Telecommand and Telemetry Formats
Instrument Operation Focus (abridged)

Large Area Telescope (LAT) Flight Software (FSW) Group
Gamma Ray Large Area Space Telescope (GLAST) Project

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0 SCOPE

0.0 Identification

This Interface Control Document (ICD) describes the formats and protocols associated with telecommands and telemetry for the Gamma-ray Large Area Space Telescope's (GLAST) Large Area Telescope (LAT) payload.

0.1 System Overview

GLAST is a high-energy gamma-ray observatory, designed for making observations of celestial sources in the energy band extending from 20 MeV to 300 GeV, with complementary coverage between 10 KeV and 25 MeV for gamma-ray bursts.

The LAT instrument detects both Cosmic Rays (i.e., charged particles) and Gamma Rays (i.e., high-energy photons), capturing the resulting information as "events". The LAT Flight Software (FSW) is tasked with configuring and operating the instrument, as well as deciding which events are Gamma Rays from celestial sources.

The vast majority of communication with the FSW is accomplished by the exchange of telecommand and telemetry packets. Telecommand packets are used to load new software, set configuration values, initiate operations, etc. Telemetry packets are used to report data of various types, including diagnostic, housekeeping, and science.

The FSW receives telecommand packets from the spacecraft (SC) and telemetry packets from the Gamma-ray Burst Monitor (GBM). It sends telemetry packets to the spacecraft, for retransmission to Earth-based installations. On rare occasions, the FSW sends telecommand packets (e.g., repoint requests) to the spacecraft.

0.2 Document Overview

This document details the telecommand and telemetry interfaces between the LAT payload and the GLAST spacecraft bus. It is organized as follows:

0 Scope

Discussion of the general nature of the document.

1 References

Documents, acronyms, and glossary terms referenced in or required for use with this document.

2 Interface Overview

A summary of the telecommand and telemetry interfaces between the LAT payload and the GLAST spacecraft bus and between the LAT payload and the GBM payload.

3 CCSDS Protocol

A summary of the CCSDS protocol.

4 Package Overview

A summary of the packages described in subsequent sections.

5 <package> (e.g., FILE, LCAT, LHK):

Definitions of relevant items (e.g., packets, attributes) for the package in question.

Indexes

Indexes into the package chapters, organized by APID, item name, etc.

0.3 Document Data Sources

The "front matter" for this document was derived, largely, from a set of hand-edited configuration files. Consequently, it may not track all changes in the software, etc.

The telecommand and telemetry descriptions in this document were autogenerated from the following packages/versions in the LAT flight software code management system:

0.4 Document Output Variants

The "Telecommand and Telemetry Formats" document is available in four variant formats, differing in focus ("Software Maintenance", "Instrument Operation") and level of detail ("abridged", detailed").

The Software Maintenance variants are aimed at the needs of software maintainers. Consequently, they discuss data structures (e.g., Bitfields), use LCAT (i.e., C) nomenclature, etc.

The Instrument Operation variants are aimed at the needs of instrument operators. Consequently, they ignore data structures, use ITOS nomenclature, etc.

None of these variants is as complete and navigable, however, as the online (web-based) variants. If online access is available, this should be your first choice.

1 REFERENCES

This section lists documents, acronyms, and glossary terms that either are referenced in this Interface Control Document or provide additional information applicable to the understanding of this document.

1.0 Applicable Documents

LAT Project Documents

LAT Project Documents	
Document Number	**Document Title**

GLAST Project Documents

GLAST Project Documents	
Document Number	**Document Title**

NASA Standards and Guidelines

NASA Standards and Guidelines	
Document Number	**Document Title**
CCSDS 101.0-B-4	Consultative Committee for Space Data Systems (CCSDS) Recommendation for Telemetry Channel Coding, May 1999
CCSDS 102.0-B-4	Consultative Committee for Space Data Systems (CCSDS) Recommendation for Packet Telemetry, November 1995
CCSDS 200.0-G-6	Consultative Committee for Space Data Systems (CCSDS) Report for Telecommand: Summary of Concept and Rationale, January 1987
CCSDS 201.0-B-3	Consultative Committee for Space Data Systems (CCSDS) Recommendation for Telecommand: Part 1, Channel Service, June 2000
CCSDS 202.0-B-2	Consultative Committee for Space Data Systems (CCSDS) Recommendation for Telecommand: Part 2.1, Command Operation Procedures, October 1991
CCSDS 203.0-B-1	Consultative Committee for Space Data Systems (CCSDS) Recommendation for Telecommand: Part 3, Data Management Service Architectural Specification, January 1987
CCSDS 102.0-B-4	Consultative Committee for Space Data Systems (CCSDS) Recommendation for Packet Telemetry, November 1995
CCSDS 102.0-B-4	Consultative Committee for Space Data Systems (CCSDS) Recommendation for Packet Telemetry, November 1995
CCSDS 102.0-B-4	Consultative Committee for Space Data Systems (CCSDS) Recommendation for Packet Telemetry, November 1995
CCSDS 102.0-B-4	Consultative Committee for Space Data Systems (CCSDS) Recommendation for Packet Telemetry, November 1995

Military Standards and Guidelines

Military Standards and Guidelines	
Document Number	**Document Title**

Commercial Standards

Commercial Standards	
Document Number	**Document Title**
RFC-1590	Media Type Registration Procedure
RFC-1591	Domain Name System Structure and Delegation

1.1 Acronyms

Acronyms	
Acronym	**Definition**

1.2 Glossary

Glossary	
Term	**Definition**

2 INTERFACE OVERVIEW

This section provides a summary description of the telecommand and telemetry interfaces between the LAT payload and the GLAST spacecraft bus and between the LAT payload and the GBM payload.

2.0 Data Representation Conventions

Unless otherwise specified, the following data representation conventions are applicable for the entire document:

- Bits are numbered from 0 to N, where 0 represents the least significant bit of the field and N represents the most significant bit in a field. TBR - is this appropriate for the RAD750 and spacecraft bus? (BD)
- The data representations in this document treat bytes as the smallest addressable unit size.
- When multiple bytes are combined to form larger data units, the most significant byte of the field is the byte with the lowest address.
- When data are transferred across a serial interface, the bits flow from the most significant bit to the least significant bit.
- Floating-point values are represented in either a 32-bit IEEE-754 format or a 64-bit IEEE-754 format.

Refer to Figure 1-1 and Figure 1-2 for graphical depictions of the data representation conventions.

TBR - depending on the answer above, these pictures may need to change to reflect the convention for bit number assignments.

>>> fig_01.gif

>>> fig_02.gif

Time is represented as a 64-bit value from a time epoch. The time epoch for LAT and the spacecraft bus is 00:00:00.0 hours of January 1st, 2001. That is, the midnight between December 31st, 2000 and January 1st, 2001. The 64-bit value is represented in Figure 3. The 32-bit Timestamp Seconds represents the number of elapsed seconds since the epoch. The Timestamp Sub-Seconds represents the number of micro-seconds elapsed since the last second.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Timestamp Seconds MSW															
Timestamp Seconds LSW															
Timestamp Sub-Seconds MSW															
Timestamp Sub-Seconds LSW															

2.1 Interface Identification

The LAT interfaces are depicted below.

>>> fig_04.gif

Telecommands to LAT

Interface:	1553
Type:	BC to RT
Source:	Bus Controller - Spacecraft Bus Processor
Destination:	Remote Terminal 3 - LAT SIU
Data Transfer:	Subaddress 27 - 62 Bytes
Transfer Rate:	20 Hz maximum
Transfer Gap:	20 milliseconds minimum

Protocol: BC to RT data transfer will only take place when a LAT telecommand is ready for transfer.
Message Type: CCSDS Version 1 Telecommand Packet
Message Size: 62 bytes maximum, even number of bytes, zero filled to 62 bytes
APID Range: 0x640 - 0x69F, directed to LAT
0x701, broadcast from spacecraft bus processor
0x703, broadcast from GBM
Notes: None

Telecommands from LAT

Interface: 1553
Type: RT to BC
Source: Remote Terminal 3 - LAT SIU
Destination: Bus Controller - Spacecraft Bus Processor
Data Transfer: Subaddress 29 - 64 Bytes
Transfer Rate: 5 Hz
Transfer Gap: 150 milliseconds minimum to 250 milliseconds maximum
Protocol: First word of the transfer is a Transfer Request Counter. If the counter has changed since last read by the BC and is non-zero, then the transfer contains a new telecommand from the LAT.
Message Type: CCSDS Version 1 Telecommand Packet
Message Size: 62 bytes maximum, even number of bytes, zero filled to 62 bytes
APID Range: 0x600 - 0x63F, directed to spacecraft bus processor
0x6A0 - 0x6FF, directed to GBM
0x702, broadcast from LAT
Notes: The GBM telecommands and LAT broadcast telecommands are routed to the GBM by the spacecraft bus processor.

Housekeeping Telemetry from LAT

Interface: 1553
Type: RT to BC
Source: Remote Terminal 3 - LAT SIU
Destination: Bus Controller - Spacecraft Bus Processor
Data Transfer: Subaddress 11 through Subaddress 25 - 960 Bytes
Transfer Rate: 4 Hz
Transfer Gap: 500 milliseconds maximum (question - what is the minimum?)
Protocol: First word of the transfer is a Transfer Request Counter. If the counter has changed since last read by the BC and is non-zero, then the transfer contains new telemetry from the LAT. If the BC successfully reads the 15 subaddresses, then a BC to RT transaction is performed to write one data word to RT-3 subaddress 26. The fifteen BC to RT transactions and the sole RT to BC transactions are all scheduled to occur consecutively. By LAT convention, the housekeeping telemetry will occupy the first 116 bytes available for telemetry transfer (last 62 bytes of SA 11, first 54 bytes of SA 12). Multiple telemetry packets can be transferred during one transaction. The packets must be contiguous. Packets cannot span transactions. If the packet data for a transaction uses 958 or less bytes, then the last packet must be followed by at least two bytes containing zeroes.
Message Type: CCSDS Advanced Orbital Systems Telemetry Packets
Message Size: 116 bytes
APID Range: 0x200 - 0x25F from LAT

Notes: LAT Housekeeping telemetry is transmitted when a TDRSS or GN RF link is active. The spacecraft bus processor stores the housekeeping telemetry.

Diagnostic Telemetry from LAT

Interface:	1553
Type:	RT to BC
Source:	Remote Terminal 3 - LAT SIU
Destination:	Bus Controller - Spacecraft Bus Processor
Data Transfer:	Subaddress 11 through Subaddress 25 - 960 Bytes
Transfer Rate:	4 Hz
Transfer Gap:	500 milliseconds maximum
Protocol:	Reference protocol for Housekeeping Telemetry from LAT.
Message Type:	CCSDS Advanced Orbital Systems Telemetry Packets
Message Size:	942 bytes maximum, even number of bytes
APID Range:	0x260 - 0x33F from LAT
Notes:	LAT Diagnostic telemetry is transmitted when a TDRSS or GN RF link is active. The spacecraft bus processor stores the diagnostic telemetry. (question - how does the spacecraft processor rate-control the diagnostic telemetry?)

Alert Telemetry from LAT

Interface:	1553
Type:	RT to BC
Source:	Remote Terminal 3 - LAT SIU
Destination:	Bus Controller - Spacecraft Bus Processor
Data Transfer:	Subaddress 11 through Subaddress 25 - 960 Bytes
Transfer Rate:	4 Hz
Transfer Gap:	500 milliseconds maximum
Protocol:	Reference protocol for Housekeeping Telemetry from LAT.
Message Type:	CCSDS Advanced Orbital Systems Telemetry Packets
Message Size:	942 bytes maximum, even number of bytes
APID Range:	0x340 - 0x39F from LAT
Notes:	LAT Alert telemetry is transmitted when a TDRSS or GN RF link is active. If no RF link is active, then the spacecraft bus will activate the TDRSS link to transmit an alert telemetry packet. The spacecraft bus processor stores the alert telemetry.

Science Telemetry from LAT

Interface:	LVDS
Type:	LAT Protocol (LATp)
Source:	LAT - GASU
Destination:	Spacecraft Bus - Solid State Recorder
Data Transfer:	Contiguous and Encapsulated 128-bit LATp cells. Encapsulation uses a cell announce, cell truncate, and cell parity for each cell. The first cell in contiguous sequence has a cell header.
Transfer Rate:	TBD bits/second
Transfer Gap:	TBD time between LATp transfers
Protocol:	TBD protocol Packets must be a multiple of bytes in length.
Message Type:	CCSDS Advanced Orbital Systems Telemetry Packets
Message Size:	65540 bytes maximum (TBR), must be a multiple of 4 bytes in length
APID Range:	0x3A0 - 0x3FF from LAT

Notes: None

2.2 Unit Identification

The LAT will use the following unit identification codes for external communications (via the 1553 bus) and internal communications (via the LATp bus):

LAT Unit Identification Codes		
LAT Unit	**Description**	**LATp ID**
Not Applicable	SIU(ext): SIU test port.	0x11 (TBR)
0x0	SIU(0): The SIU designated as unit 0. The LAT unit identifier of 0x0 will be used to address the active SIU on the 1553 bus. SIU 0 is active if it is the SIU that is responsive on the 1553 bus. The LATp address for SIU(0) is unique from SIU(1) and is designated as ID 18.	0x12
	SIU(1): The SIU designated as unit 1. The LAT unit identifier of 0x0 will be used to address the active SIU on the 1553 bus. SIU 1 is active if it is the SIU that is responsive on the 1553 bus. The LATp address for SIU(1) is unique from SIU(0) and is designated as ID 19.	0x13
0x1	EPU(0): EPU designated as unit 0.	0x14
0x2	EPU(1): EPU designated as unit 1.	0x15
0x3	EPU(2): EPU designated as unit 2.	0x16
0x6-0xF	Not Assigned	Not Applicable

3 CCSDS PROTOCOL

3.0 Telecommand Packet

The LAT receives CCSDS telecommand packets as input from the SC, across the 1553 bus. The LAT can also send a limited set of telecommands to the SC, across the 1553 bus.

Packet Format

Each Telecommand packet contains three items:

- GLAST CCSDS Telecommand Packet Header
- Packet Command Data
- Packet Checksum (required by Spectrum Astro)

Header Format

The GLAST CCSDS telecommand packets have the standard 6-byte primary header, followed by a 2-byte secondary header. The GLAST CCSDS telecommand header layout is shown below.

Layout:

offset	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0x00	Version = 0			T=1	SH=1	APID										
0x02	3		Sequence Count													
0x04	Packet Length															
0x06	0	Function Code														

Fields:

APID - The CCSDS-packet application identifier.

Function Code - An indicator of the specific command action to perform.

Packet Length - The CCSDS-packet length. Indicates the length of application data, plus the two bytes of secondary header, minus 1.

Sequence Count - The CCSDS-packet sequence count. This running counter increments for each packet generated for a given application type (indicated by the "APID" member).

SF - The CCSDS-packet sequence flags ('00' = continuation packet in the middle of a sequence; '01' = first packet in a sequence; '10' = standalone packet that is not part of a sequence).

SH - The CCSDS-packet secondary-header flag. Always 1, indicating that all GLAST telemetry packets have secondary headers.

T - The CCSDS packet-type identifier ('0' indicates a telemetry packet; '1' indicates a telecommand packet).

Version - The CCSDS-packet version identifier. Always '0', indicating a Version 1 packet.

Telecommand Application Identifier (APID) Summary

Telecommand Receive Application ID's

Telecommand packets with telecommand receive application ID values designate commands or other input for which the LAT is the destination. LAT telecommand receive APID's are in the range 0x640-0x69F. In addition, the LAT also receives broadcast telecommands as input from the SC.

The LAT utilizes the APID range from 0x710-0x76F for internal LAT FSW master-task to slave-task communications. This APID range is used to address message queues associated with slave tasks. The LAT utilizes the APID range from 0x780-0x7DF for internal LAT FSW slave-task to master-task communications. This APID range is used to address message queues associated with master tasks. These APIDs are for internal communication use only and are not recognized by any LAT external system. Telecommands from the ground (across the 1553 bus) cannot utilize these APID ranges.

Telecommand Receive APIDs			
APID	**Description**	**M -> S**	**S -> M**
0x640	Boot operational telecommands	N/A	N/A
0x641	File Load telecommands	0x711	0x781
0x642	Memory Load telecommands	0x712	0x782
0x643	File Dump telecommands	0x713	0x783
0x644	Memory Dump telecommands	0x714	0x784
0x645	Task Management telecommands	0x715	0x785
0x646	Diagnostic telecommands	0x716	0x786
0x647	Not Assigned	N/A	N/A
0x648	Front end primitive telecommands	N/A	N/A
0x649	Not Assigned	N/A	N/A
0x650	Science operations telecommands	N/A	N/A
0x650-0x65F	Not Assigned	N/A	N/A
0x660	GBM alert telecommands	N/A	N/A
0x661	SC repoint request reply	N/A	N/A
0x663-0x69F	Not Assigned	N/A	N/A
0x662	SC load shed notification	N/A	N/A
0x701	SC broadcast telecommands	N/A	N/A

Telecommand Transmit Application ID's

Telecommand packets with telecommand transmit application ID values designate commands or other input for which the LAT is the source. The APID assignments for such telecommands depend on the destination. The SC destination is designated by APID's in the range 0x600-0x63F.

Telecommand Transmit APIDs	
APID	**Description**
0x600-0x63F	SC repoint request telecommands

3.1 Telemetry Packet Summary

The LAT outputs CCSDS telemetry packets to the SC on both the 1553 bus and the high-speed science data interface.

Packet Format

Each Telemetry packet contains two items:

- GLAST CCSDS Telecommand Packet Header
- Packet Command Data

Header Format

The LAT CCSDS telemetry packets have the standard 6-byte primary header, followed by an 8-byte secondary header specific to the LAT. The LAT CCSDS telemetry header layout is shown below.

Layout:

offset	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0x00	Version = 0			T=0	SH=1	APID										
0x02	SF		Sequence Count													
0x04	Packet Length: TBD															
0x06	Timestamp Seconds MSW															
0x08	Timestamp Seconds LSW															
0x0A	Timestamp Sub-Seconds MSW															
0x0C	Timestamp Sub-Seconds LSW															

APID - The CCSDS-packet application identifier.

Packet Length - The CCSDS-packet length. Indicates the length of application data, plus the two bytes of secondary header, minus 1.

Sequence Count - The CCSDS-packet sequence count. This running counter increments for each packet generated for a given application type (indicated by the "APID" member).

SF - The CCSDS-packet sequence flags ('00' = continuation packet in the middle of a sequence; '01' = first packet in a sequence; '10' = standalone packet that is not part of a sequence).

SH - The CCSDS-packet secondary-header flag. Always 1, indicating that all GLAST telemetry packets have secondary headers.

T - The CCSDS packet-type identifier ('0' indicates a telemetry packet; '1' indicates a telecommand packet).

Timestamp - Time is represented as a 64-bit offset from a time epoch. The time epoch for LAT and the spacecraft bus is 00:00:00.0 hours of January 1st, 2001. That is the midnight between December 31st, 2000 and January 1st, 2001. Timestamp Seconds represents the number of elapsed seconds since the epoch. Timestamp Sub-Seconds represents the number of microseconds elapsed since the last second.

Version - The CCSDS-packet version identifier. Always '0', indicating a Version 1 packet.

Telemetry Application Identifier (APID) Summary

Housekeeping Telemetry Application ID's

The housekeeping telemetry packets provide critical status information about the current state of the LAT. The SC treats housekeeping telemetry packets specially, so that the packets are downlinked on the real-time channel.

Housekeeping Telemetry APIDs	
APID	**Description**
0x200	Boot housekeeping telemetry
0x20F	Communication test housekeeping telemetry

Diagnostic Telemetry Appication ID's

Diagnostic telemetry packets provide status responses to particular commands or internal states of the LAT. The diagnostic telemetry may report general success or error reports, in response to telecommands. The diagnostic telemetry may also report data back in response to a telecommand that requests a dump or explicit status of some kind. Internal errors encountered during normal processing will also generate diagnostic telemetry error packets.

Diagnostic Telemetry APIDs	
APID	**Description**
0x260	File data dump telemetry
0x261	File directory dump telemetry
0x262	File system dump telemetry
0x263	Memory data dump telemetry
0x264	Memory symbol lookup telemetry
0x265	Memory pool status dump telemetry
0x266	Task status dump telemetry
0x26F	Communication test diagnostic telemetry
0x270	TEM register read telemetry
0x271	GTIC register read telemetry
0x272	GCCC register read telemetry
0x273	GCRC register read telemetry
0x274	GCFE register read telemetry
0x275	GTCC register read telemetry
0x276	GTRC register read telemetry
0x277	GTFE register read telemetry
0x278	AEM register read telemetry
0x279	GARC register read telemetry
0x27A	GAFE register read telemetry

Alert Telemetry Appication ID's

Alert Telemetry APIDs	
APID	**Description**
0x34F	Communication test alert telemetry

Science Telemetry Appication ID's

Science Telemetry APIDs	
APID	**Description**
0x3AF	Communication test science telemetry

4 PACKAGES

5 FILE Package

5.0 Overview

The FILE package contains routines that are specific to the file system.

The package supports the following functions:

- RAD750 boot and crate initialization

5.1 Command Packets

5.1.0 LFILUPLSTART (1601/0x641:0)

Description:

"File Upload Start" Telecommand Packet

Announces the start of a new file upload. The FILESIZE parameter sets the maximum offset for incomming LFILUPLDATA packets. Upon completion, the file upload state machine is in the LOAD state.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x008	0	32	U1234	LFILESIZE ?

5.1.1 LFILUPLCANCEL (1601/0x641:1)

Description:

"File Upload Cancel" Telecommand Packet

This command cancels a file upload and resets the file upload state machine to the START state, regardless of the state when the command is received. A new LFILUPLSTART command is neede to begin a new file upload.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x008	0	16	U12	LLATUNIT ?

5.1.2 LFILUPLCOMMIT (1601/0x641:2)

Description:

"File Upload Commit" Telecommand Packet

This command indicates that the loaded LFILUPLDATA file data contents should be written to storage. The FILEID paramter indicates the storage location. The complete file data set is first validated before successfully entering the COMMIT state. The validate only flag in the FILEFLAGS parameter indicates that validations errors shoud be reported, but that the file upload state machine will remain in the LOAD state regardless of the validation outcome.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x008	0	16	U12	LLATUNIT ?
0x00A	0	16	U12	LFILEFLAGS ?
0x00C	0	32	U1234	LFILEID ?

5.1.3 LFILUPLDATA (1601/0x641:3)

Description:

"File Upload Data" Telecommand Packet

Each LFILUPLDATA packet contains a portion of the file data being loaded. The FILEOFFSET parameter is the offset in bytes from the beginning of the file which the first FILEDATA byte in this packet represents. The LFILEUPLDATA packets may be loaded in any order with respect to the offset and may be re-loaded ad many times as wished .

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x008	0	32	U1234	LFILEOFFSET ?
0x00C	0	8	U1	LFILEDATA0 ?
0x00D	0	8	U1	LFILEDATA1 ?
0x00E	0	8	U1	LFILEDATA2 ?
0x00F	0	8	U1	LFILEDATA3 ?
0x010	0	8	U1	LFILEDATA4 ?
0x011	0	8	U1	LFILEDATA5 ?
0x012	0	8	U1	LFILEDATA6 ?
0x013	0	8	U1	LFILEDATA7 ?
0x014	0	8	U1	LFILEDATA8 ?
0x015	0	8	U1	LFILEDATA9 ?
0x016	0	8	U1	LFILEDATA10 ?
0x017	0	8	U1	LFILEDATA11 ?
0x018	0	8	U1	LFILEDATA12 ?
0x019	0	8	U1	LFILEDATA13 ?

Offset	S	L	Type	ITOS name, attribute(s), and description
0x01A	0	8	U1	LFILEDATA14 ?
0x01B	0	8	U1	LFILEDATA15 ?
0x01C	0	8	U1	LFILEDATA16 ?
0x01D	0	8	U1	LFILEDATA17 ?
0x01E	0	8	U1	LFILEDATA18 ?
0x01F	0	8	U1	LFILEDATA19 ?
0x020	0	8	U1	LFILEDATA20 ?
0x021	0	8	U1	LFILEDATA21 ?
0x022	0	8	U1	LFILEDATA22 ?
0x023	0	8	U1	LFILEDATA23 ?
0x024	0	8	U1	LFILEDATA24 ?
0x025	0	8	U1	LFILEDATA25 ?
0x026	0	8	U1	LFILEDATA26 ?
0x027	0	8	U1	LFILEDATA27 ?
0x028	0	8	U1	LFILEDATA28 ?
0x029	0	8	U1	LFILEDATA29 ?
0x02A	0	8	U1	LFILEDATA30 ?
0x02B	0	8	U1	LFILEDATA31 ?
0x02C	0	8	U1	LFILEDATA32 ?
0x02D	0	8	U1	LFILEDATA33 ?
0x02E	0	8	U1	LFILEDATA34 ?
0x02F	0	8	U1	LFILEDATA35 ?
0x030	0	8	U1	LFILEDATA36 ?
0x031	0	8	U1	LFILEDATA37 ?
0x032	0	8	U1	LFILEDATA38 ?
0x033	0	8	U1	LFILEDATA39 ?

Offset	S	L	Type	ITOS name, attribute(s), and description
0x034	0	8	U1	LFILEDATA40 ?
0x035	0	8	U1	LFILEDATA41 ?
0x036	0	8	U1	LFILEDATA42 ?
0x037	0	8	U1	LFILEDATA43 ?
0x038	0	8	U1	LFILEDATA44 ?
0x039	0	8	U1	LFILEDATA45 ?
0x03A	0	8	U1	LFILEDATA46 ?
0x03B	0	8	U1	LFILEDATA47 ?

5.1.4 `LFILUPLEPU` (1601/0x641:4)

Description:

"File Upload to EPU" Telecommand Packet

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x008	0	16	U12	LLATUNIT ?
0x00A	0	32	U1234	LFILEID ?

6 ISIS Package

6.0 Overview

The ISIS package contains routines that are specific to the Instrument to Spacecraft Interface Simulator.

6.1 Enumerations

6.1.0 CMD_CNT_SEL (Selects count to return as diagnostic telemetry) Enumeration

Description:

Definition:

0 No-op command (NO_OP)

1 Count of attitude messages from spacecraft (ATTITUDE)

2 Count of ancillary messages from spacecraft (ANCILLARY)

3 Count time-tone messages from spacecraft (TIME_TONE)

Used by:
???

6.1.1 EPU_ID (Enumeration of the EPUs) Enumeration

Description:

Definition:

1 EPU 1 (EDP_1)

1 EPU 0 (EPU_0)

2 EPU 2 (EPU_2)

3 External EPU (EPU_X)

Used by:
???

6.1.2 FILEDEVICE (Code for file device) Enumeration

Description:

Definition:

0 (BOOT)

1 RAM Device (RAM)

2 SIB EEPROM Patition 0 (EE0)

3 SIB EEPROM Partition 1 (EE1)

4 TMP file system (TMP)

Used by:
???

6.1.3 `ON_OFF_SELECTOR` (Enumeration of the options for the simple on-off selector) Enumeration

Description:

Definition:

0 Off (OFF)

1 On (ON)

Used by:
???

6.1.4 `PDU_ID` (Identifies a PDU) Enumeration

Description:

Definition:

0 PDU 0 (PDU_0)

1 PDU 1 (PDU_1)

Used by:
???

6.1.5 `P_S_SELECTOR` (Enumeration for the simple primary-secondary selector) Enumeration

Description:

Definition:

0 Primary (PRIMARY)

1 Secondary (SECONDARY)

Used by:
???

6.1.6 `SCIPATTYPE` (Science data generation pattern types) Enumeration

Description:

Definition:

0 Increment by 1 starting with parameter (`INCREMENT`)

1 Constant value using parameter (`CONSTANT`)

2 Random value using parameter as seed (`RANDOM`)

3 Walking one with parameter as width (`WALK1`)

4 Transition 0 to 1 with parameter size (`TRANS01`)

5 Transition 1 to 0 with parameter size (`TRANS10`)

Used by:
???

6.1.7 `SIU_ID` (Enumeration of the possible SIU IDs) Enumeration

Description:

Definition:

0 SIU 0 (aka SIU 7 aka primary SIU) (`SIU_0`)

1 SIU 1 (aka SIU 11 aka secondary SIU) (`SIU_1`)

2 External SIU (`SIU_X`)

Used by:
???

6.2 Ranges

6.2.0 `bits_12_range` (Range for 12-bit fields) Range

Description:

Definition:

Limits 0 - 4095

Used by:

???

6.2.1 `cmd_cnt_range` (Range for command count selection) Range

Description:

Definition:

Limits 0 - 3

Used by:

???

6.2.2 `epu_range` (EPU number range) Range

Description:

Definition:

Limits 0 - 7

Used by:

???

6.2.3 `on_off_range` (On and off selector range) Range

Description:

Definition:

Limits 0 - 1

Used by:

???

6.2.4 `p_s_range` (Primary and secondary selector range) Range

Description:

Definition:

Limits 0 - 1

Used by:

???

6.2.5 `pdu_id_range` (PDU ID range) Range

Description:

Definition:

Limits 0 - 1

Used by:

???

6.2.6 `siu_id_range` (SIU ID range) Range

Description:

Definition:

Limits 0 - 2

Used by:

???

6.2.7 `tem_mask_range` (TEM mask range) Range

Description:

Definition:

Limits 0 - 65535

Used by:

???

7 ITC Package

7.0 Overview

The ITC package defines a common communications standard to unify communications between tasks on either the same or different CPUs. It also provides the services to build up tasks that are capable of communicating according to the standard.

The package supports the following functions:

- CPU internal communications/task frameworks

7.1 Telemetry Packets

7.1.0 `CmdConfirm` (720/0x2D0)

Description:

"Response to command from spacecraft" Telemetry Packet

Command confirmation telemetry packet. When executing spacecraft commands, ITC will autogenerate a diagnostic packet, detailing where and when a command is executed as well as the return code for the execution. To identify the command, ITC reflects the command in toto.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x00E	0	8	I1	ITC_NODE; ITC_NODEID ITC node ID
0x00F	0	8	I1	ITC_TASK ITC task ID
0x010	0	32	U1234	ITC_DEQTIMHI Time (most significant 32 bits)
0x014	0	32	U1234	ITC_DEQTIMLO Time (least significant 32 bits)
0x018	0	32	U1234	ITC_EXETIMHI Time (most significant 32 bits)
0x01C	0	32	U1234	ITC_EXETIMLO Time (least significant 32 bits)
0x020	0	32	U1234	ITC_EXESTATUS MSG status code
0x024	0	16	U12	ITC_DROPCNFRM Number of dropped confirmations
0x026	0	16	U12	ITC_PADDING Pad two bytes
0x028	0	3	I1	ITC_CMDHDRVER CCSDS version
	3	1	I1	ITC_CMDHDRCMD CCSDS command bit
	4	1	I1	ITC_CMDHDRSEC CCSDS secondary header flag
	5	11	U12	ITC_CMDHDRAPID CCSDS application ID
0x02A	0	2	I1	ITC_CMDHDRSEQ CCSDS sequencing bits
	2	14	U12	ITC_CMDHDRCNT

Offset	S	L	Type	ITOS name, attribute(s), and description
				CCSDS sequencing count
0x02C	0	16	U12	ITC_CMDHDRLEN CCSDS telecommand packet length
0x02E	0	1	I1	ITC_CMDHDRPAD Padding
	1	15	U12	ITC_CMDHDRFNC CCSDS telecommand function code

7.2 Discretes

7.2.0 `ITC_NODEID` (Discrete list of ITC nodes) Discrete

Description:
Discrete list of ITC nodes

Definition:

-1 Unknown node (guard value) (`ITC_NID_UNKNOWN`)

0 SIU (`ITC_NID_SIU`)

1 EPU 0 (`ITC_NID_EPU0`)

2 EPU 1 (`ITC_NID_EPU1`)

3 EPU 2 (`ITC_NID_EPU2`)

4 EPU 3 (external crate) (`ITC_NID_EPU3`)

5 Science Data Interface (to Solid State Recorder) (`ITC_NID_SDI`)

6 Spacecraft (`ITC_NID_SC`)

7 CPU broadcast class (`ITC_NID_BCST`)

Used by:
???

7.2.1 `ITC_TASKID` (Discrete list of ITC task IDs) Discrete

Description:
Discrete list of ITC task IDs

Definition:

-1 Unknown task (guard value) (`ITC_TID_UNKNOWN`)

0 The anonymous task (`ITC_TID_ANON`)

1 LAT computer manager task (`ITC_TID_LCM`)

2 LAT file system master task (`ITC_TID_LFS_M`)

3 LAT file system slave task (`LAT_TID_LFS_S`)

4 LAT housekeeping master task (`LAT_TID_LHK_M`)

5 LAT housekeeping slave task (`ITC_TID_LHK_S`)

6 LAT instrument manager master task (`LAT_TID_LIM_M`)

7 LAT instrument manager slave task (`LAT_TID_LIM_S`)

8 LAT spacecraft messages master task (`LAT_TID_LSM_M`)

9 LAT spacecraft messages slave task (`ITC_TID_LSM_S`)

10 LAT software watchdog master task (`ITC_TID_LSW_M`)

11 LAT software watchdog slave task (`ITC_TID_LSW_S`)

12 LAT charge injection calibration master task (`ITC_TID_LCI_M`)

13 LAT charge injection calibration slave task (`ITC_TID_LCI_S`)

20 ISIS command task (`ITC_TID_ICT`)

30 LCB Tx service task (`ITS_SID_LCS`)

31 CTDB Tx service task (`ITC_SID_CTS`)

32 LCB Rx driver callback (`ITC_LID_LCX`)

33 CTDB Rx driver callback (`ITC_LID_CTX`)

34 ITC hook into message task (`ITC_LID_MSG`)

Used by:

???

8 LCM Package

8.0 Overview

The LCM package handles the management of a single LAT computer.

