

CU-QMW-TN-0003

Date: 30 Jun 1999

Issue: 1

Rev. : 8

Page: i

Definition of the Interface between
Data Reduction and CDF Creation Software
for the UK CSDS Data Products

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Document Status Sheet			
1. Document Title: Software-CDF Interface			
2. Document Reference Number: CU-QMW-TN-0003			
3. Issue	4. Revision	5. Date	6. Reason for Change
Draft	0	26 May 94	
1	0	6 Oct 94	First Issue. Change of Status data condition of fill value line. Clarify 'E' marker. Addition of SC.id controller for SPD. Inclusion of int State_wec and Status_wbd. PI stream iff outputs to stdout for p file. Addition of record number to 'Inst_mode'.
1	1	1 Nov 94	Including sample PEACE .iff file typographical corrections.
1	2	20 Dec 94	Including Extensions for writing CSDS cdf file.
1	3	10 Apr 95	Change source of SC.id from RDA SPD files.
1	4	3 May 95	Update Inst_mode to comply with V1.7 skeletons.
1	5	24 May 95	QIFF V1.9 allows multiple elements and hex escapes.
1	6	30 June 97	Add optional overrides on Time period.
1	7	29 August 97	extend hex escapes.
1	8	30 June 99	Remove writing of Data.intervals
Require data periodicity parameter.			

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1 Introduction

This technical note is to form an addendum to the CDHF-PI Interface Documents and provides information for program design and coding at the instrument teams and the UK CDHF.

1.1 Changes this Version

This version brings the cdf writing software into compliance with the CSDS standard cdf files for Cluster II, and follows acceptance by CSDS of the change request DS-QMW-CR-0006. The global attribute "Data_intervals" is no longer written by the iff-to-cdf software. The parameter "s" for specifying data resolution (in milliseconds) becomes mandatory at this software release, and is used for determining the "Half_interval" variable.

1.2 Applicable Documents

The following documents are applicable to this technical note and provide details not explicitly set out here.

- 'Interface Control Document between the UK CDHF and the UK PIs', CU-RAL-ID-0001
- 'Reference Document for CSDS CDF Implementation', DS-QMW-TN-0003
- 'Data Products Task Group Report', DS-MPE-TN-0001
- 'CSDS Standard Skeleton Files', DS-QMW-TN-0005
- 'Technical Note on the Raw Data Access Interface', CU-RAL-TN-0002
- 'Manual for Software to write UK CSDS CDF files', CU-QMW-MA-0004
- 'Process Control for the Routine Production of the UK CSDS Data Products', CU-QMW-TN-0005

1.3 Structure of the Document

The interface is defined in a generic form for all the UK led instrument teams. Appendices are provided giving explicit example interface files for each instrument team individually.

The table in Appendix A shows the attributes which must or may be populated by means of data passed via the interface files to the CDHF software which creates the CDF files, or are generated internally by the CDF writing software.

2 Summary of UK CSDS Data Processing

The processing of UK CSDS products (i.e. Prime and Summary Parameters for FGM, PEACE, and DWP) is described in the document 'Process Control for the Routine Production of the UK CSDS Data Products', CU-QMW-TN-0005.

The schematic processing chain is reproduced here in the interests of providing a self contained interface description.

