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WEC DATA  
ISDAT Housekeeping Database Handler

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## 1 Introduction

To facilitate the analysis of their high resolution data, the WEC experimenters have adopted the Swedish ISDAT system. This system is client-server, consisting of a number of database handlers that read and pre-process the data and client processes that plot and manipulate the data.

### 1.1 Purpose of this document

This document describes the implementation of the housekeeping server. This package takes the raw data files from the RDM and extracts, calibrates and displays the parameters requested by the user.

### 1.2 Acronyms

DDS	Data Disposition System
ESA	European Space Agency
ESOC	European Space Operations Centre
HK	Housekeeping data
HKD	Housekeeping data
HPD	Housekeeping Parameter Description
ISDAT	Interactive Satellite Data Analysis Tool
RDM	Raw Data Media (CD-rom)
SC	Spacecraft
SW	Software
TASI	Telemetry Acquisition Sequence Identifier
TED	Telemetry Extraction and Decommuation
WEC	Wave Experiment Consortium

### 1.3 References

**CWD-IPG-001** ISDAT programmers guide, I, Overview and General guidelines. Anders Lundgren and Gunnar Holmgren 14/2/94.

WEC User Manual.

### 1.4 Overview of document

The rest of this document is structured as follows

Section 2 describes the environment and standards used during the development of the SW.

Section 3 describes the hierarchy of logical instruments used in the housekeeping database module.

Section 4 describes the software.

Section 5 gives examples of output from the module. within the module.

Section 6 lists the function descriptions of the code.

## **2 Development environment and standards**

This section outlines the development environment and standards adopted within the code.

### **2.1 Environment**

The housekeeping modules were developed on a SUN SPARCstation using the Solaris 2.5 operating system.

### **2.2 Tools**

The code is completely written using the ANSI C language. It was compiled with the SUN C compiler SC3.0.1 dated 13 July 1994.

### **2.3 Naming conventions**

The naming convention for macros, functions and variables follows those given in the guidelines found in [CWD-IPG-001].

### **2.4 Software requirements**

The housekeeping database handler modules requires the following code to be available.

- TED version 2.3
- TED library version 4.2

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### 3 Conceptual instrument description

Within ISDAT, a conceptual instrument description is used to access data from the various data streams or logical instruments. The basic framework for these instrument descriptions consists of the following hierarchy

project > member > sensor > signal > channel > parameter

WEC parameters are referred to by their designated name in the AIT database. Spacecraft parameters are referred to by their short descriptions. Appendix A gives the correspondence between WEC AIT acronyms and ESOC DDS designations.

**NOTE:**

- Not all AIT entries have an equivalent entry in the HPD files.
- Some parameters are defined incorrectly within the HPD files.
- Some cannot be specified using the notation used within the HPD files. In these cases, the extraction method is hard wired within the TED software.
- The snapshot options are not available within the server environment.

Known errors in the HPD files are listed in appendix B.

In the case of the housekeeping database handler, this hierarchy is mapped as follows

project	Cluster
member	e.g. 1
instrument	hkeep

Sensor	Signal	Channel	Parameter
s/c	efw	EFW POTENTIOM 1 EFW POTENTIOM 2 EFW POTENTIOM 3 EFW POTENTIOM 4 EFW1 END OF WIRE EFW2 END OF WIRE EFW3 END OF WIRE EFW4 END OF WIRE EFW 1 RELAY STAT EFW 2 RELAY STAT EFW 3 RELAY STAT EFW 4 RELAY STAT	
	wec	LCL WEC A CURR LCL WEC B CURR RB WEC IH TEMP RB WEC OH TEMP LCL WEC A STATUS LCL WEC B STATUS LCL WEC A STATUS LCL WEC B STATUS RB +Y IH (WEC) M RB +Y IH (WEC) R RB +Y OH (WEC) M RB +Y OH (WEC) R	

Table 1: Logical instrument hierarchy – Spacecraft parameters

Sensor	Signal	Channel	Parameter
efw	mode	Snapshot ew0edmd1 ew0edmd2 ew0edmd3 ew0edmd4 ew0ifmod ew0insds ew0mot1s ew0mot2s ew0mot3s ew0mot4s ew0pwrst ew0samod	
	inst	Snapshot ew0bints ew0cntmm ew0cregl ew0cregm ew0dscin ew0mabpb ew0notlm ew0pbind ew0rlcyc ew0tseqn ew0uxtln ew0whpul	
	data	Snapshot ew0badhd ew0bdtmc ew0slwb0 ew0slwb1 ew0slwb2 ew0slwb3 ew0slwb4 ew0slwb5 ew0slwb6 ew0slwb7 ew0slwp_ ew0sppot ew0spsts ew0sunan ew0sweep	

Table 2: Logical instrument hierarchy – EFW parameters



Sensor	Signal	Channel	Parameter
staff sa	mode	Snapshot ew1amode ew1enwrk ew1insds ew1pwrst	
	inst	Snapshot ew1eword ew1lucnt ew1monds ew1rlcyc ew1tmon ew1vmon0 ew1vmon1 ew1vmon2 ew1whwsa ew1zcntr	
	data	Snapshot ew1agc0_ ew1agc1_ ew1agc2_ ew1agc3_ ew1agc4_ ew1agc5_ ew1agc6_ ew1agc7_ ew1agc8_ ew1agc9_	

Table 3: Logical instrument hierarchy – STAFF-SA parameters

Sensor	Signal	Channel	Parameter
staff mwf	mode	Snapshot ew2bandw ew2calmd ew2calst ew2enwrk ew2insds ew2pwrst	
	inst	Snapshot ew2eword ew2lucnt ew2ludet ew2monds ew2prctl ew2rlcyc ew2tmon0 ew2tmon1 ew2vmon0 ew2vmon1 ew2vmon2 ew2vmon3	
	data	Snapshot ew2bxmax ew2bymax ew2bzmax	

