Created:June 20, 1995
Modified:December 18, 1996

Gemini Controls Group Interface Control Document

ICD 16 - The Parameter Definition Format

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gscg.grp.025/07

This report provides a description of the Parameter Definition Format (PDF) used for describing the interface for a Gemini Principal System.

1.0 Purpose

Each of the Gemini Principal Systems presents an interface for the use of other principal systems. Most commonly this interface is used by the Observatory Control System (OCS). This report describes the formal method that is used to detail the information flows at such an interface.

The tool used for this method is called a Parameter Definition Format document (PDF) and is intended to embody all the information necessary for one principal system to interface to another.

2.0 Assumptions

This report assumes that the principal systems present an interface using the following record types (i.e. Conforming to the specification in ICDs 1a, 1b, and 2):

- Command Action Directive (CAD) [ICD 1b]
- Command Action Response (CAR) [ICD 1b]
- Status Information Report (SIR) [ICD 2]

All EPICS-based systems are required to provide an interface based on these records.

Non-EPICS-based systems are required to provide SIR records, and must conform to the action model described in ICD 1a and ICD 1c for the remainder of the interface. This version of this document does not address Non-EPICS systems.

3.0 Organization

Each PDF document contains some introductory material followed by a series of tables describing the individual components of the interface. Explanatory material may be interspersed with these tables. An outline of a PDF document is:

1. Description of Principal System - an overview of the principal system and its major interfaces.
2. General issues - any issues related to interfacing with that principal system that are not specific to a particular parameter, including:

- System Health information - a description of the parameters (SIR records) involved in system health (functionality only, the tables and explanatory information described in item 5 should provide details).
- System alarms - a list of the alarm conditions and related SIR records that originate with this system.

3. Tables for CAD records - documentation for all ‘CAD’ records provided by the principal system, including the identification of any CAR records that show the states of actions initiated by this CAD. This table must be followed by detailed explanations on the CAD records.
4. Information on all CAR records. There is information needed on the behavior of CAR records. See Section 5.2, “CAR records,” on page 3 for details.
5. Tables for SIR records - documentation for all ‘SIR’ records provided by the principal system. This table must be followed by detailed explanations on the SIR records.
6. Tables for other interface parameters - if there are interface parameters that are not contained in CAD, CAR, and SIR records, these are presented here. *In particular, if there is information in the Status Alarm Database, or provided directly by another system, then that information must be documented here*.

4.0 Format for the SIR record tables

Information is automatically extracted from the tables for SIR records in the PDF, so the tables are *required* to conform to the format used in the document: ICD 1.9%/3.1 - The OCS/CICS Interface. Specifically, the tables of SIR records must contain the same columnar information in the same order as used in that ICD. The column headings may differ from that used in the ICD, but each table must contain the same information in the same order.

At the current time, the extraction tool also requires that the document be written in Framemaker.

5.0 Information in the PDF

The PDF should contain detailed explanatory information for all CAD, CAR, and SIR records that comprise this interface. The PDF document must provide the following information for CAD, CAR, and SIR records documented within the PDF. While some of this information can be provided using the tables within the PDF, *explanatory mate-*

rial may be added to fully document the interface. As a general rule of thumb, you should provide enough information to allow someone to program to the interface as presented. For example, while the tables in ICD 1.9%/3.1 describe the information required in each table, the following sections describe the information that should be provided *in toto*. Some of this information can be found in the tables, but other parts must be placed in the separate explanatory material for each item.

5.1 CAD records

While all input argument fields to CAD records take strings as input[1], it is useful to know the 'underlying' type of value expected for each input argument. This information should be reflected in the PDF, as stated below.

1. *Name* - identify the EPICS record name and give a one-line description of its purpose
2. *Synopsis* - list the visible fields (public parameters) in the record, indicating the type and classification of the field (input or output). Do not list CAD input fields that are not being used, nor fields that are 'private' (not part of the 'external interface').
3. *Directive Summary* - a table showing which directives are accepted by this record and explaining why any are not accepted (for example, it may be that the action completes 'instantaneously'). The table should also indicate whether or not the record accepts additional APPLY directives while the action response is busy (as in the case of telescope offsets).
4. *Description* - describe functionality of the record including a table describing the response of the record to the directives. If the record doesn't accept one or more of the directivies the reason for doing so should be documented here. The description must also indicate whether or not the action initiated by the CAR record can be modified during processing (such as in the case of issuing multiple offsets).
5. *Command Acceptance* - describe the parameter conditions that would cause the command to be rejected.
6. *Action Responses* - describe the responses from the use of the record and the CAR records that need to be monitored to check for action completion.
7. *See Also* - identify related records (e.g. CAR records that should be monitored if describing a CAD record, related SIR records, etc.)

5.2 CAR records

1. *Name* - identify the EPICS record name and give a one-line description of its purpose
2. *Synopsis* - describe the meaning of the CAR record *val* and *mess* fields for this particular response.
3. *Description* - describe the system behavior represented by this response.

1. The EPICS automatic conversion process that might be used on these fields has the unfortunate property of not flagging invalid conversions (for example, the string input "foo" converts to the double value 0.0!). Consequently, all CAD inputs accept strings and rely on the internal subroutine to perform any required conversions in a safe manner.

4. *See Also* - identify related records (e.g. CAD records that initiate actions shown by this response, related SIR records, etc.)

5.3 SIR records

It is important that the tabular part of the PDF for SIR records match the format of the table shown below. However, you should also identify any alarm conditions, etc. that are associated with that record using additional explanatory material. The full information required is:

1. *Name* - identify the EPICS record name and give a one-line description of its purpose. Note if the SIR record is one for system or subsystem health.
2. *Synopsis* - describe the meaning of the SIR record fields for this particular status item.
3. *Fits compulsory flag* - this section is only present if the item is required in all FITS headers. The section title must be: REQUIRED IN FITS HEADER to assist in the automatic process of this information.
4. *Fits keyword*, if known, for the status item represented by the SIR record.
5. *Description* - describe the details of the system behavior represented by this status item.
6. *Alarms* - if there are alarm conditions associated with this status item, describe them in this section.
7. *See Also* - identify related records (e.g. CAD records that initiate actions affecting this status item, related SIR records, other health records affected by, or affecting this health record, etc.)

6.0 Example

The following sample table for SIR records has been taken directly from ICD 1.9%/3.1. See that document for a description of the columns.

TABLE 4. Instrument Sequencer (IS) Status Information

SIR record (“cics:sad:” +)	FITS keyword	FITS included?	Type	Units	Comments
name	INSTRUME *		string		Instrument name (“CICS”).
state	CICSST		string		Instrument state [BOOTING | INITIALISING | RUNNING | CONFIGURING]
health	CICSHLTH		string		Instrument health [GOOD | WARNING | BAD].
logmessage	HISTORY	TBD	string		Instrument log message.

TABLE 4. Instrument Sequencer (IS) Status Information

SIR record ("cics:sad:" +)	FITS keyword	FITS included?	Type	Units	Comments
insMode	INSMODE •	Start	string		Instrument mode [OP_IMAGING | OP_SPECTROSCOPY | IR_IMAGING | IR_SPECTROSCOPY].
obsMode	OBSMODE •	Start	string		Observing mode [CHOP | STARE].
obsType	OBSTYPE †	Start	string		Observation type [BIAS | DARK | FLAT | ARC | IMAGE | SPECTRUM].
obsid	OBSID •	Start	string		Current observation ID.
filename	CICSFN		string		Current observation file name.
calibfile	CICSCAL		string		On-line calibration file name (i.e. name of file downloaded and used for on-line calibration.)