .DAT would be transferred.

Note that on some computers there may not be enough computer memory available for this mode of operation. In this case, a message:

```
[90]  Insufficient memory to run batch mode 1
```

will appear, and batch mode 3 should be used instead.

Batch mode 2

When using this mode the names of the datafiles must be specified using a single 'code' made up from some combination of letters, numbers, numbers from the station number, and characters from the identifier. This facility allows several datafiles to be defined by a single statement (the 'code'), and encourages the use of datafile names which reflect the source of the data. The station numbers and/or identifiers used by the code are taken from the .LOG file (and not from the format file or \$\$\$ line). This means that, for this mode only, the .LOG file provides (indirectly) the list of datafiles and the corresponding station numbers for use in the batch transfer. As with batch mode 1, a single format file must be specified for use with all of the datafiles.

The file code must appear on line 6 of the batch file. It should consist of a string of characters in which each character is preceded by one of the letters 't', 's', or 'i' (for text, station number and identifier). The character 't' indicates that the following character should be used as typed. If 's' or 'i' are used the following number indicates the position of the

CHAPTER 5 BATCH TRANSFERS

required character in the station number or identifier. The resulting filename can have up to 8 characters, excluding the extension. For example, for a station number 987654 and identifier TEDDINGTON, the code tAtBs2s3i1i2i3.DAT would give a filename AB87TED.DAT.

As an example of a transfer using this mode, the .LOG file DEMOB.LOG:

```
Teddington
101
Putney
104
```

together with the batch job file:

```
Batch Mode 2
2
C:\HYTRAN\DEMO
DEMOB.LOG
DEMOB.FMT
tAtBs2s3i1i2i3.DAT
```

would transfer the datafiles AB01TED.DAT and AB04PUT.DAT in directory C:\HYTRAN\DEMO to HYDATA stations 101 and 104 respectively, using the format stored in file DEMOB.FMT.

Batch mode 3

In this mode the batch job file must contain the names of each of the datafiles to be transferred. A single format file must be specified for use with all of these datafiles. The datafiles must contain suitable identifiers which, in conjunction with the .LOG file, are sufficient to define the HYDATA station numbers. The identifier is defined by means of the format file or by a \$\$\$ line.

In the batch file the names of the datafiles should be listed on subsequent lines from line 6 onwards. As an example, the following batch job file would transfer the datafiles AB01TED.DAT and AB04PUT.DAT in directory C:\HYTRAN\DEMO according to the identifiers read from

5.1 Modes of operation

the datafiles and the corresponding HYDATA station numbers read from the .LOG file DEMOB.LOG:

Batch Mode 3

3

C:\HYTRAN\DEMO

DEMOB.LOG

DEMOB.FMT

AB01TED.DAT

AB04PUT.DAT

Batch mode 4

This mode operates in a similar way to mode 3, except that the identifiers are specified in the batch file rather than being read directly from the datafile. A single format file must be specified for use with all of the datafiles. In the batch job file the datafile names and identifiers should appear on alternate lines starting from line 6. As an example, the following batch file would transfer the datafiles AB01TED.DAT and AB04PUT.DAT in directory C:\HYTRAN\DEMO. The station numbers would be obtained from the .LOG file, assuming the identifiers 'Teddington' and 'Putney':

Batch Mode 4

4

C:\HYTRAN\DEMO

DEMOB.LOG

DEMOB.FMT

AB01TED.DAT

Teddington

AB04PUT.DAT

Putney

Batch mode 5

This mode operates in a similar way to mode 4, except that a separate format file must be specified for each pair of datafiles and identifiers. In the batch job file the format file names, datafile names and

CHAPTER 5 BATCH TRANSFERS

identifiers should appear on consecutive lines starting from line 6. As an example, the following batch file would transfer the datafiles AB01TED.DAT and AB04PUT.DAT in directory C:\HYTRAN\DEMO using format files AB01TED.FMT and AB04PUT.FMT. The station numbers would be obtained from the .LOG file, assuming the identifiers 'Teddington' and 'Putney':

```
Batch Mode 5
5
C:\HYTRAN\DEMO
DEMOB.LOG
AB01TED.FMT
AB01TED.DAT
Teddington
AB04PUT.FMT
AB04PUT.DAT
Putney
```

Note that in this case the format file named on line 5 is assumed to apply only to the first of the specified datafiles.