Table 4: Logical instrument hierarchy – STAFF-MWF parameters

Sensor	Signal	Channel	Parameter
whisper	mode	Snapshot	
		ew3averg	
		ew3calrl	
		ew3enwrk	
		ew3erate	
		ew3ifst_	
		ew3insds	
		ew3mode	
		ew3nohk	
		ew3pmode	
		ew3pulse	
		ew3pwrst	
	inst	Snapshot	
		ew3baqsr	
		ew3binam	
		ew3lucnt	
		ew3ludet	
		ew3monds	
		ew3nrfac	
		ew3ovflw	
		ew3pcfbs	
		ew3qsum_	
		ew3rlcyc	
		ew3rprow	
		ew3rptlr	
		ew3srfac	
		ew3srpof	
		ew3strow	
		ew3tmon	
		ew3umode	
		ew3usumm	
ew3vspsc			
ew3wdtst			
	data	Snapshot	
		ew3datpr	
		ew3frqpt	
	cmd wd	Snapshot	
		ew3creg0	
		ew3creg1	
		ew3creg2	
		ew3creg3	
		ew3wamw1	
		ew3wamw2	
		ew3wamw3	
		ew3wamw4	
		ew3wamw5	
ew3wpw			
	TX	Snapshot	
		ew3gain_	
		ew3trcyc	
		ew3txdis	
		ew3txlvl	
		ew3txpst	

Table 5: Logical instrument hierarchy – WHISPER parameters

Sensor	Signal	Channel	Parameter
wbd	mode	Snapshot ew4antna ew4bandw ew4bandw ew4confq ew4enwrk ew4insds ew4pwrst ew4wbdhk	
	inst	Snapshot ew4cregl ew4cregm ew4gain1 ew4gain2 ew4gain3 ew4gain4 ew4gain5 ew4gain6 ew4gain7 ew4gain8 ew4gnsel ew4gnset ew4lrage ew4obdhi ew4rlcyc ew4stat0 ew4stat1 ew4stat2 ew4stscn ew4tmon ew4urage ew4vcxol ew4vmon0	
	data	Snapshot ew4prctl	

Table 6: Logical instrument hierarchy – WBD parameters

Sensor	Signal	Channel	Parameter
dwp	obdh	Snapshot ew5acqmd ew5nfail ew5nrfai ew5obdhc ew5obdhr ew5rfail ew5rrfai ew5rsent	
	dwp	Snapshot ew5atsnp ew5dmafl ew5emcst ew5etmov ew5kpnum ew5lctcm ew5mcsrc ew5memrd ew5memwr ew5motag ew5p0cfg ew5p1cfg ew5p2cfg ew5pmst0 ew5pmst1 ew5pmst2 ew5srdy ew5srmon ew5sryr_ ew5tmon ew5vmon	

Table 7: Logical instrument hierarchy – DWP parameters 1

Sensor	Signal	Channel	Parameter
	expt	Snapshot ew5fgmcn ew5fgmds ew5wdwpo	
	tce	Snapshot ew5mlec1 ew5mlec2 ew5mlec3 ew5mlec4 ew5mlec5 ew5mlec6 ew5mlec7 ew5mlec8 ew5mlec9 ew5mlecc ew5mle10 ew5mle11 ew5mle12 ew5mle13 ew5mle14 ew5mle15	
	tc	Snapshot ew5elint ew5eitcm ew5eitew ew5enrdy ew5tcass ew5tiwme	
	corr	Snapshot ew5cords ew5prctl	
	wec	Snapshot ew5pwrlt ew5scfrq ew5ssoff ew5wecc0 ew5weccs ew5wecml ew5wecmo ew5wecms ew5wecmx ew5wecsp ew5wpowd	

Table 8: Logical instrument hierarchy – DWP parameters 2

## 4 Software Description

### 4.1 Overview

This section provides an overview of the software package. The task of obtaining the calibrated housekeeping data can be divided easily into three tasks, namely

- Initialisation of ISDAT data description.
- Creation of the lookup table from the HPD file.
- Extraction and calibration of the required parameter.

#### 4.1.1 ISDAT data object

The value of the housekeeping parameter is a scalar quantity (rank = 0, dimension = 0).

One value is returned per call giving a time resolution equivalent to the reset pulse.

The return data type is a real floating point number resulting from either casting the raw integer value if there is either no available calibration or the calibrated value is text or a floating point number resulting from the calibration of the raw data.

#### 4.1.2 Creation of HPD lookup table

The HPD table is created using functions provided as part of the TED package. It is generated every time the user requests data for a different day (the day is taken from the DDS header of the HPD data file). If a table already exists, it will be freed before the new table is created.

The generation of the HPD table also requires a list of corresponding aliases between the AIT and HPD listings. A table for containing the correspondences for each satellite is to be found in the file HkAliases.h.

#### 4.1.3 Extraction and calibration

The extraction and calibration of the users requested parameter is carried out using functions provided as part of the TED package. If the extraction and calibration proceeds without error, then the calibrated value may have one of two data types, either a floating point number or a character string. If the calibration results in producing a string, the extraction and calibration function will return the raw data value which may then be plotted using the IGR client.

### 4.2 Error handling

The following is a list of error codes that can occur within the housekeeping server software together with their general meanings. They are usually passed as return values from the different functions. If an error has occurred, then its number is propagated back to the main housekeeping data routine where the error routine HkeepErrChk is called. This sets an appropriate ISDAT error code that is then written within the pOrbit structure. The return code from the housekeeping data routine is then set to ERR\_EMPTY and no data will be returned.

Mnemonic	Value	Comment	ISDAT error
HkOK	0	Successful completion.	
HkBAD_CALLOC	40	Could not calloc memory.	DbBAD_ALLOC
HkBAD_HPD_TABLE	70	Could not create HPD lookup table.	DbBAD_TIME
HkBAD_HPD_DATA	80	HPD data not available.	DbBAD_EOF
HkBAD_EXT_CAL	100	Error occurred during calibration.	DbBAD_TIME
HkBAD_CAL_TYPE	110	Bad data type of calibrated data.	DbBAD_TIME
HkBAD_CALVAL_DEF	120	Calibration structure not defined.	DbBAD_TIME

## 5 Installation Tests

This section describes the installation tests to determine if the software is functioning properly.