8.1 Command Packets

8.1.0 `msgResponse` (1685/0x695:0)

Description:

"Change task messaging level" Telecommand Packet

Change the messaging level of a task

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x008	0	8	I1	LCM_NODEID ?
0x009	0	8	I1	LCM_TASKID ?
0x00A	0	8	I1	LCM_MSGLEVEL ?
0x00B	0	8	I1	LCM_MSGPAD1 ?

8.1.1 `cmdResponse` (1685/0x695:1)

Description:

"Change task command confirmation level" Telecommand Packet

Change the spacecraft command confirmation level of a task

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x008	0	8	I1	LCM_NODEID ?
0x009	0	8	I1	LCM_TASKID ?
0x00A	0	8	I1	LCM_CMDCLASS ?
0x00B	0	8	I1	LCM_CMDACTION ?
0x00C	0	8	I1	LCM_CMDLEVEL ?
0x00D	0	8	I1	LCM_CMDPAD1 ?

9 LFS Package

9.0 Overview

The LFS package provides the "standard" file operations (copy, delete, move, list directory, ...), plus a few "unusual" operations (file upload and file dump via spacecraft).

9.0.0 LLFSFILEDELETE (1608/0x648:0)

Description:

"File Delete" Telecommand Packet

Deletes the file specified by FILEID.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x008	0	16	U12	LLATUNIT ?
0x00A	0	16	U12	LPAD16 ?
0x00C	0	32	U1234	LFILEID ?

9.0.1 LLFSFILECOPY (1608/0x648:1)

Description:

"File Copy Local" Telecommand Packet

Copies a file locally on the same CPU. The FILEID values specify the source and destination file locations.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x008	0	16	U12	LLATUNIT ?
0x00A	0	16	U12	LPAD16 ?
0x00C	0	32	U1234	LSRCFILEID ?
0x010	0	32	U1234	LDESTFILEID ?

9.0.2 LLFSDIRCREATE (1608/0x648:2)

Description:

"Directory Create" Telecommand Packet

Creates a directory specified by the FILEID path. Only the device and directory number portions of the file ID are used.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x008	0	16	U12	LLATUNIT ?
0x00A	0	16	U12	LPAD16 ?
0x00C	0	32	U1234	LFILEID ?

9.0.3 LLFSDIRDELETE (1608/0x648:3)

Description:

"Directory Delete" Telecommand Packet

Deletes a directory specified by the FILEID path. Only the device and directory number portions of the file ID are used.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x008	0	16	U12	LLATUNIT ?
0x00A	0	16	U12	LPAD16 ?
0x00C	0	32	U1234	LFILEID ?

9.0.4 LLFSFILEDUMPC (1608/0x648:4)

Description:

"File Dump CTDB" Telecommand Packet

Dumps the contents of a file indicated by FILEID to the CTDB interface. The file data is sent as a series of LLFSDUMPTCTBD telemetery packets.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x008	0	16	U12	LLATUNIT ?
0x00A	0	16	U12	LPAD16 ?
0x00C	0	32	U1234	LFILEID ?

9.0.5 **LLFSDIRDUMP** (1608/0x648:5)

Description:

"Directory Dump" Telecommand Packet

Dumps the contents of a directory specified by the FILEID path. Only the device and directory number portions of the file ID are used. If the directory value is '127', a series of LLFSROOTLIST telemetry packets are sent, one for each directory in the root directory of the device. Otherwise, a series of LLFSDIRLIST telemetry packets are sent, one for each file in the directory.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x008	0	16	U12	LLATUNIT ?
0x00A	0	16	U12	LPAD16 ?
0x00C	0	32	U1234	LFILEID ?

9.0.6 **LLFSSYSSTATUS** (1608/0x648:6)

Description:

"File System Status" Telecommand Packet

Report the current status of a file system partition indicated by FILEID. Only the device number portion of the file storage ID is used. The status is returned as a single LLFSSYSLIST telemetry packet.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x008	0	16	U12	LLATUNIT ?
0x00A	0	16	U12	LPAD16 ?
0x00C	0	32	U1234	LFILEID ?

9.1 Telemetry Packets

9.1.0 **LLFSDIRLIST** (792/0x318)

Description:

"Directory Listing Report" Telemetry Packet

Lists one file entry in a LAT file system sub-directory. One of these packets is sent in response to a LLFSDIRDUMP telecommand for each file in the target directory.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x00E	0	4	U12	LLFSDDMPLATUNIT

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	? LLFSDDMPXACTID
0x010	0	1	I1	? LLFSDDMPARCFLG
	1	1	U12	? LLFSDDMPDIRFLG
	2	1	U12	? LLFSDDMPROFLG
0x012	0	3	U1234	? LLFSDDMPFDEV
	3	7	U1234	? LLFSDDMPFDIR
	10	22	U1234	? LLFSDDMPFFILE
0x016	0	32	U1234	? LLFSDDMPFSTIME
0x01A	0	32	U1234	? LLFSDDMPFSSIZE
0x01E	0	32	U1234	? LLFSDDMPFSBLKS
0x022	0	8	U1	? LLFSDDMPFHDR0
0x023	0	8	U1	? LLFSDDMPFHDR1
0x024	0	8	U1	? LLFSDDMPFHDR2
0x025	0	8	U1	? LLFSDDMPFHDR3
0x026	0	8	U1	? LLFSDDMPFHDR4
0x027	0	8	U1	? LLFSDDMPFHDR5
0x028	0	8	U1	? LLFSDDMPFHDR6
0x029	0	8	U1	? LLFSDDMPFHDR7
0x02A	0	8	U1	? LLFSDDMPFHDR8
0x02B	0	8	U1	? LLFSDDMPFHDR9
0x02C	0	8	U1	? LLFSDDMPFHDR10
0x02D	0	8	U1	? LLFSDDMPFHDR11
0x02E	0	8	U1	? LLFSDDMPFHDR12
0x02F	0	8	U1	? LLFSDDMPFHDR13
0x030	0	8	U1	? LLFSDDMPFHDR14
0x031	0	8	U1	? LLFSDDMPFHDR15

Offset	S	L	Type	ITOS name, attribute(s), and description
				?
0x032	0	8	U1	LLFSDDMPFHDR16 ?
0x033	0	8	U1	LLFSDDMPFHDR17 ?
0x034	0	8	U1	LLFSDDMPFHDR18 ?
0x035	0	8	U1	LLFSDDMPFHDR19 ?
0x036	0	8	U1	LLFSDDMPFHDR20 ?
0x037	0	8	U1	LLFSDDMPFHDR21 ?
0x038	0	8	U1	LLFSDDMPFHDR22 ?
0x039	0	8	U1	LLFSDDMPFHDR23 ?
0x03A	0	8	U1	LLFSDDMPFHDR24 ?
0x03B	0	8	U1	LLFSDDMPFHDR25 ?
0x03C	0	8	U1	LLFSDDMPFHDR26 ?
0x03D	0	8	U1	LLFSDDMPFHDR27 ?
0x03E	0	8	U1	LLFSDDMPFHDR28 ?
0x03F	0	8	U1	LLFSDDMPFHDR29 ?
0x040	0	8	U1	LLFSDDMPFHDR30 ?
0x041	0	8	U1	LLFSDDMPFHDR31 ?

9.1.1 LLFSROOTLIST (793/0x319)

Description:

"Root Listing Report" Telemetry Packet

Lists one file entry in a LAT file system root directory. One of these packets is sent in response to a LLFSDIRDUMP (directory = '127') telecommand for each sub-directory in the target device.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x00E	0	4	U12	LLFSRDMPLATUNIT ?
	4	12	U12	LLFSRDMPXACTID ?
0x010	0	1	I1	LLFSRDMPARCFLG ?

Offset	S	L	Type	ITOS name, attribute(s), and description
	1	1	U12	LLFSRDMPDIRFLG ?
	2	1	U12	LLFSRDMPROFLG ?
0x012	0	3	U1234	LLFSRDMPFDEV ?
	3	7	U1234	LLFSRDMPFDIR ?
	10	22	U1234	LLFSRDMPFFILE ?
0x016	0	32	U1234	LLFSRDMPFSTIME ?
0x01A	0	32	U1234	LLFSRDMPFSSIZE ?
0x01E	0	32	U1234	LLFSRDMPFSBLKS ?

9.1.2 LLFSSYSLIST (794/0x31A)

Description:

"File System Status Report" Telemetry Packet

Provides the status of a LAT file system partition. One of these packets is sent in response to the LLFSSYSSTATUS telecommand.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x00E	0	4	U12	LLFSSYSSLATUNIT ?
	4	12	U12	LLFSSYSSXACTID ?
0x010	0	3	U1234	LLFSSYSSFDEV ?
	3	7	U1234	LLFSSYSSFDIR ?
	10	22	U1234	LLFSSYSSFFILE ?
0x014	0	32	U1234	LLFSSYSSBLKSIZE ?
0x018	0	32	U1234	LLFSSYSSBLKFREE ?
0x01C	0	32	U1234	LLFSSYSSBLKTOT ?

9.1.3 LLFSDUMPCTDB (795/0x31B)

Description:

"File Dump Data CTDB" Telemetry Packet

Contains a portion of a file data dump to the CTDB interface. The FILESTOFFSET and FILEDUMPSIZE members provide the offset into the file and size of the current packet's data contents (FILEDATA). The FILESTID gives the storage location of the file.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x00E	0	4	U12	LLFSFDMPLATUNIT ?
	4	12	U12	LLFSFDMPXACTID ?
0x010	0	3	U1234	LLFSFDMPFDEV ?
	3	7	U1234	LLFSFDMPFDIR ?
	10	22	U1234	LLFSFDMPFFILE ?
0x014	0	32	U1234	LLFSFDMPOFFSET ?
0x018	0	32	U1234	LLFSFDMPSIZE ?
0x01C	0	8	U1	LLFSFDMPDATA0 ?
0x01D	0	8	U1	LLFSFDMPDATA1 ?
0x01E	0	8	U1	LLFSFDMPDATA2 ?
0x01F	0	8	U1	LLFSFDMPDATA3 ?
0x020	0	8	U1	LLFSFDMPDATA4 ?
0x021	0	8	U1	LLFSFDMPDATA5 ?
0x022	0	8	U1	LLFSFDMPDATA6 ?
0x023	0	8	U1	LLFSFDMPDATA7 ?
0x024	0	8	U1	LLFSFDMPDATA8 ?
0x025	0	8	U1	LLFSFDMPDATA9 ?
0x026	0	8	U1	LLFSFDMPDATA10 ?
0x027	0	8	U1	LLFSFDMPDATA11 ?
0x028	0	8	U1	LLFSFDMPDATA12 ?
0x029	0	8	U1	LLFSFDMPDATA13

Offset	S	L	Type	ITOS name, attribute(s), and description
0x02A	0	8	U1	? LLFSFDMPDATA14
0x02B	0	8	U1	? LLFSFDMPDATA15
0x02C	0	8	U1	? LLFSFDMPDATA16
0x02D	0	8	U1	? LLFSFDMPDATA17
0x02E	0	8	U1	? LLFSFDMPDATA18
0x02F	0	8	U1	? LLFSFDMPDATA19
0x030	0	8	U1	? LLFSFDMPDATA20
0x031	0	8	U1	? LLFSFDMPDATA21
0x032	0	8	U1	? LLFSFDMPDATA22
0x033	0	8	U1	? LLFSFDMPDATA23
0x034	0	8	U1	? LLFSFDMPDATA24
0x035	0	8	U1	? LLFSFDMPDATA25
0x036	0	8	U1	? LLFSFDMPDATA26
0x037	0	8	U1	? LLFSFDMPDATA27
0x038	0	8	U1	? LLFSFDMPDATA28
0x039	0	8	U1	? LLFSFDMPDATA29
0x03A	0	8	U1	? LLFSFDMPDATA30
0x03B	0	8	U1	? LLFSFDMPDATA31
0x03C	0	8	U1	? LLFSFDMPDATA32
0x03D	0	8	U1	? LLFSFDMPDATA33
0x03E	0	8	U1	? LLFSFDMPDATA34
0x03F	0	8	U1	? LLFSFDMPDATA35
0x040	0	8	U1	? LLFSFDMPDATA36
0x041	0	8	U1	? LLFSFDMPDATA37
0x042	0	8	U1	? LLFSFDMPDATA38
0x043	0	8	U1	? LLFSFDMPDATA39

Offset	S	L	Type	ITOS name, attribute(s), and description
0x044	0	8	U1	? LLFSFDMPDATA40
0x045	0	8	U1	? LLFSFDMPDATA41
0x046	0	8	U1	? LLFSFDMPDATA42
0x047	0	8	U1	? LLFSFDMPDATA43
0x048	0	8	U1	? LLFSFDMPDATA44
0x049	0	8	U1	? LLFSFDMPDATA45
0x04A	0	8	U1	? LLFSFDMPDATA46
0x04B	0	8	U1	? LLFSFDMPDATA47
0x04C	0	8	U1	? LLFSFDMPDATA48
0x04D	0	8	U1	? LLFSFDMPDATA49
0x04E	0	8	U1	? LLFSFDMPDATA50
0x04F	0	8	U1	? LLFSFDMPDATA51
0x050	0	8	U1	? LLFSFDMPDATA52
0x051	0	8	U1	? LLFSFDMPDATA53
0x052	0	8	U1	? LLFSFDMPDATA54
0x053	0	8	U1	? LLFSFDMPDATA55
0x054	0	8	U1	? LLFSFDMPDATA56
0x055	0	8	U1	? LLFSFDMPDATA57
0x056	0	8	U1	? LLFSFDMPDATA58
0x057	0	8	U1	? LLFSFDMPDATA59
0x058	0	8	U1	? LLFSFDMPDATA60
0x059	0	8	U1	? LLFSFDMPDATA61
0x05A	0	8	U1	? LLFSFDMPDATA62
0x05B	0	8	U1	? LLFSFDMPDATA63
0x05C	0	8	U1	? LLFSFDMPDATA64
0x05D	0	8	U1	? LLFSFDMPDATA65

Offset	S	L	Type	ITOS name, attribute(s), and description
				?
0x05E	0	8	U1	LLFSFDMPDATA66
				?
0x05F	0	8	U1	LLFSFDMPDATA67
				?
0x060	0	8	U1	LLFSFDMPDATA68
				?
0x061	0	8	U1	LLFSFDMPDATA69
				?
0x062	0	8	U1	LLFSFDMPDATA70
				?
0x063	0	8	U1	LLFSFDMPDATA71
				?
0x064	0	8	U1	LLFSFDMPDATA72
				?
0x065	0	8	U1	LLFSFDMPDATA73
				?
0x066	0	8	U1	LLFSFDMPDATA74
				?
0x067	0	8	U1	LLFSFDMPDATA75
				?
0x068	0	8	U1	LLFSFDMPDATA76
				?
0x069	0	8	U1	LLFSFDMPDATA77
				?
0x06A	0	8	U1	LLFSFDMPDATA78
				?
0x06B	0	8	U1	LLFSFDMPDATA79
				?
0x06C	0	8	U1	LLFSFDMPDATA80
				?
0x06D	0	8	U1	LLFSFDMPDATA81
				?
0x06E	0	8	U1	LLFSFDMPDATA82
				?
0x06F	0	8	U1	LLFSFDMPDATA83
				?
0x070	0	8	U1	LLFSFDMPDATA84
				?
0x071	0	8	U1	LLFSFDMPDATA85
				?
0x072	0	8	U1	LLFSFDMPDATA86
				?
0x073	0	8	U1	LLFSFDMPDATA87
				?
0x074	0	8	U1	LLFSFDMPDATA88
				?
0x075	0	8	U1	LLFSFDMPDATA89
				?
0x076	0	8	U1	LLFSFDMPDATA90
				?
0x077	0	8	U1	LLFSFDMPDATA91

Offset	S	L	Type	ITOS name, attribute(s), and description
0x078	0	8	U1	? LLFSFDMPDATA92
0x079	0	8	U1	? LLFSFDMPDATA93
0x07A	0	8	U1	? LLFSFDMPDATA94
0x07B	0	8	U1	? LLFSFDMPDATA95
0x07C	0	8	U1	? LLFSFDMPDATA96
0x07D	0	8	U1	? LLFSFDMPDATA97
0x07E	0	8	U1	? LLFSFDMPDATA98
0x07F	0	8	U1	? LLFSFDMPDATA99
0x080	0	8	U1	? LLFSFDMPDATA100
0x081	0	8	U1	? LLFSFDMPDATA101
0x082	0	8	U1	? LLFSFDMPDATA102
0x083	0	8	U1	? LLFSFDMPDATA103
0x084	0	8	U1	? LLFSFDMPDATA104
0x085	0	8	U1	? LLFSFDMPDATA105
0x086	0	8	U1	? LLFSFDMPDATA106
0x087	0	8	U1	? LLFSFDMPDATA107
0x088	0	8	U1	? LLFSFDMPDATA108
0x089	0	8	U1	? LLFSFDMPDATA109
0x08A	0	8	U1	? LLFSFDMPDATA110
0x08B	0	8	U1	? LLFSFDMPDATA111
0x08C	0	8	U1	? LLFSFDMPDATA112
0x08D	0	8	U1	? LLFSFDMPDATA113
0x08E	0	8	U1	? LLFSFDMPDATA114
0x08F	0	8	U1	? LLFSFDMPDATA115
0x090	0	8	U1	? LLFSFDMPDATA116
0x091	0	8	U1	? LLFSFDMPDATA117

Offset	S	L	Type	ITOS name, attribute(s), and description
				?
0x092	0	8	U1	LLFSFDMPDATA118 ?
0x093	0	8	U1	LLFSFDMPDATA119 ?
0x094	0	8	U1	LLFSFDMPDATA120 ?
0x095	0	8	U1	LLFSFDMPDATA121 ?
0x096	0	8	U1	LLFSFDMPDATA122 ?
0x097	0	8	U1	LLFSFDMPDATA123 ?
0x098	0	8	U1	LLFSFDMPDATA124 ?
0x099	0	8	U1	LLFSFDMPDATA125 ?
0x09A	0	8	U1	LLFSFDMPDATA126 ?
0x09B	0	8	U1	LLFSFDMPDATA127 ?
0x09C	0	8	U1	LLFSFDMPDATA128 ?
0x09D	0	8	U1	LLFSFDMPDATA129 ?
0x09E	0	8	U1	LLFSFDMPDATA130 ?
0x09F	0	8	U1	LLFSFDMPDATA131 ?
0x0A0	0	8	U1	LLFSFDMPDATA132 ?
0x0A1	0	8	U1	LLFSFDMPDATA133 ?
0x0A2	0	8	U1	LLFSFDMPDATA134 ?
0x0A3	0	8	U1	LLFSFDMPDATA135 ?
0x0A4	0	8	U1	LLFSFDMPDATA136 ?
0x0A5	0	8	U1	LLFSFDMPDATA137 ?
0x0A6	0	8	U1	LLFSFDMPDATA138 ?
0x0A7	0	8	U1	LLFSFDMPDATA139 ?
0x0A8	0	8	U1	LLFSFDMPDATA140 ?
0x0A9	0	8	U1	LLFSFDMPDATA141 ?
0x0AA	0	8	U1	LLFSFDMPDATA142 ?
0x0AB	0	8	U1	LLFSFDMPDATA143

Offset	S	L	Type	ITOS name, attribute(s), and description
0x0AC	0	8	U1	? LLFSFDMPDATA144
0x0AD	0	8	U1	? LLFSFDMPDATA145
0x0AE	0	8	U1	? LLFSFDMPDATA146
0x0AF	0	8	U1	? LLFSFDMPDATA147
0x0B0	0	8	U1	? LLFSFDMPDATA148
0x0B1	0	8	U1	? LLFSFDMPDATA149
0x0B2	0	8	U1	? LLFSFDMPDATA150
0x0B3	0	8	U1	? LLFSFDMPDATA151
0x0B4	0	8	U1	? LLFSFDMPDATA152
0x0B5	0	8	U1	? LLFSFDMPDATA153
0x0B6	0	8	U1	? LLFSFDMPDATA154
0x0B7	0	8	U1	? LLFSFDMPDATA155
0x0B8	0	8	U1	? LLFSFDMPDATA156
0x0B9	0	8	U1	? LLFSFDMPDATA157
0x0BA	0	8	U1	? LLFSFDMPDATA158
0x0BB	0	8	U1	? LLFSFDMPDATA159
0x0BC	0	8	U1	? LLFSFDMPDATA160
0x0BD	0	8	U1	? LLFSFDMPDATA161
0x0BE	0	8	U1	? LLFSFDMPDATA162
0x0BF	0	8	U1	? LLFSFDMPDATA163
0x0C0	0	8	U1	? LLFSFDMPDATA164
0x0C1	0	8	U1	? LLFSFDMPDATA165
0x0C2	0	8	U1	? LLFSFDMPDATA166
0x0C3	0	8	U1	? LLFSFDMPDATA167
0x0C4	0	8	U1	? LLFSFDMPDATA168
0x0C5	0	8	U1	? LLFSFDMPDATA169

Offset	S	L	Type	ITOS name, attribute(s), and description
				?
0x0C6	0	8	U1	LLFSFDMPDATA170 ?
0x0C7	0	8	U1	LLFSFDMPDATA171 ?
0x0C8	0	8	U1	LLFSFDMPDATA172 ?
0x0C9	0	8	U1	LLFSFDMPDATA173 ?
0x0CA	0	8	U1	LLFSFDMPDATA174 ?
0x0CB	0	8	U1	LLFSFDMPDATA175 ?
0x0CC	0	8	U1	LLFSFDMPDATA176 ?
0x0CD	0	8	U1	LLFSFDMPDATA177 ?
0x0CE	0	8	U1	LLFSFDMPDATA178 ?
0x0CF	0	8	U1	LLFSFDMPDATA179 ?
0x0D0	0	8	U1	LLFSFDMPDATA180 ?
0x0D1	0	8	U1	LLFSFDMPDATA181 ?
0x0D2	0	8	U1	LLFSFDMPDATA182 ?
0x0D3	0	8	U1	LLFSFDMPDATA183 ?
0x0D4	0	8	U1	LLFSFDMPDATA184 ?
0x0D5	0	8	U1	LLFSFDMPDATA185 ?
0x0D6	0	8	U1	LLFSFDMPDATA186 ?
0x0D7	0	8	U1	LLFSFDMPDATA187 ?
0x0D8	0	8	U1	LLFSFDMPDATA188 ?
0x0D9	0	8	U1	LLFSFDMPDATA189 ?
0x0DA	0	8	U1	LLFSFDMPDATA190 ?
0x0DB	0	8	U1	LLFSFDMPDATA191 ?
0x0DC	0	8	U1	LLFSFDMPDATA192 ?
0x0DD	0	8	U1	LLFSFDMPDATA193 ?
0x0DE	0	8	U1	LLFSFDMPDATA194 ?
0x0DF	0	8	U1	LLFSFDMPDATA195

Offset	S	L	Type	ITOS name, attribute(s), and description
0x0E0	0	8	U1	? LLFSFDMPDATA196
0x0E1	0	8	U1	? LLFSFDMPDATA197
0x0E2	0	8	U1	? LLFSFDMPDATA198
0x0E3	0	8	U1	? LLFSFDMPDATA199
0x0E4	0	8	U1	? LLFSFDMPDATA200
0x0E5	0	8	U1	? LLFSFDMPDATA201
0x0E6	0	8	U1	? LLFSFDMPDATA202
0x0E7	0	8	U1	? LLFSFDMPDATA203
0x0E8	0	8	U1	? LLFSFDMPDATA204
0x0E9	0	8	U1	? LLFSFDMPDATA205
0x0EA	0	8	U1	? LLFSFDMPDATA206
0x0EB	0	8	U1	? LLFSFDMPDATA207
0x0EC	0	8	U1	? LLFSFDMPDATA208
0x0ED	0	8	U1	? LLFSFDMPDATA209
0x0EE	0	8	U1	? LLFSFDMPDATA210
0x0EF	0	8	U1	? LLFSFDMPDATA211
0x0F0	0	8	U1	? LLFSFDMPDATA212
0x0F1	0	8	U1	? LLFSFDMPDATA213
0x0F2	0	8	U1	? LLFSFDMPDATA214
0x0F3	0	8	U1	? LLFSFDMPDATA215
0x0F4	0	8	U1	? LLFSFDMPDATA216
0x0F5	0	8	U1	? LLFSFDMPDATA217
0x0F6	0	8	U1	? LLFSFDMPDATA218
0x0F7	0	8	U1	? LLFSFDMPDATA219
0x0F8	0	8	U1	? LLFSFDMPDATA220
0x0F9	0	8	U1	? LLFSFDMPDATA221

Offset	S	L	Type	ITOS name, attribute(s), and description
				?
0x0FA	0	8	U1	LLFSFDMPDATA222
				?
0x0FB	0	8	U1	LLFSFDMPDATA223
				?
0x0FC	0	8	U1	LLFSFDMPDATA224
				?
0x0FD	0	8	U1	LLFSFDMPDATA225
				?
0x0FE	0	8	U1	LLFSFDMPDATA226
				?
0x0FF	0	8	U1	LLFSFDMPDATA227
				?
0x100	0	8	U1	LLFSFDMPDATA228
				?
0x101	0	8	U1	LLFSFDMPDATA229
				?
0x102	0	8	U1	LLFSFDMPDATA230
				?
0x103	0	8	U1	LLFSFDMPDATA231
				?
0x104	0	8	U1	LLFSFDMPDATA232
				?
0x105	0	8	U1	LLFSFDMPDATA233
				?
0x106	0	8	U1	LLFSFDMPDATA234
				?
0x107	0	8	U1	LLFSFDMPDATA235
				?
0x108	0	8	U1	LLFSFDMPDATA236
				?
0x109	0	8	U1	LLFSFDMPDATA237
				?
0x10A	0	8	U1	LLFSFDMPDATA238
				?
0x10B	0	8	U1	LLFSFDMPDATA239
				?
0x10C	0	8	U1	LLFSFDMPDATA240
				?
0x10D	0	8	U1	LLFSFDMPDATA241
				?
0x10E	0	8	U1	LLFSFDMPDATA242
				?
0x10F	0	8	U1	LLFSFDMPDATA243
				?
0x110	0	8	U1	LLFSFDMPDATA244
				?
0x111	0	8	U1	LLFSFDMPDATA245
				?
0x112	0	8	U1	LLFSFDMPDATA246
				?
0x113	0	8	U1	LLFSFDMPDATA247

Offset	S	L	Type	ITOS name, attribute(s), and description
0x114	0	8	U1	? LLFSFDMPDATA248
0x115	0	8	U1	? LLFSFDMPDATA249
0x116	0	8	U1	? LLFSFDMPDATA250
0x117	0	8	U1	? LLFSFDMPDATA251
0x118	0	8	U1	? LLFSFDMPDATA252
0x119	0	8	U1	? LLFSFDMPDATA253
0x11A	0	8	U1	? LLFSFDMPDATA254
0x11B	0	8	U1	? LLFSFDMPDATA255
0x11C	0	8	U1	? LLFSFDMPDATA256
0x11D	0	8	U1	? LLFSFDMPDATA257
0x11E	0	8	U1	? LLFSFDMPDATA258
0x11F	0	8	U1	? LLFSFDMPDATA259
0x120	0	8	U1	? LLFSFDMPDATA260
0x121	0	8	U1	? LLFSFDMPDATA261
0x122	0	8	U1	? LLFSFDMPDATA262
0x123	0	8	U1	? LLFSFDMPDATA263
0x124	0	8	U1	? LLFSFDMPDATA264
0x125	0	8	U1	? LLFSFDMPDATA265
0x126	0	8	U1	? LLFSFDMPDATA266
0x127	0	8	U1	? LLFSFDMPDATA267
0x128	0	8	U1	? LLFSFDMPDATA268
0x129	0	8	U1	? LLFSFDMPDATA269
0x12A	0	8	U1	? LLFSFDMPDATA270
0x12B	0	8	U1	? LLFSFDMPDATA271
0x12C	0	8	U1	? LLFSFDMPDATA272
0x12D	0	8	U1	? LLFSFDMPDATA273

Offset	S	L	Type	ITOS name, attribute(s), and description
0x12E	0	8	U1	? LLFSFDMPDATA274
0x12F	0	8	U1	? LLFSFDMPDATA275
0x130	0	8	U1	? LLFSFDMPDATA276
0x131	0	8	U1	? LLFSFDMPDATA277
0x132	0	8	U1	? LLFSFDMPDATA278
0x133	0	8	U1	? LLFSFDMPDATA279
0x134	0	8	U1	? LLFSFDMPDATA280
0x135	0	8	U1	? LLFSFDMPDATA281
0x136	0	8	U1	? LLFSFDMPDATA282
0x137	0	8	U1	? LLFSFDMPDATA283
0x138	0	8	U1	? LLFSFDMPDATA284
0x139	0	8	U1	? LLFSFDMPDATA285
0x13A	0	8	U1	? LLFSFDMPDATA286
0x13B	0	8	U1	? LLFSFDMPDATA287
0x13C	0	8	U1	? LLFSFDMPDATA288
0x13D	0	8	U1	? LLFSFDMPDATA289
0x13E	0	8	U1	? LLFSFDMPDATA290
0x13F	0	8	U1	? LLFSFDMPDATA291
0x140	0	8	U1	? LLFSFDMPDATA292
0x141	0	8	U1	? LLFSFDMPDATA293
0x142	0	8	U1	? LLFSFDMPDATA294
0x143	0	8	U1	? LLFSFDMPDATA295
0x144	0	8	U1	? LLFSFDMPDATA296
0x145	0	8	U1	? LLFSFDMPDATA297
0x146	0	8	U1	? LLFSFDMPDATA298
0x147	0	8	U1	? LLFSFDMPDATA299

Offset	S	L	Type	ITOS name, attribute(s), and description
0x148	0	8	U1	? LLFSFDMPDATA300
0x149	0	8	U1	? LLFSFDMPDATA301
0x14A	0	8	U1	? LLFSFDMPDATA302
0x14B	0	8	U1	? LLFSFDMPDATA303
0x14C	0	8	U1	? LLFSFDMPDATA304
0x14D	0	8	U1	? LLFSFDMPDATA305
0x14E	0	8	U1	? LLFSFDMPDATA306
0x14F	0	8	U1	? LLFSFDMPDATA307
0x150	0	8	U1	? LLFSFDMPDATA308
0x151	0	8	U1	? LLFSFDMPDATA309
0x152	0	8	U1	? LLFSFDMPDATA310
0x153	0	8	U1	? LLFSFDMPDATA311
0x154	0	8	U1	? LLFSFDMPDATA312
0x155	0	8	U1	? LLFSFDMPDATA313
0x156	0	8	U1	? LLFSFDMPDATA314
0x157	0	8	U1	? LLFSFDMPDATA315
0x158	0	8	U1	? LLFSFDMPDATA316
0x159	0	8	U1	? LLFSFDMPDATA317
0x15A	0	8	U1	? LLFSFDMPDATA318
0x15B	0	8	U1	? LLFSFDMPDATA319
0x15C	0	8	U1	? LLFSFDMPDATA320
0x15D	0	8	U1	? LLFSFDMPDATA321
0x15E	0	8	U1	? LLFSFDMPDATA322
0x15F	0	8	U1	? LLFSFDMPDATA323
0x160	0	8	U1	? LLFSFDMPDATA324
0x161	0	8	U1	? LLFSFDMPDATA325

Offset	S	L	Type	ITOS name, attribute(s), and description
0x162	0	8	U1	? LLFSFDMPDATA326
0x163	0	8	U1	? LLFSFDMPDATA327
0x164	0	8	U1	? LLFSFDMPDATA328
0x165	0	8	U1	? LLFSFDMPDATA329
0x166	0	8	U1	? LLFSFDMPDATA330
0x167	0	8	U1	? LLFSFDMPDATA331
0x168	0	8	U1	? LLFSFDMPDATA332
0x169	0	8	U1	? LLFSFDMPDATA333
0x16A	0	8	U1	? LLFSFDMPDATA334
0x16B	0	8	U1	? LLFSFDMPDATA335
0x16C	0	8	U1	? LLFSFDMPDATA336
0x16D	0	8	U1	? LLFSFDMPDATA337
0x16E	0	8	U1	? LLFSFDMPDATA338
0x16F	0	8	U1	? LLFSFDMPDATA339
0x170	0	8	U1	? LLFSFDMPDATA340
0x171	0	8	U1	? LLFSFDMPDATA341
0x172	0	8	U1	? LLFSFDMPDATA342
0x173	0	8	U1	? LLFSFDMPDATA343
0x174	0	8	U1	? LLFSFDMPDATA344
0x175	0	8	U1	? LLFSFDMPDATA345
0x176	0	8	U1	? LLFSFDMPDATA346
0x177	0	8	U1	? LLFSFDMPDATA347
0x178	0	8	U1	? LLFSFDMPDATA348
0x179	0	8	U1	? LLFSFDMPDATA349
0x17A	0	8	U1	? LLFSFDMPDATA350
0x17B	0	8	U1	? LLFSFDMPDATA351

Offset	S	L	Type	ITOS name, attribute(s), and description
0x17C	0	8	U1	? LLFSFDMPDATA352
0x17D	0	8	U1	? LLFSFDMPDATA353
0x17E	0	8	U1	? LLFSFDMPDATA354
0x17F	0	8	U1	? LLFSFDMPDATA355
0x180	0	8	U1	? LLFSFDMPDATA356
0x181	0	8	U1	? LLFSFDMPDATA357
0x182	0	8	U1	? LLFSFDMPDATA358
0x183	0	8	U1	? LLFSFDMPDATA359
0x184	0	8	U1	? LLFSFDMPDATA360
0x185	0	8	U1	? LLFSFDMPDATA361
0x186	0	8	U1	? LLFSFDMPDATA362
0x187	0	8	U1	? LLFSFDMPDATA363
0x188	0	8	U1	? LLFSFDMPDATA364
0x189	0	8	U1	? LLFSFDMPDATA365
0x18A	0	8	U1	? LLFSFDMPDATA366
0x18B	0	8	U1	? LLFSFDMPDATA367
0x18C	0	8	U1	? LLFSFDMPDATA368
0x18D	0	8	U1	? LLFSFDMPDATA369
0x18E	0	8	U1	? LLFSFDMPDATA370
0x18F	0	8	U1	? LLFSFDMPDATA371
0x190	0	8	U1	? LLFSFDMPDATA372
0x191	0	8	U1	? LLFSFDMPDATA373
0x192	0	8	U1	? LLFSFDMPDATA374
0x193	0	8	U1	? LLFSFDMPDATA375
0x194	0	8	U1	? LLFSFDMPDATA376
0x195	0	8	U1	? LLFSFDMPDATA377

Offset	S	L	Type	ITOS name, attribute(s), and description
				?
0x196	0	8	U1	LLFSFDMPDATA378 ?
0x197	0	8	U1	LLFSFDMPDATA379 ?
0x198	0	8	U1	LLFSFDMPDATA380 ?
0x199	0	8	U1	LLFSFDMPDATA381 ?
0x19A	0	8	U1	LLFSFDMPDATA382 ?
0x19B	0	8	U1	LLFSFDMPDATA383 ?
0x19C	0	8	U1	LLFSFDMPDATA384 ?
0x19D	0	8	U1	LLFSFDMPDATA385 ?
0x19E	0	8	U1	LLFSFDMPDATA386 ?
0x19F	0	8	U1	LLFSFDMPDATA387 ?
0x1A0	0	8	U1	LLFSFDMPDATA388 ?
0x1A1	0	8	U1	LLFSFDMPDATA389 ?