1. RDM received and logged at DRAL.
2. PI data reduction software (using/incorporating DRAL RDM reading software) generates the Prime Parameter Interface Files (PPIF) (one per spacecraft) and the Summary Parameter Interface File (SPIF). These are ASCII files, collectively referred to as .iff files, and are defined below. They will be referred to as ‘files’ throughout this document, but in practice the output from the PI provided data reduction software may be a stream to ‘standard out’ in the prescribed ASCII format, details are specified for each instrument in the Process Control definition, CU-QMW-TN-0004. Since the CDF writing software must make two passes over the interface files it will not be possible to pipe the output from the PI provided software directly into the CDF writing software, and a physical intermediate file must always be constructed. This file will be a concatenation of the output from the data reduction software and information from the controlling script and RDA software.
3. QMW software generates version “00” CDF files conforming to CSDS standards from these .iff files and the corresponding CSDS skeleton files.
4. PIs (or designate) validate the data contained within the CDF files. This requires changing various attributes and the version number to “01” (or higher), and will be accomplished using CSDS-UI supplied validation software (produced under contract by DRAL).
5. DRAL ingestion software incorporates this CDF into the CSDS database. Note that this ingestion software must check for the existence of a prior version (“n” say), rename the new version as “n+1”.
6. This CDF file is now ready for delivery to (or pick up by) other CSDS national data centres, and for access by the Cluster community.

The top level process control is described elsewhere, CU-QMW-TN-0005.

3 File Contents

The CDF file contents are fully defined in the document ‘Reference Document for CSDS CDF Implementation’, DS-QMW-TN-0003. Much of the file content defined in that document is fixed in advance and provided via the skeleton files. The skeleton files are generated by QMW for CSDS wide use and do not interface to the PI provided software. Other information in the files is provided by the CDF writing software itself.

This document will only explicitly deal with information that must be generated by the PI provided data reduction software, the RDA modules or control script, and passed to the CDF writing software via the interface files (PPIF and SPIF, collectively referred to as .iff files).

Files will contain metadata in the form of attributes. Two classes of attributes are required, those that apply to the whole file and those that are attached to each variable. Data will be treated as records comprised of a time tag and a value for each CSDS variable in turn. Records will be numbered for convenience, commencing with zero.

When it is not possible to write a value for one variable in a record a fill value must be used as a place holder. When a whole record cannot be written (even if it is only a single missing record) this is treated as a data gap and no values are entered. A data gap is identified by one (or more) lines containing the letter N in the first column (see section 4 for details).

3.1 SPD Files

The summary parameter data are one minute averages. It is possible for these parameters to be generated by averaging the PPD or by calculating directly from the raw data. Note that the minute averages are based on exact minute boundaries, whereas the PPD are based on spin periods. Consequently, if data accuracy is likely to be affected by the mismatch of PPD boundaries with SPD boundaries, the SPD should be calculated directly from averaging raw data and not from the PPD.

The Summary Parameters must be generated by the PI provided software and output to the Summary Parameter Interface File.

3.2 Validation Software

Some of the attribute information is to be provided by the CSDS validation software to be supplied by DRAL. This is identified here to provide visibility of this processing.

Logical_file_id This must reflect the new file name with correct version.

Data_version This must reflect the new file version.

TEXT Allows text input by validator, to allow identification and location of a caveats file.

Caveats Allows text input by validator for short caveats.

Validity This is provided entirely via the validation software user interface.

Validator This is provided automatically by the validation software user interface.

MODS The entry that applies to the current version of the data is supplied by the operator input into the control script and possibly by PI provided software.

4 The Interface

The interface will be via ASCII files; the syntax is defined in this section. These interface files will result from concatenation of the output from the PI provided software and attribute entries (using the same syntax) provided by the RDA software and control script.

4.1 Interface File Content

The file will contain any metadata (attributes and interprocess messages) that is generated by the PI provided software, and records containing a time and data for all dependent variables. A separate list of metadata is provided in appendix A, and this list specifies for each attribute whether it is generated by the RDA software or the PI provided software. Metadata that is already provided via the skeleton file is not listed in this document.

A separate file should be generated for each CDF to be written. Thus, for each day's data, there should be five ASCII files produced per instrument. One file is to contain the Summary Parameter data and the other four are to contain Prime Parameter data for each spacecraft separately. Each file should be independently complete, that is, they will all contain the full metadata information.

4.2 Data Types

All CDF data types are handled. They are understood for data entries (record lines) 'Variable Attribute' values and 'Global Attribute' values.