### 5.1 Test Environment

These tests were carried out on a SUN sparc 20 with the Solaris 2.5 operating system. The version of ISDAT is 2.5.

The data set used for the tests is the Cluster RDM 960306\_1\_1a. The graphical outputs were obtained using the Igr client.

### 5.2 Model tag

Start time	
Duration	seconds
Mission	Cluster
Member	3
Instrument	hkeep
Sensor	dwp
Signal	dwp
Channel	EW5MOTAG
Results	Value should be constant at 52483 (0xCD03)

### 5.3 Reset count

Start time	
Duration	seconds
Mission	Cluster
Member	3
Instrument	hkeep
Sensor	dwp
Signal	dwp
Channel	EW5RSCNT
Results	Graph should be sawtooth shaped

### 5.4 Boom 1 mode

Start time	
Duration	seconds
Mission	Cluster
Member	3
Instrument	hkeep
Sensor	efw
Signal	mode
Channel	EW1EMDM1
Results	Graph should change from zero to one in a stepwise manner.



## 5.5 Whisper mode

Start time	
Duration	seconds
Mission	Cluster
Member	3
Instrument	hkeep
Sensor	whisper
Signal	mode
Channel	EW3MODE
Results	Graph should change from zero to one in a stepwise manner.

## 6 Code Headers

### 6.1 HkeepCreateHpdtTable

**Function** HkeepCreateHpdtTable  
**Module** ISDAT housekeeping server  
**File** HkeepCreateHpdtTable.c  
**Purpose** Calls TED routines to create the internal HPD table.  
**Call** int HkeepCreateHpdtTable(unsigned char \*hpdData, Info \*info)  
**Includes** Hk.h  
**Functions** ted\_hkextract\_parse\_and\_build, HkeepHpdtData

**Arguments:**

in uchar \*hpdData Pointer to HPD data.  
in Info \*info Pointer to Info structure.

**Return codes:**

HkOK Successful completion.  
HkBAD\_HPDTABLE Error creating HPD table.

**Updates:**

1. 01/01/96 SNW original  
2. 01/01/97 SNW Incorporates TED extract and calibrate

### 6.2 HkeepHpdtData

**Function** HkeepHpdtData  
**Module** ISDAT housekeeping server  
**File** HkeepCreateHpdtTable.c  
**Purpose** Returns a pointer to the HPD data within the pOrbit struct.  
**Call** unsigned char \*HkeepHpdtData(OrbitPtr pOrbit, Info \*info)  
**Includes** Hk.h  
**Functions** None.

**Arguments:**

in OrbitPtr pOrbit Pointer to orbit structure.  
in Info \*info Pointer to Info structure.

**Return codes:**

uchar Pointer to HPD data.

**Updates:**

1. 01/01/96 SNW original  
2. 01/01/97 SNW Incorporates TED extract and calibrate

### 6.3 HkDataFunc

**Function** HkDataFunc  
**Module** ISDAT housekeeping server  
**File** HkeepData.c  
**Purpose** Determines which housekeeping data extraction function to use and returns a pointer to it.  
**Call** int (\*HkDataFunc(req, pOrbit))()  
**Includes** HKeep.h, W.h  
**Functions** None

**Arguments:**

in DbDataRequest \*req Pointer to data request structure.  
in OrbitPtr pOrbit Pointer to orbit structure.



## 6.6 HkeepPup

**Function** HkeepPup  
**Module** ISDAT housekeeping server  
**File** HkeepExtractData.c  
**Purpose** This function returns the data value. If the calibration is numeric in nature, the calibrated value is returned else if the calibration is numeric, the raw value is returned.  
**Includes** Hk.h, ctype.h  
**Functions** HkeepGetParams, ted\_hkextract\_extract  
**Arguments:**  
in Info \*info Pointer to Info structure.  
out DbDataRF0 \*dest Pointer to data value.  
**Return codes:**  
HkOK Successful completion.  
HkBAD\_CAL\_TYPE Bad or unspecified data type.  
HkBAD\_CAL\_DEFN Bad or unspecified calibration flag.  
**Updates:**  
1. 01/01/96 SNW original  
2. 01/01/97 SNW Incorporates TED extract and calibrate

## 6.7 HkeepGetData

**Function** HkeepGetData  
**Module** ISDAT housekeeping server  
**File** HkeepGetData.c  
**Purpose** Main housekeeping data extraction function.  
**Call** int HkeepGetData(pOrbit, req, obj, sys, dest, time)  
**Includes** Hk.h, HKeep.h, Dds.h  
**Functions** IsTime2Double, ted\_hkextract\_freetable, HkeepCreateHpdTable, HkeepErrorChk, WecLookupHkBlock, WecReadHk, HkeepExtractData, WecComputeHkTime, HkeepGetParams, HkeepReadAliases  
**Arguments:**  
in OrbitPtr pOrbit Pointer to orbit structure.  
in DbDataRequest \*req Pointer to data request structure.  
in DbDataObject \*obj Pointer to data object structure.  
in DataInternals \*sys Pointer to sys structure.  
out DbDataRF0 \*dest Pointer to array of output data values.  
out IsTime \*time Pointer to array of time tags.  
**Return codes:**  
int Number of data points returned or zero (error).  
**Updates:**  
1. 01/01/96 SNW original  
2. 01/01/97 SNW Incorporates TED extract and calibrate

## 6.8 HkeepSetInfoSatNum

**Function** HkeepSetInfoSatNum  
**Module** ISDAT housekeeping server  
**File** HkeepGetData.c  
**Purpose** Returns the cluster satellite number.  
**Call** int HkeepSetInfoSatNum(DbDataRequest \*req)  
**Includes** Hk.h, HKeep.h, Dds.h  
**Functions** None.