10 LHK Package

10.0 Overview

The LHK package provides monitoring facilities that are orthogonal and asynchronous to the monitoring that is based on the contents of physics events being read from the instrument. This is much more fundamental monitoring (e.g., temperatures, voltages, currents). LHK runs its own task.

The package supports the following functions:

- Housekeeping data stream

10.1 Command Packets

10.1.0 `ReqDiagPacket` (1616/0x650:0)

Description:

"Request a Housekeeping Diagnostic Packet" Telecommand Packet

Sends a request to the housekeeping system to send a packets using the diagnostic channel.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x008	0	32	U1234	LHKDIAGAPID ?
0x00C	0	32	U1234	LHKDIAGCOUNT ?
0x010	0	32	U1234	LHKDIAGINTERVAL ?

10.1.1 `SysReset` (1616/0x650:1)

Description:

"System Reset" Telecommand Packet

Resets the housekeeping system using configuration file parameters. File IDs can be null, which specifies loading of default configuration.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x008	0	32	U1234	LHKCFGFILE0 ?
0x00C	0	32	U1234	LHKCFGFILE1 ?

10.1.2 `StopDiag` (1616/0x650:2)

Description:

"Stop Diagnostic Sample" Telecommand Packet

Terminates the current diagnostic sample run.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description

10.2 Ranges

10.2.0 `LHKAPIDRNG` (LHK APID Range) Range

Description:

Valid range of APIDs for LHK

Definition:

Limits 528 - 555

Used by:

???

10.2.1 `LHKDIAGINTV` (Diagnostic Interval) Range

Description:

Range in milliseconds for a diagnostic sample interval.

Definition:

Limits 100 - 4000

Used by:

???

10.2.2 `LHKDIAGPKTCNT` (Diagnostic Packet Count) Range

Description:

Specifies the range of valid diagnostic sample packet counts.

Definition:

Limits 1 - 64

Used by:

???

10.3 Telemetry Packets

10.3.0 `TemEnvPwr0` (528/0x210)

Description:

"TEM Power Packet 0" Telemetry Packet

Contains power specific ADC values for TEMs 0, 1, and 2.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKT0TKR25VD TEM0 TKR 2.5V digital raw
	4	12	U12	LHKT0TKR25ID TEM0 TKR 2.5I digital raw
	4	12	U12	LHKT0TKR15VAA TEM0 TKR 1.5V analog A raw
	4	12	U12	LHKT0TKR15IAA TEM0 TKR 1.5I analog A raw
	4	12	U12	LHKT0TKR25VAB TEM0 TKR 2.5V analog B raw
	4	12	U12	LHKT0TKR25IAB TEM0 TKR 2.5I analog B raw
	4	12	U12	LHKT0TKRBIASV TEM0 TKR Bias V raw
	4	12	U12	LHKT0TKRBIASI TEM0 TKR Bias I raw
	4	12	U12	LHKT0CAL33VD TEM0 CAL 3.3V digital raw
	4	12	U12	LHKT0CAL33ID TEM0 CAL 3.3I digital raw
	4	12	U12	LHKT0CAL33VA TEM0 CAL 3.3V analog raw
	4	12	U12	LHKT0CAL33IA TEM0 CAL 3.3I analog raw
	4	12	U12	LHKT0CALBIASV TEM0 CAL Bias V raw
	4	12	U12	LHKT0CALBIASI TEM0 CAL Bias I raw
	4	12	U12	LHKT0TEM33V TEM0 TEM 3.3V raw
	4	12	U12	LHKT0TEM33I TEM0 3.3I digital raw
	4	12	U12	LHKT1TKR25VD TEM1 TKR 2.5V digital raw
	4	12	U12	LHKT1TKR25ID TEM1 TKR 2.5I digital raw
	4	12	U12	LHKT1TKR15VAA TEM1 TKR 1.5V analog A raw
	4	12	U12	LHKT1TKR15IAA TEM1 TKR 1.5I analog A raw
	4	12	U12	LHKT1TKR25VAB

Offset	S	L	Type	ITOS name, attribute(s), and description
				TEM1 TKR 2.5V analog B raw
	4	12	U12	LHKT1TKR25IAB
				TEM1 TKR 2.5I analog B raw
	4	12	U12	LHKT1TKRBIASV
				TEM1 TKR Bias V raw
	4	12	U12	LHKT1TKRBIASI
				TEM1 TKR Bias I raw
	4	12	U12	LHKT1CAL33VD
				TEM1 CAL 3.3V digital raw
	4	12	U12	LHKT1CAL33ID
				TEM1 CAL 3.3I digital raw
	4	12	U12	LHKT1CAL33VA
				TEM1 CAL 3.3V analog raw
	4	12	U12	LHKT1CAL33IA
				TEM1 CAL 3.3I analog raw
	4	12	U12	LHKT1CALBIASV
				TEM1 CAL Bias V raw
	4	12	U12	LHKT1CALBIASI
				TEM1 CAL Bias I raw
	4	12	U12	LHKT1TEM33V
				TEM1 TEM 3.3V digital raw
	4	12	U12	LHKT1TEM33I
				TEM1 TEM 3.3I digital raw
	4	12	U12	LHKT2TKR25VD
				TEM2 TKR 2.5V digital raw
	4	12	U12	LHKT2TKR25ID
				TEM2 TKR 2.5I digital raw
	4	12	U12	LHKT2TKR15VAA
				TEM2 TKR 1.5V analog A raw
	4	12	U12	LHKT2TKR15IAA
				TEM2 TKR 1.5I analog A raw
	4	12	U12	LHKT2TKR25VAB
				TEM2 TKR 2.5V analog B raw
	4	12	U12	LHKT2TKR25IAB
				TEM2 TKR 2.5I analog B raw
	4	12	U12	LHKT2TKRBIASV
				TEM2 TKR Bias V raw
	4	12	U12	LHKT2TKRBIASI
				TEM2 TKR Bias I raw
	4	12	U12	LHKT2CAL33VD
				TEM2 CAL 3.3V digital raw
	4	12	U12	LHKT2CAL33ID
				TEM2 CAL 3.3I digital raw
	4	12	U12	LHKT2CAL33VA
				TEM2 CAL 3.3V analog raw
	4	12	U12	LHKT2CAL33IA
				TEM2 CAL 3.3I analog raw
	4	12	U12	LHKT2CALBIASV
				TEM2 CAL Bias V raw
	4	12	U12	LHKT2CALBIASI
				TEM2 CAL Bias I raw
	4	12	U12	LHKT2TEM33V

Offset	S	L	Type	ITOS name, attribute(s), and description
				TEM2 TEM 3.3V digital raw
	4	12	U12	LHKT2TEM33I TEM2 TEM 3.3I digital raw

10.3.1 `TemEnvPwr1` (529/0x211)

Description:

"TEM Power Packet 1" Telemetry Packet

Contains power specific ADC values for TEMs 3,4, and 5.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKT3TKR25VD TEM3 TKR 2.5V digital raw
	4	12	U12	LHKT3TKR25ID TEM3 TKR 2.5I digital raw
	4	12	U12	LHKT3TKR15VAA TEM3 TKR 1.5V analog A raw
	4	12	U12	LHKT3TKR15IAA TEM3 TKR 1.5I analog A raw
	4	12	U12	LHKT3TKR25VAB TEM3 TKR 2.5V analog B raw
	4	12	U12	LHKT3TKR25IAB TEM3 TKR 2.5I analog B raw
	4	12	U12	LHKT3TKRBIASV TEM3 TKR Bias V raw
	4	12	U12	LHKT3TKRBIASI TEM3 TKR Bias I raw
	4	12	U12	LHKT3CAL33VD TEM3 CAL 3.3V digital raw
	4	12	U12	LHKT3CAL33ID TEM3 CAL 3.3I digital raw
	4	12	U12	LHKT3CAL33VA TEM3 CAL 3.3V analog raw
	4	12	U12	LHKT3CAL33IA TEM3 CAL 3.3I analog raw
	4	12	U12	LHKT3CALBIASV TEM3 CAL Bias V raw
	4	12	U12	LHKT3CALBIASI TEM3 CAL Bias I raw
	4	12	U12	LHKT3TEM33V TEM3 TEM 3.3V raw
	4	12	U12	LHKT3TEM33I TEM3 3.3I digital raw
	4	12	U12	LHKT4TKR25VD TEM4 TKR 2.5V digital raw
	4	12	U12	LHKT4TKR25ID TEM4 TKR 2.5I digital raw
	4	12	U12	LHKT4TKR15VAA TEM4 TKR 1.5V analog A raw

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKT4TKR15IAA TEM4 TKR 1.5I analog A raw
	4	12	U12	LHKT4TKR25VAB TEM4 TKR 2.5V analog B raw
	4	12	U12	LHKT4TKR25IAB TEM4 TKR 2.5I analog B raw
	4	12	U12	LHKT4TKRBIASV TEM4 TKR Bias V raw
	4	12	U12	LHKT4TKRBIASI TEM4 TKR Bias I raw
	4	12	U12	LHKT4CAL33VD TEM4 CAL 3.3V digital raw
	4	12	U12	LHKT4CAL33ID TEM4 CAL 3.3I digital raw
	4	12	U12	LHKT4CAL33VA TEM4 CAL 3.3V analog raw
	4	12	U12	LHKT4CAL33IA TEM4 CAL 3.3I analog raw
	4	12	U12	LHKT4CALBIASV TEM4 CAL Bias V raw
	4	12	U12	LHKT4CALBIASI TEM4 CAL Bias I raw
	4	12	U12	LHKT4TEM33V TEM4 TEM 3.3V digital raw
	4	12	U12	LHKT4TEM33I TEM4 TEM 3.3I digital raw
	4	12	U12	LHKT5TKR25VD TEM5 TKR 2.5V digital raw
	4	12	U12	LHKT5TKR25ID TEM5 TKR 2.5I digital raw
	4	12	U12	LHKT5TKR15VAA TEM5 TKR 1.5V analog A raw
	4	12	U12	LHKT5TKR15IAA TEM5 TKR 1.5I analog A raw
	4	12	U12	LHKT5TKR25VAB TEM5 TKR 2.5V analog B raw
	4	12	U12	LHKT5TKR25IAB TEM5 TKR 2.5I analog B raw
	4	12	U12	LHKT5TKRBIASV TEM5 TKR Bias V raw
	4	12	U12	LHKT5TKRBIASI TEM5 TKR Bias I raw
	4	12	U12	LHKT5CAL33VD TEM5 CAL 3.3V digital raw
	4	12	U12	LHKT5CAL33ID TEM5 CAL 3.3I digital raw
	4	12	U12	LHKT5CAL33VA TEM5 CAL 3.3V analog raw
	4	12	U12	LHKT5CAL33IA TEM5 CAL 3.3I analog raw
	4	12	U12	LHKT5CALBIASV TEM5 CAL Bias V raw

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKT5CALBIASI TEM5 CAL Bias I raw
	4	12	U12	LHKT5TEM33V TEM5 TEM 3.3V digital raw
	4	12	U12	LHKT5TEM33I TEM5 TEM 3.3I digital raw

10.3.2 `TemEnvPwr2` (530/0x212)

Description:

"TEM Power Packet 2" Telemetry Packet

Contains power specific ADC values for TEMs 6, 7, and 8.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKT6TKR25VD TEM6 TKR 2.5V digital raw
	4	12	U12	LHKT6TKR25ID TEM6 TKR 2.5I digital raw
	4	12	U12	LHKT6TKR15VAA TEM6 TKR 1.5V analog A raw
	4	12	U12	LHKT6TKR15IAA TEM6 TKR 1.5I analog A raw
	4	12	U12	LHKT6TKR25VAB TEM6 TKR 2.5V analog B raw
	4	12	U12	LHKT6TKR25IAB TEM6 TKR 2.5I analog B raw
	4	12	U12	LHKT6TKRBIASV TEM6 TKR Bias V raw
	4	12	U12	LHKT6TKRBIASI TEM6 TKR Bias I raw
	4	12	U12	LHKT6CAL33VD TEM6 CAL 3.3V digital raw
	4	12	U12	LHKT6CAL33ID TEM6 CAL 3.3I digital raw
	4	12	U12	LHKT6CAL33VA TEM6 CAL 3.3V analog raw
	4	12	U12	LHKT6CAL33IA TEM6 CAL 3.3I analog raw
	4	12	U12	LHKT6CALBIASV TEM6 CAL Bias V raw
	4	12	U12	LHKT6CALBIASI TEM6 CAL Bias I raw
	4	12	U12	LHKT6TEM33V TEM6 TEM 3.3V raw
	4	12	U12	LHKT6TEM33I TEM6 3.3I digital raw
	4	12	U12	LHKT7TKR25VD TEM7 TKR 2.5V digital raw
	4	12	U12	LHKT7TKR25ID

Offset	S	L	Type	ITOS name, attribute(s), and description
				TEM7 TKR 2.5I digital raw
	4	12	U12	LHKT7TKR15VAA
				TEM7 TKR 1.5V analog A raw
	4	12	U12	LHKT7TKR15IAA
				TEM7 TKR 1.5I analog A raw
	4	12	U12	LHKT7TKR25VAB
				TEM7 TKR 2.5V analog B raw
	4	12	U12	LHKT7TKR25IAB
				TEM7 TKR 2.5I analog B raw
	4	12	U12	LHKT7TKRBIASV
				TEM7 TKR Bias V raw
	4	12	U12	LHKT7TKRBIASI
				TEM7 TKR Bias I raw
	4	12	U12	LHKT7CAL33VD
				TEM7 CAL 3.3V digital raw
	4	12	U12	LHKT7CAL33ID
				TEM7 CAL 3.3I digital raw
	4	12	U12	LHKT7CAL33VA
				TEM7 CAL 3.3V analog raw
	4	12	U12	LHKT7CAL33IA
				TEM7 CAL 3.3I analog raw
	4	12	U12	LHKT7CALBIASV
				TEM7 CAL Bias V raw
	4	12	U12	LHKT7CALBIASI
				TEM7 CAL Bias I raw
	4	12	U12	LHKT7TEM33V
				TEM7 TEM 3.3V digital raw
	4	12	U12	LHKT7TEM33I
				TEM7 TEM 3.3I digital raw
	4	12	U12	LHKT8TKR25VD
				TEM8 TKR 2.5V digital raw
	4	12	U12	LHKT8TKR25ID
				TEM8 TKR 2.5I digital raw
	4	12	U12	LHKT8TKR15VAA
				TEM8 TKR 1.5V analog A raw
	4	12	U12	LHKT8TKR15IAA
				TEM8 TKR 1.5I analog A raw
	4	12	U12	LHKT8TKR25VAB
				TEM8 TKR 2.5V analog B raw
	4	12	U12	LHKT8TKR25IAB
				TEM8 TKR 2.5I analog B raw
	4	12	U12	LHKT8TKRBIASV
				TEM8 TKR Bias V raw
	4	12	U12	LHKT8TKRBIASI
				TEM8 TKR Bias I raw
	4	12	U12	LHKT8CAL33VD
				TEM8 CAL 3.3V digital raw
	4	12	U12	LHKT8CAL33ID
				TEM8 CAL 3.3I digital raw
	4	12	U12	LHKT8CAL33VA
				TEM8 CAL 3.3V analog raw
	4	12	U12	LHKT8CAL33IA

Offset	S	L	Type	ITOS name, attribute(s), and description
				TEM8 CAL 3.3I analog raw
	4	12	U12	LHKT8CALBIASV TEM8 CAL Bias V raw
	4	12	U12	LHKT8CALBIASI TEM8 CAL Bias I raw
	4	12	U12	LHKT8TEM33V TEM8 TEM 3.3V digital raw
	4	12	U12	LHKT8TEM33I TEM8 TEM 3.3I digital raw

10.3.3 `TemEnvPwr3` (531/0x213)

Description:

"TEM Power Packet 3" Telemetry Packet

Contains power specific ADC values for TEMs 9, 10, and 11.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKT9TKR25VD TEM9 TKR 2.5V digital raw
	4	12	U12	LHKT9TKR25ID TEM9 TKR 2.5I digital raw
	4	12	U12	LHKT9TKR15VAA TEM9 TKR 1.5V analog A raw
	4	12	U12	LHKT9TKR15IAA TEM9 TKR 1.5I analog A raw
	4	12	U12	LHKT9TKR25VAB TEM9 TKR 2.5V analog B raw
	4	12	U12	LHKT9TKR25IAB TEM9 TKR 2.5I analog B raw
	4	12	U12	LHKT9TKRBIASV TEM9 TKR Bias V raw
	4	12	U12	LHKT9TKRBIASI TEM9 TKR Bias I raw
	4	12	U12	LHKT9CAL33VD TEM9 CAL 3.3V digital raw
	4	12	U12	LHKT9CAL33ID TEM9 CAL 3.3I digital raw
	4	12	U12	LHKT9CAL33VA TEM9 CAL 3.3V analog raw
	4	12	U12	LHKT9CAL33IA TEM9 CAL 3.3I analog raw
	4	12	U12	LHKT9CALBIASV TEM9 CAL Bias V raw
	4	12	U12	LHKT9CALBIASI TEM9 CAL Bias I raw
	4	12	U12	LHKT9TEM33V TEM9 TEM 3.3V raw
	4	12	U12	LHKT9TEM33I TEM9 3.3I digital raw

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKTATKR25VD TEMA TKR 2.5V digital raw
	4	12	U12	LHKTATKR25ID TEMA TKR 2.5I digital raw
	4	12	U12	LHKTATKR15VAA TEMA TKR 1.5V analog A raw
	4	12	U12	LHKTATKR15IAA TEMA TKR 1.5I analog A raw
	4	12	U12	LHKTATKR25VAB TEMA TKR 2.5V analog B raw
	4	12	U12	LHKTATKR25IAB TEMA TKR 2.5I analog B raw
	4	12	U12	LHKTATKRBIASV TEMA TKR Bias V raw
	4	12	U12	LHKTATKRBIASI TEMA TKR Bias I raw
	4	12	U12	LHKTACAL33VD TEMA CAL 3.3V digital raw
	4	12	U12	LHKTACAL33ID TEMA CAL 3.3I digital raw
	4	12	U12	LHKTACAL33VA TEMA CAL 3.3V analog raw
	4	12	U12	LHKTACAL33IA TEMA CAL 3.3I analog raw
	4	12	U12	LHKTACALBIASV TEMA CAL Bias V raw
	4	12	U12	LHKTACALBIASI TEMA CAL Bias I raw
	4	12	U12	LHKTATEM33V TEMA TEM 3.3V digital raw
	4	12	U12	LHKTATEM33I TEMA TEM 3.3I digital raw
	4	12	U12	LHKTBTKR25VD TEMB TKR 2.5V digital raw
	4	12	U12	LHKTBTKR25ID TEMB TKR 2.5I digital raw
	4	12	U12	LHKTBTKR15VAA TEMB TKR 1.5V analog A raw
	4	12	U12	LHKTBTKR15IAA TEMB TKR 1.5I analog A raw
	4	12	U12	LHKTBTKR25VAB TEMB TKR 2.5V analog B raw
	4	12	U12	LHKTBTKR25IAB TEMB TKR 2.5I analog B raw
	4	12	U12	LHKTBTKRBIASV TEMB TKR Bias V raw
	4	12	U12	LHKTBTKRBIASI TEMB TKR Bias I raw
	4	12	U12	LHKTBCAL33VD TEMB CAL 3.3V digital raw
	4	12	U12	LHKTBCAL33ID TEMB CAL 3.3I digital raw

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKTBCAL33VA TEMB CAL 3.3V analog raw
	4	12	U12	LHKTBCAL33IA TEMB CAL 3.3I analog raw
	4	12	U12	LHKTBCALBIASV TEMB CAL Bias V raw
	4	12	U12	LHKTBCALBIASI TEMB CAL Bias I raw
	4	12	U12	LHKTBTEM33V TEMB TEM 3.3V digital raw
	4	12	U12	LHKTBTEM33I TEMB TEM 3.3I digital raw

10.3.4 `TemEnvPwr4` (532/0x214)

Description:

"TEM Power Packet 4" Telemetry Packet

Contains power specific ADC values for TEMs 12, 13, and 14.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKTCTKR25VD TEMC TKR 2.5V digital raw
	4	12	U12	LHKTCTKR25ID TEMC TKR 2.5I digital raw
	4	12	U12	LHKTCTKR15VAA TEMC TKR 1.5V analog A raw
	4	12	U12	LHKTCTKR15IAA TEMC TKR 1.5I analog A raw
	4	12	U12	LHKTCTKR25VAB TEMC TKR 2.5V analog B raw
	4	12	U12	LHKTCTKR25IAB TEMC TKR 2.5I analog B raw
	4	12	U12	LHKTCTKRBIASV TEMC TKR Bias V raw
	4	12	U12	LHKTCTKRBIASI TEMC TKR Bias I raw
	4	12	U12	LHKTCCAL33VD TEMC CAL 3.3V digital raw
	4	12	U12	LHKTCCAL33ID TEMC CAL 3.3I digital raw
	4	12	U12	LHKTCCAL33VA TEMC CAL 3.3V analog raw
	4	12	U12	LHKTCCAL33IA TEMC CAL 3.3I analog raw
	4	12	U12	LHKTCCALBIASV TEMC CAL Bias V raw
	4	12	U12	LHKTCCALBIASI TEMC CAL Bias I raw
	4	12	U12	LHKTCTEM33V

Offset	S	L	Type	ITOS name, attribute(s), and description
				TEMC TEM 3.3V raw
	4	12	U12	LHKTCTEM33I
				TEMC 3.3I digital raw
	4	12	U12	LHKTDTKR25VD
				TEMD TKR 2.5V digital raw
	4	12	U12	LHKTDTKR25ID
				TEMD TKR 2.5I digital raw
	4	12	U12	LHKTDTKR15VAA
				TEMD TKR 1.5V analog A raw
	4	12	U12	LHKTDTKR15IAA
				TEMD TKR 1.5I analog A raw
	4	12	U12	LHKTDTKR25VAB
				TEMD TKR 2.5V analog B raw
	4	12	U12	LHKTDTKR25IAB
				TEMD TKR 2.5I analog B raw
	4	12	U12	LHKTDTKRBIASV
				TEMD TKR Bias V raw
	4	12	U12	LHKTDTKRBIASI
				TEMD TKR Bias I raw
	4	12	U12	LHKTDCAL33VD
				TEMD CAL 3.3V digital raw
	4	12	U12	LHKTDCAL33ID
				TEMD CAL 3.3I digital raw
	4	12	U12	LHKTDCAL33VA
				TEMD CAL 3.3V analog raw
	4	12	U12	LHKTDCAL33IA
				TEMD CAL 3.3I analog raw
	4	12	U12	LHKTDCALBIASV
				TEMD CAL Bias V raw
	4	12	U12	LHKTDCALBIASI
				TEMD CAL Bias I raw
	4	12	U12	LHKTDTEM33V
				TEMD TEM 3.3V digital raw
	4	12	U12	LHKTDTEM33I
				TEMD TEM 3.3I digital raw
	4	12	U12	LHKTETKR25VD
				TEME TKR 2.5V digital raw
	4	12	U12	LHKTETKR25ID
				TEME TKR 2.5I digital raw
	4	12	U12	LHKTETKR15VAA
				TEME TKR 1.5V analog A raw
	4	12	U12	LHKTETKR15IAA
				TEME TKR 1.5I analog A raw
	4	12	U12	LHKTETKR25VAB
				TEME TKR 2.5V analog B raw
	4	12	U12	LHKTETKR25IAB
				TEME TKR 2.5I analog B raw
	4	12	U12	LHKTETKRBIASV
				TEME TKR Bias V raw
	4	12	U12	LHKTETKRBIASI
				TEME TKR Bias I raw
	4	12	U12	LHKTECAL33VD

Offset	S	L	Type	ITOS name, attribute(s), and description
				TEME CAL 3.3V digital raw
	4	12	U12	LHKTECAL33ID TEME CAL 3.3I digital raw
	4	12	U12	LHKTECAL33VA TEME CAL 3.3V analog raw
	4	12	U12	LHKTECAL33IA TEME CAL 3.3I analog raw
	4	12	U12	LHKTECALBIASV TEME CAL Bias V raw
	4	12	U12	LHKTECALBIASI TEME CAL Bias I raw
	4	12	U12	LHKTETEM33V TEME TEM 3.3V digital raw
	4	12	U12	LHKTETEM33I TEME TEM 3.3I digital raw

10.3.5 `TemEnvPwr5` (533/0x215)

Description:

"TEM Power Packet 5" Telemetry Packet

Contains powr specific ADC values for TEM 15.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKTFTKR25VD TEMF TKR 2.5V digital raw
	4	12	U12	LHKTFTKR25ID TEMF TKR 2.5I digital raw
	4	12	U12	LHKTFTKR15VAA TEMF TKR 1.5V analog A raw
	4	12	U12	LHKTFTKR15IAA TEMF TKR 1.5I analog A raw
	4	12	U12	LHKTFTKR25VAB TEMF TKR 2.5V analog B raw
	4	12	U12	LHKTFTKR25IAB TEMF TKR 2.5I analog B raw
	4	12	U12	LHKTFTKRBIASV TEMF TKR Bias V raw
	4	12	U12	LHKTFTKRBIASI TEMF TKR Bias I raw
	4	12	U12	LHKTFCAL33VD TEMF CAL 3.3V digital raw
	4	12	U12	LHKTFCAL33ID TEMF CAL 3.3I digital raw
	4	12	U12	LHKTFCAL33VA TEMF CAL 3.3V analog raw
	4	12	U12	LHKTFCAL33IA TEMF CAL 3.3I analog raw
	4	12	U12	LHKTFCALBIASV TEMF CAL Bias V raw

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKTFCALBIASI TEMF CAL Bias I raw
	4	12	U12	LHKTFTEM33V TEMF TEM 3.3V raw
	4	12	U12	LHKTFTEM33I TEMF 3.3I digital raw

10.3.6 `TemEnvTemp0` (534/0x216)

Description:

"TEM Temperature Packet 0" Telemetry Packet

Contains temperature specific ADC values for TEMs 0 and 1.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKT0CALAF0T0 TEM0 CAL AFEE0 Temp 0 raw
	4	12	U12	LHKT0CALAF0T1 TEM0 CAL AFEE0 Temp 1 raw
	4	12	U12	LHKT0CALAF1T0 TEM0 CAL AFEE1 Temp 0 raw
	4	12	U12	LHKT0CALAF1T1 TEM0 CAL AFEE1 Temp 1 raw
	4	12	U12	LHKT0CALAF2T0 TEM0 CAL AFEE2 Temp 0 raw
	4	12	U12	LHKT0CALAF2T1 TEM0 CAL AFEE2 Temp 1 raw
	4	12	U12	LHKT0CALAF3T0 TEM0 CAL AFEE3 Temp 0 raw
	4	12	U12	LHKT0CALAF3T1 TEM0 CAL AFEE3 Temp 1 raw
	4	12	U12	LHKT0TKRC0T0 TEM0 TKR Cable 0 Temp 0 raw
	4	12	U12	LHKT0TKRC0T1 TEM0 TKR Cable 0 Temp 1 raw
	4	12	U12	LHKT0TKRC1T0 TEM0 TKR Cable 1 Temp 0 raw
	4	12	U12	LHKT0TKRC1T1 TEM0 TKR Cable 1 Temp 1 raw
	4	12	U12	LHKT0TKRC2T0 TEM0 TKR Cable 2 Temp 0 raw
	4	12	U12	LHKT0TKRC2T1 TEM0 TKR Cable 2 Temp 1 raw
	4	12	U12	LHKT0TKRC3T0 TEM0 TKR Cable 3 Temp 0 raw
	4	12	U12	LHKT0TKRC3T1 TEM0 TKR Cable 3 Temp 1 raw
	4	12	U12	LHKT0TKRC4T0 TEM0 TKR Cable 4 Temp 0 raw
	4	12	U12	LHKT0TKRC4T1

Offset	S	L	Type	ITOS name, attribute(s), and description
				TEM0 TKR Cable 4 Temp 1 raw
	4	12	U12	LHKT0TKRC5T0
				TEM0 TKR Cable 5 Temp 0 raw
	4	12	U12	LHKT0TKRC5T1
				TEM0 TKR Cable 5 Temp 1 raw
	4	12	U12	LHKT0TKRC6T0
				TEM0 TKR Cable 6 Temp 0 raw
	4	12	U12	LHKT0TKRC6T1
				TEM0 TKR Cable 6 Temp 1 raw
	4	12	U12	LHKT0TKRC7T0
				TEM0 TKR Cable 7 Temp 0 raw
	4	12	U12	LHKT0TKRC7T1
				TEM0 TKR Cable 7 Temp 1 raw
	4	12	U12	LHKT1CALAF0T0
				TEM1 CAL AFEE0 Temp 0 raw
	4	12	U12	LHKT1CALAF0T1
				TEM1 CAL AFEE0 Temp 1 raw
	4	12	U12	LHKT1CALAF1T0
				TEM1 CAL AFEE1 Temp 0 raw
	4	12	U12	LHKT1CALAF1T1
				TEM1 CAL AFEE1 Temp 1 raw
	4	12	U12	LHKT1CALAF2T0
				TEM1 CAL AFEE2 Temp 0 raw
	4	12	U12	LHKT1CALAF2T1
				TEM1 CAL AFEE2 Temp 1 raw
	4	12	U12	LHKT1CALAF3T0
				TEM1 CAL AFEE3 Temp 0 raw
	4	12	U12	LHKT1CALAF3T1
				TEM1 CAL AFEE3 Temp 1 raw
	4	12	U12	LHKT1TKRC0T0
				TEM1 TKR Cable 0 Temp 0 raw
	4	12	U12	LHKT1TKRC0T1
				TEM1 TKR Cable 0 Temp 1 raw
	4	12	U12	LHKT1TKRC1T0
				TEM1 TKR Cable 1 Temp 0 raw
	4	12	U12	LHKT1TKRC1T1
				TEM1 TKR Cable 1 Temp 1 raw
	4	12	U12	LHKT1TKRC2T0
				TEM1 TKR Cable 2 Temp 0 raw
	4	12	U12	LHKT1TKRC2T1
				TEM1 TKR Cable 2 Temp 1 raw
	4	12	U12	LHKT1TKRC3T0
				TEM1 TKR Cable 3 Temp 0 raw
	4	12	U12	LHKT1TKRC3T1
				TEM1 TKR Cable 3 Temp 1 raw
	4	12	U12	LHKT1TKRC4T0
				TEM1 TKR Cable 4 Temp 0 raw
	4	12	U12	LHKT1TKRC4T1
				TEM1 TKR Cable 4 Temp 1 raw
	4	12	U12	LHKT1TKRC5T0
				TEM1 TKR Cable 5 Temp 0 raw
	4	12	U12	LHKT1TKRC5T1

Offset	S	L	Type	ITOS name, attribute(s), and description
				TEM1 TKR Cable 5 Temp 1 raw
	4	12	U12	LHKT1TKRC6T0 TEM1 TKR Cable 6 Temp 0 raw
	4	12	U12	LHKT1TKRC6T1 TEM1 TKR Cable 6 Temp 1 raw
	4	12	U12	LHKT1TKRC7T0 TEM1 TKR Cable 7 Temp 0 raw
	4	12	U12	LHKT1TKRC7T1 TEM1 TKR Cable 7 Temp 1 raw

10.3.7 `TemEnvTemp1` (535/0x217)

Description:

"TEM Temperature Packet 1" Telemetry Packet

Contains temperature specific ADC values for TEMs 2 and 3.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKT2CALAF0T0 TEM2 CAL AFEE0 Temp 0 raw
	4	12	U12	LHKT2CALAF0T1 TEM2 CAL AFEE0 Temp 1 raw
	4	12	U12	LHKT2CALAF1T0 TEM2 CAL AFEE1 Temp 0 raw
	4	12	U12	LHKT2CALAF1T1 TEM2 CAL AFEE1 Temp 1 raw
	4	12	U12	LHKT2CALAF2T0 TEM2 CAL AFEE2 Temp 0 raw
	4	12	U12	LHKT2CALAF2T1 TEM2 CAL AFEE2 Temp 1 raw
	4	12	U12	LHKT2CALAF3T0 TEM2 CAL AFEE3 Temp 0 raw
	4	12	U12	LHKT2CALAF3T1 TEM2 CAL AFEE3 Temp 1 raw
	4	12	U12	LHKT2TKRC0T0 TEM2 TKR Cable 0 Temp 0 raw
	4	12	U12	LHKT2TKRC0T1 TEM2 TKR Cable 0 Temp 1 raw
	4	12	U12	LHKT2TKRC1T0 TEM2 TKR Cable 1 Temp 0 raw
	4	12	U12	LHKT2TKRC1T1 TEM2 TKR Cable 1 Temp 1 raw
	4	12	U12	LHKT2TKRC2T0 TEM2 TKR Cable 2 Temp 0 raw
	4	12	U12	LHKT2TKRC2T1 TEM2 TKR Cable 2 Temp 1 raw
	4	12	U12	LHKT2TKRC3T0 TEM2 TKR Cable 3 Temp 0 raw
	4	12	U12	LHKT2TKRC3T1 TEM2 TKR Cable 3 Temp 1 raw