CDF_CHAR
CDF_UCHAR
CDF_BYTE
CDF_INT1
CDF_UINT1
CDF_INT2
CDF_UINT2
CDF_INT4
CDF_UINT4
CDF_REAL4
CDF_FLOAT
CDF_REAL8
CDF_DOUBLE
CDF_EPOCH

Character data types (CDF_CHAR, CDF_UCHAR) take the form of a quoted string in the input 'iff' file. Non-printing character values may be written using ascii hexadecimal escape codes. If the character combinations '\x' or '\X' are found in an input text string, the following two characters are treated as hexadecimal values and are converted to their ascii character counterparts. For example, the ISTP fill value may be entered as "\XFF" or "\xff".

Single byte data types (CDF_BYTE, CDF_INT1, CDF_UINT1) also accept hexadecimal escape codes for their numeric values. Distinct bytes must be space separated whether they are hexadecimal or decimal representations. CDF_BYTE and CDF_INT1 are equivalent.

Other data types are converted from the input string using the atoi and atof functions as appropriate and do not accept hexadecimal escapes. All numeric entries must be space separated.

4.3 File Naming Convention

Each interface file name is unique to allow storage for a short time during system testing for debug purposes.

The file names will reflect the general CSDS file naming syntax. The file name consists of a number of fields (all uppercase alphanumeric) separated by underscores, followed by the postfix '.iff':

`CX_RR_III_YYYYMMDD.iff`

where 'CX' is one of C1, C2, C3, C4 or CL (the last for the Summary Parameter files), 'RR' is the resolution of the data, i.e., either SP or PP for the summary and prime parameters respectively, 'III' is the three character instrument abbreviation and 'YYYYMMDD' is the date stamp of the data contained in the file. The abbreviation 'III' will take values FGM, PEA or DWP for the three relevant UK led instruments. For example, the prime parameter file from PEACE for 1 June 1996 from spacecraft 3 should be:

`C3_PP_PEA_19960601.iff`

Note that version numbers are not attached to the interface files.

The postfix '.iff' is to designate that this is an interface file.

4.4 Interface File Internal Syntax

Each line will have an identifying first character followed by a string of appropriate syntax and terminated by a new-line character ('\n' in C, any carriage return characters will be ignored).

Data Periodicity This will take the form:

S period

where *period* is a real value specifying the expected time interval between records in milliseconds. It is needed to correctly specify the Half_interval variable.

comments These will take the form:

% text string

and are intended to help make the file more readable.

messages These will take the form:

M text string

and are intended to provide a mechanism for identifying information that may be caught by a filter for display on the console and passed to a log file for operator inspection. For example, warning messages that are normally displayed during data reduction should also be copied to the ".iff" file to ensure that such information is available during later CDF file generation and short term archive.

fatal error These provide error state communication to the CDF writing software from the other components of the pipeline data reduction software. They will take the form:

F text string

where the text message is for operator use in investigating the cause of the error. These differ from 'messages' in the sense that they are for communicating fatal error states rather than warning messages. They will cause termination of the processing on the active interface file, and the resulting cdf file will be deleted by the CDF writing software to ensure that other automatic/operator processes do not distribute corrupted data files. The text message will be written into the log file.

global attributes These will take the form:

G Attribute_name Value

where '*Attribute_name*' is the CSDS defined name for the attribute (a list is provided in appendix A) and '*value*' is the entry to be placed in the attribute. The CDHF software will keep track of multiple entries as appropriate. If '*value*' is a text string it may either be delimited by white space or a double quote, ". If the text string itself contains white space (e.g. sentences used in MODS) then it **must** be delimited by double quotes. For CSDS files the data type of a global attribute entry is the same as that in the skeleton file.