**Arguments:**

in DbDataRequest \*req Pointer to data request structure.

**Return codes:**

int Satellite number (1-4).

**Updates:**

1. 01/01/97 SNW original

## 6.9 HkeepSetInfo

**Function** HkeepSetInfo  
**Module** ISDAT housekeeping server  
**File** HkeepGetData.c  
**Purpose** Sets up either WEC hk parameter or s/c parameters for search.  
**Call** int HkeepSetInfo(DbDataRequest \*req, Info \*info)  
**Includes** Hk.h, HKeep.h, Dds.h  
**Functions** None.

**Arguments:**

in DbDataRequest \*req Pointer to data request structure.

out Info \*info Pointer to Info structure.

**Return codes:**

HkOK Successful completion.

DbBAD\_SENSOR Bad sensor value in request.

**Updates:**

1. 01/01/97 SNW original

## 6.10 HkeepSetUnitsQty

**Function** HkeepSetUnitsQty  
**Module** ISDAT housekeeping server  
**File** HkeepGetData.c  
**Purpose** Sets the unit and quantity types in the data description.  
**Call** int HkeepSetInfo(DbDataRequest \*req, Info \*info)  
**Includes** Hk.h, HKeep.h, Dds.h  
**Functions** None.

**Arguments:**

in Info \*info Pointer to Info structure.

out DbDataObject \*obj Pointer to data object structure.

**Return codes:**

HkOK Successful completion.

**Updates:**

1. 01/01/97 SNW original

## 6.11 HkeepGetParams

**Function** HkeepGetParams  
**Module** ISDAT housekeeping server  
**File** HkeepGetParams.c  
**Purpose** This function returns the AIT/HPD acronym of the user selected parameter. The HPD acronyms do NOT include the satellite number.  
**Call** int HkeepGetParams(DbDataRequest \*req, char \*acro)  
**Includes** Hk.h, HKeep.h  
**Functions** None.  
**Arguments:**  
in DbDataRequest \*req Pointer to data request structure.  
out char \*acro Parameter acronym string.  
**Return codes:**  
HkOK Successful completion.  
**Updates:**  
1. 01/01/96 SNW original  
2. 01/01/97 SNW Incorporates TED extract and calibrate

## 6.12 HkeepInit

**Function** HkeepInit  
**Module** ISDAT housekeeping server  
**File** HkeepInit.c  
**Purpose** Initialisation of the HK server module.  
**Call** void HkeepInit()  
**Includes** W.h  
**Functions** WecRegisterFunction  
**Arguments:**  
None  
**Return codes:**  
None  
**Updates:**  
1. 01/01/96 SNW original  
2. 01/01/97 SNW Incorporates TED extract and calibrate

## 6.13 HkeepDumpCalVal

**Function** HkeepDumpCalVal  
**Module** ISDAT housekeeping server  
**File** HkeepPrint.c  
**Purpose** Outputs the entries in the TED\_HKEXTRACT\_CALIBRATED\_VALUE structure related to HPD file. Used for debugging purposes mainly.  
**Call** void DumpCalVal(TED\_HKEXTRACT\_CALIBRATED\_VALUE \*calVal)  
**Includes** Hk.h  
**Functions** None.  
**Arguments:**  
in TED \*calVal Struct containing HPD entry information.  
**Return codes:**  
None  
**Updates:**  
1. 01/01/96 SNW original  
2. 01/01/97 SNW Incorporates TED extract and calibrate

## 6.14 HkeepPrintCal

**Function** HkeepPrintCal  
**Module** ISDAT housekeeping server  
**File** HkeepPrint.c  
**Purpose** Outputs the entries in the TED\_HKEXTRACT\_CALIBRATED\_VALUE structure related to general settings. Used for debugging purposes mainly.  
**Call** void DumpCalVal(TED\_HKEXTRACT\_CALIBRATED\_VALUE \*calVal)  
**Includes** Hk.h  
**Functions** HkeepDumpCalVal  
**Arguments:**  
in TED \*calVal Struct containing HPD entry information.  
**Return codes:**  
HkOk Successful completion  
HkBAD\_CALVAL\_DEF Bad argument passed.  
**Updates:**  
1. 01/01/96 SNW original  
2. 01/01/97 SNW Incorporates TED extract and calibrate

## 6.15 HkeepQuery

**Function** HkeepQuery  
**Module** ISDAT housekeeping server  
**File** HkeepQuery.c  
**Purpose** Creates the logical instrument hierarchy.  
**Call** int HkeepQuery(client, desc, qdata)  
**Includes** W.h, HKeep.h  
**Functions** QueryInstrument, QuerySensor, QuerySignal, QueryChannel, QueryParameter  
**Arguments:**  
in ClientPtr client Pointer to client structure.  
in DbQueryDesc \*desc Pointer to query desc structure.  
out DbQueryData \*qdata Pointer to query data structure.  
**Return codes:**  
int Number of entries.  
**Updates:**  
1. 01/01/96 SNW original  
2. 01/01/97 SNW Incorporates TED extract and calibrate

## 6.16 QueryInstrument

**Function** QueryInstrument  
**Module** ISDAT housekeeping server  
**File** HkeepQuery.c  
**Purpose** Queries the instrument level in the logical instrument hierarchy.  
**Call** static QueryInstrument(mode, project, member, p)  
**Includes** W.h, HKeep.h  
**Functions** None.

**Arguments:**

in	int mode	Query mode.
in	int project	Project code.
in	int member	Member code.
out	DbQueryData *p	Array of instruments .