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKT2TKRC4T0 TEM2 TKR Cable 4 Temp 0 raw
	4	12	U12	LHKT2TKRC4T1 TEM2 TKR Cable 4 Temp 1 raw
	4	12	U12	LHKT2TKRC5T0 TEM2 TKR Cable 5 Temp 0 raw
	4	12	U12	LHKT2TKRC5T1 TEM2 TKR Cable 5 Temp 1 raw
	4	12	U12	LHKT2TKRC6T0 TEM2 TKR Cable 6 Temp 0 raw
	4	12	U12	LHKT2TKRC6T1 TEM2 TKR Cable 6 Temp 1 raw
	4	12	U12	LHKT2TKRC7T0 TEM2 TKR Cable 7 Temp 0 raw
	4	12	U12	LHKT2TKRC7T1 TEM2 TKR Cable 7 Temp 1 raw
	4	12	U12	LHKT3CALAF0T0 TEM3 CAL AFEE0 Temp 0 raw
	4	12	U12	LHKT3CALAF0T1 TEM3 CAL AFEE0 Temp 1 raw
	4	12	U12	LHKT3CALAF1T0 TEM3 CAL AFEE1 Temp 0 raw
	4	12	U12	LHKT3CALAF1T1 TEM3 CAL AFEE1 Temp 1 raw
	4	12	U12	LHKT3CALAF2T0 TEM3 CAL AFEE2 Temp 0 raw
	4	12	U12	LHKT3CALAF2T1 TEM3 CAL AFEE2 Temp 1 raw
	4	12	U12	LHKT3CALAF3T0 TEM3 CAL AFEE3 Temp 0 raw
	4	12	U12	LHKT3CALAF3T1 TEM3 CAL AFEE3 Temp 1 raw
	4	12	U12	LHKT3TKRC0T0 TEM3 TKR Cable 0 Temp 0 raw
	4	12	U12	LHKT3TKRC0T1 TEM3 TKR Cable 0 Temp 1 raw
	4	12	U12	LHKT3TKRC1T0 TEM3 TKR Cable 1 Temp 0 raw
	4	12	U12	LHKT3TKRC1T1 TEM3 TKR Cable 1 Temp 1 raw
	4	12	U12	LHKT3TKRC2T0 TEM3 TKR Cable 2 Temp 0 raw
	4	12	U12	LHKT3TKRC2T1 TEM3 TKR Cable 2 Temp 1 raw
	4	12	U12	LHKT3TKRC3T0 TEM3 TKR Cable 3 Temp 0 raw
	4	12	U12	LHKT3TKRC3T1 TEM3 TKR Cable 3 Temp 1 raw
	4	12	U12	LHKT3TKRC4T0 TEM3 TKR Cable 4 Temp 0 raw
	4	12	U12	LHKT3TKRC4T1 TEM3 TKR Cable 4 Temp 1 raw

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKT3TKRC5T0 TEM3 TKR Cable 5 Temp 0 raw
	4	12	U12	LHKT3TKRC5T1 TEM3 TKR Cable 5 Temp 1 raw
	4	12	U12	LHKT3TKRC6T0 TEM3 TKR Cable 6 Temp 0 raw
	4	12	U12	LHKT3TKRC6T1 TEM3 TKR Cable 6 Temp 1 raw
	4	12	U12	LHKT3TKRC7T0 TEM3 TKR Cable 7 Temp 0 raw
	4	12	U12	LHKT3TKRC7T1 TEM3 TKR Cable 7 Temp 1 raw

10.3.8 TemEnvTemp2 (536/0x218)

Description:

"TEM Temperature Packet 2" Telemetry Packet

Contains temperature specific ADC values for TEMs 4 and 5.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKT4CALAF0T0 TEM4 CAL AFEE0 Temp 0 raw
	4	12	U12	LHKT4CALAF0T1 TEM4 CAL AFEE0 Temp 1 raw
	4	12	U12	LHKT4CALAF1T0 TEM4 CAL AFEE1 Temp 0 raw
	4	12	U12	LHKT4CALAF1T1 TEM4 CAL AFEE1 Temp 1 raw
	4	12	U12	LHKT4CALAF2T0 TEM4 CAL AFEE2 Temp 0 raw
	4	12	U12	LHKT4CALAF2T1 TEM4 CAL AFEE2 Temp 1 raw
	4	12	U12	LHKT4CALAF3T0 TEM4 CAL AFEE3 Temp 0 raw
	4	12	U12	LHKT4CALAF3T1 TEM4 CAL AFEE3 Temp 1 raw
	4	12	U12	LHKT4TKRC0T0 TEM4 TKR Cable 0 Temp 0 raw
	4	12	U12	LHKT4TKRC0T1 TEM4 TKR Cable 0 Temp 1 raw
	4	12	U12	LHKT4TKRC1T0 TEM4 TKR Cable 1 Temp 0 raw
	4	12	U12	LHKT4TKRC1T1 TEM4 TKR Cable 1 Temp 1 raw
	4	12	U12	LHKT4TKRC2T0 TEM4 TKR Cable 2 Temp 0 raw
	4	12	U12	LHKT4TKRC2T1 TEM4 TKR Cable 2 Temp 1 raw
	4	12	U12	LHKT4TKRC3T0

Offset	S	L	Type	ITOS name, attribute(s), and description
				TEM4 TKR Cable 3 Temp 0 raw
	4	12	U12	LHKT4TKRC3T1
				TEM4 TKR Cable 3 Temp 1 raw
	4	12	U12	LHKT4TKRC4T0
				TEM4 TKR Cable 4 Temp 0 raw
	4	12	U12	LHKT4TKRC4T1
				TEM4 TKR Cable 4 Temp 1 raw
	4	12	U12	LHKT4TKRC5T0
				TEM4 TKR Cable 5 Temp 0 raw
	4	12	U12	LHKT4TKRC5T1
				TEM4 TKR Cable 5 Temp 1 raw
	4	12	U12	LHKT4TKRC6T0
				TEM4 TKR Cable 6 Temp 0 raw
	4	12	U12	LHKT4TKRC6T1
				TEM4 TKR Cable 6 Temp 1 raw
	4	12	U12	LHKT4TKRC7T0
				TEM4 TKR Cable 7 Temp 0 raw
	4	12	U12	LHKT4TKRC7T1
				TEM4 TKR Cable 7 Temp 1 raw
	4	12	U12	LHKT5CALAF0T0
				TEM5 CAL AFEE0 Temp 0 raw
	4	12	U12	LHKT5CALAF0T1
				TEM5 CAL AFEE0 Temp 1 raw
	4	12	U12	LHKT5CALAF1T0
				TEM5 CAL AFEE1 Temp 0 raw
	4	12	U12	LHKT5CALAF1T1
				TEM5 CAL AFEE1 Temp 1 raw
	4	12	U12	LHKT5CALAF2T0
				TEM5 CAL AFEE2 Temp 0 raw
	4	12	U12	LHKT5CALAF2T1
				TEM5 CAL AFEE2 Temp 1 raw
	4	12	U12	LHKT5CALAF3T0
				TEM5 CAL AFEE3 Temp 0 raw
	4	12	U12	LHKT5CALAF3T1
				TEM5 CAL AFEE3 Temp 1 raw
	4	12	U12	LHKT5TKRC0T0
				TEM5 TKR Cable 0 Temp 0 raw
	4	12	U12	LHKT5TKRC0T1
				TEM5 TKR Cable 0 Temp 1 raw
	4	12	U12	LHKT5TKRC1T0
				TEM5 TKR Cable 1 Temp 0 raw
	4	12	U12	LHKT5TKRC1T1
				TEM5 TKR Cable 1 Temp 1 raw
	4	12	U12	LHKT5TKRC2T0
				TEM5 TKR Cable 2 Temp 0 raw
	4	12	U12	LHKT5TKRC2T1
				TEM5 TKR Cable 2 Temp 1 raw
	4	12	U12	LHKT5TKRC3T0
				TEM5 TKR Cable 3 Temp 0 raw
	4	12	U12	LHKT5TKRC3T1
				TEM5 TKR Cable 3 Temp 1 raw
	4	12	U12	LHKT5TKRC4T0

Offset	S	L	Type	ITOS name, attribute(s), and description
				TEM5 TKR Cable 4 Temp 0 raw
	4	12	U12	LHKT5TKRC4T1 TEM5 TKR Cable 4 Temp 1 raw
	4	12	U12	LHKT5TKRC5T0 TEM5 TKR Cable 5 Temp 0 raw
	4	12	U12	LHKT5TKRC5T1 TEM5 TKR Cable 5 Temp 1 raw
	4	12	U12	LHKT5TKRC6T0 TEM5 TKR Cable 6 Temp 0 raw
	4	12	U12	LHKT5TKRC6T1 TEM5 TKR Cable 6 Temp 1 raw
	4	12	U12	LHKT5TKRC7T0 TEM5 TKR Cable 7 Temp 0 raw
	4	12	U12	LHKT5TKRC7T1 TEM5 TKR Cable 7 Temp 1 raw

10.3.9 `TemEnvTemp3` (537/0x219)

Description:

"TEM Temperature Packet 3" Telemetry Packet

Contains temperature specific ADC values for TEMs 6 and 7.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKT6CALAF0T0 TEM6 CAL AFEE0 Temp 0 raw
	4	12	U12	LHKT6CALAF0T1 TEM6 CAL AFEE0 Temp 1 raw
	4	12	U12	LHKT6CALAF1T0 TEM6 CAL AFEE1 Temp 0 raw
	4	12	U12	LHKT6CALAF1T1 TEM6 CAL AFEE1 Temp 1 raw
	4	12	U12	LHKT6CALAF2T0 TEM6 CAL AFEE2 Temp 0 raw
	4	12	U12	LHKT6CALAF2T1 TEM6 CAL AFEE2 Temp 1 raw
	4	12	U12	LHKT6CALAF3T0 TEM6 CAL AFEE3 Temp 0 raw
	4	12	U12	LHKT6CALAF3T1 TEM6 CAL AFEE3 Temp 1 raw
	4	12	U12	LHKT6TKRC0T0 TEM6 TKR Cable 0 Temp 0 raw
	4	12	U12	LHKT6TKRC0T1 TEM6 TKR Cable 0 Temp 1 raw
	4	12	U12	LHKT6TKRC1T0 TEM6 TKR Cable 1 Temp 0 raw
	4	12	U12	LHKT6TKRC1T1 TEM6 TKR Cable 1 Temp 1 raw
	4	12	U12	LHKT6TKRC2T0 TEM6 TKR Cable 2 Temp 0 raw

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKT6TKRC2T1 TEM6 TKR Cable 2 Temp 1 raw
	4	12	U12	LHKT6TKRC3T0 TEM6 TKR Cable 3 Temp 0 raw
	4	12	U12	LHKT6TKRC3T1 TEM6 TKR Cable 3 Temp 1 raw
	4	12	U12	LHKT6TKRC4T0 TEM6 TKR Cable 4 Temp 0 raw
	4	12	U12	LHKT6TKRC4T1 TEM6 TKR Cable 4 Temp 1 raw
	4	12	U12	LHKT6TKRC5T0 TEM6 TKR Cable 5 Temp 0 raw
	4	12	U12	LHKT6TKRC5T1 TEM6 TKR Cable 5 Temp 1 raw
	4	12	U12	LHKT6TKRC6T0 TEM6 TKR Cable 6 Temp 0 raw
	4	12	U12	LHKT6TKRC6T1 TEM6 TKR Cable 6 Temp 1 raw
	4	12	U12	LHKT6TKRC7T0 TEM6 TKR Cable 7 Temp 0 raw
	4	12	U12	LHKT6TKRC7T1 TEM6 TKR Cable 7 Temp 1 raw
	4	12	U12	LHKT7CALAF0T0 TEM7 CAL AFEE0 Temp 0 raw
	4	12	U12	LHKT7CALAF0T1 TEM7 CAL AFEE0 Temp 1 raw
	4	12	U12	LHKT7CALAF1T0 TEM7 CAL AFEE1 Temp 0 raw
	4	12	U12	LHKT7CALAF1T1 TEM7 CAL AFEE1 Temp 1 raw
	4	12	U12	LHKT7CALAF2T0 TEM7 CAL AFEE2 Temp 0 raw
	4	12	U12	LHKT7CALAF2T1 TEM7 CAL AFEE2 Temp 1 raw
	4	12	U12	LHKT7CALAF3T0 TEM7 CAL AFEE3 Temp 0 raw
	4	12	U12	LHKT7CALAF3T1 TEM7 CAL AFEE3 Temp 1 raw
	4	12	U12	LHKT7TKRC0T0 TEM7 TKR Cable 0 Temp 0 raw
	4	12	U12	LHKT7TKRC0T1 TEM7 TKR Cable 0 Temp 1 raw
	4	12	U12	LHKT7TKRC1T0 TEM7 TKR Cable 1 Temp 0 raw
	4	12	U12	LHKT7TKRC1T1 TEM7 TKR Cable 1 Temp 1 raw
	4	12	U12	LHKT7TKRC2T0 TEM7 TKR Cable 2 Temp 0 raw
	4	12	U12	LHKT7TKRC2T1 TEM7 TKR Cable 2 Temp 1 raw
	4	12	U12	LHKT7TKRC3T0 TEM7 TKR Cable 3 Temp 0 raw

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKT7TKRC3T1 TEM7 TKR Cable 3 Temp 1 raw
	4	12	U12	LHKT7TKRC4T0 TEM7 TKR Cable 4 Temp 0 raw
	4	12	U12	LHKT7TKRC4T1 TEM7 TKR Cable 4 Temp 1 raw
	4	12	U12	LHKT7TKRC5T0 TEM7 TKR Cable 5 Temp 0 raw
	4	12	U12	LHKT7TKRC5T1 TEM7 TKR Cable 5 Temp 1 raw
	4	12	U12	LHKT7TKRC6T0 TEM7 TKR Cable 6 Temp 0 raw
	4	12	U12	LHKT7TKRC6T1 TEM7 TKR Cable 6 Temp 1 raw
	4	12	U12	LHKT7TKRC7T0 TEM7 TKR Cable 7 Temp 0 raw
	4	12	U12	LHKT7TKRC7T1 TEM7 TKR Cable 7 Temp 1 raw

10.3.10 `TemEnvTemp4` (538/0x21A)

Description:

"TEM Temperature Packet 4" Telemetry Packet

Contains temperature specific ADC values for TEMs 8 and 9.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKT8CALAF0T0 TEM8 CAL AFEE0 Temp 0 raw
	4	12	U12	LHKT8CALAF0T1 TEM8 CAL AFEE0 Temp 1 raw
	4	12	U12	LHKT8CALAF1T0 TEM8 CAL AFEE1 Temp 0 raw
	4	12	U12	LHKT8CALAF1T1 TEM8 CAL AFEE1 Temp 1 raw
	4	12	U12	LHKT8CALAF2T0 TEM8 CAL AFEE2 Temp 0 raw
	4	12	U12	LHKT8CALAF2T1 TEM8 CAL AFEE2 Temp 1 raw
	4	12	U12	LHKT8CALAF3T0 TEM8 CAL AFEE3 Temp 0 raw
	4	12	U12	LHKT8CALAF3T1 TEM8 CAL AFEE3 Temp 1 raw
	4	12	U12	LHKT8TKRC0T0 TEM8 TKR Cable 0 Temp 0 raw
	4	12	U12	LHKT8TKRC0T1 TEM8 TKR Cable 0 Temp 1 raw
	4	12	U12	LHKT8TKRC1T0 TEM8 TKR Cable 1 Temp 0 raw
	4	12	U12	LHKT8TKRC1T1

Offset	S	L	Type	ITOS name, attribute(s), and description
				TEM8 TKR Cable 1 Temp 1 raw
	4	12	U12	LHKT8TKRC2T0 TEM8 TKR Cable 2 Temp 0 raw
	4	12	U12	LHKT8TKRC2T1 TEM8 TKR Cable 2 Temp 1 raw
	4	12	U12	LHKT8TKRC3T0 TEM8 TKR Cable 3 Temp 0 raw
	4	12	U12	LHKT8TKRC3T1 TEM8 TKR Cable 3 Temp 1 raw
	4	12	U12	LHKT8TKRC4T0 TEM8 TKR Cable 4 Temp 0 raw
	4	12	U12	LHKT8TKRC4T1 TEM8 TKR Cable 4 Temp 1 raw
	4	12	U12	LHKT8TKRC5T0 TEM8 TKR Cable 5 Temp 0 raw
	4	12	U12	LHKT8TKRC5T1 TEM8 TKR Cable 5 Temp 1 raw
	4	12	U12	LHKT8TKRC6T0 TEM8 TKR Cable 6 Temp 0 raw
	4	12	U12	LHKT8TKRC6T1 TEM8 TKR Cable 6 Temp 1 raw
	4	12	U12	LHKT8TKRC7T0 TEM8 TKR Cable 7 Temp 0 raw
	4	12	U12	LHKT8TKRC7T1 TEM8 TKR Cable 7 Temp 1 raw
	4	12	U12	LHKT9CALAF0T0 TEM9 CAL AFEE0 Temp 0 raw
	4	12	U12	LHKT9CALAF0T1 TEM9 CAL AFEE0 Temp 1 raw
	4	12	U12	LHKT9CALAF1T0 TEM9 CAL AFEE1 Temp 0 raw
	4	12	U12	LHKT9CALAF1T1 TEM9 CAL AFEE1 Temp 1 raw
	4	12	U12	LHKT9CALAF2T0 TEM9 CAL AFEE2 Temp 0 raw
	4	12	U12	LHKT9CALAF2T1 TEM9 CAL AFEE2 Temp 1 raw
	4	12	U12	LHKT9CALAF3T0 TEM9 CAL AFEE3 Temp 0 raw
	4	12	U12	LHKT9CALAF3T1 TEM9 CAL AFEE3 Temp 1 raw
	4	12	U12	LHKT9TKRC0T0 TEM9 TKR Cable 0 Temp 0 raw
	4	12	U12	LHKT9TKRC0T1 TEM9 TKR Cable 0 Temp 1 raw
	4	12	U12	LHKT9TKRC1T0 TEM9 TKR Cable 1 Temp 0 raw
	4	12	U12	LHKT9TKRC1T1 TEM9 TKR Cable 1 Temp 1 raw
	4	12	U12	LHKT9TKRC2T0 TEM9 TKR Cable 2 Temp 0 raw
	4	12	U12	LHKT9TKRC2T1

Offset	S	L	Type	ITOS name, attribute(s), and description
				TEM9 TKR Cable 2 Temp 1 raw
	4	12	U12	LHKT9TKRC3T0 TEM9 TKR Cable 3 Temp 0 raw
	4	12	U12	LHKT9TKRC3T1 TEM9 TKR Cable 3 Temp 1 raw
	4	12	U12	LHKT9TKRC4T0 TEM9 TKR Cable 4 Temp 0 raw
	4	12	U12	LHKT9TKRC4T1 TEM9 TKR Cable 4 Temp 1 raw
	4	12	U12	LHKT9TKRC5T0 TEM9 TKR Cable 5 Temp 0 raw
	4	12	U12	LHKT9TKRC5T1 TEM9 TKR Cable 5 Temp 1 raw
	4	12	U12	LHKT9TKRC6T0 TEM9 TKR Cable 6 Temp 0 raw
	4	12	U12	LHKT9TKRC6T1 TEM9 TKR Cable 6 Temp 1 raw
	4	12	U12	LHKT9TKRC7T0 TEM9 TKR Cable 7 Temp 0 raw
	4	12	U12	LHKT9TKRC7T1 TEM9 TKR Cable 7 Temp 1 raw

10.3.11 `TemEnvTemp5` (539/0x21B)

Description:

"TEM Temperature Packet 5" Telemetry Packet

Contains temperature specific ADC values for TEMs A and B.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKTACALAF0T0 TEMA CAL AFEE0 Temp 0 raw
	4	12	U12	LHKTACALAF0T1 TEMA CAL AFEE0 Temp 1 raw
	4	12	U12	LHKTACALAF1T0 TEMA CAL AFEE1 Temp 0 raw
	4	12	U12	LHKTACALAF1T1 TEMA CAL AFEE1 Temp 1 raw
	4	12	U12	LHKTACALAF2T0 TEMA CAL AFEE2 Temp 0 raw
	4	12	U12	LHKTACALAF2T1 TEMA CAL AFEE2 Temp 1 raw
	4	12	U12	LHKTACALAF3T0 TEMA CAL AFEE3 Temp 0 raw
	4	12	U12	LHKTACALAF3T1 TEMA CAL AFEE3 Temp 1 raw
	4	12	U12	LHKTATKRC0T0 TEMA TKR Cable 0 Temp 0 raw
	4	12	U12	LHKTATKRC0T1 TEMA TKR Cable 0 Temp 1 raw

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKTATKRC1T0 TEMA TKR Cable 1 Temp 0 raw
	4	12	U12	LHKTATKRC1T1 TEMA TKR Cable 1 Temp 1 raw
	4	12	U12	LHKTATKRC2T0 TEMA TKR Cable 2 Temp 0 raw
	4	12	U12	LHKTATKRC2T1 TEMA TKR Cable 2 Temp 1 raw
	4	12	U12	LHKTATKRC3T0 TEMA TKR Cable 3 Temp 0 raw
	4	12	U12	LHKTATKRC3T1 TEMA TKR Cable 3 Temp 1 raw
	4	12	U12	LHKTATKRC4T0 TEMA TKR Cable 4 Temp 0 raw
	4	12	U12	LHKTATKRC4T1 TEMA TKR Cable 4 Temp 1 raw
	4	12	U12	LHKTATKRC5T0 TEMA TKR Cable 5 Temp 0 raw
	4	12	U12	LHKTATKRC5T1 TEMA TKR Cable 5 Temp 1 raw
	4	12	U12	LHKTATKRC6T0 TEMA TKR Cable 6 Temp 0 raw
	4	12	U12	LHKTATKRC6T1 TEMA TKR Cable 6 Temp 1 raw
	4	12	U12	LHKTATKRC7T0 TEMA TKR Cable 7 Temp 0 raw
	4	12	U12	LHKTATKRC7T1 TEMA TKR Cable 7 Temp 1 raw
	4	12	U12	LHKTBCALAF0T0 TEMB CAL AFEE0 Temp 0 raw
	4	12	U12	LHKTBCALAF0T1 TEMB CAL AFEE0 Temp 1 raw
	4	12	U12	LHKTBCALAF1T0 TEMB CAL AFEE1 Temp 0 raw
	4	12	U12	LHKTBCALAF1T1 TEMB CAL AFEE1 Temp 1 raw
	4	12	U12	LHKTBCALAF2T0 TEMB CAL AFEE2 Temp 0 raw
	4	12	U12	LHKTBCALAF2T1 TEMB CAL AFEE2 Temp 1 raw
	4	12	U12	LHKTBCALAF3T0 TEMB CAL AFEE3 Temp 0 raw
	4	12	U12	LHKTBCALAF3T1 TEMB CAL AFEE3 Temp 1 raw
	4	12	U12	LHKTBTKRC0T0 TEMB TKR Cable 0 Temp 0 raw
	4	12	U12	LHKTBTKRC0T1 TEMB TKR Cable 0 Temp 1 raw
	4	12	U12	LHKTBTKRC1T0 TEMB TKR Cable 1 Temp 0 raw
	4	12	U12	LHKTBTKRC1T1 TEMB TKR Cable 1 Temp 1 raw

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKTBTKRC2T0 TEMB TKR Cable 2 Temp 0 raw
	4	12	U12	LHKTBTKRC2T1 TEMB TKR Cable 2 Temp 1 raw
	4	12	U12	LHKTBTKRC3T0 TEMB TKR Cable 3 Temp 0 raw
	4	12	U12	LHKTBTKRC3T1 TEMB TKR Cable 3 Temp 1 raw
	4	12	U12	LHKTBTKRC4T0 TEMB TKR Cable 4 Temp 0 raw
	4	12	U12	LHKTBTKRC4T1 TEMB TKR Cable 4 Temp 1 raw
	4	12	U12	LHKTBTKRC5T0 TEMB TKR Cable 5 Temp 0 raw
	4	12	U12	LHKTBTKRC5T1 TEMB TKR Cable 5 Temp 1 raw
	4	12	U12	LHKTBTKRC6T0 TEMB TKR Cable 6 Temp 0 raw
	4	12	U12	LHKTBTKRC6T1 TEMB TKR Cable 6 Temp 1 raw
	4	12	U12	LHKTBTKRC7T0 TEMB TKR Cable 7 Temp 0 raw
	4	12	U12	LHKTBTKRC7T1 TEMB TKR Cable 7 Temp 1 raw

10.3.12 `TemEnvTemp6` (540/0x21C)

Description:

"TEM Temperature Packet 6" Telemetry Packet

Contains temperature specific ADC values for TEMs C and D.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKTCCALAF0T0 TEMC CAL AFEE0 Temp 0 raw
	4	12	U12	LHKTCCALAF0T1 TEMC CAL AFEE0 Temp 1 raw
	4	12	U12	LHKTCCALAF1T0 TEMC CAL AFEE1 Temp 0 raw
	4	12	U12	LHKTCCALAF1T1 TEMC CAL AFEE1 Temp 1 raw
	4	12	U12	LHKTCCALAF2T0 TEMC CAL AFEE2 Temp 0 raw
	4	12	U12	LHKTCCALAF2T1 TEMC CAL AFEE2 Temp 1 raw
	4	12	U12	LHKTCCALAF3T0 TEMC CAL AFEE3 Temp 0 raw
	4	12	U12	LHKTCCALAF3T1 TEMC CAL AFEE3 Temp 1 raw
	4	12	U12	LHKTCTKRC0T0

Offset	S	L	Type	ITOS name, attribute(s), and description
				TEMC TKR Cable 0 Temp 0 raw
	4	12	U12	LHKTCTKRC0T1
				TEMC TKR Cable 0 Temp 1 raw
	4	12	U12	LHKTCTKRC1T0
				TEMC TKR Cable 1 Temp 0 raw
	4	12	U12	LHKTCTKRC1T1
				TEMC TKR Cable 1 Temp 1 raw
	4	12	U12	LHKTCTKRC2T0
				TEMC TKR Cable 2 Temp 0 raw
	4	12	U12	LHKTCTKRC2T1
				TEMC TKR Cable 2 Temp 1 raw
	4	12	U12	LHKTCTKRC3T0
				TEMC TKR Cable 3 Temp 0 raw
	4	12	U12	LHKTCTKRC3T1
				TEMC TKR Cable 3 Temp 1 raw
	4	12	U12	LHKTCTKRC4T0
				TEMC TKR Cable 4 Temp 0 raw
	4	12	U12	LHKTCTKRC4T1
				TEMC TKR Cable 4 Temp 1 raw
	4	12	U12	LHKTCTKRC5T0
				TEMC TKR Cable 5 Temp 0 raw
	4	12	U12	LHKTCTKRC5T1
				TEMC TKR Cable 5 Temp 1 raw
	4	12	U12	LHKTCTKRC6T0
				TEMC TKR Cable 6 Temp 0 raw
	4	12	U12	LHKTCTKRC6T1
				TEMC TKR Cable 6 Temp 1 raw
	4	12	U12	LHKTCTKRC7T0
				TEMC TKR Cable 7 Temp 0 raw
	4	12	U12	LHKTCTKRC7T1
				TEMC TKR Cable 7 Temp 1 raw
	4	12	U12	LHKTDCALAF0T0
				TEMD CAL AFEE0 Temp 0 raw
	4	12	U12	LHKTDCALAF0T1
				TEMD CAL AFEE0 Temp 1 raw
	4	12	U12	LHKTDCALAF1T0
				TEMD CAL AFEE1 Temp 0 raw
	4	12	U12	LHKTDCALAF1T1
				TEMD CAL AFEE1 Temp 1 raw
	4	12	U12	LHKTDCALAF2T0
				TEMD CAL AFEE2 Temp 0 raw
	4	12	U12	LHKTDCALAF2T1
				TEMD CAL AFEE2 Temp 1 raw
	4	12	U12	LHKTDCALAF3T0
				TEMD CAL AFEE3 Temp 0 raw
	4	12	U12	LHKTDCALAF3T1
				TEMD CAL AFEE3 Temp 1 raw
	4	12	U12	LHKTDTKRC0T0
				TEMD TKR Cable 0 Temp 0 raw
	4	12	U12	LHKTDTKRC0T1
				TEMD TKR Cable 0 Temp 1 raw
	4	12	U12	LHKTDTKRC1T0

Offset	S	L	Type	ITOS name, attribute(s), and description
				TEMD TKR Cable 1 Temp 0 raw
	4	12	U12	LHKTDTKRC1T1 TEMD TKR Cable 1 Temp 1 raw
	4	12	U12	LHKTDTKRC2T0 TEMD TKR Cable 2 Temp 0 raw
	4	12	U12	LHKTDTKRC2T1 TEMD TKR Cable 2 Temp 1 raw
	4	12	U12	LHKTDTKRC3T0 TEMD TKR Cable 3 Temp 0 raw
	4	12	U12	LHKTDTKRC3T1 TEMD TKR Cable 3 Temp 1 raw
	4	12	U12	LHKTDTKRC4T0 TEMD TKR Cable 4 Temp 0 raw
	4	12	U12	LHKTDTKRC4T1 TEMD TKR Cable 4 Temp 1 raw
	4	12	U12	LHKTDTKRC5T0 TEMD TKR Cable 5 Temp 0 raw
	4	12	U12	LHKTDTKRC5T1 TEMD TKR Cable 5 Temp 1 raw
	4	12	U12	LHKTDTKRC6T0 TEMD TKR Cable 6 Temp 0 raw
	4	12	U12	LHKTDTKRC6T1 TEMD TKR Cable 6 Temp 1 raw
	4	12	U12	LHKTDTKRC7T0 TEMD TKR Cable 7 Temp 0 raw
	4	12	U12	LHKTDTKRC7T1 TEMD TKR Cable 7 Temp 1 raw

10.3.13 `TemEnvTemp7` (541/0x21D)

Description:

"TEM Temperature Packet 7" Telemetry Packet

Contains temperature specific ADC values for TEMs E and F.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKTECALAF0T0 TEME CAL AFEE0 Temp 0 raw
	4	12	U12	LHKTECALAF0T1 TEME CAL AFEE0 Temp 1 raw
	4	12	U12	LHKTECALAF1T0 TEME CAL AFEE1 Temp 0 raw
	4	12	U12	LHKTECALAF1T1 TEME CAL AFEE1 Temp 1 raw
	4	12	U12	LHKTECALAF2T0 TEME CAL AFEE2 Temp 0 raw
	4	12	U12	LHKTECALAF2T1 TEME CAL AFEE2 Temp 1 raw
	4	12	U12	LHKTECALAF3T0 TEME CAL AFEE3 Temp 0 raw

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKTECALAF3T1 TEME CAL AFEE3 Temp 1 raw
	4	12	U12	LHKTETKRC0T0 TEME TKR Cable 0 Temp 0 raw
	4	12	U12	LHKTETKRC0T1 TEME TKR Cable 0 Temp 1 raw
	4	12	U12	LHKTETKRC1T0 TEME TKR Cable 1 Temp 0 raw
	4	12	U12	LHKTETKRC1T1 TEME TKR Cable 1 Temp 1 raw
	4	12	U12	LHKTETKRC2T0 TEME TKR Cable 2 Temp 0 raw
	4	12	U12	LHKTETKRC2T1 TEME TKR Cable 2 Temp 1 raw
	4	12	U12	LHKTETKRC3T0 TEME TKR Cable 3 Temp 0 raw
	4	12	U12	LHKTETKRC3T1 TEME TKR Cable 3 Temp 1 raw
	4	12	U12	LHKTETKRC4T0 TEME TKR Cable 4 Temp 0 raw
	4	12	U12	LHKTETKRC4T1 TEME TKR Cable 4 Temp 1 raw
	4	12	U12	LHKTETKRC5T0 TEME TKR Cable 5 Temp 0 raw
	4	12	U12	LHKTETKRC5T1 TEME TKR Cable 5 Temp 1 raw
	4	12	U12	LHKTETKRC6T0 TEME TKR Cable 6 Temp 0 raw
	4	12	U12	LHKTETKRC6T1 TEME TKR Cable 6 Temp 1 raw
	4	12	U12	LHKTETKRC7T0 TEME TKR Cable 7 Temp 0 raw
	4	12	U12	LHKTETKRC7T1 TEME TKR Cable 7 Temp 1 raw
	4	12	U12	LHKTFCALAF0T0 TEMF CAL AFEE0 Temp 0 raw
	4	12	U12	LHKTFCALAF0T1 TEMF CAL AFEE0 Temp 1 raw
	4	12	U12	LHKTFCALAF1T0 TEMF CAL AFEE1 Temp 0 raw
	4	12	U12	LHKTFCALAF1T1 TEMF CAL AFEE1 Temp 1 raw
	4	12	U12	LHKTFCALAF2T0 TEMF CAL AFEE2 Temp 0 raw
	4	12	U12	LHKTFCALAF2T1 TEMF CAL AFEE2 Temp 1 raw
	4	12	U12	LHKTFCALAF3T0 TEMF CAL AFEE3 Temp 0 raw
	4	12	U12	LHKTFCALAF3T1 TEMF CAL AFEE3 Temp 1 raw
	4	12	U12	LHKTFTKRC0T0 TEMF TKR Cable 0 Temp 0 raw