Each entry of a global attribute of char data type contains a single string, but without the null terminator. Global attributes of other data types may have more than one element per entry. At present all CSDS global attributes are of string type and no multi-element attributes are needed. Nevertheless, a facility is provided for general processing, and against future evolution of CSDS CDF file design. Thus if multiple values are supplied in the global attribute line in the .iff file *e.g.*

G Attribute_name Value1 Value2 Value3

where *Valuen* are data types other than char strings, they will be entered as successive elements in a single global attribute entry.

variable attributes These will take the form:

V Variable_name Attribute_name Value(s)

where '*Variable_name*' is the name of the CSDS data product to which it applies, '*Attribute_name*' is the CSDS defined name for the attribute (a list will be provided as an appendix) and '*value*' is the entry to be placed in the attribute. Variable attributes may take multi-element entries, and so '*value*' may be a space separated list of elements for any data type other than character. Multi-element character entries are treated as text strings. If '*value*' is a text string it may either be delimited by white space or a double quote, ". If the text string itself contains white space (e.g. sentences used in MODS) then it **must** be delimited by double quotes.

data records These will take the form:

R Record_number UTC_time_tag millisecs_time_tag dependent_variables

where '*Record_number*' is a sequential numeric label starting at zero. This is to aid in system tests. The entry '*UTC_time_tag*' is the UTC time for the measurements in that record; '*millisecs_time_tag*' gives the time converted to milliseconds past midnight of the previous day. '*Dependent_variables*' is a list of values for each variable in the order specified in the instrument specific appendices.

Note that the '*UTC_time_tag*' is provided *only* to improve the readability of the file. The actual time used within the CDF will be taken from the '*millisecs_time_tag*' entry (to calculate the Epoch variable).

Each entry in the record is separated by at least one space character.

Any variable of data type 'character' must be delimited by double quotes since they may contain white space or other characters. Character type variables may be multiple entry and are stored as text strings in the CDF file, they are entered in the .iff file as quoted strings (*e.g.* "A %+"). Since the Status variables have become arrays of 1-byte integers, there are no character type variables for any of the UK led instruments in the CSDS data base. This facility is, however, retained against future evolution of the CSDS data products.

Dependent variables must be supplied in the same order that they appear in the appropriate skeleton files. This is the same as the order used in the instrument-specific appendices, where sample files are provided. Elements of GSE vectors must appear in the 'natural' order, x,y,z, separated by spaces. No PPD or SPD data products have higher dimensionality than vector, but the CDHF supplied code will be able to write variables of any dimensionality and size into CSDS compliant CDF files. When used for these non-CSDS files with higher dimension data, the order of array elements should be the natural order in C programs, that is the last index varies the fastest (*e.g.* A[0][0] A[0][1] A[1][0] A[1][1] for a 2x2 array) with elements separated by at least one white space character. The input record length is limited to 1000 entries, but this limit may readily be increased to accomodate input of large data arrays. This is robust for any line length as space is allocated on the fly for each line read.

Data Gaps These are identified by a line with the character N in the first column. Any number of gap lines are allowed, and constitute a single gap in the data between the record preceding the gap line(s) and the record following it. This information is used by the CDF creation software for determining the "Half_interval" variable.

End of Processing The end of processing marker will be the character 'E' in the first column followed by a white space character and the number of data records written into the file as an integer. This latter is provided as a consistency check. Any data record entries beyond this end of file marker will not be placed in the CDF file, and a warning will be written into the logfile. Absence of this flag within a .iff file will be treated as a fatal error state. This marker implies the successful completion of the data reduction processing. The end of processing, 'E', marker and the fatal error, 'F', marker are mutually exclusive.

Fill Values An optional line containing fill values in the same format as a data record may be placed anywhere in the file. It differs from a 'record' line in that the first character is 'U' in place of 'R'. This line will be interpreted as the values to be expected for each variable in a record line if they cannot be provided by the processing software. When these values are encountered for the respective variables in a record, the CSDS standard value FILLVAL for that data type will be written in their place into the CDF file. If this line is not present in the file, then all values will be written into the CDF file unaltered, and fill values used must conform to those specified in the CSDS CDF Reference Document, DS-QMW-TN-0003.