Batch mode 6

This mode operates in a similar way to mode 3, except that the station numbers are specified in the batch file rather than being deduced from identifiers in the datafile. A valid .LOG file must still be supplied but in this case has no effect on the transfer. The only use made of this file is to obtain identifier names for use in the screen display and in the HYTRAN.REM file which is produced during each batch job. If a .LOG file has not previously been needed a 'dummy' file can be created containing the required HYDATA station numbers and some arbitrary identifiers (for example, the names of the sites at which the HYDATA stations are located). As with mode 3, only one format file can be specified.

In the batch job file for this mode the datafile names and station numbers must appear on alternate lines starting from line 6. As an example, the following batch job file would transfer the datafiles AB01TED.DAT and AB04PUT.DAT in directory C:\HYTRAN\DEMO

5.1 Modes of operation

to HYDATA stations 101 and 104.

Batch Mode 6

6

C:\HYTRAN\DEMO

DEMOB.LOG

DEMOB.FMT

AB01TED.DAT

101

AB04PUT.DAT

104

Batch mode 7

This mode operates in a similar way to mode 6, except that a separate format file must be defined for each of the specified datafiles and station numbers. In the batch job file the format file names, datafile names and station numbers should appear on consecutive lines starting from line 6. As an example, the following batch file would transfer the datafiles AB01TED.DAT and AB04PUT.DAT in directory C:\HYTRAN\DEMO to HYDATA stations 101 and 104 using format files AB01TED.FMT and AB04PUT.FMT:

Batch Mode 7

7

C:\HYTRAN\DEMO

DEMOB.LOG

AB01TED.FMT

AB01TED.DAT

101

AB04PUT.FMT

AB04PUT.DAT

104

Note that in this case the format file named on line 5 is assumed to apply only to the first of the specified datafiles.

CHAPTER 5 BATCH TRANSFERS

Mode	Features
1	Transfers all datafiles in directory. Single format file. HYDATA station numbers from identifiers in datafiles
2	As mode 1, except datafile names are 'constructed' from a code incorporating the station numbers and identifiers. A datafile is transferred for each entry in the .LOG file
3	Datafile names specified in batch job file. Single format file. HYDATA station numbers from identifiers in datafiles
4	As mode 3, except identifiers specified in batch job file
5	As mode 4, except each datafile has a separate format file (as specified in batch job file)
6	As mode 3, except station numbers specified in batch job file. Identifiers optional
7	As mode 6, except each datafile has a separate format file (as specified in batch job file). Identifiers optional

Table 5.1 Summary of batch modes of operation

5.2 Output

Two types of output are produced during a batch job; a screen display and an output file (called HYTRAN.REM):

Screen display

When Option [3], Continue, is selected from Menu BM1, the screen clears and the following text appears at the top of the screen:

<i>Datafile</i>	<i>HYDATA</i>	<i>Identifier</i>	<i>Start</i>	<i>Number</i>	<i>SCAN</i>	<i>Error</i>
	<i>Station</i>		<i>Date</i>		<i>RESULTS</i>	<i>Code</i>
					<i>Max Min Dif</i>	
<i>DEMO1.DAT</i>						

The first entry, under datafile, indicates the first datafile to be transferred. In this example the file is called DEMO1.DAT. Whilst the file is being transferred messages will appear indicating the stage reached in the transfer. Once the transfer has been completed the remaining entries in the display will be filled and the name of the next datafile to be transferred will appear. For example:

<i>Datafile</i>	<i>HYDATA</i>	<i>Identifier</i>	<i>Start</i>	<i>Number</i>	<i>SCAN</i>	<i>Error</i>
	<i>Station</i>		<i>Date</i>		<i>RESULTS</i>	<i>Code</i>
					<i>Max Min Dif</i>	
<i>DEMO1.DAT</i>	<i>101</i>	<i>Teddington</i>	<i>1988 Jan 4</i>	<i>2880</i>	<i>18 0 2</i>	
<i>DEMO2.DAT</i>						

This example shows that for the file DEMO1.DAT 2,880 values have been transferred to HYDATA station 101. The scan results show that 18 of these values exceeded the maximum limit specified in the database for station 101, 2 values exceeded the maximum permitted change, but that no values were below the minimum limit. As mentioned earlier, during a batch transfer HYTRAN transfers all values regardless of the specified station limits. If any values exceed these limits it is advisable, on completion of the batch job, to identify and check these values using the plotting and editing facilities in HYDATA, or the 'Write Check File'

CHAPTER 5 BATCH TRANSFERS

option (Menu MM2) in HYTRAN.