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKTFTKRC0T1 TEMF TKR Cable 0 Temp 1 raw
	4	12	U12	LHKTFTKRC1T0 TEMF TKR Cable 1 Temp 0 raw
	4	12	U12	LHKTFTKRC1T1 TEMF TKR Cable 1 Temp 1 raw
	4	12	U12	LHKTFTKRC2T0 TEMF TKR Cable 2 Temp 0 raw
	4	12	U12	LHKTFTKRC2T1 TEMF TKR Cable 2 Temp 1 raw
	4	12	U12	LHKTFTKRC3T0 TEMF TKR Cable 3 Temp 0 raw
	4	12	U12	LHKTFTKRC3T1 TEMF TKR Cable 3 Temp 1 raw
	4	12	U12	LHKTFTKRC4T0 TEMF TKR Cable 4 Temp 0 raw
	4	12	U12	LHKTFTKRC4T1 TEMF TKR Cable 4 Temp 1 raw
	4	12	U12	LHKTFTKRC5T0 TEMF TKR Cable 5 Temp 0 raw
	4	12	U12	LHKTFTKRC5T1 TEMF TKR Cable 5 Temp 1 raw
	4	12	U12	LHKTFTKRC6T0 TEMF TKR Cable 6 Temp 0 raw
	4	12	U12	LHKTFTKRC6T1 TEMF TKR Cable 6 Temp 1 raw
	4	12	U12	LHKTFTKRC7T0 TEMF TKR Cable 7 Temp 0 raw
	4	12	U12	LHKTFTKRC7T1 TEMF TKR Cable 7 Temp 1 raw

10.3.14 `PduEnv0` (542/0x21E)

Description:

"PDU Environmental Packet 0" Telemetry Packet

PDU Packet 0

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x014	0	1	U1	LHKP0TEMFPM; LDPDUTEMPWRST PDU0 TEMF Power Mgt Switch
	1	1	U1	LHKP0TEMEPM PDU0 TEME Power Mgt Switch
	2	1	U1	LHKP0TEMDPM PDU0 TEMD Power Mgt Switch
	3	1	U1	LHKP0TEMCPM PDU0 TEMC Power Mgt Switch
	4	1	U1	LHKP0TEMBPM PDU0 TEMB Power Mgt Switch
	5	1	U1	LHKP0TEMAPM

Offset	S	L	Type	ITOS name, attribute(s), and description
				PDU0 TEMA Power Mgt Switch
	6	1	U1	LHKP0TEM9PM PDU0 TEM9 Power Mgt Switch
	7	1	U1	LHKP0TEM8PM PDU0 TEM8 Power Mgt Switch
	8	1	U1	LHKP0TEM7PM PDU0 TEM7 Power Mgt Switch
	9	1	U1	LHKP0TEM6PM PDU0 TEM6 Power Mgt Switch
	10	1	U1	LHKP0TEM5PM PDU0 TEM5 Power Mgt Switch
	11	1	U1	LHKP0TEM4PM PDU0 TEM4 Power Mgt Switch
	12	1	U1	LHKP0TEM3PM PDU0 TEM3 Power Mgt Switch
	13	1	U1	LHKP0TEM2PM PDU0 TEM2 Power Mgt Switch
	14	1	U1	LHKP0TEM1PM PDU0 TEM1 Power Mgt Switch
	15	1	U1	LHKP0TEM0PM PDU0 TEM0 Power Mgt Switch
	10	1	U1	LHKP0EPU2CNVT PDU0 EPU2 Power Converter Switch
	11	1	U1	LHKP0EPU1CNVT PDU0 EPU1 Power Converter Switch
	12	1	U1	LHKP0EPU0CNVT PDU0 EPU0 Power Converter Switch
	13	1	U1	LHKP0EPU2PM PDU0 EPU2 Power Mgt Switch
	14	1	U1	LHKP0EPU1PM PDU0 EPU1 Power Mgt Switch
	15	1	U1	LHKP0EPU0PM PDU0 EPU0 Power Mgt Switch
	13	1	U1	LHKP0ACDCNVT PDU0 ACD Converter Switch
	14	1	I1	LHKP0ACDPSP PDU0 ACD Power Supply Switch
	15	1	I1	LHKP0ACDPM PDU0 ACD Power Mgt Switch
	4	12	U12	LHKP0TEM033V PDU0 TEM0 3.3V digital raw
	4	12	U12	LHKP0TEM133V PDU0 TEM1 3.3V digital raw
	4	12	U12	LHKP0TEM233V PDU0 TEM2 3.3V digital raw
	4	12	U12	LHKP0TEM333V PDU0 TEM3 3.3V digital raw
	4	12	U12	LHKP0TEM433V PDU0 TEM4 3.3V digital raw
	4	12	U12	LHKP0TEM533V PDU0 TEM5 3.3V digital raw
	4	12	U12	LHKP0TEM633V

Offset	S	L	Type	ITOS name, attribute(s), and description
				PDU0 TEM6 3.3V digital raw
	4	12	U12	LHKP0TEM733V
				PDU0 TEM7 3.3V digital raw
	4	12	U12	LHKP0TEM833V
				PDU0 TEM8 3.3V digital raw
	4	12	U12	LHKP0TEM933V
				PDU0 TEM9 3.3V digital raw
	4	12	U12	LHKP0TEMA33V
				PDU0 TEMA 3.3V digital raw
	4	12	U12	LHKP0TEMB33V
				PDU0 TEMB 3.3V digital raw
	4	12	U12	LHKP0TEMC33V
				PDU0 TEMC 3.3V digital raw
	4	12	U12	LHKP0TEMD33V
				PDU0 TEMD 3.3V digital raw
	4	12	U12	LHKP0TEME33V
				PDU0 TEME 3.3V digital raw
	4	12	U12	LHKP0TEMF33V
				PDU0 TEMF 3.3V digital raw
	4	12	U12	LHKP0TEM0PCT
				PDU0 TEM0 PCB temperature raw
	4	12	U12	LHKP0TEM1PCT
				PDU0 TEM1 PCB temperature raw
	4	12	U12	LHKP0TEM2PCT
				PDU0 TEM2 PCB temperature raw
	4	12	U12	LHKP0TEM3PCT
				PDU0 TEM3 PCB temperature raw
	4	12	U12	LHKP0TEM4PCT
				PDU0 TEM4 PCB temperature raw
	4	12	U12	LHKP0TEM5PCT
				PDU0 TEM5 PCB temperature raw
	4	12	U12	LHKP0TEM6PCT
				PDU0 TEM6 PCB temperature raw
	4	12	U12	LHKP0TEM7PCT
				PDU0 TEM7 PCB temperature raw
	4	12	U12	LHKP0TEM8PCT
				PDU0 TEM8 PCB temperature raw
	4	12	U12	LHKP0TEM9PCT
				PDU0 TEM9 PCB temperature raw
	4	12	U12	LHKP0TEMAPCT
				PDU0 TEMA PCB temperature raw
	4	12	U12	LHKP0TEMBPCT
				PDU0 TEMB PCB temperature raw
	4	12	U12	LHKP0TEMCPCT
				PDU0 TEMC PCB temperature raw
	4	12	U12	LHKP0TEMDPCT
				PDU0 TEMD PCB temperature raw
	4	12	U12	LHKP0TEMEPCT
				PDU0 TEME PCB temperature raw
	4	12	U12	LHKP0TEMFPCT
				PDU0 TEMF PCB temperature raw
	4	12	U12	LHKP0EPU033V

Offset	S	L	Type	ITOS name, attribute(s), and description
				PDU0 EPU0 3.3V digital raw
	4	12	U12	LHKP0EPU133V PDU0 EPU1 3.3V digital raw
	4	12	U12	LHKP0EPU233V PDU0 EPU2 3.3V digital raw
	4	12	U12	LHKP0EPU0T PDU0 EPU0 temperature raw
	4	12	U12	LHKP0EPU1T PDU0 EPU1 temperature raw
	4	12	U12	LHKP0EPU2T PDU0 EPU2 temperature raw
	4	12	U12	LHKAFR33ISUM AEM FREE Board 3.3 Current Sum
	4	12	U12	LHKADABTEMP DAQ Board Temperature
	4	12	U12	LHKAFR28ISUM AEM FREE Board 28V Current Sum
	4	12	U12	LHKADAB33V DAQ Board 3.3V

10.3.15 `PduEnv1` (543/0x21F)

Description:

"PDU Environmental Packet 1" Telemetry Packet

PDU Packet 1

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKP0TEM0PST PDU0 TEM0 power supply temperature raw
	4	12	U12	LHKP0TEM1PST PDU0 TEM1 power supply temperature raw
	4	12	U12	LHKP0TEM2PST PDU0 TEM2 power supply temperature raw
	4	12	U12	LHKP0TEM3PST PDU0 TEM3 power supply temperature raw
	4	12	U12	LHKP0TEM4PST PDU0 TEM4 power supply temperature raw
	4	12	U12	LHKP0TEM5PST PDU0 TEM5 power supply temperature raw
	4	12	U12	LHKP0TEM6PST PDU0 TEM6 power supply temperature raw
	4	12	U12	LHKP0TEM7PST PDU0 TEM7 power supply temperature raw
	4	12	U12	LHKP0TEM8PST PDU0 TEM8 power supply temperature raw
	4	12	U12	LHKP0TEM9PST PDU0 TEM9 power supply temperature raw
	4	12	U12	LHKP0TEMAPST PDU0 TEMA power supply temperature raw

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	`U12`	`LHKP0TEMBPST` PDU0 TEMB power supply temperature raw
	4	12	`U12`	`LHKP0TEMCPST` PDU0 TEMC power supply temperature raw
	4	12	`U12`	`LHKP0TEMDPST` PDU0 TEMD power supply temperature raw
	4	12	`U12`	`LHKP0TEMEPST` PDU0 TEME power supply temperature raw
	4	12	`U12`	`LHKP0TEMFPST` PDU0 TEMF power supply temperature raw
	4	12	`U12`	`LHKP0CAL0BPT` PDU0 TEM0 CAL baseplate temperature raw
	4	12	`U12`	`LHKP0CAL1BPT` PDU0 TEM1 CAL baseplate temperature raw
	4	12	`U12`	`LHKP0CAL2BPT` PDU0 TEM2 CAL baseplate temperature raw
	4	12	`U12`	`LHKP0CAL3BPT` PDU0 TEM3 CAL baseplate temperature raw
	4	12	`U12`	`LHKP0CAL4BPT` PDU0 TEM4 CAL baseplate temperature raw
	4	12	`U12`	`LHKP0CAL5BPT` PDU0 TEM5 CAL baseplate temperature raw
	4	12	`U12`	`LHKP0CAL6BPT` PDU0 TEM6 CAL baseplate temperature raw
	4	12	`U12`	`LHKP0CAL7BPT` PDU0 TEM7 CAL baseplate temperature raw
	4	12	`U12`	`LHKP0CAL8BPT` PDU0 TEM8 CAL baseplate temperature raw
	4	12	`U12`	`LHKP0CAL9BPT` PDU0 TEM9 CAL baseplate temperature raw
	4	12	`U12`	`LHKP0CALABPT` PDU0 TEMA CAL baseplate temperature raw
	4	12	`U12`	`LHKP0CALBBPT` PDU0 TEMB CAL baseplate temperature raw
	4	12	`U12`	`LHKP0CALCBPT` PDU0 TEMC CAL baseplate temperature raw
	4	12	`U12`	`LHKP0CALDBPT` PDU0 TEMD CAL baseplate temperature raw
	4	12	`U12`	`LHKP0CALEBPT` PDU0 TEME CAL baseplate temperature raw
	4	12	`U12`	`LHKP0CALFBPT` PDU0 TEMF CAL baseplate temperature raw

10.3.16 `PduEnv2` (544/0x220)

Description:

"PDU Environmental Packet 2" Telemetry Packet

PDU Packet 2

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKP0HP0DSIT +Y VCHP 0 DSHP Interface temperature raw
	4	12	U12	LHKP0HP1DSIT +Y VCHP 1 DSHP Interface temperature raw
	4	12	U12	LHKP0HP2DSIT +Y VCHP 2 DSHP Interface temperature raw
	4	12	U12	LHKP0HP3DSIT +Y VCHP 3 DSHP Interface temperature raw
	4	12	U12	LHKP0HP4DSIT +Y VCHP 4 DSHP Interface temperature raw
	4	12	U12	LHKP0HP5DSIT +Y VCHP 5 DSHP Interface temperature raw
	4	12	U12	LHKP0MHP0DSIT -Y VCHP 0 DSHP Interface temperature raw
	4	12	U12	LHKP0MHP1DSIT -Y VCHP 1 DSHP Interface temperature raw
	4	12	U12	LHKP0MHP2DSIT -Y VCHP 2 DSHP Interface temperature raw
	4	12	U12	LHKP0MHP3DSIT -Y VCHP 3 DSHP Interface temperature raw
	4	12	U12	LHKP0MHP4DSIT -Y VCHP 4 DSHP Interface temperature raw
	4	12	U12	LHKP0MHP5DSIT -Y VCHP 5 DSHP Interface temperature raw
	4	12	U12	LHKP0HP0XLIT +Y VCHP 0 XLHP Interface temperature raw
	4	12	U12	LHKP0HP1XLIT +Y VCHP 1 XLHP Interface temperature raw
	4	12	U12	LHKP0HP2XLIT +Y VCHP 2 XLHP Interface temperature raw
	4	12	U12	LHKP0HP3XLIT +Y VCHP 3 XLHP Interface temperature raw
	4	12	U12	LHKP0HP4XLIT +Y VCHP 4 XLHP Interface temperature raw
	4	12	U12	LHKP0HP5XLIT +Y VCHP 5 XLHP Interface temperature raw
	4	12	U12	LHKP0MHP0XLIT -Y VCHP 0 XLHP Interface temperature raw
	4	12	U12	LHKP0MHP1XLIT -Y VCHP 1 XLHP Interface temperature raw
	4	12	U12	LHKP0MHP2XLIT -Y VCHP 2 XLHP Interface temperature raw
	4	12	U12	LHKP0MHP3XLIT -Y VCHP 3 XLHP Interface temperature raw
	4	12	U12	LHKP0MHP4XLIT -Y VCHP 4 XLHP Interface temperature raw
	4	12	U12	LHKP0MHP5XLIT -Y VCHP 5 XLHP Interface temperature raw
	4	12	U12	LHKP0HP0RVHT +Y VCHP 0 reservoir heater temperature raw
	4	12	U12	LHKP0HP1RVHT

Offset	S	L	Type	ITOS name, attribute(s), and description
				+Y VCHP 1 reservoir heater temperature raw
	4	12	U12	LHKP0PHP2RVHT +Y VCHP 2 reservoir heater temperature raw
	4	12	U12	LHKP0PHP3RVHT +Y VCHP 3 reservoir heater temperature raw
	4	12	U12	LHKP0PHP4RVHT +Y VCHP 4 reservoir heater temperature raw
	4	12	U12	LHKP0PHP5RVHT +Y VCHP 5 reservoir heater temperature raw
	4	12	U12	LHKP0MHP0RVHT -Y VCHP 0 reservoir heater temperature raw
	4	12	U12	LHKP0MHP1RVHT -Y VCHP 1 reservoir heater temperature raw
	4	12	U12	LHKP0MHP2RVHT -Y VCHP 2 reservoir heater temperature raw
	4	12	U12	LHKP0MHP3RVHT -Y VCHP 3 reservoir heater temperature raw
	4	12	U12	LHKP0MHP4RVHT -Y VCHP 4 reservoir heater temperature raw
	4	12	U12	LHKP0MHP5RVHT -Y VCHP 5 reservoir heater temperature raw

10.3.17 `PduEnv3` (545/0x221)

Description:

"PDU Environmental Packet 3" Telemetry Packet

PDU Packet 3

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKP0GRID0T Grid 0 temperature raw
	4	12	U12	LHKP0GRID1T Grid 1 temperature raw
	4	12	U12	LHKP0GRID2T Grid 2 temperature raw
	4	12	U12	LHKP0GRID3T Grid 3 temperature raw
	4	12	U12	LHKP0GRID4T Grid 4 temperature raw
	4	12	U12	LHKP0GRID5T Grid 5 temperature raw
	4	12	U12	LHKP0GRID6T Grid 6 temperature raw
	4	12	U12	LHKP0GRID7T Grid 7 temperature raw
	4	12	U12	LHKP0GRID8T Grid 8 temperature raw
	4	12	U12	LHKP0GRID9T Grid 9 temperature raw

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKP0GRID10T Grid 10 temperature raw
	4	12	U12	LHKP0GRID11T Grid 11 temperature raw
	4	12	U12	LHKP0ACDSHT0 ACD shell temperature 0 raw
	4	12	U12	LHKP0ACDSHT1 ACD shell temperature 1 raw
	4	12	U12	LHKP0ACDPRT0 ACD PMT rail temperature 0 raw
	4	12	U12	LHKP0ACDPRT1 ACD PMT rail temperature 1 raw
	4	12	U12	LHKP0ACDPRT2 ACD PMT rail temperature 2 raw
	4	12	U12	LHKP0ACDPRT3 ACD PMT rail temperature 3 raw
	4	12	U12	LHKP0ACDBGT0 ACD BEA grid temperature 0 raw
	4	12	U12	LHKP0ACDBGT1 ACD BEA grid temperature 1 raw
	4	12	U12	LHKP0RADAFHT0 Radiator 0 antifreeze heater temperature raw
	4	12	U12	LHKP0RADAFHT1 Radiator 1 antifreeze heater temperature raw
	4	12	U12	LHKP0GRAD0IFT Grid radiator 0 interface temperature raw
	4	12	U12	LHKP0GRAD1IFT Grid radiator 1 interface temperature raw
	4	12	U12	LHKP0GRAD2IFT Grid radiator 2 interface temperature raw
	4	12	U12	LHKP0GRAD3IFT Grid radiator 3 interface temperature raw
	4	12	U12	LHKP0RAD0T Radiator 0 temperature raw
	4	12	U12	LHKP0RAD1T Radiator 1 temperature raw
	4	12	U12	LHKP0RAD2T Radiator 2 temperature raw
	4	12	U12	LHKP0RAD3T Radiator 3 temperature raw
	4	12	U12	LHKP0RAD4T Radiator 4 temperature raw
	4	12	U12	LHKP0RAD5T Radiator 5 temperature raw
	4	12	U12	LHKP0RAD6T Radiator 6 temperature raw
	4	12	U12	LHKP0RAD7T Radiator 7 temperature raw
	4	12	U12	LHKP0RAD8T Radiator 8 temperature raw
	4	12	U12	LHKP0RAD9T Radiator 9 temperature raw

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKP0RAD10T Radiator 10 temperature raw
	4	12	U12	LHKP0RAD11T Radiator 11 temperature raw

10.3.18 `PduEnv4` (546/0x222)

Description:

"PDU Environmental Packet 4" Telemetry Packet

PDU Packet 4

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x014	0	1	U1	LHKP1TEMFPM; LDPDUTEMPWRST PDU1 TEMF Power Mgt Switch
	1	1	U1	LHKP1TEMEPM PDU1 TEME Power Mgt Switch
	2	1	U1	LHKP1TEMDPM PDU1 TEMD Power Mgt Switch
	3	1	U1	LHKP1TEMCPM PDU1 TEMC Power Mgt Switch
	4	1	U1	LHKP1TEMBPM PDU1 TEMB Power Mgt Switch
	5	1	U1	LHKP1TEMAPM PDU1 TEMA Power Mgt Switch
	6	1	U1	LHKP1TEM9PM PDU1 TEM9 Power Mgt Switch
	7	1	U1	LHKP1TEM8PM PDU1 TEM8 Power Mgt Switch
	8	1	U1	LHKP1TEM7PM PDU1 TEM7 Power Mgt Switch
	9	1	U1	LHKP1TEM6PM PDU1 TEM6 Power Mgt Switch
	10	1	U1	LHKP1TEM5PM PDU1 TEM5 Power Mgt Switch
	11	1	U1	LHKP1TEM4PM PDU1 TEM4 Power Mgt Switch
	12	1	U1	LHKP1TEM3PM PDU1 TEM3 Power Mgt Switch
	13	1	U1	LHKP1TEM2PM PDU1 TEM2 Power Mgt Switch
	14	1	U1	LHKP1TEM1PM PDU1 TEM1 Power Mgt Switch
	15	1	U1	LHKP1TEM0PM PDU1 TEM0 Power Mgt Switch
	10	1	U1	LHKP1EPU2CNVT PDU1 EPU2 Power Converter Switch
	11	1	U1	LHKP1EPU1CNVT PDU1 EPU1 Power Converter Switch
	12	1	U1	LHKP1EPU0CNVT

Offset	S	L	Type	ITOS name, attribute(s), and description
				PDU1 EPU0 Power Converter Switch
	13	1	U1	LHKP1EPU2PM
				PDU1 EPU2 Power Mgt Switch
	14	1	U1	LHKP1EPU1PM
				PDU1 EPU1 Power Mgt Switch
	15	1	U1	LHKP1EPU0PM
				PDU1 EPU0 Power Mgt Switch
	13	1	U1	LHKP1ACDCNVT
				PDU1 ACD Converter Switch
	14	1	I1	LHKP1ACDPSP
				PDU1 ACD Power Supply Switch
	15	1	I1	LHKP1ACDPM
				PDU1 ACD Power Mgt Switch
	4	12	U12	LHKP1TEM033V
				PDU1 TEM0 3.3V digital raw
	4	12	U12	LHKP1TEM133V
				PDU1 TEM1 3.3V digital raw
	4	12	U12	LHKP1TEM233V
				PDU1 TEM2 3.3V digital raw
	4	12	U12	LHKP1TEM333V
				PDU1 TEM3 3.3V digital raw
	4	12	U12	LHKP1TEM433V
				PDU1 TEM4 3.3V digital raw
	4	12	U12	LHKP1TEM533V
				PDU1 TEM5 3.3V digital raw
	4	12	U12	LHKP1TEM633V
				PDU1 TEM6 3.3V digital raw
	4	12	U12	LHKP1TEM733V
				PDU1 TEM7 3.3V digital raw
	4	12	U12	LHKP1TEM833V
				PDU1 TEM8 3.3V digital raw
	4	12	U12	LHKP1TEM933V
				PDU1 TEM9 3.3V digital raw
	4	12	U12	LHKP1TEMA33V
				PDU1 TEMA 3.3V digital raw
	4	12	U12	LHKP1TEMB33V
				PDU1 TEMB 3.3V digital raw
	4	12	U12	LHKP1TEMC33V
				PDU1 TEMC 3.3V digital raw
	4	12	U12	LHKP1TEMD33V
				PDU1 TEMD 3.3V digital raw
	4	12	U12	LHKP1TEME33V
				PDU1 TEME 3.3V digital raw
	4	12	U12	LHKP1TEMF33V
				PDU1 TEMF 3.3V digital raw
	4	12	U12	LHKP1TEM0PCT
				PDU1 TEM0 PCB temperature raw
	4	12	U12	LHKP1TEM1PCT
				PDU1 TEM1 PCB temperature raw
	4	12	U12	LHKP1TEM2PCT
				PDU1 TEM2 PCB temperature raw
	4	12	U12	LHKP1TEM3PCT

Offset	S	L	Type	ITOS name, attribute(s), and description
				PDU1 TEM3 PCB temperature raw
	4	12	U12	LHKP1TEM4PCT PDU1 TEM4 PCB temperature raw
	4	12	U12	LHKP1TEM5PCT PDU1 TEM5 PCB temperature raw
	4	12	U12	LHKP1TEM6PCT PDU1 TEM6 PCB temperature raw
	4	12	U12	LHKP1TEM7PCT PDU1 TEM7 PCB temperature raw
	4	12	U12	LHKP1TEM8PCT PDU1 TEM8 PCB temperature raw
	4	12	U12	LHKP1TEM9PCT PDU1 TEM9 PCB temperature raw
	4	12	U12	LHKP1TEMAPCT PDU1 TEMA PCB temperature raw
	4	12	U12	LHKP1TEMBPCT PDU1 TEMB PCB temperature raw
	4	12	U12	LHKP1TEMCPCT PDU1 TEMC PCB temperature raw
	4	12	U12	LHKP1TEMDPCT PDU1 TEMD PCB temperature raw
	4	12	U12	LHKP1TEMEPCT PDU1 TEME PCB temperature raw
	4	12	U12	LHKP1TEMFPCT PDU1 TEMF PCB temperature raw
	4	12	U12	LHKP1EPU033V PDU1 EPU0 3.3V digital raw
	4	12	U12	LHKP1EPU133V PDU1 EPU1 3.3V digital raw
	4	12	U12	LHKP1EPU233V PDU1 EPU2 3.3V digital raw
	4	12	U12	LHKP1EPU0T PDU1 EPU0 temperature raw
	4	12	U12	LHKP1EPU1T PDU1 EPU1 temperature raw
	4	12	U12	LHKP1EPU2T PDU1 EPU2 temperature raw

10.3.19 **`PduEnv5`** (547/0x223)

Description:

"PDU Environmental Packet 5" Telemetry Packet

PDU Packet 5

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKP1TEM0PST PDU1 TEM0 power supply temperature raw
	4	12	U12	LHKP1TEM1PST PDU1 TEM1 power supply temperature raw

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKP1TEM2PST PDU1 TEM2 power supply temperature raw
	4	12	U12	LHKP1TEM3PST PDU1 TEM3 power supply temperature raw
	4	12	U12	LHKP1TEM4PST PDU1 TEM4 power supply temperature raw
	4	12	U12	LHKP1TEM5PST PDU1 TEM5 power supply temperature raw
	4	12	U12	LHKP1TEM6PST PDU1 TEM6 power supply temperature raw
	4	12	U12	LHKP1TEM7PST PDU1 TEM7 power supply temperature raw
	4	12	U12	LHKP1TEM8PST PDU1 TEM8 power supply temperature raw
	4	12	U12	LHKP1TEM9PST PDU1 TEM9 power supply temperature raw
	4	12	U12	LHKP1TEMAPST PDU1 TEMA power supply temperature raw
	4	12	U12	LHKP1TEMBPST PDU1 TEMB power supply temperature raw
	4	12	U12	LHKP1TEMCPST PDU1 TEMC power supply temperature raw
	4	12	U12	LHKP1TEMDPST PDU1 TEMD power supply temperature raw
	4	12	U12	LHKP1TEMEPST PDU1 TEME power supply temperature raw
	4	12	U12	LHKP1TEMFPST PDU1 TEMF power supply temperature raw
	4	12	U12	LHKP1CAL0BPT PDU1 TEM0 CAL baseplate temperature raw
	4	12	U12	LHKP1CAL1BPT PDU1 TEM1 CAL baseplate temperature raw
	4	12	U12	LHKP1CAL2BPT PDU1 TEM2 CAL baseplate temperature raw
	4	12	U12	LHKP1CAL3BPT PDU1 TEM3 CAL baseplate temperature raw
	4	12	U12	LHKP1CAL4BPT PDU1 TEM4 CAL baseplate temperature raw
	4	12	U12	LHKP1CAL5BPT PDU1 TEM5 CAL baseplate temperature raw
	4	12	U12	LHKP1CAL6BPT PDU1 TEM6 CAL baseplate temperature raw
	4	12	U12	LHKP1CAL7BPT PDU1 TEM7 CAL baseplate temperature raw
	4	12	U12	LHKP1CAL8BPT PDU1 TEM8 CAL baseplate temperature raw
	4	12	U12	LHKP1CAL9BPT PDU1 TEM9 CAL baseplate temperature raw
	4	12	U12	LHKP1CALABPT PDU1 TEMA CAL baseplate temperature raw
	4	12	U12	LHKP1CALBBPT PDU1 TEMB CAL baseplate temperature raw

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKP1CALCBPT PDU1 TEMC CAL baseplate temperature raw
	4	12	U12	LHKP1CALDBPT PDU1 TEMD CAL baseplate temperature raw
	4	12	U12	LHKP1CALEBPT PDU1 TEME CAL baseplate temperature raw
	4	12	U12	LHKP1CALFBPT PDU1 TEMF CAL baseplate temperature raw

10.3.20 `PduEnv6` (548/0x224)

Description:

"PDU Environmental Packet 6" Telemetry Packet

PDU Packet 6

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKP1PHP0DSIT +Y VCHP 0 DSHP Interface temperature raw
	4	12	U12	LHKP1PHP1DSIT +Y VCHP 1 DSHP Interface temperature raw
	4	12	U12	LHKP1PHP2DSIT +Y VCHP 2 DSHP Interface temperature raw
	4	12	U12	LHKP1PHP3DSIT +Y VCHP 3 DSHP Interface temperature raw
	4	12	U12	LHKP1PHP4DSIT +Y VCHP 4 DSHP Interface temperature raw
	4	12	U12	LHKP1PHP5DSIT +Y VCHP 5 DSHP Interface temperature raw
	4	12	U12	LHKP1MHP0DSIT -Y VCHP 0 DSHP Interface temperature raw
	4	12	U12	LHKP1MHP1DSIT -Y VCHP 1 DSHP Interface temperature raw
	4	12	U12	LHKP1MHP2DSIT -Y VCHP 2 DSHP Interface temperature raw
	4	12	U12	LHKP1MHP3DSIT -Y VCHP 3 DSHP Interface temperature raw
	4	12	U12	LHKP1MHP4DSIT -Y VCHP 4 DSHP Interface temperature raw
	4	12	U12	LHKP1MHP5DSIT -Y VCHP 5 DSHP Interface temperature raw
	4	12	U12	LHKP1PHP0XLIT +Y VCHP 0 XLHP Interface temperature raw
	4	12	U12	LHKP1PHP1XLIT +Y VCHP 1 XLHP Interface temperature raw
	4	12	U12	LHKP1PHP2XLIT +Y VCHP 2 XLHP Interface temperature raw
	4	12	U12	LHKP1PHP3XLIT +Y VCHP 3 XLHP Interface temperature raw
	4	12	U12	LHKP1PHP4XLIT

Offset	S	L	Type	ITOS name, attribute(s), and description
				+Y VCHP 4 XLHP Interface temperature raw
	4	12	U12	LHKP1PHP5XLIT +Y VCHP 5 XLHP Interface temperature raw
	4	12	U12	LHKP1MHP0XLIT -Y VCHP 0 XLHP Interface temperature raw
	4	12	U12	LHKP1MHP1XLIT -Y VCHP 1 XLHP Interface temperature raw
	4	12	U12	LHKP1MHP2XLIT -Y VCHP 2 XLHP Interface temperature raw
	4	12	U12	LHKP1MHP3XLIT -Y VCHP 3 XLHP Interface temperature raw
	4	12	U12	LHKP1MHP4XLIT -Y VCHP 4 XLHP Interface temperature raw
	4	12	U12	LHKP1MHP5XLIT -Y VCHP 5 XLHP Interface temperature raw
	4	12	U12	LHKP1PHP0RVHT +Y VCHP 0 reservoir heater temperature raw
	4	12	U12	LHKP1PHP1RVHT +Y VCHP 1 reservoir heater temperature raw
	4	12	U12	LHKP1PHP2RVHT +Y VCHP 2 reservoir heater temperature raw
	4	12	U12	LHKP1PHP3RVHT +Y VCHP 3 reservoir heater temperature raw
	4	12	U12	LHKP1PHP4RVHT +Y VCHP 4 reservoir heater temperature raw
	4	12	U12	LHKP1PHP5RVHT +Y VCHP 5 reservoir heater temperature raw
	4	12	U12	LHKP1MHP0RVHT -Y VCHP 0 reservoir heater temperature raw
	4	12	U12	LHKP1MHP1RVHT -Y VCHP 1 reservoir heater temperature raw
	4	12	U12	LHKP1MHP2RVHT -Y VCHP 2 reservoir heater temperature raw
	4	12	U12	LHKP1MHP3RVHT -Y VCHP 3 reservoir heater temperature raw
	4	12	U12	LHKP1MHP4RVHT -Y VCHP 4 reservoir heater temperature raw
	4	12	U12	LHKP1MHP5RVHT -Y VCHP 5 reservoir heater temperature raw

10.3.21 `PduEnv7` (549/0x225)

Description:

"PDU Environmental Packet 7" Telemetry Packet

PDU Packet 7

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKP1GRID0T Grid 0 temperature raw

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKP1GRID1T Grid 1 temperature raw
	4	12	U12	LHKP1GRID2T Grid 2 temperature raw
	4	12	U12	LHKP1GRID3T Grid 3 temperature raw
	4	12	U12	LHKP1GRID4T Grid 4 temperature raw
	4	12	U12	LHKP1GRID5T Grid 5 temperature raw
	4	12	U12	LHKP1GRID6T Grid 6 temperature raw
	4	12	U12	LHKP1GRID7T Grid 7 temperature raw
	4	12	U12	LHKP1GRID8T Grid 8 temperature raw
	4	12	U12	LHKP1GRID9T Grid 9 temperature raw
	4	12	U12	LHKP1GRID10T Grid 10 temperature raw
	4	12	U12	LHKP1GRID11T Grid 11 temperature raw
	4	12	U12	LHKP1ACDSHT0 ACD shell temperature 0 raw
	4	12	U12	LHKP1ACDSHT1 ACD shell temperature 1 raw
	4	12	U12	LHKP1ACDPRT0 ACD PMT rail temperature 0 raw
	4	12	U12	LHKP1ACDPRT1 ACD PMT rail temperature 1 raw
	4	12	U12	LHKP1ACDPRT2 ACD PMT rail temperature 2 raw
	4	12	U12	LHKP1ACDPRT3 ACD PMT rail temperature 3 raw
	4	12	U12	LHKP1ACDBGT0 ACD BEA grid temperature 0 raw
	4	12	U12	LHKP1ACDBGT1 ACD BEA grid temperature 1 raw
	4	12	U12	LHKP1RADAFHT0 Radiator 0 antifreeze heater temperature raw
	4	12	U12	LHKP1RADAFHT1 Radiator 1 antifreeze heater temperature raw
	4	12	U12	LHKP1GRAD0IFT Grid radiator 0 interface temperature raw
	4	12	U12	LHKP1GRAD1IFT Grid radiator 1 interface temperature raw
	4	12	U12	LHKP1GRAD2IFT Grid radiator 2 interface temperature raw
	4	12	U12	LHKP1GRAD3IFT Grid radiator 3 interface temperature raw
	4	12	U12	LHKP1RAD0T Radiator 0 temperature raw