Note that it is intended that this line may be written by the same function call that writes the data records to ensure exact matching of sample fill values and

those encountered in records. To enable this, the fill value line must have a dummy record number and time text string as place holders, see examples in appendices. Similarly, if hexadecimal escapes are used for numeric byte data type values in a record line the hexadecimal escape must be used for the fill value as these are detected using string comparisons between the 'U' entries and the 'R' entries.

Only one fill value line is required per interface file, and this may appear anywhere before the 'End_of_data' marker. If multiple fill value lines are encountered, the last such line will be used.

4.5 Syntax Extensions

This section deals with options that are not required during routine pipeline processing, but which will be available in the delivered software. These extensions will allow creation of csds compliant cdf files for data products that are not included in the csds distribution, as well as missions other than Cluster.

Time Offset This will take the form:

T *yyyy mm dd*

The optional time offset is given by the three space separated integers, *yyyy mm dd* which specify respectively the year (full four digit, e.g. 1999), month and day to be used as start day for time measurement. Times in records will then be taken as milliseconds from the start of this specified offset day. This overrides the use of the start of the day determined from the file name. It is only needed for non-Cluster data sets.

Variable Names This will take the form:

I "*text*"

where "*text*" is a quoted string giving the extension to be used for the Half_interval variable and the attributes to the Epoch variable, and overrides that determined from the file name. Other variables take the full variable name from the skeleton file. It is only needed for non-Cluster data sets. A null string "" will result in no extension being added.

File Names It is not possible to change the file name syntax as this is a crucial part of the Cluster pipeline error checking, and ensures complete compliance with CSDS standards. It is possible, however, to generate files with a different syntax by renaming them after processing, and using the above override optional inputs to control file name dependent inputs.

A CSDS Attributes

The complete list of CSDS attributes are provided in the reference document DS-QMW-TN-0003. Most of these attributes are defined within the skeleton file and require no input from the actual data processing software. The following table lists the attributes which are not supplied in the skeleton file and identifies which attributes are to be ingested via the .iff file, and their source. The .iff file will be a concatenation of a file generated by the

CDHF software and controlling script, and that produced by the PI provided software. These sources are distinguished in the following table under the heading 'Source'. An entry '.iff' indicates that this is to be placed in the interface file, and this will be accompanied by either 'RDA' indicating that it is written into the interface file by the RDA software or controlling script (CDHF provided) or 'Inst' indicating that it is to form part of the instrument data reduction software output to the interface file. An entry 'QMW' indicates that the attribute is constructed internally by the QMW provided CDF writing software. An entry CSDS indicates that this attribute is written into the CDF file by the CSDS UI validation software. The column 'Entry' indicates whether the attribute allows multiple (M) entries or only single (S) entries.

Note that all attribute time information should be given in UTC in standard ISO form, e.g., 1993-06-24T13:05:22.000Z. Note that date fields which are not part of a UTC time are 8 character strings of the form *yyyymmdd*, which is the ISTP preferred format.