**Return codes:**

int	Number of entries.
-----	--------------------

**Updates:**

1.	01/01/96	SNW	original
2.	01/01/97	SNW	Incorporates TED extract and calibrate

## 6.17 QuerySensor

<b>Function</b>	QuerySensor
<b>Module</b>	ISDAT housekeeping server
<b>File</b>	HkeepQuery.c
<b>Purpose</b>	Queries the sensor level in the logical instrument hierarchy.
<b>Call</b>	static QuerySensor(mode, project, member, instrument, p)
<b>Includes</b>	W.h, HKeep.h
<b>Functions</b>	None.

**Arguments:**

in	int mode	Query mode.
in	int project	Project code.
in	int member	Member code.
in	int instrument	Instrument code.
out	DbQueryData *p	Array of sensors.

**Return codes:**

int	Number of entries.
-----	--------------------

**Updates:**

1.	01/01/96	SNW	original
2.	01/01/97	SNW	Incorporates TED extract and calibrate

## 6.18 QuerySignal

<b>Function</b>	QuerySignal
<b>Module</b>	ISDAT housekeeping server
<b>File</b>	HkeepQuery.c
<b>Purpose</b>	Queries the signal level in the logical instrument hierarchy.
<b>Call</b>	static QuerySignal(mode, project, member, instrument, sensor, p)
<b>Includes</b>	W.h, HKeep.h
<b>Functions</b>	None.

**Arguments:**

in	int mode	Query mode.
in	int project	Project code.
in	int member	Member code.
in	int instrument	Instrument code.
in	int sensor	Sensor code.
out	DbQueryData *p	Array of signals.

**Return codes:**

int	Number of entries.
-----	--------------------

**Updates:**

1.	01/01/96	SNW	original
2.	01/01/97	SNW	Incorporates TED extract and calibrate



## 6.19 QueryChannel

**Function** QueryChannel  
**Module** ISDAT housekeeping server  
**File** HkeepQuery.c  
**Purpose** Queries the channel level in the logical instrument heirachy.  
**Call** static QueryChannel(mode, project, member, instrument,sensor, signal, p)  
**Includes** W.h, HKeep.h

**Arguments:**

in	int mode	Query mode.
in	int project	Project code.
in	int member	Member code.
in	int instrument	Instrument code.
in	int sensor	Sensor code.
in	int signal	Signal code.
out	DbQueryData *p	Array of channels.

**Return codes:**

int	Number of entries.
-----	--------------------

**Updates:**

1.	01/01/96	SNW	original
2.	01/01/97	SNW	Incorporates TED extract and calibrate

## 6.20 QueryParameter

**Function** QueryParameter  
**Module** ISDAT housekeeping server  
**File** HkeepQuery.c  
**Purpose** Queries the parameter level in the logical instrument heirachy.  
**Call** static QueryParameter(mode, project, member, instrument,sensor, signal, channel, p)

**Includes** W.h, HKeep.h

**Functions** None.

**Arguments:**

in	int mode	Query mode.
in	int project	Project code.
in	int member	Member code.
in	int instrument	Instrument code.
in	int sensor	Sensor code.
in	int signal	Signal code.
in	int channel	Channel code.
out	DbQueryData *p	Array of channels.

**Return codes:**

int	Number of entries.
-----	--------------------

**Updates:**

1.	01/01/96	SNW	original
2.	01/01/97	SNW	Incorporates TED extract and calibrate



## A Correlation between WEC AIT and HPD acronyms.

AIT	HPD			
	Clu 1	Clu 2	Clu 3	Clu 4
EW0BADHD	1G_001	2G_001	3G_001	4G_001
EW0BDTMC	1G_002	2G_002	3G_002	4G_002
EW0CNTMM	1G_004	2G_004	3G_004	4G_004
EW0CREGL	1G_005	2G_005	3G_005	4G_005
EW0CREGM	1G_006	2G_006	3G_006	4G_006
EW0DSCIN	1G_007	2G_007	3G_007	4G_007
EW0EDMD1	1G_008	2G_008	3G_008	4G_008
EW0EDMD2	1G_009	2G_009	3G_009	4G_009
EW0EDMD3	1G_010	2G_010	3G_010	4G_010
EW0EDMD4	1G_011	2G_011	3G_011	4G_011
EW0IFMOD	1G_012	2G_012	3G_012	4G_012
EW0INSDS	1G_013	2G_013	3G_013	4G_013
EW0MABPB	1G_014	2G_014	3G_014	4G_014
EW0MOT1S	1G_015	2G_015	3G_015	4G_015
EW0MOT2S	1G_016	2G_016	3G_016	4G_016
EW0MOT3S	1G_017	2G_017	3G_017	4G_017
EW0MOT4S	1G_018	2G_018	3G_018	4G_018
EW0NOTLM	1G_019	2G_019	3G_019	4G_019
EW0PBIND	1G_020	2G_020	3G_020	4G_020
EW0PWRST	1G_021	2G_021	3G_021	4G_021
EW0RLCYC	1G_022	2G_022	3G_022	4G_022
EW0SAMOD	1G_023	2G_023	3G_023	4G_023
EW0SLWB0	1G_024	2G_024	3G_024	4G_024
EW0SLWB1	1G_025	2G_025	3G_025	4G_025
EW0SLWB2	1G_026	2G_026	3G_026	4G_026
EW0SLWB3	1G_027	2G_027	3G_027	4G_027
EW0SLWB4	1G_028	2G_028	3G_028	4G_028
EW0SLWB5	1G_029	2G_029	3G_029	4G_029
EW0SLWB6	1G_030	2G_030	3G_030	4G_030
EW0SLWB7	1G_031	2G_031	3G_031	4G_031
EW0SLWP_	1G_032	2G_032	3G_032	4G_032
EW0SPSTS	1G_034	2G_034	3G_034	4G_034
EW0SUNAN	1G_035	2G_035	3G_035	4G_035
EW0SWEEP	1G_036	2G_036	3G_036	4G_036
EW0TSEQN	1G_037	2G_037	3G_037	4G_037
EW0UXTLM	1G_038	2G_038	3G_038	4G_038
EW0WHPUL	1G_039	2G_039	3G_039	4G_039
EW1AGC0_	1S_035	2S_035	3S_035	4S_035
EW1AGC1_	1S_036	2S_036	3S_036	4S_036
EW1AGC2_	1S_037	2S_037	3S_037	4S_037