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKP1RAD1T Radiator 1 temperature raw
	4	12	U12	LHKP1RAD2T Radiator 2 temperature raw
	4	12	U12	LHKP1RAD3T Radiator 3 temperature raw
	4	12	U12	LHKP1RAD4T Radiator 4 temperature raw
	4	12	U12	LHKP1RAD5T Radiator 5 temperature raw
	4	12	U12	LHKP1RAD6T Radiator 6 temperature raw
	4	12	U12	LHKP1RAD7T Radiator 7 temperature raw
	4	12	U12	LHKP1RAD8T Radiator 8 temperature raw
	4	12	U12	LHKP1RAD9T Radiator 9 temperature raw
	4	12	U12	LHKP1RAD10T Radiator 10 temperature raw
	4	12	U12	LHKP1RAD11T Radiator 11 temperature raw

10.3.22 `AemEnv0` (550/0x226)

Description:

"AEM Environmental Monitor Packet 0" Telemetry Packet

AEM Packet 0

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	1	U1	LHKAEMFR11PWRST AEM Free 11 Power State
	5	1	U1	LHKAEMFR10PWRST AEM Free 10 Power State
	6	1	U1	LHKAEMFR9PWRST AEM Free 9 Power State
	7	1	U1	LHKAEMFR8PWRST AEM Free 8 Power State
	8	1	U1	LHKAEMFR7PWRST AEM Free 7 Power State
	9	1	U1	LHKAEMFR6PWRST AEM Free 6 Power State
	10	1	U1	LHKAEMFR5PWRST AEM Free 5 Power State
	11	1	U1	LHKAEMFR4PWRST AEM Free 4 Power State
	12	1	U1	LHKAEMFR3PWRST AEM Free 3 Power State
	13	1	U1	LHKAEMFR2PWRST

Offset	S	L	Type	ITOS name, attribute(s), and description
				AEM Free 2 Power State
	14	1	U1	LHKAEMFR1PWRST
				AEM Free 1 Power State
	15	1	U1	LHKAEMFR0PWRST
				AEM Free 0 Power State
	4	12	U12	LHKAEMFR0VD
				AEM free board 0 VDD raw
	4	12	U12	LHKAEMFR0T
				AEM free board 0 temperature raw
	4	12	U12	LHKAEMFR0V1
				AEM free board 0 HV1 raw
	4	12	U12	LHKAEMFR0V2
				AEM free board 0 HV2 raw
	4	12	U12	LHKAEMFR1VD
				AEM free board 1 VDD raw
	4	12	U12	LHKAEMFR1T
				AEM free board 1 temperature raw
	4	12	U12	LHKAEMFR1V1
				AEM free board 1 HV1 raw
	4	12	U12	LHKAEMFR1V2
				AEM free board 1 HV2 raw
	4	12	U12	LHKAEMFR2VD
				AEM free board 2 VDD raw
	4	12	U12	LHKAEMFR2T
				AEM free board 2 temperature raw
	4	12	U12	LHKAEMFR2V1
				AEM free board 2 HV1 raw
	4	12	U12	LHKAEMFR2V2
				AEM free board 2 HV2 raw
	4	12	U12	LHKAEMFR3VD
				AEM free board 3 VDD raw
	4	12	U12	LHKAEMFR3T
				AEM free board 3 temperature raw
	4	12	U12	LHKAEMFR3V1
				AEM free board 3 HV1 raw
	4	12	U12	LHKAEMFR3V2
				AEM free board 3 HV2 raw
	4	12	U12	LHKAEMFR4VD
				AEM free board 4 VDD raw
	4	12	U12	LHKAEMFR4T
				AEM free board 4 temperature raw
	4	12	U12	LHKAEMFR4V1
				AEM free board 4 HV1 raw
	4	12	U12	LHKAEMFR4V2
				AEM free board 4 HV2 raw
	4	12	U12	LHKAEMFR5VD
				AEM free board 5 VDD raw
	4	12	U12	LHKAEMFR5T
				AEM free board 5 temperature raw
	4	12	U12	LHKAEMFR5V1
				AEM free board 5 HV1 raw
	4	12	U12	LHKAEMFR5V2

Offset	S	L	Type	ITOS name, attribute(s), and description
				AEM free board 5 HV2 raw
	4	12	U12	LHKAEMFR6VD AEM free board 6 VDD raw
	4	12	U12	LHKAEMFR6T AEM free board 6 temperature raw
	4	12	U12	LHKAEMFR6V1 AEM free board 6 HV1 raw
	4	12	U12	LHKAEMFR6V2 AEM free board 6 HV2 raw
	4	12	U12	LHKAEMFR7VD AEM free board 7 VDD raw
	4	12	U12	LHKAEMFR7T AEM free board 7 temperature raw
	4	12	U12	LHKAEMFR7V1 AEM free board 7 HV1 raw
	4	12	U12	LHKAEMFR7V2 AEM free board 7 HV2 raw
	4	12	U12	LHKAEMFR8VD AEM free board 8 VDD raw
	4	12	U12	LHKAEMFR8T AEM free board 8 temperature raw
	4	12	U12	LHKAEMFR8V1 AEM free board 8 HV1 raw
	4	12	U12	LHKAEMFR8V2 AEM free board 8 HV2 raw
	4	12	U12	LHKAEMFR9VD AEM free board 9 VDD raw
	4	12	U12	LHKAEMFR9T AEM free board 9 temperature raw
	4	12	U12	LHKAEMFR9V1 AEM free board 9 HV1 raw
	4	12	U12	LHKAEMFR9V2 AEM free board 9 HV2 raw
	4	12	U12	LHKAEMFR10VD AEM free board 10 VDD raw
	4	12	U12	LHKAEMFR10T AEM free board 10 temperature raw
	4	12	U12	LHKAEMFR10V1 AEM free board 10 HV1 raw
	4	12	U12	LHKAEMFR10V2 AEM free board 10 HV2 raw
	4	12	U12	LHKAEMFR11VD AEM free board 11 VDD raw
	4	12	U12	LHKAEMFR11T AEM free board 11 temperature raw
	4	12	U12	LHKAEMFR11V1 AEM free board 11 HV1 raw
	4	12	U12	LHKAEMFR11V2 AEM free board 11 HV2 raw

10.3.23 `Lrs0` (551/0x227)

Description:

"Low-rate Science Packet" Telemetry Packet

Contains TEM dead-time counters and GEM livetime counter

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x014	0	32	U1234	LHKGLRSSEC GEM livetime read timestamp seconds
0x018	0	32	U1234	LHKGLRSSUB GEM livetime read timestamp subseconds
0x01C	0	32	U1234	LHKGLRSLIVE GEM Low-rate Science Livetime
0x020	0	32	U1234	LHKGLRSPRESC GEM Low-rate Science Prescaled
0x024	0	32	U1234	LHKGLRSDISC GEM Low-rate Science Discarded
0x028	0	32	U1234	LHKGLRSSENT GEM Low-rate Science Sent
0x02C	0	32	U1234	LHKTLRSSEC TEM deadtime read timestamp seconds
0x030	0	32	U1234	LHKTLRSSUB TEM deadtime read timestamp subseconds
0x034	0	24	U1234	LHKT0TEMLRSDT TEM0 LRS Deadtime Counter
0x038	0	24	U1234	LHKT1TEMLRSDT TEM1 LRS Deadtime Counter
0x03C	0	24	U1234	LHKT2TEMLRSDT TEM2 LRS Deadtime Counter
0x040	0	24	U1234	LHKT3TEMLRSDT TEM3 LRS Deadtime Counter
0x044	0	24	U1234	LHKT4TEMLRSDT TEM4 LRS Deadtime Counter
0x048	0	24	U1234	LHKT5TEMLRSDT TEM5 LRS Deadtime Counter
0x04C	0	24	U1234	LHKT6TEMLRSDT TEM6 LRS Deadtime Counter
0x050	0	24	U1234	LHKT7TEMLRSDT TEM7 LRS Deadtime Counter
0x054	0	24	U1234	LHKT8TEMLRSDT TEM8 LRS Deadtime Counter
0x058	0	24	U1234	LHKT9TEMLRSDT TEM9 LRS Deadtime Counter
0x05C	0	24	U1234	LHKTATEMLRSDT TEMA LRS Deadtime Counter
0x060	0	24	U1234	LHKTBTEMLRSDT TEMB LRS Deadtime Counter
0x064	0	24	U1234	LHKTCTEMLRSDT TEMC LRS Deadtime Counter
0x068	0	24	U1234	LHKTDTEMLRSDT

Offset	S	L	Type	ITOS name, attribute(s), and description
				TEMD LRS Deadtime Counter
0x06C	0	24	U1234	LHKTETEMLRSDT TEME LRS Deadtime Counter
0x070	0	24	U1234	LHKTFTEMLRSDT TEMF LRS Deadtime Counter

10.3.24 `CmdCnt0` (552/0x228)

Description:

"Command Statistics Packet 0" Telemetry Packet

Contains task level command statistics.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x014	0	32	U1234	LHKTSK0CMDSEC SIU task 0 command counter seconds
0x018	0	32	U1234	LHKTSK0CMDSUB SIU task 0 command counter subseconds
0x01C	0	32	U1234	LHKTSK0CMDSENT SIU task 0 command sent counter
0x020	0	16	U12	LHKTSK0CMDDISP SIU task 0 command dispatch counter
0x022	0	16	U12	LHKTSK0CMDEXEF SIU task 0 command execution failed counter
0x024	0	32	U1234	LHKTSK1CMDSEC SIU task 1 command counter seconds
0x028	0	32	U1234	LHKTSK1CMDSUB SIU task 1 command counter subseconds
0x02C	0	32	U1234	LHKTSK1CMDSENT SIU task 1 command sent counter
0x030	0	16	U12	LHKTSK1CMDDISP SIU task 1 command dispatch counter
0x032	0	16	U12	LHKTSK1CMDEXEF SIU task 1 command execution failed counter
0x034	0	32	U1234	LHKTSK2CMDSEC SIU task 2 command counter seconds
0x038	0	32	U1234	LHKTSK2CMDSUB SIU task 2 command counter subseconds
0x03C	0	32	U1234	LHKTSK2CMDSENT SIU task 2 command sent counter
0x040	0	16	U12	LHKTSK2CMDDISP SIU task 2 command dispatch counter
0x042	0	16	U12	LHKTSK2CMDEXEF SIU task 2 command execution failed counter
0x044	0	32	U1234	LHKTSK3CMDSEC SIU task 3 command counter seconds
0x048	0	32	U1234	LHKTSK3CMDSUB SIU task 3 command counter subseconds
0x04C	0	32	U1234	LHKTSK3CMDSENT SIU task 3 command sent counter

Offset	S	L	Type	ITOS name, attribute(s), and description
0x050	0	16	U12	LHKTSK3CMDDISP SIU task 3 command dispatch counter
0x052	0	16	U12	LHKTSK3CMDEXEF SIU task 3 command execution failed counter
0x054	0	32	U1234	LHKTSK4CMDSEC SIU task 4 command counter seconds
0x058	0	32	U1234	LHKTSK4CMDSUB SIU task 4 command counter subseconds
0x05C	0	32	U1234	LHKTSK4CMDSENT SIU task 4 command sent counter
0x060	0	16	U12	LHKTSK4CMDDISP SIU task 4 command dispatch counter
0x062	0	16	U12	LHKTSK4CMDEXEF SIU task 4 command execution failed counter
0x064	0	32	U1234	LHKTSK5CMDSEC SIU task 5 command counter seconds
0x068	0	32	U1234	LHKTSK5CMDSUB SIU task 5 command counter subseconds
0x06C	0	32	U1234	LHKTSK5CMDSENT SIU task 5 command sent counter
0x070	0	16	U12	LHKTSK5CMDDISP SIU task 5 command dispatch counter
0x072	0	16	U12	LHKTSK5CMDEXEF SIU task 5 command execution failed counter

10.3.25 `CmdCnt1` (553/0x229)

Description:

"Command Statistics Packet 1" Telemetry Packet

Contains task level command statistics

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x014	0	32	U1234	LHKTSK6CMDSEC SIU task 6 command counter seconds
0x018	0	32	U1234	LHKTSK6CMDSUB SIU task 6 command counter subseconds
0x01C	0	32	U1234	LHKTSK6CMDSENT SIU task 6 command sent counter
0x020	0	16	U12	LHKTSK6CMDDISP SIU task 6 command dispatch counter
0x022	0	16	U12	LHKTSK6CMDEXEF SIU task 6 command execution failed counter
0x024	0	32	U1234	LHKTSK7CMDSEC SIU task 7 command counter seconds
0x028	0	32	U1234	LHKTSK7CMDSUB SIU task 7 command counter subseconds
0x02C	0	32	U1234	LHKTSK7CMDSENT SIU task 7 command sent counter
0x030	0	16	U12	LHKTSK7CMDDISP

Offset	S	L	Type	ITOS name, attribute(s), and description
				SIU task 7 command dispatch counter
0x032	0	16	U12	LHKTSK7CMDEXEF SIU task 7 command execution failed counter
0x034	0	32	U1234	LHKTSK8CMDSEC SIU task 8 command counter seconds
0x038	0	32	U1234	LHKTSK8CMDSUB SIU task 8 command counter subseconds
0x03C	0	32	U1234	LHKTSK8CMDSENT SIU task 8 command sent counter
0x040	0	16	U12	LHKTSK8CMDDISP SIU task 8 command dispatch counter
0x042	0	16	U12	LHKTSK8CMDEXEF SIU task 8 command execution failed counter
0x044	0	32	U1234	LHKTSK9CMDSEC SIU task 9 command counter seconds
0x048	0	32	U1234	LHKTSK9CMDSUB SIU task 9 command counter subseconds
0x04C	0	32	U1234	LHKTSK9CMDSENT SIU task 9 command sent counter
0x050	0	16	U12	LHKTSK9CMDDISP SIU task 9 command dispatch counter
0x052	0	16	U12	LHKTSK9CMDEXEF SIU task 9 command execution failed counter
0x054	0	32	U1234	LHKTSK10CMDSEC SIU task 10 command counter seconds
0x058	0	32	U1234	LHKTSK10CMDSUB SIU task 10 command counter subseconds
0x05C	0	32	U1234	LHKTSK10CMDSENT SIU task 10 command sent counter
0x060	0	16	U12	LHKTSK10CMDDISP SIU task 10 command dispatch counter
0x062	0	16	U12	LHKTSK10CMDEXEF SIU task 10 command execution failed counter
0x064	0	32	U1234	LHKTSK11CMDSEC SIU task 11 command counter seconds
0x068	0	32	U1234	LHKTSK11CMDSUB SIU task 11 command counter subseconds
0x06C	0	32	U1234	LHKTSK11CMDSENT SIU task 11 command sent counter
0x070	0	16	U12	LHKTSK11CMDDISP SIU task 11 command dispatch counter
0x072	0	16	U12	LHKTSK11CMDEXEF SIU task 11 command execution failed counter

10.3.26 `FileStats` (554/0x22A)

Description:

"File System Statistics Packet" Telemetry Packet

Contains FILE statistics for each CPU.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x014	0	32	U1234	LHKSFILSTATE SIU File System State
0x018	0	32	U1234	LHKSFILCURSIZE SIU File Current Size
0x01C	0	32	U1234	LHKSFILPKTCNT SIU File Packet Count
0x020	0	32	U1234	LHKSFILERRCODE SIU File Error Code
0x024	0	32	U1234	LHKSFILERRCNT SIU File Error Count
0x028	0	32	U1234	LHKSFILCOMID SIU File Commit ID
0x02C	0	32	U1234	LHKE0FILSTATE EPU 0 File System State
0x030	0	32	U1234	LHKE0FILCURSIZE EPU 0 File Current Size
0x034	0	32	U1234	LHKE0FILPKTCNT EPU 0 File Packet Count
0x038	0	32	U1234	LHKE0FILERRCODE EPU 0 File Error Code
0x03C	0	32	U1234	LHKE0FILERRCNT EPU 0 File Error Count
0x040	0	32	U1234	LHKE0FILCOMID EPU 0 File Commit ID
0x044	0	32	U1234	LHKE1FILSTATE EPU 1 File System State
0x048	0	32	U1234	LHKE1FILCURSIZE EPU 1 File Current Size
0x04C	0	32	U1234	LHKE1FILPKTCNT EPU 1 File Packet Count
0x050	0	32	U1234	LHKE1FILERRCODE EPU 1 File Error Code
0x054	0	32	U1234	LHKE1FILERRCNT EPU 1 File Error Count
0x058	0	32	U1234	LHKE1FILCOMID EPU 1 File Commit ID
0x05C	0	32	U1234	LHKE2FILSTATE EPU 2 File System State
0x060	0	32	U1234	LHKE2FILCURSIZE EPU 2 File Current Size
0x064	0	32	U1234	LHKE2FILPKTCNT EPU 2 File Packet Count
0x068	0	32	U1234	LHKE2FILERRCODE EPU 2 File Error Code
0x06C	0	32	U1234	LHKE2FILERRCNT EPU 2 File Error Count
0x070	0	32	U1234	LHKE2FILCOMID EPU 2 File Commit ID

10.3.27 `CpuMetr` (555/0x22B)

Description:

"CPU Metrics/RT Statistics Packet" Telemetry Packet

Contains CPU metrics for all LAT CPUs. Contains the 1553 RT driver statistics.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x014	0	32	U1234	LHKRTERRCNT A count of the number of remote terminal errors
0x018	0	32	U1234	LHKRTINTRCNT A count of the number of remote terminal device interrupts
0x01C	0	32	U1234	LHKRTCRXPKTCNT A count of the number of CmdRx packets received by the remote terminal
0x020	0	32	U1234	LHKRTCRXBYTCNT A count of the number of CmdRx bytes received by the remote terminal
0x024	0	32	U1234	LHKRTCTXPKTCNT A count of the number of CmdTx packets sent by the remote terminal
0x028	0	32	U1234	LHKRTCTXBYTCNT A count of the number of CmdTx bytes sent by the remote terminal
0x02C	0	32	U1234	LHKRTHKPKTCNT A count of the number of HKP packets sent by the remote terminal
0x030	0	32	U1234	LHKRTHKBYTCNT A count of the number of HKP bytes sent by the remote terminal
0x034	0	32	U1234	LHKRTTLMPKTCNT A count of the number of Telem packets sent by the remote terminal (not HKP)
0x038	0	32	U1234	LHKRTTLMBYTCNT A count of the number of Telem bytes sent by the remote terminal (not HKP)
0x03C	0	16	U12	LHKSIUCPUJTEMP SIU CPU junction temperature
0x03E	0	16	U12	LHKEPU0CPUJTEMP EPU0 CPU junction temperature
0x040	0	16	U12	LHKEPU1CPUJTEMP EPU1 CPU junction temperature
0x042	0	16	U12	LHKEPU2CPUJTEMP EPU2 CPU junction temperature

10.3.28 `MemStats0` (556/0x22C)

Description:

"Memory Load/Dump Statistics" Telemetry Packet

Contains the statistics for memory loads and dumps on the SIU and EPU0.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x014	0	32	U1234	LHKSMEMLDSTAT SIU Status of most recent load action
0x018	0	32	U1234	LHKSMEMLDACT SIU Memory load active flag

Offset	S	L	Type	ITOS name, attribute(s), and description
0x01C	0	32	U1234	LHKSMEMLDSTART SIU Starting memory load address
0x020	0	32	U1234	LHKSMEMLDBYTES SIU Memory load total bytes
0x024	0	32	U1234	LHKSMEMLDOFST SIU Memory load offset
0x028	0	32	U1234	LHKSMEMDMPSTAT SIU Memory dump status
0x02C	0	32	U1234	LHKSMEMDMPACT SIU Memory dump active
0x030	0	32	U1234	LHKSMEMDMPSTRT SIU Memory dump start address
0x034	0	32	U1234	LHKSMEMDMPBYT SIU Memory dump bytes
0x038	0	32	U1234	LHKSMEMDMPADDR SIU Memory dump address
0x03C	0	32	U1234	LHKSMEMDMPFCDE SIU Memory dump function code
0x040	0	32	U1234	LHKSMEM0MPTID SIU Memory dump transaction ID
0x044	0	32	U1234	LHKE0MEMLDSTAT EPU0 Status of most recent load action
0x048	0	32	U1234	LHKE0MEMLDACT EPU0 Memory load active flag
0x04C	0	32	U1234	LHKE0MEMLDSTART EPU0 Starting memory load address
0x050	0	32	U1234	LHKE0MEMLDBYTES EPU0 Memory load total bytes
0x054	0	32	U1234	LHKE0MEMLDOFST EPU0 Memory load offset
0x058	0	32	U1234	LHKE0MEMDMPSTAT EPU0 Memory dump status
0x05C	0	32	U1234	LHKE0MEMDMPACT EPU0 Memory dump active
0x060	0	32	U1234	LHKE0MEMDMPSTRT EPU0 Memory dump start address
0x064	0	32	U1234	LHKE0MEMDMPBYT EPU0 Memory dump bytes
0x068	0	32	U1234	LHKE0MEMDMPADDR EPU0 Memory dump address
0x06C	0	32	U1234	LHKE0MEMDMPFCDE EPU0 Memory dump function code
0x070	0	32	U1234	LHKE0MEMDMPTID EPU0 Memory dump transaction ID

10.3.29 `MemStats1` (557/0x22D)

Description:

"Memory Load/Dump Statistics" Telemetry Packet

Contains the statistics for memory loads and dumps on the EPU1 and EPU2.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x014	0	32	U1234	LHKE1MEMLDSTAT EPU1 Status of most recent load action
0x018	0	32	U1234	LHKE1MEMLDACT EPU1 Memory load active flag
0x01C	0	32	U1234	LHKE1MEMLDSTART EPU1 Starting memory load address
0x020	0	32	U1234	LHKE1MEMLDBYTES EPU1 Memory load total bytes
0x024	0	32	U1234	LHKE1MEMLDOFST EPU1 Memory load offset
0x028	0	32	U1234	LHKE1MEMDMPSTAT EPU1 Memory dump status
0x02C	0	32	U1234	LHKE1MEMDMPACT EPU1 Memory dump active
0x030	0	32	U1234	LHKE1MEMDMPSTRT EPU1 Memory dump start address
0x034	0	32	U1234	LHKE1MEMDMPBYT EPU1 Memory dump bytes
0x038	0	32	U1234	LHKE1MEMDMPADDR EPU1 Memory dump address
0x03C	0	32	U1234	LHKE1MEMDMPFCDE EPU1 Memory dump function code
0x040	0	32	U1234	LHKE1MEMDMPTID EPU1 Memory dump transaction ID
0x044	0	32	U1234	LHKE2MEMLDSTAT EPU2 Status of most recent load action
0x048	0	32	U1234	LHKE2MEMLDACT EPU2 Memory load active flag
0x04C	0	32	U1234	LHKE2MEMLDSTART EPU2 Starting memory load address
0x050	0	32	U1234	LHKE2MEMLDBYTES EPU2 Memory load total bytes
0x054	0	32	U1234	LHKE2MEMLDOFST EPU2 Memory load offset
0x058	0	32	U1234	LHKE2MEMDMPSTAT EPU2 Memory dump status
0x05C	0	32	U1234	LHKE2MEMDMPACT EPU2 Memory dump active
0x060	0	32	U1234	LHKE2MEMDMPSTRT EPU2 Memory dump start address
0x064	0	32	U1234	LHKE2MEMDMPBYT EPU2 Memory dump bytes
0x068	0	32	U1234	LHKE2MEMDMPADDR EPU2 Memory dump address
0x06C	0	32	U1234	LHKE2MEMDMPFCDE EPU2 Memory dump function code
0x070	0	32	U1234	LHKE2MEMDMPTID EPU2 Memory dump transaction ID

10.3.30 `DiagTemEnvPwr0` (624/0x270)

Description:

"Diagnostic TEM Power Packet 0" Telemetry Packet

Contains power specific ADC values for TEMs 0, 1, and 2.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKDT0TKR25VD TEM0 TKR 2.5V digital raw
	4	12	U12	LHKDT0TKR25ID TEM0 TKR 2.5I digital raw
	4	12	U12	LHKDT0TKR15VAA TEM0 TKR 1.5V analog A raw
	4	12	U12	LHKDT0TKR15IAA TEM0 TKR 1.5I analog A raw
	4	12	U12	LHKDT0TKR25VAB TEM0 TKR 2.5V analog B raw
	4	12	U12	LHKDT0TKR25IAB TEM0 TKR 2.5I analog B raw
	4	12	U12	LHKDT0TKRBIASV TEM0 TKR Bias V raw
	4	12	U12	LHKDT0TKRBIASI TEM0 TKR Bias I raw
	4	12	U12	LHKDT0CAL33VD TEM0 CAL 3.3V digital raw
	4	12	U12	LHKDT0CAL33ID TEM0 CAL 3.3I digital raw
	4	12	U12	LHKDT0CAL33VA TEM0 CAL 3.3V analog raw
	4	12	U12	LHKDT0CAL33IA TEM0 CAL 3.3I analog raw
	4	12	U12	LHKDT0CALBIASV TEM0 CAL Bias V raw
	4	12	U12	LHKDT0CALBIASI TEM0 CAL Bias I raw
	4	12	U12	LHKDT0TEM33V TEM0 TEM 3.3V raw
	4	12	U12	LHKDT0TEM33I TEM0 3.3I digital raw
	4	12	U12	LHKDT1TKR25VD TEM1 TKR 2.5V digital raw
	4	12	U12	LHKDT1TKR25ID TEM1 TKR 2.5I digital raw
	4	12	U12	LHKDT1TKR15VAA TEM1 TKR 1.5V analog A raw
	4	12	U12	LHKDT1TKR15IAA TEM1 TKR 1.5I analog A raw
	4	12	U12	LHKDT1TKR25VAB TEM1 TKR 2.5V analog B raw
	4	12	U12	LHKDT1TKR25IAB

Offset	S	L	Type	ITOS name, attribute(s), and description
				TEM1 TKR 2.5I analog B raw
	4	12	U12	LHKDT1TKRBIASV
				TEM1 TKR Bias V raw
	4	12	U12	LHKDT1TKRBIASI
				TEM1 TKR Bias I raw
	4	12	U12	LHKDT1CAL33VD
				TEM1 CAL 3.3V digital raw
	4	12	U12	LHKDT1CAL33ID
				TEM1 CAL 3.3I digital raw
	4	12	U12	LHKDT1CAL33VA
				TEM1 CAL 3.3V analog raw
	4	12	U12	LHKDT1CAL33IA
				TEM1 CAL 3.3I analog raw
	4	12	U12	LHKDT1CALBIASV
				TEM1 CAL Bias V raw
	4	12	U12	LHKDT1CALBIASI
				TEM1 CAL Bias I raw
	4	12	U12	LHKDT1TEM33V
				TEM1 TEM 3.3V digital raw
	4	12	U12	LHKDT1TEM33I
				TEM1 TEM 3.3I digital raw
	4	12	U12	LHKDT2TKR25VD
				TEM2 TKR 2.5V digital raw
	4	12	U12	LHKDT2TKR25ID
				TEM2 TKR 2.5I digital raw
	4	12	U12	LHKDT2TKR15VAA
				TEM2 TKR 1.5V analog A raw
	4	12	U12	LHKDT2TKR15IAA
				TEM2 TKR 1.5I analog A raw
	4	12	U12	LHKDT2TKR25VAB
				TEM2 TKR 2.5V analog B raw
	4	12	U12	LHKDT2TKR25IAB
				TEM2 TKR 2.5I analog B raw
	4	12	U12	LHKDT2TKRBIASV
				TEM2 TKR Bias V raw
	4	12	U12	LHKDT2TKRBIASI
				TEM2 TKR Bias I raw
	4	12	U12	LHKDT2CAL33VD
				TEM2 CAL 3.3V digital raw
	4	12	U12	LHKDT2CAL33ID
				TEM2 CAL 3.3I digital raw
	4	12	U12	LHKDT2CAL33VA
				TEM2 CAL 3.3V analog raw
	4	12	U12	LHKDT2CAL33IA
				TEM2 CAL 3.3I analog raw
	4	12	U12	LHKDT2CALBIASV
				TEM2 CAL Bias V raw
	4	12	U12	LHKDT2CALBIASI
				TEM2 CAL Bias I raw
	4	12	U12	LHKDT2TEM33V
				TEM2 TEM 3.3V digital raw
	4	12	U12	LHKDT2TEM33I

Offset	S	L	Type	ITOS name, attribute(s), and description
				TEM2 TEM 3.3I digital raw

10.3.31 `DiagTemEnvPwr1` (625/0x271)

Description:

"Diagnostic TEM Power Packet 1" Telemetry Packet

Contains power specific ADC values for TEMs 3,4, and 5.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKDT3TKR25VD TEM3 TKR 2.5V digital raw
	4	12	U12	LHKDT3TKR25ID TEM3 TKR 2.5I digital raw
	4	12	U12	LHKDT3TKR15VAA TEM3 TKR 1.5V analog A raw
	4	12	U12	LHKDT3TKR15IAA TEM3 TKR 1.5I analog A raw
	4	12	U12	LHKDT3TKR25VAB TEM3 TKR 2.5V analog B raw
	4	12	U12	LHKDT3TKR25IAB TEM3 TKR 2.5I analog B raw
	4	12	U12	LHKDT3TKRBIASV TEM3 TKR Bias V raw
	4	12	U12	LHKDT3TKRBIASI TEM3 TKR Bias I raw
	4	12	U12	LHKDT3CAL33VD TEM3 CAL 3.3V digital raw
	4	12	U12	LHKDT3CAL33ID TEM3 CAL 3.3I digital raw
	4	12	U12	LHKDT3CAL33VA TEM3 CAL 3.3V analog raw
	4	12	U12	LHKDT3CAL33IA TEM3 CAL 3.3I analog raw
	4	12	U12	LHKDT3CALBIASV TEM3 CAL Bias V raw
	4	12	U12	LHKDT3CALBIASI TEM3 CAL Bias I raw
	4	12	U12	LHKDT3TEM33V TEM3 TEM 3.3V raw
	4	12	U12	LHKDT3TEM33I TEM3 3.3I digital raw
	4	12	U12	LHKDT4TKR25VD TEM4 TKR 2.5V digital raw
	4	12	U12	LHKDT4TKR25ID TEM4 TKR 2.5I digital raw
	4	12	U12	LHKDT4TKR15VAA TEM4 TKR 1.5V analog A raw
	4	12	U12	LHKDT4TKR15IAA TEM4 TKR 1.5I analog A raw

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKDT4TKR25VAB TEM4 TKR 2.5V analog B raw
	4	12	U12	LHKDT4TKR25IAB TEM4 TKR 2.5I analog B raw
	4	12	U12	LHKDT4TKRBIASV TEM4 TKR Bias V raw
	4	12	U12	LHKDT4TKRBIASI TEM4 TKR Bias I raw
	4	12	U12	LHKDT4CAL33VD TEM4 CAL 3.3V digital raw
	4	12	U12	LHKDT4CAL33ID TEM4 CAL 3.3I digital raw
	4	12	U12	LHKDT4CAL33VA TEM4 CAL 3.3V analog raw
	4	12	U12	LHKDT4CAL33IA TEM4 CAL 3.3I analog raw
	4	12	U12	LHKDT4CALBIASV TEM4 CAL Bias V raw
	4	12	U12	LHKDT4CALBIASI TEM4 CAL Bias I raw
	4	12	U12	LHKDT4TEM33V TEM4 TEM 3.3V digital raw
	4	12	U12	LHKDT4TEM33I TEM4 TEM 3.3I digital raw
	4	12	U12	LHKDT5TKR25VD TEM5 TKR 2.5V digital raw
	4	12	U12	LHKDT5TKR25ID TEM5 TKR 2.5I digital raw
	4	12	U12	LHKDT5TKR15VAA TEM5 TKR 1.5V analog A raw
	4	12	U12	LHKDT5TKR15IAA TEM5 TKR 1.5I analog A raw
	4	12	U12	LHKDT5TKR25VAB TEM5 TKR 2.5V analog B raw
	4	12	U12	LHKDT5TKR25IAB TEM5 TKR 2.5I analog B raw
	4	12	U12	LHKDT5TKRBIASV TEM5 TKR Bias V raw
	4	12	U12	LHKDT5TKRBIASI TEM5 TKR Bias I raw
	4	12	U12	LHKDT5CAL33VD TEM5 CAL 3.3V digital raw
	4	12	U12	LHKDT5CAL33ID TEM5 CAL 3.3I digital raw
	4	12	U12	LHKDT5CAL33VA TEM5 CAL 3.3V analog raw
	4	12	U12	LHKDT5CAL33IA TEM5 CAL 3.3I analog raw
	4	12	U12	LHKDT5CALBIASV TEM5 CAL Bias V raw
	4	12	U12	LHKDT5CALBIASI TEM5 CAL Bias I raw

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKDT5TEM33V TEM5 TEM 3.3V digital raw
	4	12	U12	LHKDT5TEM33I TEM5 TEM 3.3I digital raw

10.3.32 DiagTemEnvPwr2 (626/0x272)

Description:

"Diagnostic TEM Power Packet 2" Telemetry Packet

Contains power specific ADC values for TEMs 6, 7, and 8.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKDT6TKR25VD TEM6 TKR 2.5V digital raw
	4	12	U12	LHKDT6TKR25ID TEM6 TKR 2.5I digital raw
	4	12	U12	LHKDT6TKR15VAA TEM6 TKR 1.5V analog A raw
	4	12	U12	LHKDT6TKR15IAA TEM6 TKR 1.5I analog A raw
	4	12	U12	LHKDT6TKR25VAB TEM6 TKR 2.5V analog B raw
	4	12	U12	LHKDT6TKR25IAB TEM6 TKR 2.5I analog B raw
	4	12	U12	LHKDT6TKRBIASV TEM6 TKR Bias V raw
	4	12	U12	LHKDT6TKRBIASI TEM6 TKR Bias I raw
	4	12	U12	LHKDT6CAL33VD TEM6 CAL 3.3V digital raw
	4	12	U12	LHKDT6CAL33ID TEM6 CAL 3.3I digital raw
	4	12	U12	LHKDT6CAL33VA TEM6 CAL 3.3V analog raw
	4	12	U12	LHKDT6CAL33IA TEM6 CAL 3.3I analog raw
	4	12	U12	LHKDT6CALBIASV TEM6 CAL Bias V raw
	4	12	U12	LHKDT6CALBIASI TEM6 CAL Bias I raw
	4	12	U12	LHKDT6TEM33V TEM6 TEM 3.3V raw
	4	12	U12	LHKDT6TEM33I TEM6 3.3I digital raw
	4	12	U12	LHKDT7TKR25VD TEM7 TKR 2.5V digital raw
	4	12	U12	LHKDT7TKR25ID TEM7 TKR 2.5I digital raw
	4	12	U12	LHKDT7TKR15VAA

Offset	S	L	Type	ITOS name, attribute(s), and description
				TEM7 TKR 1.5V analog A raw
	4	12	U12	LHKDT7TKR15IAA
				TEM7 TKR 1.5I analog A raw
	4	12	U12	LHKDT7TKR25VAB
				TEM7 TKR 2.5V analog B raw
	4	12	U12	LHKDT7TKR25IAB
				TEM7 TKR 2.5I analog B raw
	4	12	U12	LHKDT7TKRBIASV
				TEM7 TKR Bias V raw
	4	12	U12	LHKDT7TKRBIASI
				TEM7 TKR Bias I raw
	4	12	U12	LHKDT7CAL33VD
				TEM7 CAL 3.3V digital raw
	4	12	U12	LHKDT7CAL33ID
				TEM7 CAL 3.3I digital raw
	4	12	U12	LHKDT7CAL33VA
				TEM7 CAL 3.3V analog raw
	4	12	U12	LHKDT7CAL33IA
				TEM7 CAL 3.3I analog raw
	4	12	U12	LHKDT7CALBIASV
				TEM7 CAL Bias V raw
	4	12	U12	LHKDT7CALBIASI
				TEM7 CAL Bias I raw
	4	12	U12	LHKDT7TEM33V
				TEM7 TEM 3.3V digital raw
	4	12	U12	LHKDT7TEM33I
				TEM7 TEM 3.3I digital raw
	4	12	U12	LHKDT8TKR25VD
				TEM8 TKR 2.5V digital raw
	4	12	U12	LHKDT8TKR25ID
				TEM8 TKR 2.5I digital raw
	4	12	U12	LHKDT8TKR15VAA
				TEM8 TKR 1.5V analog A raw
	4	12	U12	LHKDT8TKR15IAA
				TEM8 TKR 1.5I analog A raw
	4	12	U12	LHKDT8TKR25VAB
				TEM8 TKR 2.5V analog B raw
	4	12	U12	LHKDT8TKR25IAB
				TEM8 TKR 2.5I analog B raw
	4	12	U12	LHKDT8TKRBIASV
				TEM8 TKR Bias V raw
	4	12	U12	LHKDT8TKRBIASI
				TEM8 TKR Bias I raw
	4	12	U12	LHKDT8CAL33VD
				TEM8 CAL 3.3V digital raw
	4	12	U12	LHKDT8CAL33ID
				TEM8 CAL 3.3I digital raw
	4	12	U12	LHKDT8CAL33VA
				TEM8 CAL 3.3V analog raw
	4	12	U12	LHKDT8CAL33IA
				TEM8 CAL 3.3I analog raw
	4	12	U12	LHKDT8CALBIASV

Offset	S	L	Type	ITOS name, attribute(s), and description
				TEM8 CAL Bias V raw
	4	12	U12	LHKDT8CALBIASI TEM8 CAL Bias I raw
	4	12	U12	LHKDT8TEM33V TEM8 TEM 3.3V digital raw
	4	12	U12	LHKDT8TEM33I TEM8 TEM 3.3I digital raw

10.3.33 `DiagTemEnvPwr3` (627/0x273)

Description:

"Diagnostic TEM Power Packet 3" Telemetry Packet

Contains power specific ADC values for TEMs 9, 10, and 11.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKDT9TKR25VD TEM9 TKR 2.5V digital raw
	4	12	U12	LHKDT9TKR25ID TEM9 TKR 2.5I digital raw
	4	12	U12	LHKDT9TKR15VAA TEM9 TKR 1.5V analog A raw
	4	12	U12	LHKDT9TKR15IAA TEM9 TKR 1.5I analog A raw
	4	12	U12	LHKDT9TKR25VAB TEM9 TKR 2.5V analog B raw
	4	12	U12	LHKDT9TKR25IAB TEM9 TKR 2.5I analog B raw
	4	12	U12	LHKDT9TKRBIASV TEM9 TKR Bias V raw
	4	12	U12	LHKDT9TKRBIASI TEM9 TKR Bias I raw
	4	12	U12	LHKDT9CAL33VD TEM9 CAL 3.3V digital raw
	4	12	U12	LHKDT9CAL33ID TEM9 CAL 3.3I digital raw
	4	12	U12	LHKDT9CAL33VA TEM9 CAL 3.3V analog raw
	4	12	U12	LHKDT9CAL33IA TEM9 CAL 3.3I analog raw
	4	12	U12	LHKDT9CALBIASV TEM9 CAL Bias V raw
	4	12	U12	LHKDT9CALBIASI TEM9 CAL Bias I raw
	4	12	U12	LHKDT9TEM33V TEM9 TEM 3.3V raw
	4	12	U12	LHKDT9TEM33I TEM9 3.3I digital raw
	4	12	U12	LHKDTATKR25VD TEMA TKR 2.5V digital raw

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKDTATKR25ID TEMA TKR 2.5I digital raw
	4	12	U12	LHKDTATKR15VAA TEMA TKR 1.5V analog A raw
	4	12	U12	LHKDTATKR15IAA TEMA TKR 1.5I analog A raw
	4	12	U12	LHKDTATKR25VAB TEMA TKR 2.5V analog B raw
	4	12	U12	LHKDTATKR25IAB TEMA TKR 2.5I analog B raw
	4	12	U12	LHKDTATKRBIASV TEMA TKR Bias V raw
	4	12	U12	LHKDTATKRBIASI TEMA TKR Bias I raw
	4	12	U12	LHKDTACAL33VD TEMA CAL 3.3V digital raw
	4	12	U12	LHKDTACAL33ID TEMA CAL 3.3I digital raw
	4	12	U12	LHKDTACAL33VA TEMA CAL 3.3V analog raw
	4	12	U12	LHKDTACAL33IA TEMA CAL 3.3I analog raw
	4	12	U12	LHKDTACALBIASV TEMA CAL Bias V raw
	4	12	U12	LHKDTACALBIASI TEMA CAL Bias I raw
	4	12	U12	LHKDTATEM33V TEMA TEM 3.3V digital raw
	4	12	U12	LHKDTATEM33I TEMA TEM 3.3I digital raw
	4	12	U12	LHKDTBTKR25VD TEMB TKR 2.5V digital raw
	4	12	U12	LHKDTBTKR25ID TEMB TKR 2.5I digital raw
	4	12	U12	LHKDTBTKR15VAA TEMB TKR 1.5V analog A raw
	4	12	U12	LHKDTBTKR15IAA TEMB TKR 1.5I analog A raw
	4	12	U12	LHKDTBTKR25VAB TEMB TKR 2.5V analog B raw
	4	12	U12	LHKDTBTKR25IAB TEMB TKR 2.5I analog B raw
	4	12	U12	LHKDTBTKRBIASV TEMB TKR Bias V raw
	4	12	U12	LHKDTBTKRBIASI TEMB TKR Bias I raw
	4	12	U12	LHKDTBCAL33VD TEMB CAL 3.3V digital raw
	4	12	U12	LHKDTBCAL33ID TEMB CAL 3.3I digital raw
	4	12	U12	LHKDTBCAL33VA TEMB CAL 3.3V analog raw

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKDTBCAL33IA TEMB CAL 3.3I analog raw
	4	12	U12	LHKDTBCALBIASV TEMB CAL Bias V raw
	4	12	U12	LHKDTBCALBIASI TEMB CAL Bias I raw
	4	12	U12	LHKDTBTEM33V TEMB TEM 3.3V digital raw
	4	12	U12	LHKDTBTEM33I TEMB TEM 3.3I digital raw

10.3.34 `DiagTemEnvPwr4` (628/0x274)

Description:

"Diagnostic TEM Power Packet 4" Telemetry Packet

Contains power specific ADC values for TEMs 12, 13, and 14.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKDTCTKR25VD TEMC TKR 2.5V digital raw
	4	12	U12	LHKDTCTKR25ID TEMC TKR 2.5I digital raw
	4	12	U12	LHKDTCTKR15VAA TEMC TKR 1.5V analog A raw
	4	12	U12	LHKDTCTKR15IAA TEMC TKR 1.5I analog A raw
	4	12	U12	LHKDTCTKR25VAB TEMC TKR 2.5V analog B raw
	4	12	U12	LHKDTCTKR25IAB TEMC TKR 2.5I analog B raw
	4	12	U12	LHKDTCTKRBIASV TEMC TKR Bias V raw
	4	12	U12	LHKDTCTKRBIASI TEMC TKR Bias I raw
	4	12	U12	LHKDTCCAL33VD TEMC CAL 3.3V digital raw
	4	12	U12	LHKDTCCAL33ID TEMC CAL 3.3I digital raw
	4	12	U12	LHKDTCCAL33VA TEMC CAL 3.3V analog raw
	4	12	U12	LHKDTCCAL33IA TEMC CAL 3.3I analog raw
	4	12	U12	LHKDTCCALBIASV TEMC CAL Bias V raw
	4	12	U12	LHKDTCCALBIASI TEMC CAL Bias I raw
	4	12	U12	LHKDTCTEM33V TEMC TEM 3.3V raw
	4	12	U12	LHKDTCTEM33I

Offset	S	L	Type	ITOS name, attribute(s), and description
				TEMC 3.3I digital raw
	4	12	U12	LHKDTDTKR25VD TEMD TKR 2.5V digital raw
	4	12	U12	LHKDTDTKR25ID TEMD TKR 2.5I digital raw
	4	12	U12	LHKDTDTKR15VAA TEMD TKR 1.5V analog A raw
	4	12	U12	LHKDTDTKR15IAA TEMD TKR 1.5I analog A raw
	4	12	U12	LHKDTDTKR25VAB TEMD TKR 2.5V analog B raw
	4	12	U12	LHKDTDTKR25IAB TEMD TKR 2.5I analog B raw
	4	12	U12	LHKDTDTKRBIASV TEMD TKR Bias V raw
	4	12	U12	LHKDTDTKRBIASI TEMD TKR Bias I raw
	4	12	U12	LHKDTDCAL33VD TEMD CAL 3.3V digital raw
	4	12	U12	LHKDTDCAL33ID TEMD CAL 3.3I digital raw
	4	12	U12	LHKDTDCAL33VA TEMD CAL 3.3V analog raw
	4	12	U12	LHKDTDCAL33IA TEMD CAL 3.3I analog raw
	4	12	U12	LHKDTDCALBIASV TEMD CAL Bias V raw
	4	12	U12	LHKDTDCALBIASI TEMD CAL Bias I raw
	4	12	U12	LHKDTDTEM33V TEMD TEM 3.3V digital raw
	4	12	U12	LHKDTDTEM33I TEMD TEM 3.3I digital raw
	4	12	U12	LHKDTETKR25VD TEME TKR 2.5V digital raw
	4	12	U12	LHKDTETKR25ID TEME TKR 2.5I digital raw
	4	12	U12	LHKDTETKR15VAA TEME TKR 1.5V analog A raw
	4	12	U12	LHKDTETKR15IAA TEME TKR 1.5I analog A raw
	4	12	U12	LHKDTETKR25VAB TEME TKR 2.5V analog B raw
	4	12	U12	LHKDTETKR25IAB TEME TKR 2.5I analog B raw
	4	12	U12	LHKDTETKRBIASV TEME TKR Bias V raw
	4	12	U12	LHKDTETKRBIASI TEME TKR Bias I raw
	4	12	U12	LHKDTECAL33VD TEME CAL 3.3V digital raw
	4	12	U12	LHKDTECAL33ID

Offset	S	L	Type	ITOS name, attribute(s), and description
				TEME CAL 3.3I digital raw
	4	12	U12	LHKDTECAL33VA TEME CAL 3.3V analog raw
	4	12	U12	LHKDTECAL33IA TEME CAL 3.3I analog raw
	4	12	U12	LHKDTECALBIASV TEME CAL Bias V raw
	4	12	U12	LHKDTECALBIASI TEME CAL Bias I raw
	4	12	U12	LHKDTETEM33V TEME TEM 3.3V digital raw
	4	12	U12	LHKDTETEM33I TEME TEM 3.3I digital raw

10.3.35 `DiagTemEnvPwr5` (629/0x275)

Description:

"Diagnostic TEM Power Packet 5" Telemetry Packet

Contains powr specific ADC values for TEM 15.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKDTFTKR25VD TEMF TKR 2.5V digital raw
	4	12	U12	LHKDTFTKR25ID TEMF TKR 2.5I digital raw
	4	12	U12	LHKDTFTKR15VAA TEMF TKR 1.5V analog A raw
	4	12	U12	LHKDTFTKR15IAA TEMF TKR 1.5I analog A raw
	4	12	U12	LHKDTFTKR25VAB TEMF TKR 2.5V analog B raw
	4	12	U12	LHKDTFTKR25IAB TEMF TKR 2.5I analog B raw
	4	12	U12	LHKDTFTKRBIASV TEMF TKR Bias V raw
	4	12	U12	LHKDTFTKRBIASI TEMF TKR Bias I raw
	4	12	U12	LHKDTFCAL33VD TEMF CAL 3.3V digital raw
	4	12	U12	LHKDTFCAL33ID TEMF CAL 3.3I digital raw
	4	12	U12	LHKDTFCAL33VA TEMF CAL 3.3V analog raw
	4	12	U12	LHKDTFCAL33IA TEMF CAL 3.3I analog raw
	4	12	U12	LHKDTFCALBIASV TEMF CAL Bias V raw
	4	12	U12	LHKDTFCALBIASI TEMF CAL Bias I raw

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKDTFTEM33V TEMF TEM 3.3V raw
	4	12	U12	LHKDTFTEM33I TEMF 3.3I digital raw

10.3.36 `DiagTemEnvTemp0` (630/0x276)

Description:

"Diagnostic TEM Temperature Packet 0" Telemetry Packet

Contains temperature specific ADC values for TEMs 0 and 1.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKDT0CALAF0T0 TEM0 CAL AFEE0 Temp 0 raw
	4	12	U12	LHKDT0CALAF0T1 TEM0 CAL AFEE0 Temp 1 raw
	4	12	U12	LHKDT0CALAF1T0 TEM0 CAL AFEE1 Temp 0 raw
	4	12	U12	LHKDT0CALAF1T1 TEM0 CAL AFEE1 Temp 1 raw
	4	12	U12	LHKDT0CALAF2T0 TEM0 CAL AFEE2 Temp 0 raw
	4	12	U12	LHKDT0CALAF2T1 TEM0 CAL AFEE2 Temp 1 raw
	4	12	U12	LHKDT0CALAF3T0 TEM0 CAL AFEE3 Temp 0 raw
	4	12	U12	LHKDT0CALAF3T1 TEM0 CAL AFEE3 Temp 1 raw
	4	12	U12	LHKDT0TKRC0T0 TEM0 TKR Cable 0 Temp 0 raw
	4	12	U12	LHKDT0TKRC0T1 TEM0 TKR Cable 0 Temp 1 raw
	4	12	U12	LHKDT0TKRC1T0 TEM0 TKR Cable 1 Temp 0 raw
	4	12	U12	LHKDT0TKRC1T1 TEM0 TKR Cable 1 Temp 1 raw
	4	12	U12	LHKDT0TKRC2T0 TEM0 TKR Cable 2 Temp 0 raw
	4	12	U12	LHKDT0TKRC2T1 TEM0 TKR Cable 2 Temp 1 raw
	4	12	U12	LHKDT0TKRC3T0 TEM0 TKR Cable 3 Temp 0 raw
	4	12	U12	LHKDT0TKRC3T1 TEM0 TKR Cable 3 Temp 1 raw
	4	12	U12	LHKDT0TKRC4T0 TEM0 TKR Cable 4 Temp 0 raw
	4	12	U12	LHKDT0TKRC4T1 TEM0 TKR Cable 4 Temp 1 raw
	4	12	U12	LHKDT0TKRC5T0

Offset	S	L	Type	ITOS name, attribute(s), and description
				TEM0 TKR Cable 5 Temp 0 raw
	4	12	U12	LHKDT0TKRC5T1
				TEM0 TKR Cable 5 Temp 1 raw
	4	12	U12	LHKDT0TKRC6T0
				TEM0 TKR Cable 6 Temp 0 raw
	4	12	U12	LHKDT0TKRC6T1
				TEM0 TKR Cable 6 Temp 1 raw
	4	12	U12	LHKDT0TKRC7T0
				TEM0 TKR Cable 7 Temp 0 raw
	4	12	U12	LHKDT0TKRC7T1
				TEM0 TKR Cable 7 Temp 1 raw
	4	12	U12	LHKDT1CALAF0T0
				TEM1 CAL AFEE0 Temp 0 raw
	4	12	U12	LHKDT1CALAF0T1
				TEM1 CAL AFEE0 Temp 1 raw
	4	12	U12	LHKDT1CALAF1T0
				TEM1 CAL AFEE1 Temp 0 raw
	4	12	U12	LHKDT1CALAF1T1
				TEM1 CAL AFEE1 Temp 1 raw
	4	12	U12	LHKDT1CALAF2T0
				TEM1 CAL AFEE2 Temp 0 raw
	4	12	U12	LHKDT1CALAF2T1
				TEM1 CAL AFEE2 Temp 1 raw
	4	12	U12	LHKDT1CALAF3T0
				TEM1 CAL AFEE3 Temp 0 raw
	4	12	U12	LHKDT1CALAF3T1
				TEM1 CAL AFEE3 Temp 1 raw
	4	12	U12	LHKDT1TKRC0T0
				TEM1 TKR Cable 0 Temp 0 raw
	4	12	U12	LHKDT1TKRC0T1
				TEM1 TKR Cable 0 Temp 1 raw
	4	12	U12	LHKDT1TKRC1T0
				TEM1 TKR Cable 1 Temp 0 raw
	4	12	U12	LHKDT1TKRC1T1
				TEM1 TKR Cable 1 Temp 1 raw
	4	12	U12	LHKDT1TKRC2T0
				TEM1 TKR Cable 2 Temp 0 raw
	4	12	U12	LHKDT1TKRC2T1
				TEM1 TKR Cable 2 Temp 1 raw
	4	12	U12	LHKDT1TKRC3T0
				TEM1 TKR Cable 3 Temp 0 raw
	4	12	U12	LHKDT1TKRC3T1
				TEM1 TKR Cable 3 Temp 1 raw
	4	12	U12	LHKDT1TKRC4T0
				TEM1 TKR Cable 4 Temp 0 raw
	4	12	U12	LHKDT1TKRC4T1
				TEM1 TKR Cable 4 Temp 1 raw
	4	12	U12	LHKDT1TKRC5T0
				TEM1 TKR Cable 5 Temp 0 raw
	4	12	U12	LHKDT1TKRC5T1
				TEM1 TKR Cable 5 Temp 1 raw
	4	12	U12	LHKDT1TKRC6T0

Offset	S	L	Type	ITOS name, attribute(s), and description
				TEM1 TKR Cable 6 Temp 0 raw
	4	12	U12	LHKDT1TKRC6T1 TEM1 TKR Cable 6 Temp 1 raw
	4	12	U12	LHKDT1TKRC7T0 TEM1 TKR Cable 7 Temp 0 raw
	4	12	U12	LHKDT1TKRC7T1 TEM1 TKR Cable 7 Temp 1 raw

10.3.37 `DiagTemEnvTemp1` (631/0x277)

Description:

"Diagnostic TEM Temperature Packet 1" Telemetry Packet

Contains temperature specific ADC values for TEMs 2 and 3.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKDT2CALAF0T0 TEM2 CAL AFEE0 Temp 0 raw
	4	12	U12	LHKDT2CALAF0T1 TEM2 CAL AFEE0 Temp 1 raw
	4	12	U12	LHKDT2CALAF1T0 TEM2 CAL AFEE1 Temp 0 raw
	4	12	U12	LHKDT2CALAF1T1 TEM2 CAL AFEE1 Temp 1 raw
	4	12	U12	LHKDT2CALAF2T0 TEM2 CAL AFEE2 Temp 0 raw
	4	12	U12	LHKDT2CALAF2T1 TEM2 CAL AFEE2 Temp 1 raw
	4	12	U12	LHKDT2CALAF3T0 TEM2 CAL AFEE3 Temp 0 raw
	4	12	U12	LHKDT2CALAF3T1 TEM2 CAL AFEE3 Temp 1 raw
	4	12	U12	LHKDT2TKRC0T0 TEM2 TKR Cable 0 Temp 0 raw
	4	12	U12	LHKDT2TKRC0T1 TEM2 TKR Cable 0 Temp 1 raw
	4	12	U12	LHKDT2TKRC1T0 TEM2 TKR Cable 1 Temp 0 raw
	4	12	U12	LHKDT2TKRC1T1 TEM2 TKR Cable 1 Temp 1 raw
	4	12	U12	LHKDT2TKRC2T0 TEM2 TKR Cable 2 Temp 0 raw
	4	12	U12	LHKDT2TKRC2T1 TEM2 TKR Cable 2 Temp 1 raw
	4	12	U12	LHKDT2TKRC3T0 TEM2 TKR Cable 3 Temp 0 raw
	4	12	U12	LHKDT2TKRC3T1 TEM2 TKR Cable 3 Temp 1 raw
	4	12	U12	LHKDT2TKRC4T0 TEM2 TKR Cable 4 Temp 0 raw

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKDT2TKRC4T1 TEM2 TKR Cable 4 Temp 1 raw
	4	12	U12	LHKDT2TKRC5T0 TEM2 TKR Cable 5 Temp 0 raw
	4	12	U12	LHKDT2TKRC5T1 TEM2 TKR Cable 5 Temp 1 raw
	4	12	U12	LHKDT2TKRC6T0 TEM2 TKR Cable 6 Temp 0 raw
	4	12	U12	LHKDT2TKRC6T1 TEM2 TKR Cable 6 Temp 1 raw
	4	12	U12	LHKDT2TKRC7T0 TEM2 TKR Cable 7 Temp 0 raw
	4	12	U12	LHKDT2TKRC7T1 TEM2 TKR Cable 7 Temp 1 raw
	4	12	U12	LHKDT3CALAF0T0 TEM3 CAL AFEE0 Temp 0 raw
	4	12	U12	LHKDT3CALAF0T1 TEM3 CAL AFEE0 Temp 1 raw
	4	12	U12	LHKDT3CALAF1T0 TEM3 CAL AFEE1 Temp 0 raw
	4	12	U12	LHKDT3CALAF1T1 TEM3 CAL AFEE1 Temp 1 raw
	4	12	U12	LHKDT3CALAF2T0 TEM3 CAL AFEE2 Temp 0 raw
	4	12	U12	LHKDT3CALAF2T1 TEM3 CAL AFEE2 Temp 1 raw
	4	12	U12	LHKDT3CALAF3T0 TEM3 CAL AFEE3 Temp 0 raw
	4	12	U12	LHKDT3CALAF3T1 TEM3 CAL AFEE3 Temp 1 raw
	4	12	U12	LHKDT3TKRC0T0 TEM3 TKR Cable 0 Temp 0 raw
	4	12	U12	LHKDT3TKRC0T1 TEM3 TKR Cable 0 Temp 1 raw
	4	12	U12	LHKDT3TKRC1T0 TEM3 TKR Cable 1 Temp 0 raw
	4	12	U12	LHKDT3TKRC1T1 TEM3 TKR Cable 1 Temp 1 raw
	4	12	U12	LHKDT3TKRC2T0 TEM3 TKR Cable 2 Temp 0 raw
	4	12	U12	LHKDT3TKRC2T1 TEM3 TKR Cable 2 Temp 1 raw
	4	12	U12	LHKDT3TKRC3T0 TEM3 TKR Cable 3 Temp 0 raw
	4	12	U12	LHKDT3TKRC3T1 TEM3 TKR Cable 3 Temp 1 raw
	4	12	U12	LHKDT3TKRC4T0 TEM3 TKR Cable 4 Temp 0 raw
	4	12	U12	LHKDT3TKRC4T1 TEM3 TKR Cable 4 Temp 1 raw
	4	12	U12	LHKDT3TKRC5T0 TEM3 TKR Cable 5 Temp 0 raw

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKDT3TKRC5T1 TEM3 TKR Cable 5 Temp 1 raw
	4	12	U12	LHKDT3TKRC6T0 TEM3 TKR Cable 6 Temp 0 raw
	4	12	U12	LHKDT3TKRC6T1 TEM3 TKR Cable 6 Temp 1 raw
	4	12	U12	LHKDT3TKRC7T0 TEM3 TKR Cable 7 Temp 0 raw
	4	12	U12	LHKDT3TKRC7T1 TEM3 TKR Cable 7 Temp 1 raw

10.3.38 `DiagTemEnvTemp2` (632/0x278)

Description:

"Diagnostic TEM Temperature Packet 2" Telemetry Packet

Contains temperature specific ADC values for TEMs 4 and 5.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKDT4CALAF0T0 TEM4 CAL AFEE0 Temp 0 raw
	4	12	U12	LHKDT4CALAF0T1 TEM4 CAL AFEE0 Temp 1 raw
	4	12	U12	LHKDT4CALAF1T0 TEM4 CAL AFEE1 Temp 0 raw
	4	12	U12	LHKDT4CALAF1T1 TEM4 CAL AFEE1 Temp 1 raw
	4	12	U12	LHKDT4CALAF2T0 TEM4 CAL AFEE2 Temp 0 raw
	4	12	U12	LHKDT4CALAF2T1 TEM4 CAL AFEE2 Temp 1 raw
	4	12	U12	LHKDT4CALAF3T0 TEM4 CAL AFEE3 Temp 0 raw
	4	12	U12	LHKDT4CALAF3T1 TEM4 CAL AFEE3 Temp 1 raw
	4	12	U12	LHKDT4TKRC0T0 TEM4 TKR Cable 0 Temp 0 raw
	4	12	U12	LHKDT4TKRC0T1 TEM4 TKR Cable 0 Temp 1 raw
	4	12	U12	LHKDT4TKRC1T0 TEM4 TKR Cable 1 Temp 0 raw
	4	12	U12	LHKDT4TKRC1T1 TEM4 TKR Cable 1 Temp 1 raw
	4	12	U12	LHKDT4TKRC2T0 TEM4 TKR Cable 2 Temp 0 raw
	4	12	U12	LHKDT4TKRC2T1 TEM4 TKR Cable 2 Temp 1 raw
	4	12	U12	LHKDT4TKRC3T0 TEM4 TKR Cable 3 Temp 0 raw
	4	12	U12	LHKDT4TKRC3T1

Offset	S	L	Type	ITOS name, attribute(s), and description
				TEM4 TKR Cable 3 Temp 1 raw
	4	12	U12	LHKDT4TKRC4T0
				TEM4 TKR Cable 4 Temp 0 raw
	4	12	U12	LHKDT4TKRC4T1
				TEM4 TKR Cable 4 Temp 1 raw
	4	12	U12	LHKDT4TKRC5T0
				TEM4 TKR Cable 5 Temp 0 raw
	4	12	U12	LHKDT4TKRC5T1
				TEM4 TKR Cable 5 Temp 1 raw
	4	12	U12	LHKDT4TKRC6T0
				TEM4 TKR Cable 6 Temp 0 raw
	4	12	U12	LHKDT4TKRC6T1
				TEM4 TKR Cable 6 Temp 1 raw
	4	12	U12	LHKDT4TKRC7T0
				TEM4 TKR Cable 7 Temp 0 raw
	4	12	U12	LHKDT4TKRC7T1
				TEM4 TKR Cable 7 Temp 1 raw
	4	12	U12	LHKDT5CALAF0T0
				TEM5 CAL AFEE0 Temp 0 raw
	4	12	U12	LHKDT5CALAF0T1
				TEM5 CAL AFEE0 Temp 1 raw
	4	12	U12	LHKDT5CALAF1T0
				TEM5 CAL AFEE1 Temp 0 raw
	4	12	U12	LHKDT5CALAF1T1
				TEM5 CAL AFEE1 Temp 1 raw
	4	12	U12	LHKDT5CALAF2T0
				TEM5 CAL AFEE2 Temp 0 raw
	4	12	U12	LHKDT5CALAF2T1
				TEM5 CAL AFEE2 Temp 1 raw
	4	12	U12	LHKDT5CALAF3T0
				TEM5 CAL AFEE3 Temp 0 raw
	4	12	U12	LHKDT5CALAF3T1
				TEM5 CAL AFEE3 Temp 1 raw
	4	12	U12	LHKDT5TKRC0T0
				TEM5 TKR Cable 0 Temp 0 raw
	4	12	U12	LHKDT5TKRC0T1
				TEM5 TKR Cable 0 Temp 1 raw
	4	12	U12	LHKDT5TKRC1T0
				TEM5 TKR Cable 1 Temp 0 raw
	4	12	U12	LHKDT5TKRC1T1
				TEM5 TKR Cable 1 Temp 1 raw
	4	12	U12	LHKDT5TKRC2T0
				TEM5 TKR Cable 2 Temp 0 raw
	4	12	U12	LHKDT5TKRC2T1
				TEM5 TKR Cable 2 Temp 1 raw
	4	12	U12	LHKDT5TKRC3T0
				TEM5 TKR Cable 3 Temp 0 raw
	4	12	U12	LHKDT5TKRC3T1
				TEM5 TKR Cable 3 Temp 1 raw
	4	12	U12	LHKDT5TKRC4T0
				TEM5 TKR Cable 4 Temp 0 raw
	4	12	U12	LHKDT5TKRC4T1

Offset	S	L	Type	ITOS name, attribute(s), and description
				TEM5 TKR Cable 4 Temp 1 raw
	4	12	U12	LHKDT5TKRC5T0 TEM5 TKR Cable 5 Temp 0 raw
	4	12	U12	LHKDT5TKRC5T1 TEM5 TKR Cable 5 Temp 1 raw
	4	12	U12	LHKDT5TKRC6T0 TEM5 TKR Cable 6 Temp 0 raw
	4	12	U12	LHKDT5TKRC6T1 TEM5 TKR Cable 6 Temp 1 raw
	4	12	U12	LHKDT5TKRC7T0 TEM5 TKR Cable 7 Temp 0 raw
	4	12	U12	LHKDT5TKRC7T1 TEM5 TKR Cable 7 Temp 1 raw

10.3.39 `DiagTemEnvTemp3` (633/0x279)

Description:

"Diagnostic TEM Temperature Packet 3" Telemetry Packet

Contains temperature specific ADC values for TEMs 6 and 7.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKDT6CALAF0T0 TEM6 CAL AFEE0 Temp 0 raw
	4	12	U12	LHKDT6CALAF0T1 TEM6 CAL AFEE0 Temp 1 raw
	4	12	U12	LHKDT6CALAF1T0 TEM6 CAL AFEE1 Temp 0 raw
	4	12	U12	LHKDT6CALAF1T1 TEM6 CAL AFEE1 Temp 1 raw
	4	12	U12	LHKDT6CALAF2T0 TEM6 CAL AFEE2 Temp 0 raw
	4	12	U12	LHKDT6CALAF2T1 TEM6 CAL AFEE2 Temp 1 raw
	4	12	U12	LHKDT6CALAF3T0 TEM6 CAL AFEE3 Temp 0 raw
	4	12	U12	LHKDT6CALAF3T1 TEM6 CAL AFEE3 Temp 1 raw
	4	12	U12	LHKDT6TKRC0T0 TEM6 TKR Cable 0 Temp 0 raw
	4	12	U12	LHKDT6TKRC0T1 TEM6 TKR Cable 0 Temp 1 raw
	4	12	U12	LHKDT6TKRC1T0 TEM6 TKR Cable 1 Temp 0 raw
	4	12	U12	LHKDT6TKRC1T1 TEM6 TKR Cable 1 Temp 1 raw
	4	12	U12	LHKDT6TKRC2T0 TEM6 TKR Cable 2 Temp 0 raw
	4	12	U12	LHKDT6TKRC2T1 TEM6 TKR Cable 2 Temp 1 raw