In the above example the entry for 'Error code' was left blank. This means that the transfer was completed with no major errors. If an error does occur a code number will appear in the display and some, or all, of the remaining entries will remain blank. The code number will correspond to the number of the message which appeared at the bottom of the screen when the transfer failed (on some computers these messages will only be visible for a very short time). The text of the message can be found by examining the HYTRAN.REM file (see below).

As datafiles are transferred the screen display is updated and, if the display reaches the bottom of the screen, the entries will begin to scroll. Once all of the datafiles have been transferred a message *BATCH JOB FINISHED* will appear at the end of the display and the HYTRAN session can then be terminated using the [!] ([F1]) key.

HYTRAN.REM file

A new version of the HYTRAN.REM file is created during every batch job. It contains all of the information from the screen display together with some additional information. On completion of a batch job it is advisable to exit from HYTRAN and obtain a hard copy of this file. This could be done using a word processor or using the DOS command:

PRINT HYTRAN.REM

Note that during every batch job the current contents of this file are overwritten, so a copy should be made if a permanent record of the file is required. Table 5.2 shows a typical entry at the start of this file. When an error occurs some or all of this information may be omitted according to the stage reached in the transfer when the error occurred. Instead, the cause of the error will appear in the file. If the error occurred whilst writing to the database an additional message will appear indicating how many values were transferred successfully before the error occurred.

 HYTRAN BATCH JOB

Date: 1989 Oct 23

Batch file	:	DEMOB.BAT
Format file	:	DEMOF.FMT
Directory	:	C:\HYTRAN\DEMO

1. DATAFILE	:	AB01TED.DAT
-------------	---	-------------

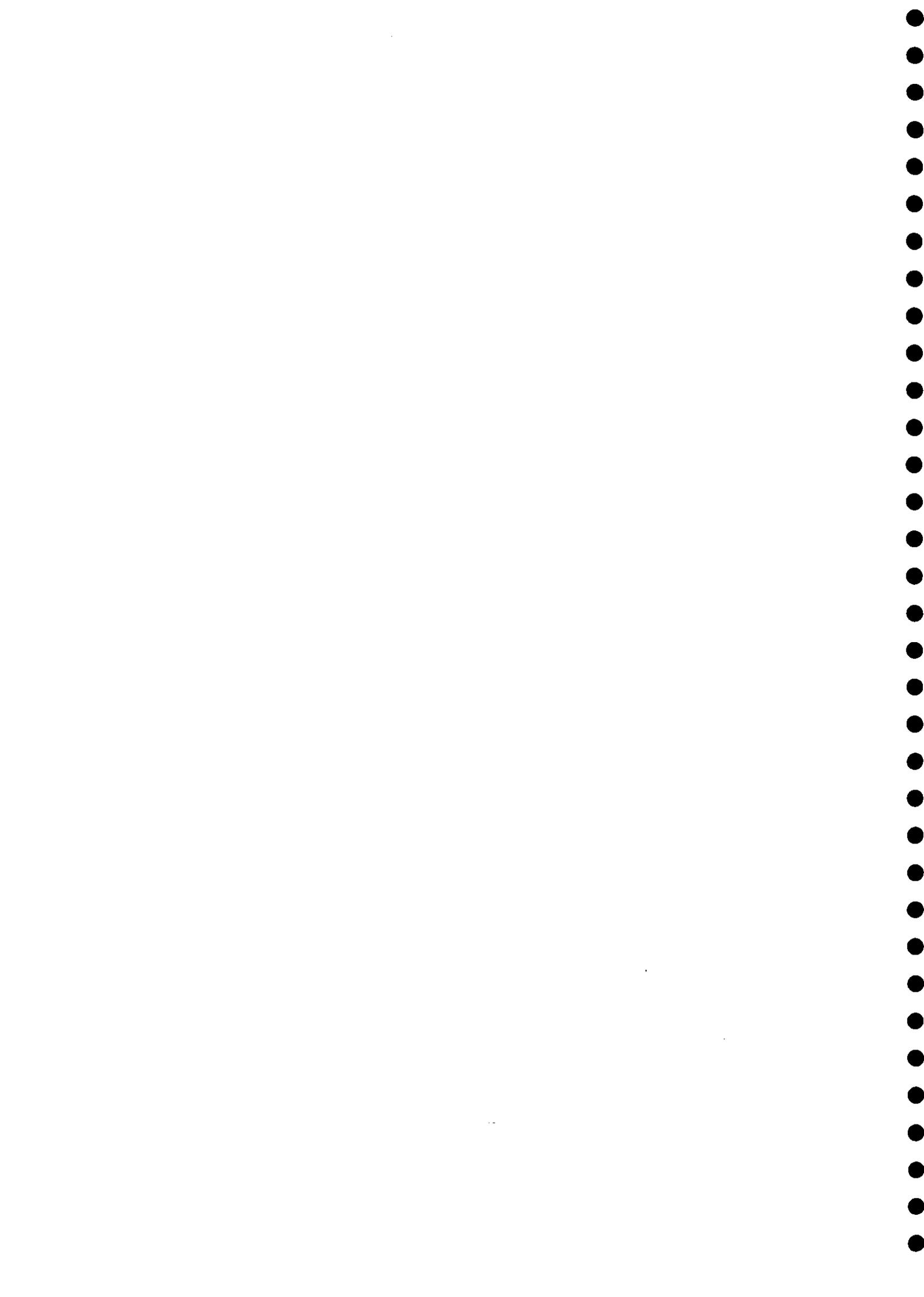
Identifier	:	TEDDINGTON
HYDATA Station No.	:	101
Data type	:	Event