AIT	HPD			
	Clu 1	Clu 2	Clu 3	Clu 4
EW1AGC3_	1S_038	2S_038	3S_038	4S_038
EW1AGC4_	1S_039	2S_039	3S_039	4S_039
EW1AGC5_	1S_040	2S_040	3S_040	4S_040
EW1AGC6_	1S_041	2S_041	3S_041	4S_041
EW1AGC7_	1S_042	2S_042	3S_042	4S_042
EW1AGC8_	1S_043	2S_043	3S_043	4S_043
EW1AGC9_	1S_044	2S_044	3S_044	4S_044
EW1AMODE	1S_022	2S_022	3S_022	4S_022
EW1ENWRK	1S_023	2S_023	3S_023	4S_023
EW1EWORD	1S_024	2S_024	3S_024	4S_024
EW1INSDS	1S_025	2S_025	3S_025	4S_025
EW1LUCNT	1S_026	2S_026	3S_026	4S_026
EW1MONDS	1S_027	2S_027	3S_027	4S_027
EW1PWRST	1S_028	2S_028	3S_028	4S_028
EW1RLCYC	1S_029	2S_029	3S_029	4S_029
EW1TMON	1S_030	2S_030	3S_030	4S_030
EW1VMON0	1S_031	2S_031	3S_031	4S_031
EW1VMON1	1S_032	2S_032	3S_032	4S_032
EW1VMON2	1S_033	2S_033	3S_033	4S_033
EW1WHWSA	1S_045	2S_045	3S_045	4S_045
EW1ZCNTR	1S_034	2S_034	3S_034	4S_034
EW2BANDW	1S_001	2S_001	3S_001	4S_001
EW2BXMAX	1S_002	2S_002	3S_002	4S_002
EW2BYMAX	1S_003	2S_003	3S_003	4S_003
EW2BZMAX	1S_004	2S_004	3S_004	4S_004
EW2CALMD	1S_005	2S_005	3S_005	4S_005
EW2CALST	1S_006	2S_006	3S_006	4S_006
EW2ENWRK	1S_007	2S_007	3S_007	4S_007
EW2EWORD	1S_008	2S_008	3S_008	4S_008
EW2INSDS	1S_009	2S_009	3S_009	4S_009
EW2LUCNT	1S_010	2S_010	3S_010	4S_010
EW2LUDET	1G_033	2G_033	3G_033	4G_033
EW2MONDS	1S_012	2S_012	3S_012	4S_012
EW2PRCTL	1S_013	2S_013	3S_013	4S_013
EW2PWRST	1S_014	2S_014	3S_014	4S_014
EW2RLCYC	1S_015	2S_015	3S_015	4S_015
EW2TMON0	1S_016	2S_016	3S_016	4S_016
EW2TMON1	1S_017	2S_017	3S_017	4S_017
EW2VMON0	1S_018	2S_018	3S_018	4S_018
EW2VMON1	1S_019	2S_019	3S_019	4S_019
EW2VMON2	1S_020	2S_020	3S_020	4S_020
EW2VMON3	1S_021	2S_021	3S_021	4S_021
EW3AVERG	1L_001	2L_001	3L_001	4L_001
EW3BINAM	1L_003	2L_003	3L_003	4L_003
EW3CALRL	1L_004	2L_004	3L_004	4L_004
EW3CREG0	1L_005	2L_005	3L_005	4L_005
EW3CREG1	1L_006	2L_006	3L_006	4L_006

AIT	HPD			
	Clu 1	Clu 2	Clu 3	Clu 4
EW3CREG2	1L_007	2L_007	3L_007	4L_007
EW3CREG3	1L_008	2L_008	3L_008	4L_008
EW3DATPR	1L_009	2L_009	3L_009	4L_009
EW3ENWRK	1L_010	2L_010	3L_010	4L_010
EW3ERATE	1L_011	2L_011	3L_011	4L_011
EW3EWCW	1L_012	2L_012	3L_012	4L_012
EW3FRQPT	1L_013	2L_013	3L_013	4L_013
EW3INSDS	1L_016	2L_016	3L_016	4L_016
EW3LUCNT	1L_017	2L_017	3L_017	4L_017
EW3LUDET	1L_018	2L_018	3L_018	4L_018
EW3MODE	1L_019	2L_019	3L_019	4L_019
EW3MONDS	1L_020	2L_020	3L_020	4L_020
EW3NOHK	1L_021	2L_021	3L_021	4L_021
EW3NRFAC	1L_022	2L_022	3L_022	4L_022
EW3OVFLW	1L_023	2L_023	3L_023	4L_023
EW3PCFBS	1L_024	2L_024	3L_024	4L_024
EW3PMODE	1L_025	2L_025	3L_025	4L_025
EW3PULSE	1L_026	2L_026	3L_026	4L_026
EW3PWRST	1L_027	2L_027	3L_027	4L_027
EW3QSUM_	1L_028	2L_028	3L_028	4L_028
EW3RLCYC	1L_029	2L_029	3L_029	4L_029
EW3RPROW	1L_030	2L_030	3L_030	4L_030
EW3RPTLR	1L_031	2L_031	3L_031	4L_031
EW3SRFAC	1L_032	2L_032	3L_032	4L_032
EW3SRPOF	1L_033	2L_033	3L_033	4L_033
EW3STROW	1L_034	2L_034	3L_034	4L_034
EW3TMON	1L_035	2L_035	3L_035	4L_035
EW3TRCYC	1L_036	2L_036	3L_036	4L_036
EW3TXDIS	1L_037	2L_037	3L_037	4L_037
EW3TXLVL	1L_038	2L_038	3L_038	4L_038
EW3TXPST	1L_039	2L_039	3L_039	4L_039
EW3UMODE	1L_040	2L_040	3L_040	4L_040
EW3USUMM	1L_041	2L_041	3L_041	4L_041
EW3VSPSC	1L_042	2L_042	3L_042	4L_042
EW3WAMW1	1L_043	2L_043	3L_043	4L_043
EW3WAMW2	1L_044	2L_044	3L_044	4L_044
EW3WAMW3	1L_045	2L_045	3L_045	4L_045
EW3WAMW4	1L_046	2L_046	3L_046	4L_046
EW3WAMW5	1L_047	2L_047	3L_047	4L_047
EW3WDTST	1L_048	2L_048	3L_048	4L_048
EW3WPW	1L_049	2L_049	3L_049	4L_049
EW4BANDW	1W_002	2W_002	3W_002	4W_002
EW4CONFQ	1W_003	2W_003	3W_003	4W_003
EW4CREGL	1W_004	2W_004	3W_004	4W_004
EW4CREGM	1W_005	2W_005	3W_005	4W_005