Global Attributes

gAttr name	Entry	Source	Format/Value
Logical_file_id	S	.iff RDA	“Cn_res_ins_date”. Name of .iff file (without the .iff extension) following ISTEP/CSDS naming convention. (50 chars max)
Parents	M	.iff RDA	“RDM>rdm_id” from RDA software. (80 chars max)
Generated_by	S	QMW	Identifies UK CDHF as source of file. Set as an environment variable. (80 chars max recommended)
Generation_date	S	QMW	Produced by call to C function ‘time’. (80 chars max)
Orbit_number	M	Not UK	“Perigee>Orbit_number>Period” where ‘Perigee’ is the UTC time at perigee of the identified orbit in ISO format, ‘Period’ is the predicted period of the orbit as an integer number of minutes, and ‘Orbit_number’ is the integer number of the orbit equal to the ‘revolution number’ on the RDM. This attribute is only in the AUX files (not relevant to UK data files). (80 chars max)
MODS	M	.iff RDA & .skt & csds	Record of history of modifications to CDF data set in free-form text. The .iff option is for operator input, but the PI software may also provide input if desired. (80 chars max)
Inst_mode	M	.iff Inst	“Cn>Ins>rec_num>UTC Time>INS_Mode>Text”. Initial entry plus new entry for each mode change. Note that the Time is that of the commencement of the identified mode, and rec_num is the number of the data records in the .iff file for which the new mode is applicable. Note that INS_mode is the mode acronym starting with the instrument three letter acronym, e.g. “PEA_SWM1” and can have up to 30 characters (exceeding this limit will cause the CSDS UI catalogue ingestion to fail). The text field may be 200 characters long. (270 chars max)
Software_version	M	.iff RDA & QMW	Free form text containing the version of the RDA system. The QMW software will add its own version number and that of the CDF software. (80 chars max)
Inst_settings	M	.iff Inst optional	“Parameter>value”. Text providing any internal instrumental or software settings, flags, etc. used within the data reduction software and not covered by the variable attributes dealing with calibration information. (80 characters max)

Variable Attributes

vAttr	Entry	Source	Format/Value (NB. One entry required for EACH VARIABLE)
Calib_software	S	.iff Inst	Free-form text. Suggested format XXX_DATE with XXX an arbitrary length string defining the version of data reduction/calibration software used and DATE is an 8-digit date stamp in the same format as in the Logical_file_id. Limited to 80 characters in total. (80 chars max recommended)
Calib_input	S	.iff Inst	Free-form text. Suggested format XXX_DATE with XXX an arbitrary length string indentifying the calibration file(s) loaded by the calibration software and DATE is an 8-digit date stamp in the same format as in the Logical_file_id. Limited to 80 characters in total. (80 chars max recommended)
SC_id	S	.iff PI SPDB	Integer as text. To be included in .iff file for SPDB only. Provided in .skt for PPDB. (80 chars max recommended)

B FGM > FluxGate Magnetometer

This Appendix provides a sample FGM Interface File.

```
% UK CDHF Pipeline Controller Inputs
%
% Processing of RDM ID 132435465768 on 2 February 1997
%
% Data periodicity
S 4000
%
% Fill in Global/Variable Attributes
%
% File ID
G Logical_file_id "C3_PP_FGM_19970123_V00"
%
% RDM ID (can have more than one entry)
G Parents "RDM>132435465768"
M Only one RDM used
%
% MODS
G MODS "Data calibration may be unreliable at this early stage of the mission"
%
% RDA software version
G Software_version "RDA version 1.6"
%
% END Controller input
% -----
%
% FGM Data Reduction Software
% K-H Glassmeier, FRG
% A Balogh, ICSTM, PI
%
% Instrument settings, RDM-reading software, etc.
G Inst_settings "RDA_timelist>2.1a"
G Inst_settings "FGM_switch2>Off"
%
% Epoch Variable Attributes
V Epoch%C3_PP_FGM Calib_software "V2.7_19960113"
V Epoch%C3_PP_FGM Calib_input C3V1."7-59_19960113"
%
% B-vector Variable Attributes
V B_xyz_gse%C3_PP_FGM Calib_software "V2.7_19960113"
V B_xyz_gse%C3_PP_FGM Calib_input "C3V1.7-59_19960113"
%
% B sigma Variable Attributes
V B_nsigma%C3_PP_FGM Calib_software "V2.7_19960113"
V B_nsigma%C3_PP_FGM Calib_input "C3V1.7-59_19960113"
%
% Status Variable Attributes
V Status%C3_PP_FGM Calib_software "V2.7_19960113"
V Status%C3_PP_FGM Calib_input "C3V1.7-59_19960113"
%
M Data Reduction Started 13:37:23 on 2 February 1997
% Fill in initial entry to Instrument Mode Attribute
G Inst_mode "C3>FGM>0>1997-01-23T02:33:17.235Z>NM1>FGM Normal Mode 1"
```