HYDATA Station limits	Maximum	=	10.000
	Minimum	=	0.000
	Max. change	=	1.000

Scan results	Start date	=	1988 Jan 4
	No. values in datafile	=	2880
	Maximum value in file	=	10.940
	Times max. limit exceeded	=	18
	Minimum value in file	=	0.064
	Times below min. limit	=	0
	Max. change in file	=	1.071
	Times max. change exceeded	=	2

Transfer results	No. values transferred	=	2880
	Start date for transfer	=	1988 Jan 4
	Start time	=	0: 0: 0
	End date for transfer	=	1988 Jan 11
	End time	=	23:45: 0

Table 5.2 Example of the first entry in a HYTRAN.REM file



APPENDIX A INSTALLING HYTRAN

NOTE: HYTRAN cannot be used until HYDATA has been installed correctly on your computer, and a HYDATA database has been created. Full instructions for installing HYDATA are given in your HYDATA Operating Manual.

HYTRAN is supplied on a single floppy disk. The disk contains the HYTRAN program file **HYTRAN.EXE** and two demonstration datafiles (**DEMO1.DAT** and **DEMO2.DAT**), together with corresponding format files (**DEMO1.FMT** and **DEMO2.FMT**). Three further examples of datafiles (**Event96.dat**, **Daily.dat** and **Monthly.dat**) are supplied together with their related format files (**Event96.frm**, **Daily.frm** and **Monthly.frm**). The disk also contains demonstration batch job files for each of the possible batch modes of operation (**DEMOB1.BAT** to **DEMOB7.BAT**). To install HYTRAN it is recommended that the HYTRAN program file and the demonstration datafiles are copied into the directory containing the HYDATA database which is to receive the data¹. This can be done by first moving to the directory using the DOS command:

CD\directory

where **directory** is the name of the directory, then inserting the floppy disk into drive **A:**, and then typing:

COPY A:*.*

HYTRAN can then be started by typing:

HYTRAN

¹ Alternatives are to run HYTRAN from the floppy disk by typing:
A:HYTRAN

or to run HYTRAN from another directory using the command:
\directory\HYTRAN

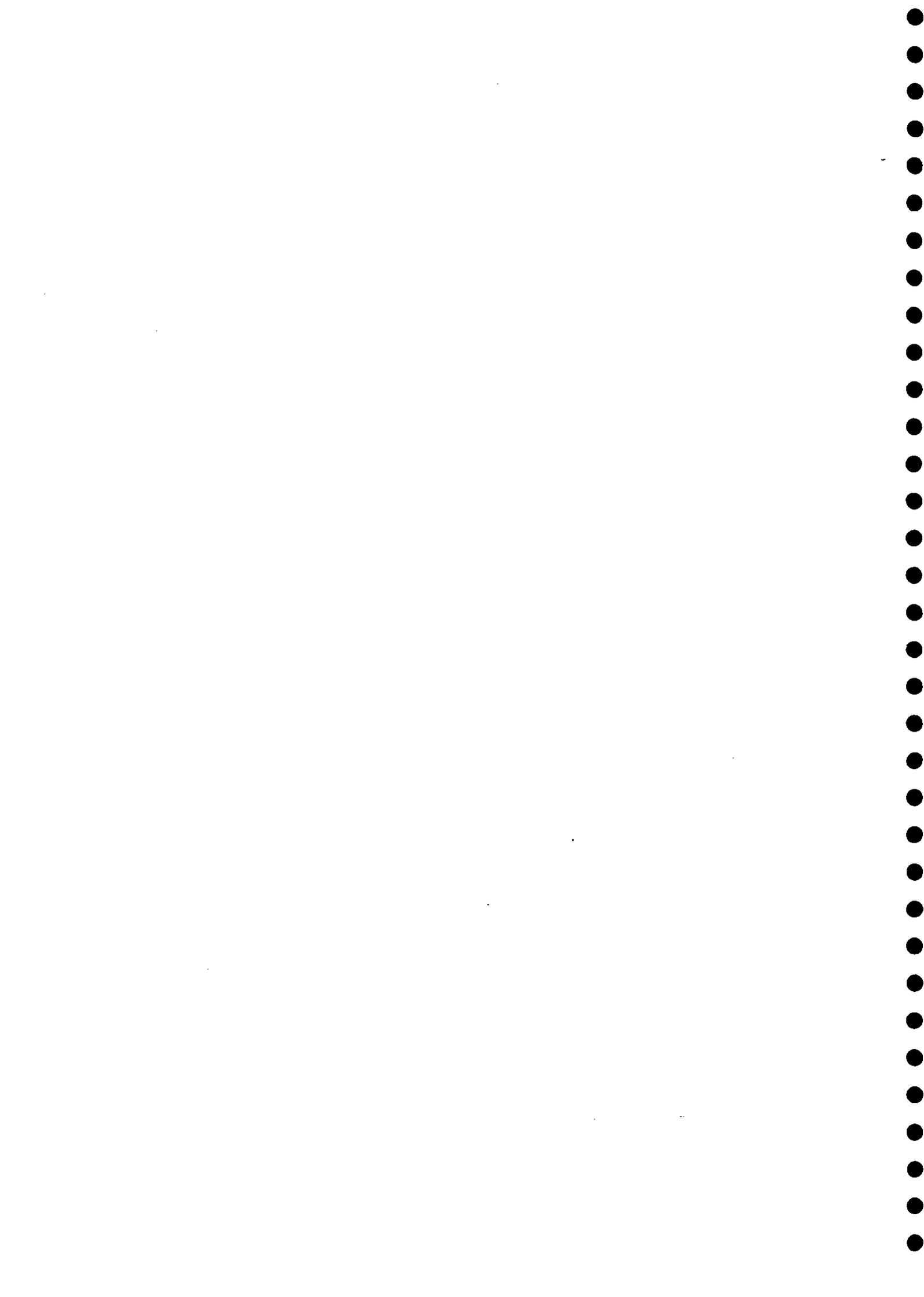
APPENDIX A INSTALLING HYTRAN

Provided that your HYDATA system was installed correctly, a highlighted (or coloured) box should appear around the perimeter of the screen, and various titles and messages should be displayed. If this does not occur, it will be necessary to re-install HYDATA, following the instructions given in Appendix A of the HYDATA Operation Manual.

APPENDIX B LIMITATIONS ON THE INPUT DATAFILE

HYTRAN can process datafiles which satisfy the following constraints:

- a) The datafile must be in standard ASCII (text) format. Within blocks, data values must be spaced at equal intervals in time. Changes in time may occur between blocks provided that full date and (if applicable) time information is stated at the start of each block.
- b) Maximum number of lines in file = 2500
- c) Maximum number of data values per line = 32
- d) Maximum number of characters per line = 132
- e) Maximum number of characters per variable = 20
- f) Maximum number of blocks of data = 366
- g) Maximum number of data blocks to ignore = 10
- h) Maximum number of identifiers in log file (if used) = 100
- i) Maximum number of datafiles in one batch job = 50



APPENDIX C DEMONSTRATION DATA

HYTRAN is supplied with several demonstration data sets together with stored formats appropriate to the data. Users may wish to use these demonstration files when learning to operate HYTRAN. Several demonstration batch job files are also provided. Some of the data sets have already been described in section 2.4 (Event96.dat, Daily.dat and Monthly.dat and their appropriate .frm files). Further demonstration datafiles are DEMO1.DAT and DEMO2.DAT and their corresponding format files are called DEMO1.FMT and DEMO2.FMT. The batch job files are called DEMOB1.BAT to DEMOB7.BAT.

When using the demonstration datafiles the appropriate format file name, data type and data period should be entered in Menu MM1. The 'Inspect format' option should then be selected from Menu MM2 to allow the data to be examined on the screen. The / command could then be used to give access to each of the format menus, allowing the stored format settings to be examined on the screen. To transfer the data, the datafile should first be 'ordered' using the O command. The data could then be written either to a new datafile, using the 'Write Check File' option in Menu MM2, or transferred to a HYDATA station (provided one has been created earlier for the required water years) using the 'Transfer data' option in Menu MM2.