AIT	HPD			
	Clu 1	Clu 2	Clu 3	Clu 4
EW4ENWRK	1W_006	2W_006	3W_006	4W_006
EW4GAIN1	1W_007	2W_007	3W_007	4W_007
EW4GAIN2	1W_008	2W_008	3W_008	4W_008
EW4GAIN3	1W_009	2W_009	3W_009	4W_009
EW4GAIN4	1W_010	2W_010	3W_010	4W_010
EW4GAIN5	1W_011	2W_011	3W_011	4W_011
EW4GAIN6	1W_012	2W_012	3W_012	4W_012
EW4GAIN7	1W_013	2W_013	3W_013	4W_013
EW4GAIN7	1W_013	2W_013	3W_013	4W_013
EW4GAIN8	1W_014	2W_014	3W_014	4W_014
EW4GNSEL	1W_015	2W_015	3W_015	4W_015
EW4GNSET	1W_016	2W_016	3W_016	4W_016
EW4INSDS	1W_017	2W_017	3W_017	4W_017
EW4LRAGE	1W_018	2W_018	3W_018	4W_018
EW4OBDHI	1W_019	2W_019	3W_019	4W_019
EW4PRCTL	1W_020	2W_020	3W_020	4W_020
EW4PWRST	1W_021	2W_021	3W_021	4W_021
EW4RLCYC	1W_022	2W_022	3W_022	4W_022
EW4STAT0	1W_023	2W_023	3W_023	4W_023
EW4STAT1	1W_024	2W_024	3W_024	4W_024
EW4STAT2	1W_025	2W_025	3W_025	4W_025
EW4STSCN	1W_026	2W_026	3W_026	4W_026
EW4TMON	1W_027	2W_027	3W_027	4W_027
EW4URAGE	1W_028	2W_028	3W_028	4W_028
EW4VCXOL	1W_029	2W_029	3W_029	4W_029
EW4VMON0	1W_030	2W_030	3W_030	4W_030
EW4WBDHK	1W_031	2W_031	3W_031	4W_031
EW5ACQMD	1D_012	2D_012	3D_012	4D_012
EW5ATSNP	1D_013	2D_013	3D_013	4D_013
EW5CORDS	1D_014	2D_014	3D_014	4D_014
EW5DMAFL	1D_015	2D_015	3D_015	4D_015
EW5EAPOV	1D_016	2D_016	3D_016	4D_016
EW5EITCM	1D_017	2D_017	3D_017	4D_017
EW5EITCW	1D_018	2D_018	3D_018	4D_018
EW5ELINT	1D_019	2D_019	3D_019	4D_019
EW5EMCST	1D_020	2D_020	3D_020	4D_020
EW5ENRDY	1D_021	2D_021	3D_021	4D_021
EW5ESTMR	1D_022	2D_022	3D_022	4D_022
EW5ETMOV	1D_023	2D_023	3D_023	4D_023
EW5FGMCN	1D_024	2D_024	3D_024	4D_024
EW5FGMDS	1D_025	2D_025	3D_025	4D_025
EW5KPNUM	1D_026	2D_026	3D_026	4D_026
EW5LCTCM	1D_027	2D_027	3D_027	4D_027
EW5MCSRC	1D_028	2D_028	3D_028	4D_028
EW5MEMRD	1D_029	2D_029	3D_029	4D_029