%


```
% Write out col numbers and field labels for clarity
% Note these are ignored by CDF-writing software
%123456789012345678901234567890123456789012345678901234567890123456789
%R_no. UTC Time      Millisec   Status   Bx          By          Bz          Bsigma
%-----|
R 0  02:33:17.235   9197235  2 32 7 244 +2.729e-00 -1.234e-01 +7.745e+01 +2.347e-00
R 1  02:33:21.124   9201124  2 32 7 244 +2.745e-00 -1.567e-01 +7.215e+01 +2.117e-00
R 2  02:33:25.921   9205921  2 32 7 244 +2.729e-00 -1.567e-01 +7.745e+01 +3.212e-00
%-----|
M Unable to calculate B_sigma due to too few good data values
%-----|
R 3  02:33:30.012   9210012  1 32 7 244 +2.745e-00 -1.234e-01 +7.215e+01 -1.000e+31
%-----|
G Inst_mode "C3>FGM>4>1997-01-23T02:33:38.235Z>BM2>FGM Burst Mode 2"
%-----|
R 4  02:33:34.235   9214235  2 6 15 244 +2.126e-00 -1.125e-01 +8.350e+01 +1.119e-00
%-----|
M No time input from RDA
N
N
%
G Inst_mode "C3>FGM>5>1997-01-23T17:44:51.845Z>NM1>FGM Normal Mode 1"
%-----|
R 5  17:44:46.845   63886845 2 32 7 244 +1.234e+01 +5.234e-00 +8.324e+01 +2.156e-00
R 6  17:44:50.334   63890334 2 32 7 244 +1.234e+01 +5.234e-00 +8.324e+01 +2.156e-00
R 7  17:44:55.112   63895112 2 32 7 244 +1.234e+01 +5.234e-00 +8.324e+01 +2.156e-00
R 8  17:44:59.345   63899345 2 32 7 244 +1.234e+01 +5.234e-00 +8.324e+01 +2.156e-00
R 9  17:45:03.749   63903749 2 32 7 244 +1.234e+01 +5.234e-00 +8.324e+01 +2.156e-00
R 10 17:45:08.153   63908153 2 32 7 244 +1.234e+01 +5.234e-00 +8.324e+01 +2.156e-00
%-----|
M End of data reached
M File C3_PP_FGM_19970123.iff closed at 13:42:12 on 2 February 1997
E 11
%
```

C DWP > Digital Wave Processor

This Appendix provides a sample DWP Prime Parameter Interface File. The DWP Summary Parameter Interface would be very similar.

```
% UK CDHF Pipeline Controller Inputs
%
% Processing of RDM ID 132435465768 on 2 February 1997
%
% Data periodicity
%
S 4000
%
% Fill in Global/Variable Attributes
%
% File ID
G Logical_file_id "C3_PP_DWP_19970123_V00"
%
% RDM ID (can have more than one entry)
G Parents "RDM>132435465768"
M Only one RDM used
%
% MODS
G MODS "Data calibration may be unreliable at this early stage of the mission"
%
% RDA software version
G Software_version "RDA version 1.6"
%
% END Controller input
% -----
%
% DWP Data Reduction Software
% Andy Buckley, Sussex
% LJC Woolliscroft, Sheffield, PI
%
% Fill in Global/Variable Attributes
%
% Instrument settings, etc.
G Inst_settings "RDA_timelist>2.1a"
G Inst_settings "DWP_switch2>Off"
%
% Epoch Variable Attributes
V Epoch%C3_PP_DWP Calib_software "V2.7_19960113"
V Epoch%C3_PP_DWP Calib_input "C3V1.7-59_19960113"
%
% Correlator_most Intense Variable Attributes
V Correl_signif%C3_PP_DWP Calib_software "V2.7_19960113"
V Correl_signif%C3_PP_DWP Calib_input "C3V1.7-59_19960113"
%
% Correlator_Energy at peak correlation Variable Attributes
V Correl_P%C3_PP_DWP Calib_software "V2.7_19960113"
V Correl_P%C3_PP_DWP Calib_input "C3V1.7-59_19960113"
%
% Correlator_frequency at peak correlation Variable Attributes
V Correl_freq%C3_PP_DWP Calib_software "V2.7_19960113"
V Correl_freq%C3_PP_DWP Calib_input "C3V1.7-59_19960113"
```