DEMO1.DAT

This datafile contains 8 days of stage data, with 96 values per day. The file was obtained from a UK water authority.

The data are organised into blocks, each containing one day of data, with 12 data values per line. The file has two lines of header text, and each block has one line of header text, which contains the date of the block. Each line of data starts with the letter S.

The file format was set up as follows:

- a) First line of first block = 3
- Line no. of first line of data = 4

APPENDIX C DEMONSTRATION DATA

These settings eliminate the two lines of header text in the file, and indicate that each block has one line of header text.

- b) End of block indicated by line number
Last line of first block = 11

This setting indicates that blocks are of fixed length. The first block starts on line 4 and ends on line 11, so HYTRAN deduces that each block is 8 lines long.

- c) No/readings per day = 96

This setting is used to calculate the time interval (15 minutes) between readings.

- d) The format **F** command was used as follows:

Line 3 of file - the subcommand **DD MM YY** was used to indicate that the date of each block appears in the header text to the block.

Line 4 of file (arbitrary) - the **C** subcommand was used to eliminate the first column (i.e. the **S**) from each line of data.

These commands are sufficient to fully define the format of the datafile. The order **O** command may be used to check that the format is correct.

DEMO2.DAT

This datafile contains three years of daily flow readings, and was also obtained from a UK water authority.

The data are organised into blocks of one month. Each block has one line of header text which contains the start year and month of the block, and the number of values in the block. Each line of data has ten data values, so the blocks are of variable length (according to the month for the block).

The file format was set up as follows:

Appendix C Demonstration data

- a) First line of first block = 1
Line no. of first line of data = 2

These settings indicate that the first block begins on the first line of the file and contains one line of header text.

- b) End of block found using 'implicit'
Number of values per block specified from format line
- c) The format **F** command was used as follows:

Line 1 of file - the subcommand **NN** was used to read the number of values per block

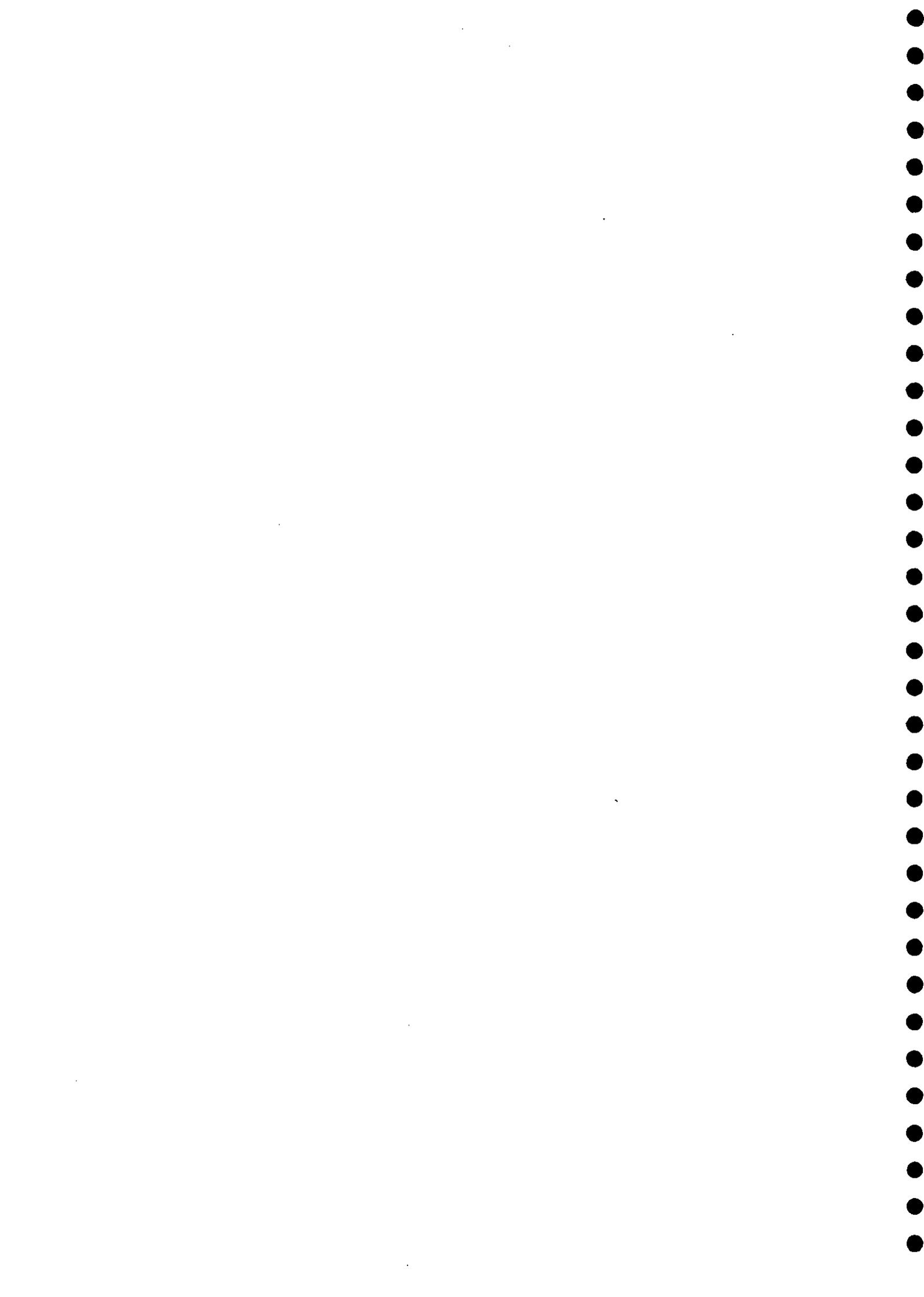
Line 1 of file - the subcommand **YYYYMM** was used to read the start year and month of the first block. Note that as full information is not given (i.e. day as well), **HYTRAN** only reads this date once, from the first block, rather than reading the date from the header of every block.