AIT	HPD			
	Clu 1	Clu 2	Clu 3	Clu 4
EW5MEMWR	1D_030	2D_030	3D_030	4D_030
EW5MLE10	1D_031	2D_031	3D_031	4D_031
EW5MLE11	1D_032	2D_032	3D_032	4D_032
EW5MLE12	1D_033	2D_033	3D_033	4D_033
EW5MLE13	1D_034	2D_034	3D_034	4D_034
EW5MLE14	1D_035	2D_035	3D_035	4D_035
EW5MLE15	1D_036	2D_036	3D_036	4D_036
EW5MLEC1	1D_037	2D_037	3D_037	4D_037
EW5MLEC2	1D_038	2D_038	3D_038	4D_038
EW5MLEC3	1D_039	2D_039	3D_039	4D_039
EW5MLEC4	1D_040	2D_040	3D_040	4D_040
EW5MLEC5	1D_041	2D_041	3D_041	4D_041
EW5MLEC6	1D_042	2D_042	3D_042	4D_042
EW5MLEC7	1D_043	2D_043	3D_043	4D_043
EW5MLEC8	1D_044	2D_044	3D_044	4D_044
EW5MLEC9	1D_045	2D_045	3D_045	4D_045
EW5MLECC	1D_046	2D_046	3D_046	4D_046
EW5MOTAG	1D_047	2D_047	3D_047	4D_047
EW5NFAIL	1D_048	2D_048	3D_048	4D_048
EW5NRFAI	1D_049	2D_049	3D_049	4D_049
EW5OBDHC	1D_050	2D_050	3D_050	4D_050
EW5OBDHR	1D_051	2D_051	3D_051	4D_051
EW5P0CFG	1D_R01	2D_R01	3D_R01	4D_R01
EW5P1CFG	1D_R01	2D_R01	3D_R01	4D_R01
EW5P2CFG	1D_R01	2D_R01	3D_R01	4D_R01
EW5PMST0	1D_055	2D_055	3D_055	4D_055
EW5PMST1	1D_056	2D_056	3D_056	4D_056
EW5PMST2	1D_057	2D_057	3D_057	4D_057
EW5PRCTL	1D_059	2D_059	3D_059	4D_059
EW5PWRLT	1D_060	2D_060	3D_060	4D_060
EW5RFAIL	1D_061	2D_061	3D_061	4D_061
EW5RRFAI	1D_062	2D_062	3D_062	4D_062
EW5RSCNT	1D_063	2D_063	3D_063	4D_063
EW5SCFRQ	1D_064	2D_064	3D_064	4D_064
EW5SSOFF	1D_068	2D_068	3D_068	4D_068
EW5TCASS	1D_069	2D_069	3D_069	4D_069
EW5TIWME	1D_070	2D_070	3D_070	4D_070
EW5TMON	1D_071	2D_071	3D_071	4D_071
EW5VMON	1D_072	2D_072	3D_072	4D_072
EW5WDWPO	1D_073	2D_073	3D_073	4D_073
EW5WECC0	1D_074	2D_074	3D_074	4D_074
EW5WECCS	1D_075	2D_075	3D_075	4D_075
EW5WECML	1D_076	2D_076	3D_076	4D_076
EW5WECMO	1D_077	2D_077	3D_077	4D_077
EW5WECMS	1D_078	2D_078	3D_078	4D_078
EW5WECMX	1D_079	2D_079	3D_079	4D_079
EW5WECSP	1D_080	2D_080	3D_080	4D_080
EW5WPOWD	1D_081	2D_081	3D_081	4D_081

## B Discrepancies between WEC AIT and HPD acronyms.

This is a list of the discrepancies found when comparing the AIT parameter listing with the HPD parameter listing.

AIT	HPD	Comment
EW5SRYR_	-	AIT parameter not in HPD listing.
EW5SRMON	-	AIT parameter not in HPD listing.
EW5SRDAY	-	AIT parameter not in HPD listing.
EW2PRCTL	3S_013	AIT and HPD definition are different. AIT definition 34/FF 35/FF. HPD definition 35/03. It may be that these are the only 2 bits used out of the 2 8 bit words defined in the AIT listing.
EW5MLECC	3D_046	Correctly defined but it is also defined by parameters in the ranges (3D_L31 - 3D_L45) (3D_M31 - 3D_M45) L=lsb, M=msb. These ranges should surely refer to AIT parameters ew5mlec1-ew5mle15 i.e. 3D_L31 = EW5MLE1 56/FF, 3D_M31 = EW5MLE1 57/FF and so on. At present the HPD parameters are all defined as 54/FF 55/FF
EW0SPPOT	3G_033	AIT and HPD definition are different. AIT definition EW0SPPOT 105/0F 104/FF HPD definition 3G_033 105/0F 106/FF HPD definition 3G_015 104/0F 105/FF
EW2LUDET	-	I think this AIT parameter doesn't exist anymore.
-	3S_047	Does not appear to be in the AIT listing. HPD short description is STAFF MWF EZ MD.
-	3S_046	Does not appear to be in the AIT listing. HPD short description is STAFF MWF EY MD.
EW3IFST_	-	Does not appear to have a corresponding HPD entry.
EW4GAIN4	3W_010	These parameters are both incorrect. They should be 140/FF 141/FF and not 138/FF 139/FF.
EW3BAQSR	-	This AIT parameter cannot specify using HPD notation. AIT definition is 139/07 143/08 145/7F.
EW3QSUM_	3L_028	AIT and HPD definitions are different. AIT definition of EW3QSUM_ 148/FF 149/FF 146/FF 147/FF HPD definition of 3L_028 148/FF 149/FF 150/FF 151/FF
EW5TCASS	3D_069	AIT and HPD definitions are different. AIT definition of EW5TCASS 187/FF 186/FF HPD definition of 3D_069 187/FF 188/FF
EW0TSEQN	3D_037	AIT entry has no units. HPD has units of DEC.

The following parameters are not referred to in the AIT database.



HPD acronym	HPD short description
3G_U52	B2 MOTOR STATUS
3G_U54	B4 MOTOR STATUS
3G_U51	B1 MOTOR STATUS
3G_U53	B3 MOTOR STATUS
3G_U32	B2 COVER DOORS
3G_U34	B4 COVER DOORS
3G_U22	B2 TURNS SWITCH
3G_U24	B4 TURNS SWITCH
3G_U12	B2 END OF WIRE
3G_U14	B4 END OF WIRE
3G_U31	B1 COVER DOORS
3G_U33	B3 COVER DOORS
3G_U21	B1 TURNS SWITCH
3G_U23	B3 TURNS SWITCH
3G_R12	SL WIND WD 1 RAW
3G_U61	B1 DEPL'D LENGTH CL'S
3G_U63	B3 DEPL'D LENGTH CL'S
3G_U62	B2 DEPL'D LENGTH CL'S
3G_U64	B4 DEPL'D LENGTH CL'S
3G_U71	B1 CMD'D LENGTH CL'S
3G_U72	B2 CMD'D LENGTH CL'S
3G_U73	B3 CMD'D LENGTH CL'S
3G_U74	B4 CMD'D LENGTH CL'S
3G_U42	B2 OVERRIDE MASK
3G_U44	B4 OVERRIDE MASK
3G_UA1	B1 INT COUNTER
3G_UA2	B2 INT COUNTER
3G_UA3	B3 INT COUNTER
3G_UA4	B4 INT COUNTER