%

```
% DWP Status Variable Attributes
V Status%C3_PP_DWP Calib_software "V2.7_19960113"
V Status%C3_PP_DWP Calib_input "C3V1.7-59_19960113"
%
% WBD Status Variable Attributes
V Status_wbd%C3_PP_DWP Calib_software "V2.7_19960113"
V Status_wbd%C3_PP_DWP Calib_input "C3V1.7-59_19960113"
%
% WEC State Variable Attributes
V State_wec%C3_PP_DWP Calib_software "V2.7_19960113"
V State_wec%C3_PP_DWP Calib_input "C3V1.7-59_19960113"
%
M Data Reduction Started 13:37:23 on 2 February 1997
% Fill in initial entry to Instrument Mode Attribute
%
G Inst_mode "C3>DWP>0>1997-01-23T02:33:17.235Z>NM1>DWP Normal Mode 1"
%
% Write out col numbers and field labels for clarity.
% Note these are ignored by CDF-writing software
%123456789012345678901234567890123456789012345678901234567890123456789
%Rec  UTC Time  Millisec  Stat          State_wec      Status_wbd      Sig  C  f
%-----|
%
% identify FILL VALUES for each variable
U 0 00:00:00.000 -1 255 255 255 255 255 255 255 255 255 255 255 255 -1 -1 -1
% Note dummy record number and time text string
%
R 0 02:33:17.235 9197235 2 44 71 234 5 17 31 13 7 255 12 14 7 347. 9. 5.
R 1 02:33:21.124 9201124 2 44 71 234 5 17 31 13 7 255 12 14 7 465. 14. 1.
R 2 02:33:25.921 9205921 2 44 71 234 5 17 31 13 7 255 12 14 7 503. 4. 6.
%-----|
M Unable to generate correl
%-----|
R 3 02:33:30.012 9210012 1 44 71 234 5 17 31 13 7 255 12 14 7 -1. -1. -1.
%-----|
G Inst_mode "C3>DWP>4>1997-01-23T02:33:38.235Z>BM2>DWP Burst Mode 2"
%-----|
R 4 02:33:34.235 9214235 2 56 71 234 5 17 31 13 7 255 12 14 7 465. 14. 1.
%-----|
M Lost spin counter
N
N
%
G Inst_mode "C3>DWP>5>1997-01-23T17:44:51.845Z>NM1>DWP Normal Mode 1"
%-----|
R 5 17:44:46.845 63886845 2 44 71 234 5 17 31 13 7 255 12 14 7 503. 4. 6.
R 6 17:44:50.334 63890334 2 44 71 234 5 17 31 13 7 255 12 14 7 503. 4. 6.
R 7 17:44:55.112 63895112 2 44 71 234 5 17 31 13 7 255 12 14 7 503. 4. 6.
R 8 17:44:59.345 63899345 2 44 71 234 5 17 31 13 7 255 12 14 7 503. 4. 6.
R 9 17:45:03.749 63903749 2 44 71 234 5 17 31 13 7 255 12 14 7 503. 4. 6.
R 10 17:45:08.153 63908153 2 44 71 234 5 17 31 13 7 255 12 14 7 503. 4. 6.
%-----|
M End of data reached
M File C3_PP_DWP_19970123.iff closed at 13:42:12 on 2 February 1997
E 11
```

D PEACE >

Plasma Electron And Current Experiment

See separate appendix.