Again, these commands are sufficient to fully define the format of the datafile.

DEMONSTRATION BATCH JOB FILES

The demonstration batch job files give examples for each of the seven batch modes of operation. Each file gives the commands necessary to transfer three datafiles **DEMO5.DAT**, **DEMO6.DAT**, **DEMO7.DAT**, in directory **C:\HYTRAN\DEMO**, to **HYDATA** station numbers 1005, 1006 and 1007. The datafiles are assumed to have the same format file **DEMOF.FMT**, except in modes 5 and 7, when the format files **DEMOF5.FMT**, **DEMOF6.FMT** and **DEMOF7.FMT** are used. The **HYDATA** station numbers and identifiers are assumed to be stored in file **DEMOB.LOG**.

These batch job files are intended only as examples of the formats required for each batch mode. To use these files the directory, datafiles, **.LOG** file, format file and **HYDATA** stations would all need to be created beforehand.



APPENDIX D THE \$\$\$ LINE

If the first line of a HYTRAN data file begins with \$\$\$, this will issue special instructions to HYTRAN to fill in some of the initial menu options.

An example of a \$\$\$ line is:

```
$$$ 1 1 2                001234      LOGGER.FRM  
1234567890123456789012345678901234567890123456789012
```

The specification of the \$\$\$ line is:

```
$$$ , Data type , Time period , Flag , Stn.no. , LogID , Filename  
(a)   (b)       (c)       (d)   (e)   (f)   (g)
```

- (a) \$\$\$...first three characters in line 1
- (b) Data type:- 3 characters, right justified
 - 1 = Stage (active option in example)
 - 2 = Flow
 - 3 = General
 - 4 = Rainfall
 - 5 = Storage
- (c) Time period:- 3 characters, right justified
 - 1 = <daily (active option in example)
 - 2 = daily
 - 3 = monthly

APPENDIX D THE \$\$\$ LINE

- (d) Flag to specify if HYDATA station number or identifier specified:-
 - 3 characters, right justified
 - 1 = HYDATA station number to follow
 - 2 = identifier provided (this option active in the example)
- (e) If (d) = 1 provide HYDATA station number here:-
 - 8 characters, right justified
- (f) If (d) = 2 provide identifier here (active option in the example)
 - 16 characters, left justified
- (g) File name containing format specification:-
 - 16 characters, right justified (see example).

APPENDIX E ERROR AND INFORMATION MESSAGES

This Appendix lists the error and information messages produced by HYTRAN.

HYTRAN error and information messages appear at the bottom of the screen and have a prefix identification number in brackets []. Some of the messages may also appear in the HYTRAN.REM file.

Other messages may be produced by the operating system.

The HYTRAN messages are as follows:

- [1] Enter HYDATA station number
- [2] Value must be in the range 1-100
- [3] UNEXPECTED ERROR . Going to error report
- [4] Station requested not on system
- [5] Year requested not on system
- [6] Datafile contains too many lines
- [7] Further information required before continuing
- [8] Error opening or reading from input datafile
- [9] Line number must be within file
- [10] First line of data cannot be before start line of file
- [11] Invalid text - text ignored

APPENDIX E ERROR AND INFORMATION MESSAGES

- [12] Arrows, Page Up/Down. Home, End, Line No.,
V / F O C *
- [13] Use C, I, V, R, N, or YYYY (or YY), MM, DD or hh,
mm, ss
- [14] Number of start line of first block
- [15] Number of first line of data in block
- [16] Specify final line number or marker, or use Implicit
- [17] Number of last line in block
- [18] Characters defining end of block
- [19] End of block defined by number of variables
- [20] Enter characters identifying missing numbers
- [21] Enter characters to be ignored. Use & for i symbol
- [22] Enter multiplying factor to be applied to all numbers
- [23] Enter constant to be added to all numbers
- [24] As found, 1 year, 1 month, 1 day, Specify
- [25] Enter maximum number of variables per block
- [26] Enter direction in which counting is to proceed
- [27] No data found in file
- [28] Number of lines in file exceeds maximum allowed
- [29] Maximum allowed number of blocks exceeded
- [30] Number of values exceeds maximum allowed

Appendix E Error and Information Messages

- [31] Calculating order. Percentage complete
- [32] Writing file to disc. Percentage complete
- [33] Reset format parameters
- [34] Second pass in order calculation
- [35] Error reading from format file
- [36] 1 = event, 2 = flow, 3 = general, 4 = rainfall,
5 = storage
- [37] 1 = < daily, 2 = daily, 3 = monthly
- [38] Format not yet defined
- [39] Enter name of format file
- [40] Field does not exist
- [41] Input name of format file
- [42] < daily interval only available for event data
- [43] Enter filename
- [44] Enter date as (YYY MMM DD)
- [45] Enter time as (hh:mm:ss)
- [46] Data type must be 1, 2, 3, 4 or 5
- [47] Data period must be 1, 2 or 3
- [48] Ensure station number and year are available on HYDATA
- [49] 1=hard copy, 2=screen messages required
- [50] Check data complies with HYDATA station limits

APPENDIX E ERROR AND INFORMATION MESSAGES

- [51] Attempting data transfer, please wait
- [52] Reset HYDATA limits to comply with data file
- [53] Value must be in the range 1-5
- [54] Writing to file HYTRAN.CHK
- [55] Automatic input for monthly data not yet available
- [56] Invalid station type
- [57] No data located for the station
- [58] Serious error, please abort and consult log file
- [59] Writing data to HYDATA. Percentage complete
- [60] Transfer complete
- [61] Option not yet available
- [62] Data scan not yet performed
- [63] Enter station identifier
- [64] Error reading from HYTRAN.LOG file
- [65] File HYTRAN.LOG not found
- [66] Proceed to inspect and transfer menu
- [67] Inspect data and edit format file
- [68] No. readings/day in HYDATA not compatible with format
- [69] Scanning data. Percentage complete
- [70] Station number not yet specified

Appendix E Error and Information Messages

- [71] Writing file HYTRAN.CHK. Percentage complete
- [72] WARNING. Limits exceeded. Press [RETURN] to continue
- [73] Order not yet calculated
- [74] Scan completed. Use "Inspect format" to examine data
- [75] Closing database files
- [76] Error opening batch file
- [77] Error reading batch file
- [78] Batch job completed. Press [RETURN] to continue
- [79] Error : too many datafile names in batch file
- [80] Batch job type must be in range 1 to 7 inclusive
- [81] Error opening or reading format file
- [82] Invalid directory or filename specified in batch file
- [83] Error reading datafile name from batch file
- [84] Error reading station number from batch file
- [85] Error reading identifier from batch file
- [86] Error reading logfile name from batch file
- [87] Please wait. Checking contents of batch file
- [88] Checks completed
- [89] Error setting up file names for batch job
- [90] Insufficient memory to run batch mode 1

APPENDIX E ERROR AND INFORMATION MESSAGES

- [91] File line more than 132 characters long
- [92] Invalid ASCII file format
- [93] Error transferring data to HYDATA
- [94] Hytran check file completed
- [95] HYDATA installation file (HDBIN) not found
- [96] Transfer aborted; internal error code 100/101
- [97] Transfer aborted; value too large to save