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKDT6TKRC3T0 TEM6 TKR Cable 3 Temp 0 raw
	4	12	U12	LHKDT6TKRC3T1 TEM6 TKR Cable 3 Temp 1 raw
	4	12	U12	LHKDT6TKRC4T0 TEM6 TKR Cable 4 Temp 0 raw
	4	12	U12	LHKDT6TKRC4T1 TEM6 TKR Cable 4 Temp 1 raw
	4	12	U12	LHKDT6TKRC5T0 TEM6 TKR Cable 5 Temp 0 raw
	4	12	U12	LHKDT6TKRC5T1 TEM6 TKR Cable 5 Temp 1 raw
	4	12	U12	LHKDT6TKRC6T0 TEM6 TKR Cable 6 Temp 0 raw
	4	12	U12	LHKDT6TKRC6T1 TEM6 TKR Cable 6 Temp 1 raw
	4	12	U12	LHKDT6TKRC7T0 TEM6 TKR Cable 7 Temp 0 raw
	4	12	U12	LHKDT6TKRC7T1 TEM6 TKR Cable 7 Temp 1 raw
	4	12	U12	LHKDT7CALAF0T0 TEM7 CAL AFEE0 Temp 0 raw
	4	12	U12	LHKDT7CALAF0T1 TEM7 CAL AFEE0 Temp 1 raw
	4	12	U12	LHKDT7CALAF1T0 TEM7 CAL AFEE1 Temp 0 raw
	4	12	U12	LHKDT7CALAF1T1 TEM7 CAL AFEE1 Temp 1 raw
	4	12	U12	LHKDT7CALAF2T0 TEM7 CAL AFEE2 Temp 0 raw
	4	12	U12	LHKDT7CALAF2T1 TEM7 CAL AFEE2 Temp 1 raw
	4	12	U12	LHKDT7CALAF3T0 TEM7 CAL AFEE3 Temp 0 raw
	4	12	U12	LHKDT7CALAF3T1 TEM7 CAL AFEE3 Temp 1 raw
	4	12	U12	LHKDT7TKRC0T0 TEM7 TKR Cable 0 Temp 0 raw
	4	12	U12	LHKDT7TKRC0T1 TEM7 TKR Cable 0 Temp 1 raw
	4	12	U12	LHKDT7TKRC1T0 TEM7 TKR Cable 1 Temp 0 raw
	4	12	U12	LHKDT7TKRC1T1 TEM7 TKR Cable 1 Temp 1 raw
	4	12	U12	LHKDT7TKRC2T0 TEM7 TKR Cable 2 Temp 0 raw
	4	12	U12	LHKDT7TKRC2T1 TEM7 TKR Cable 2 Temp 1 raw
	4	12	U12	LHKDT7TKRC3T0 TEM7 TKR Cable 3 Temp 0 raw
	4	12	U12	LHKDT7TKRC3T1 TEM7 TKR Cable 3 Temp 1 raw

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKDT7TKRC4T0 TEM7 TKR Cable 4 Temp 0 raw
	4	12	U12	LHKDT7TKRC4T1 TEM7 TKR Cable 4 Temp 1 raw
	4	12	U12	LHKDT7TKRC5T0 TEM7 TKR Cable 5 Temp 0 raw
	4	12	U12	LHKDT7TKRC5T1 TEM7 TKR Cable 5 Temp 1 raw
	4	12	U12	LHKDT7TKRC6T0 TEM7 TKR Cable 6 Temp 0 raw
	4	12	U12	LHKDT7TKRC6T1 TEM7 TKR Cable 6 Temp 1 raw
	4	12	U12	LHKDT7TKRC7T0 TEM7 TKR Cable 7 Temp 0 raw
	4	12	U12	LHKDT7TKRC7T1 TEM7 TKR Cable 7 Temp 1 raw

10.3.40 `DiagTemEnvTemp4` (634/0x27A)

Description:

"Diagnostic TEM Temperature Packet 4" Telemetry Packet

Contains temperature specific ADC values for TEMs 8 and 9.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKDT8CALAF0T0 TEM8 CAL AFEE0 Temp 0 raw
	4	12	U12	LHKDT8CALAF0T1 TEM8 CAL AFEE0 Temp 1 raw
	4	12	U12	LHKDT8CALAF1T0 TEM8 CAL AFEE1 Temp 0 raw
	4	12	U12	LHKDT8CALAF1T1 TEM8 CAL AFEE1 Temp 1 raw
	4	12	U12	LHKDT8CALAF2T0 TEM8 CAL AFEE2 Temp 0 raw
	4	12	U12	LHKDT8CALAF2T1 TEM8 CAL AFEE2 Temp 1 raw
	4	12	U12	LHKDT8CALAF3T0 TEM8 CAL AFEE3 Temp 0 raw
	4	12	U12	LHKDT8CALAF3T1 TEM8 CAL AFEE3 Temp 1 raw
	4	12	U12	LHKDT8TKRC0T0 TEM8 TKR Cable 0 Temp 0 raw
	4	12	U12	LHKDT8TKRC0T1 TEM8 TKR Cable 0 Temp 1 raw
	4	12	U12	LHKDT8TKRC1T0 TEM8 TKR Cable 1 Temp 0 raw
	4	12	U12	LHKDT8TKRC1T1 TEM8 TKR Cable 1 Temp 1 raw
	4	12	U12	LHKDT8TKRC2T0

Offset	S	L	Type	ITOS name, attribute(s), and description
				TEM8 TKR Cable 2 Temp 0 raw
	4	12	U12	LHKDT8TKRC2T1
				TEM8 TKR Cable 2 Temp 1 raw
	4	12	U12	LHKDT8TKRC3T0
				TEM8 TKR Cable 3 Temp 0 raw
	4	12	U12	LHKDT8TKRC3T1
				TEM8 TKR Cable 3 Temp 1 raw
	4	12	U12	LHKDT8TKRC4T0
				TEM8 TKR Cable 4 Temp 0 raw
	4	12	U12	LHKDT8TKRC4T1
				TEM8 TKR Cable 4 Temp 1 raw
	4	12	U12	LHKDT8TKRC5T0
				TEM8 TKR Cable 5 Temp 0 raw
	4	12	U12	LHKDT8TKRC5T1
				TEM8 TKR Cable 5 Temp 1 raw
	4	12	U12	LHKDT8TKRC6T0
				TEM8 TKR Cable 6 Temp 0 raw
	4	12	U12	LHKDT8TKRC6T1
				TEM8 TKR Cable 6 Temp 1 raw
	4	12	U12	LHKDT8TKRC7T0
				TEM8 TKR Cable 7 Temp 0 raw
	4	12	U12	LHKDT8TKRC7T1
				TEM8 TKR Cable 7 Temp 1 raw
	4	12	U12	LHKDT9CALAF0T0
				TEM9 CAL AFEE0 Temp 0 raw
	4	12	U12	LHKDT9CALAF0T1
				TEM9 CAL AFEE0 Temp 1 raw
	4	12	U12	LHKDT9CALAF1T0
				TEM9 CAL AFEE1 Temp 0 raw
	4	12	U12	LHKDT9CALAF1T1
				TEM9 CAL AFEE1 Temp 1 raw
	4	12	U12	LHKDT9CALAF2T0
				TEM9 CAL AFEE2 Temp 0 raw
	4	12	U12	LHKDT9CALAF2T1
				TEM9 CAL AFEE2 Temp 1 raw
	4	12	U12	LHKDT9CALAF3T0
				TEM9 CAL AFEE3 Temp 0 raw
	4	12	U12	LHKDT9CALAF3T1
				TEM9 CAL AFEE3 Temp 1 raw
	4	12	U12	LHKDT9TKRC0T0
				TEM9 TKR Cable 0 Temp 0 raw
	4	12	U12	LHKDT9TKRC0T1
				TEM9 TKR Cable 0 Temp 1 raw
	4	12	U12	LHKDT9TKRC1T0
				TEM9 TKR Cable 1 Temp 0 raw
	4	12	U12	LHKDT9TKRC1T1
				TEM9 TKR Cable 1 Temp 1 raw
	4	12	U12	LHKDT9TKRC2T0
				TEM9 TKR Cable 2 Temp 0 raw
	4	12	U12	LHKDT9TKRC2T1
				TEM9 TKR Cable 2 Temp 1 raw
	4	12	U12	LHKDT9TKRC3T0

Offset	S	L	Type	ITOS name, attribute(s), and description
				TEM9 TKR Cable 3 Temp 0 raw
	4	12	U12	LHKDT9TKRC3T1 TEM9 TKR Cable 3 Temp 1 raw
	4	12	U12	LHKDT9TKRC4T0 TEM9 TKR Cable 4 Temp 0 raw
	4	12	U12	LHKDT9TKRC4T1 TEM9 TKR Cable 4 Temp 1 raw
	4	12	U12	LHKDT9TKRC5T0 TEM9 TKR Cable 5 Temp 0 raw
	4	12	U12	LHKDT9TKRC5T1 TEM9 TKR Cable 5 Temp 1 raw
	4	12	U12	LHKDT9TKRC6T0 TEM9 TKR Cable 6 Temp 0 raw
	4	12	U12	LHKDT9TKRC6T1 TEM9 TKR Cable 6 Temp 1 raw
	4	12	U12	LHKDT9TKRC7T0 TEM9 TKR Cable 7 Temp 0 raw
	4	12	U12	LHKDT9TKRC7T1 TEM9 TKR Cable 7 Temp 1 raw

10.3.41 `DiagTemEnvTemp5` (635/0x27B)

Description:

"Diagnostic TEM Temperature Packet 5" Telemetry Packet

Contains temperature specific ADC values for TEMs A and B.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKDTACALAF0T0 TEMA CAL AFEE0 Temp 0 raw
	4	12	U12	LHKDTACALAF0T1 TEMA CAL AFEE0 Temp 1 raw
	4	12	U12	LHKDTACALAF1T0 TEMA CAL AFEE1 Temp 0 raw
	4	12	U12	LHKDTACALAF1T1 TEMA CAL AFEE1 Temp 1 raw
	4	12	U12	LHKDTACALAF2T0 TEMA CAL AFEE2 Temp 0 raw
	4	12	U12	LHKDTACALAF2T1 TEMA CAL AFEE2 Temp 1 raw
	4	12	U12	LHKDTACALAF3T0 TEMA CAL AFEE3 Temp 0 raw
	4	12	U12	LHKDTACALAF3T1 TEMA CAL AFEE3 Temp 1 raw
	4	12	U12	LHKDTATKRC0T0 TEMA TKR Cable 0 Temp 0 raw
	4	12	U12	LHKDTATKRC0T1 TEMA TKR Cable 0 Temp 1 raw
	4	12	U12	LHKDTATKRC1T0 TEMA TKR Cable 1 Temp 0 raw

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKDTATKRC1T1 TEMA TKR Cable 1 Temp 1 raw
	4	12	U12	LHKDTATKRC2T0 TEMA TKR Cable 2 Temp 0 raw
	4	12	U12	LHKDTATKRC2T1 TEMA TKR Cable 2 Temp 1 raw
	4	12	U12	LHKDTATKRC3T0 TEMA TKR Cable 3 Temp 0 raw
	4	12	U12	LHKDTATKRC3T1 TEMA TKR Cable 3 Temp 1 raw
	4	12	U12	LHKDTATKRC4T0 TEMA TKR Cable 4 Temp 0 raw
	4	12	U12	LHKDTATKRC4T1 TEMA TKR Cable 4 Temp 1 raw
	4	12	U12	LHKDTATKRC5T0 TEMA TKR Cable 5 Temp 0 raw
	4	12	U12	LHKDTATKRC5T1 TEMA TKR Cable 5 Temp 1 raw
	4	12	U12	LHKDTATKRC6T0 TEMA TKR Cable 6 Temp 0 raw
	4	12	U12	LHKDTATKRC6T1 TEMA TKR Cable 6 Temp 1 raw
	4	12	U12	LHKDTATKRC7T0 TEMA TKR Cable 7 Temp 0 raw
	4	12	U12	LHKDTATKRC7T1 TEMA TKR Cable 7 Temp 1 raw
	4	12	U12	LHKDTBCALAF0T0 TEMB CAL AFEE0 Temp 0 raw
	4	12	U12	LHKDTBCALAF0T1 TEMB CAL AFEE0 Temp 1 raw
	4	12	U12	LHKDTBCALAF1T0 TEMB CAL AFEE1 Temp 0 raw
	4	12	U12	LHKDTBCALAF1T1 TEMB CAL AFEE1 Temp 1 raw
	4	12	U12	LHKDTBCALAF2T0 TEMB CAL AFEE2 Temp 0 raw
	4	12	U12	LHKDTBCALAF2T1 TEMB CAL AFEE2 Temp 1 raw
	4	12	U12	LHKDTBCALAF3T0 TEMB CAL AFEE3 Temp 0 raw
	4	12	U12	LHKDTBCALAF3T1 TEMB CAL AFEE3 Temp 1 raw
	4	12	U12	LHKDTBTKRC0T0 TEMB TKR Cable 0 Temp 0 raw
	4	12	U12	LHKDTBTKRC0T1 TEMB TKR Cable 0 Temp 1 raw
	4	12	U12	LHKDTBTKRC1T0 TEMB TKR Cable 1 Temp 0 raw
	4	12	U12	LHKDTBTKRC1T1 TEMB TKR Cable 1 Temp 1 raw
	4	12	U12	LHKDTBTKRC2T0 TEMB TKR Cable 2 Temp 0 raw

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKDTBTKRC2T1 TEMB TKR Cable 2 Temp 1 raw
	4	12	U12	LHKDTBTKRC3T0 TEMB TKR Cable 3 Temp 0 raw
	4	12	U12	LHKDTBTKRC3T1 TEMB TKR Cable 3 Temp 1 raw
	4	12	U12	LHKDTBTKRC4T0 TEMB TKR Cable 4 Temp 0 raw
	4	12	U12	LHKDTBTKRC4T1 TEMB TKR Cable 4 Temp 1 raw
	4	12	U12	LHKDTBTKRC5T0 TEMB TKR Cable 5 Temp 0 raw
	4	12	U12	LHKDTBTKRC5T1 TEMB TKR Cable 5 Temp 1 raw
	4	12	U12	LHKDTBTKRC6T0 TEMB TKR Cable 6 Temp 0 raw
	4	12	U12	LHKDTBTKRC6T1 TEMB TKR Cable 6 Temp 1 raw
	4	12	U12	LHKDTBTKRC7T0 TEMB TKR Cable 7 Temp 0 raw
	4	12	U12	LHKDTBTKRC7T1 TEMB TKR Cable 7 Temp 1 raw

10.3.42 `DiagTemEnvTemp6` (636/0x27C)

Description:

"Diagnostic TEM Temperature Packet 6" Telemetry Packet

Contains temperature specific ADC values for TEMs C and D.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKDTCCALAF0T0 TEMC CAL AFEE0 Temp 0 raw
	4	12	U12	LHKDTCCALAF0T1 TEMC CAL AFEE0 Temp 1 raw
	4	12	U12	LHKDTCCALAF1T0 TEMC CAL AFEE1 Temp 0 raw
	4	12	U12	LHKDTCCALAF1T1 TEMC CAL AFEE1 Temp 1 raw
	4	12	U12	LHKDTCCALAF2T0 TEMC CAL AFEE2 Temp 0 raw
	4	12	U12	LHKDTCCALAF2T1 TEMC CAL AFEE2 Temp 1 raw
	4	12	U12	LHKDTCCALAF3T0 TEMC CAL AFEE3 Temp 0 raw
	4	12	U12	LHKDTCCALAF3T1 TEMC CAL AFEE3 Temp 1 raw
	4	12	U12	LHKDTCTKRC0T0 TEMC TKR Cable 0 Temp 0 raw
	4	12	U12	LHKDTCTKRC0T1

Offset	S	L	Type	ITOS name, attribute(s), and description
				TEMC TKR Cable 0 Temp 1 raw
	4	12	U12	LHKDTCTKRC1T0
				TEMC TKR Cable 1 Temp 0 raw
	4	12	U12	LHKDTCTKRC1T1
				TEMC TKR Cable 1 Temp 1 raw
	4	12	U12	LHKDTCTKRC2T0
				TEMC TKR Cable 2 Temp 0 raw
	4	12	U12	LHKDTCTKRC2T1
				TEMC TKR Cable 2 Temp 1 raw
	4	12	U12	LHKDTCTKRC3T0
				TEMC TKR Cable 3 Temp 0 raw
	4	12	U12	LHKDTCTKRC3T1
				TEMC TKR Cable 3 Temp 1 raw
	4	12	U12	LHKDTCTKRC4T0
				TEMC TKR Cable 4 Temp 0 raw
	4	12	U12	LHKDTCTKRC4T1
				TEMC TKR Cable 4 Temp 1 raw
	4	12	U12	LHKDTCTKRC5T0
				TEMC TKR Cable 5 Temp 0 raw
	4	12	U12	LHKDTCTKRC5T1
				TEMC TKR Cable 5 Temp 1 raw
	4	12	U12	LHKDTCTKRC6T0
				TEMC TKR Cable 6 Temp 0 raw
	4	12	U12	LHKDTCTKRC6T1
				TEMC TKR Cable 6 Temp 1 raw
	4	12	U12	LHKDTCTKRC7T0
				TEMC TKR Cable 7 Temp 0 raw
	4	12	U12	LHKDTCTKRC7T1
				TEMC TKR Cable 7 Temp 1 raw
	4	12	U12	LHKDTDCALAF0T0
				TEMD CAL AFEE0 Temp 0 raw
	4	12	U12	LHKDTDCALAF0T1
				TEMD CAL AFEE0 Temp 1 raw
	4	12	U12	LHKDTDCALAF1T0
				TEMD CAL AFEE1 Temp 0 raw
	4	12	U12	LHKDTDCALAF1T1
				TEMD CAL AFEE1 Temp 1 raw
	4	12	U12	LHKDTDCALAF2T0
				TEMD CAL AFEE2 Temp 0 raw
	4	12	U12	LHKDTDCALAF2T1
				TEMD CAL AFEE2 Temp 1 raw
	4	12	U12	LHKDTDCALAF3T0
				TEMD CAL AFEE3 Temp 0 raw
	4	12	U12	LHKDTDCALAF3T1
				TEMD CAL AFEE3 Temp 1 raw
	4	12	U12	LHKDTDTKRC0T0
				TEMD TKR Cable 0 Temp 0 raw
	4	12	U12	LHKDTDTKRC0T1
				TEMD TKR Cable 0 Temp 1 raw
	4	12	U12	LHKDTDTKRC1T0
				TEMD TKR Cable 1 Temp 0 raw
	4	12	U12	LHKDTDTKRC1T1

Offset	S	L	Type	ITOS name, attribute(s), and description
				TEMD TKR Cable 1 Temp 1 raw
	4	12	U12	LHKDTDTKRC2T0 TEMD TKR Cable 2 Temp 0 raw
	4	12	U12	LHKDTDTKRC2T1 TEMD TKR Cable 2 Temp 1 raw
	4	12	U12	LHKDTDTKRC3T0 TEMD TKR Cable 3 Temp 0 raw
	4	12	U12	LHKDTDTKRC3T1 TEMD TKR Cable 3 Temp 1 raw
	4	12	U12	LHKDTDTKRC4T0 TEMD TKR Cable 4 Temp 0 raw
	4	12	U12	LHKDTDTKRC4T1 TEMD TKR Cable 4 Temp 1 raw
	4	12	U12	LHKDTDTKRC5T0 TEMD TKR Cable 5 Temp 0 raw
	4	12	U12	LHKDTDTKRC5T1 TEMD TKR Cable 5 Temp 1 raw
	4	12	U12	LHKDTDTKRC6T0 TEMD TKR Cable 6 Temp 0 raw
	4	12	U12	LHKDTDTKRC6T1 TEMD TKR Cable 6 Temp 1 raw
	4	12	U12	LHKDTDTKRC7T0 TEMD TKR Cable 7 Temp 0 raw
	4	12	U12	LHKDTDTKRC7T1 TEMD TKR Cable 7 Temp 1 raw

10.3.43 `DiagTemEnvTemp7` (637/0x27D)

Description:

"Diagnostic TEM Temperature Packet 7" Telemetry Packet

Contains temperature specific ADC values for TEMs E and F.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKDTECALAF0T0 TEME CAL AFEE0 Temp 0 raw
	4	12	U12	LHKDTECALAF0T1 TEME CAL AFEE0 Temp 1 raw
	4	12	U12	LHKDTECALAF1T0 TEME CAL AFEE1 Temp 0 raw
	4	12	U12	LHKDTECALAF1T1 TEME CAL AFEE1 Temp 1 raw
	4	12	U12	LHKDTECALAF2T0 TEME CAL AFEE2 Temp 0 raw
	4	12	U12	LHKDTECALAF2T1 TEME CAL AFEE2 Temp 1 raw
	4	12	U12	LHKDTECALAF3T0 TEME CAL AFEE3 Temp 0 raw
	4	12	U12	LHKDTECALAF3T1 TEME CAL AFEE3 Temp 1 raw

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKDTETKRC0T0 TEME TKR Cable 0 Temp 0 raw
	4	12	U12	LHKDTETKRC0T1 TEME TKR Cable 0 Temp 1 raw
	4	12	U12	LHKDTETKRC1T0 TEME TKR Cable 1 Temp 0 raw
	4	12	U12	LHKDTETKRC1T1 TEME TKR Cable 1 Temp 1 raw
	4	12	U12	LHKDTETKRC2T0 TEME TKR Cable 2 Temp 0 raw
	4	12	U12	LHKDTETKRC2T1 TEME TKR Cable 2 Temp 1 raw
	4	12	U12	LHKDTETKRC3T0 TEME TKR Cable 3 Temp 0 raw
	4	12	U12	LHKDTETKRC3T1 TEME TKR Cable 3 Temp 1 raw
	4	12	U12	LHKDTETKRC4T0 TEME TKR Cable 4 Temp 0 raw
	4	12	U12	LHKDTETKRC4T1 TEME TKR Cable 4 Temp 1 raw
	4	12	U12	LHKDTETKRC5T0 TEME TKR Cable 5 Temp 0 raw
	4	12	U12	LHKDTETKRC5T1 TEME TKR Cable 5 Temp 1 raw
	4	12	U12	LHKDTETKRC6T0 TEME TKR Cable 6 Temp 0 raw
	4	12	U12	LHKDTETKRC6T1 TEME TKR Cable 6 Temp 1 raw
	4	12	U12	LHKDTETKRC7T0 TEME TKR Cable 7 Temp 0 raw
	4	12	U12	LHKDTETKRC7T1 TEME TKR Cable 7 Temp 1 raw
	4	12	U12	LHKDTFCALAF0T0 TEMF CAL AFEE0 Temp 0 raw
	4	12	U12	LHKDTFCALAF0T1 TEMF CAL AFEE0 Temp 1 raw
	4	12	U12	LHKDTFCALAF1T0 TEMF CAL AFEE1 Temp 0 raw
	4	12	U12	LHKDTFCALAF1T1 TEMF CAL AFEE1 Temp 1 raw
	4	12	U12	LHKDTFCALAF2T0 TEMF CAL AFEE2 Temp 0 raw
	4	12	U12	LHKDTFCALAF2T1 TEMF CAL AFEE2 Temp 1 raw
	4	12	U12	LHKDTFCALAF3T0 TEMF CAL AFEE3 Temp 0 raw
	4	12	U12	LHKDTFCALAF3T1 TEMF CAL AFEE3 Temp 1 raw
	4	12	U12	LHKDTFTKRC0T0 TEMF TKR Cable 0 Temp 0 raw
	4	12	U12	LHKDTFTKRC0T1 TEMF TKR Cable 0 Temp 1 raw

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKDTFTKRC1T0 TEMF TKR Cable 1 Temp 0 raw
	4	12	U12	LHKDTFTKRC1T1 TEMF TKR Cable 1 Temp 1 raw
	4	12	U12	LHKDTFTKRC2T0 TEMF TKR Cable 2 Temp 0 raw
	4	12	U12	LHKDTFTKRC2T1 TEMF TKR Cable 2 Temp 1 raw
	4	12	U12	LHKDTFTKRC3T0 TEMF TKR Cable 3 Temp 0 raw
	4	12	U12	LHKDTFTKRC3T1 TEMF TKR Cable 3 Temp 1 raw
	4	12	U12	LHKDTFTKRC4T0 TEMF TKR Cable 4 Temp 0 raw
	4	12	U12	LHKDTFTKRC4T1 TEMF TKR Cable 4 Temp 1 raw
	4	12	U12	LHKDTFTKRC5T0 TEMF TKR Cable 5 Temp 0 raw
	4	12	U12	LHKDTFTKRC5T1 TEMF TKR Cable 5 Temp 1 raw
	4	12	U12	LHKDTFTKRC6T0 TEMF TKR Cable 6 Temp 0 raw
	4	12	U12	LHKDTFTKRC6T1 TEMF TKR Cable 6 Temp 1 raw
	4	12	U12	LHKDTFTKRC7T0 TEMF TKR Cable 7 Temp 0 raw
	4	12	U12	LHKDTFTKRC7T1 TEMF TKR Cable 7 Temp 1 raw

10.3.44 `DiagPduEnv0` (638/0x27E)

Description:

"Diagnostic PDU Environmental Packet 0" Telemetry Packet

PDU Packet 0

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x014	0	1	U1	LHKDP0TEMFPM; LDPDUTEMPWRST PDU0 TEMF Power Mgt Switch
	1	1	U1	LHKDP0TEMEPM PDU0 TEME Power Mgt Switch
	2	1	U1	LHKDP0TEMDPM PDU0 TEMD Power Mgt Switch
	3	1	U1	LHKDP0TEMCPM PDU0 TEMC Power Mgt Switch
	4	1	U1	LHKDP0TEMBPM PDU0 TEMB Power Mgt Switch
	5	1	U1	LHKDP0TEMAPM PDU0 TEMA Power Mgt Switch
	6	1	U1	LHKDP0TEM9PM

Offset	S	L	Type	ITOS name, attribute(s), and description
				PDU0 TEM9 Power Mgt Switch
	7	1	U1	LHKDP0TEM8PM PDU0 TEM8 Power Mgt Switch
	8	1	U1	LHKDP0TEM7PM PDU0 TEM7 Power Mgt Switch
	9	1	U1	LHKDP0TEM6PM PDU0 TEM6 Power Mgt Switch
	10	1	U1	LHKDP0TEM5PM PDU0 TEM5 Power Mgt Switch
	11	1	U1	LHKDP0TEM4PM PDU0 TEM4 Power Mgt Switch
	12	1	U1	LHKDP0TEM3PM PDU0 TEM3 Power Mgt Switch
	13	1	U1	LHKDP0TEM2PM PDU0 TEM2 Power Mgt Switch
	14	1	U1	LHKDP0TEM1PM PDU0 TEM1 Power Mgt Switch
	15	1	U1	LHKDP0TEM0PM PDU0 TEM0 Power Mgt Switch
	10	1	U1	LHKDP0EPU2CNVT PDU0 EPU2 Converter Switch
	11	1	U1	LHKDP0EPU1CNVT PDU0 EPU1 Converter Switch
	12	1	U1	LHKDP0EPU0CNVT PDU0 EPU0 Converter Switch
	13	1	U1	LHKDP0EPU2PM PDU0 EPU2 Power Mgt Switch
	14	1	U1	LHKDP0EPU1PM PDU0 EPU1 Power Mgt Switch
	15	1	U1	LHKDP0EPU0PM PDU0 EPU0 Power Mgt Switch
	13	1	U1	LHKDP0ACDCNVT PDU0 ACD Converter Switch
	14	1	I1	LHKDP0ACDPSP PDU0 ACD Power Supply Switch
	15	1	I1	LHKDP0ACDPM PDU0 ACD Power Mgt Switch
	4	12	U12	LHKDP0TEM033V PDU0 TEM0 3.3V digital raw
	4	12	U12	LHKDP0TEM133V PDU0 TEM1 3.3V digital raw
	4	12	U12	LHKDP0TEM233V PDU0 TEM2 3.3V digital raw
	4	12	U12	LHKDP0TEM333V PDU0 TEM3 3.3V digital raw
	4	12	U12	LHKDP0TEM433V PDU0 TEM4 3.3V digital raw
	4	12	U12	LHKDP0TEM533V PDU0 TEM5 3.3V digital raw
	4	12	U12	LHKDP0TEM633V PDU0 TEM6 3.3V digital raw
	4	12	U12	LHKDP0TEM733V

Offset	S	L	Type	ITOS name, attribute(s), and description
				PDU0 TEM7 3.3V digital raw
	4	12	U12	LHKDP0TEM833V
				PDU0 TEM8 3.3V digital raw
	4	12	U12	LHKDP0TEM933V
				PDU0 TEM9 3.3V digital raw
	4	12	U12	LHKDP0TEMA33V
				PDU0 TEMA 3.3V digital raw
	4	12	U12	LHKDP0TEMB33V
				PDU0 TEMB 3.3V digital raw
	4	12	U12	LHKDP0TEMC33V
				PDU0 TEMC 3.3V digital raw
	4	12	U12	LHKDP0TEMD33V
				PDU0 TEMD 3.3V digital raw
	4	12	U12	LHKDP0TEME33V
				PDU0 TEME 3.3V digital raw
	4	12	U12	LHKDP0TEMF33V
				PDU0 TEMF 3.3V digital raw
	4	12	U12	LHKDP0TEM0PCT
				PDU0 TEM0 PCB temperature raw
	4	12	U12	LHKDP0TEM1PCT
				PDU0 TEM1 PCB temperature raw
	4	12	U12	LHKDP0TEM2PCT
				PDU0 TEM2 PCB temperature raw
	4	12	U12	LHKDP0TEM3PCT
				PDU0 TEM3 PCB temperature raw
	4	12	U12	LHKDP0TEM4PCT
				PDU0 TEM4 PCB temperature raw
	4	12	U12	LHKDP0TEM5PCT
				PDU0 TEM5 PCB temperature raw
	4	12	U12	LHKDP0TEM6PCT
				PDU0 TEM6 PCB temperature raw
	4	12	U12	LHKDP0TEM7PCT
				PDU0 TEM7 PCB temperature raw
	4	12	U12	LHKDP0TEM8PCT
				PDU0 TEM8 PCB temperature raw
	4	12	U12	LHKDP0TEM9PCT
				PDU0 TEM9 PCB temperature raw
	4	12	U12	LHKDP0TEMAPCT
				PDU0 TEMA PCB temperature raw
	4	12	U12	LHKDP0TEMBPCT
				PDU0 TEMB PCB temperature raw
	4	12	U12	LHKDP0TEMCPCT
				PDU0 TEMC PCB temperature raw
	4	12	U12	LHKDP0TEMDPCT
				PDU0 TEMD PCB temperature raw
	4	12	U12	LHKDP0TEMEPCT
				PDU0 TEME PCB temperature raw
	4	12	U12	LHKDP0TEMFPCT
				PDU0 TEMF PCB temperature raw
	4	12	U12	LHKDP0EPU033V
				PDU0 EPU0 3.3V digital raw
	4	12	U12	LHKDP0EPU133V

Offset	S	L	Type	ITOS name, attribute(s), and description
				PDU0 EPU1 3.3V digital raw
	4	12	U12	LHKDP0EPU233V PDU0 EPU2 3.3V digital raw
	4	12	U12	LHKDP0EPU0T PDU0 EPU0 temperature raw
	4	12	U12	LHKDP0EPU1T PDU0 EPU1 temperature raw
	4	12	U12	LHKDP0EPU2T PDU0 EPU2 temperature raw
	4	12	U12	LHKDAFR33ISUM AEM FREE Board 3.3 Current Sum
	4	12	U12	LHKDADABTEMP DAQ Board Temperature
	4	12	U12	LHKDAFR28ISUM AEM FREE Board 28V Current Sum
	4	12	U12	LHKDADAB33V DAQ Board 3.3V

10.3.45 `DiagPduEnv1` (639/0x27F)

Description:

"Diagnostic PDU Environmental Packet 1" Telemetry Packet

PDU Packet 1

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKDP0TEM0PST PDU0 TEM0 power supply temperature raw
	4	12	U12	LHKDP0TEM1PST PDU0 TEM1 power supply temperature raw
	4	12	U12	LHKDP0TEM2PST PDU0 TEM2 power supply temperature raw
	4	12	U12	LHKDP0TEM3PST PDU0 TEM3 power supply temperature raw
	4	12	U12	LHKDP0TEM4PST PDU0 TEM4 power supply temperature raw
	4	12	U12	LHKDP0TEM5PST PDU0 TEM5 power supply temperature raw
	4	12	U12	LHKDP0TEM6PST PDU0 TEM6 power supply temperature raw
	4	12	U12	LHKDP0TEM7PST PDU0 TEM7 power supply temperature raw
	4	12	U12	LHKDP0TEM8PST PDU0 TEM8 power supply temperature raw
	4	12	U12	LHKDP0TEM9PST PDU0 TEM9 power supply temperature raw
	4	12	U12	LHKDP0TEMAPST PDU0 TEMA power supply temperature raw
	4	12	U12	LHKDP0TEMBPST PDU0 TEMB power supply temperature raw

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKDP0TEMCPST PDU0 TEMC power supply temperature raw
	4	12	U12	LHKDP0TEMDPST PDU0 TEMD power supply temperature raw
	4	12	U12	LHKDP0TEMEPST PDU0 TEME power supply temperature raw
	4	12	U12	LHKDP0TEMFPST PDU0 TEMF power supply temperature raw
	4	12	U12	LHKDP0CAL0BPT PDU0 TEM0 CAL baseplate temperature raw
	4	12	U12	LHKDP0CAL1BPT PDU0 TEM1 CAL baseplate temperature raw
	4	12	U12	LHKDP0CAL2BPT PDU0 TEM2 CAL baseplate temperature raw
	4	12	U12	LHKDP0CAL3BPT PDU0 TEM3 CAL baseplate temperature raw
	4	12	U12	LHKDP0CAL4BPT PDU0 TEM4 CAL baseplate temperature raw
	4	12	U12	LHKDP0CAL5BPT PDU0 TEM5 CAL baseplate temperature raw
	4	12	U12	LHKDP0CAL6BPT PDU0 TEM6 CAL baseplate temperature raw
	4	12	U12	LHKDP0CAL7BPT PDU0 TEM7 CAL baseplate temperature raw
	4	12	U12	LHKDP0CAL8BPT PDU0 TEM8 CAL baseplate temperature raw
	4	12	U12	LHKDP0CAL9BPT PDU0 TEM9 CAL baseplate temperature raw
	4	12	U12	LHKDP0CALABPT PDU0 TEMA CAL baseplate temperature raw
	4	12	U12	LHKDP0CALBBPT PDU0 TEMB CAL baseplate temperature raw
	4	12	U12	LHKDP0CALCBPT PDU0 TEMC CAL baseplate temperature raw
	4	12	U12	LHKDP0CALDBPT PDU0 TEMD CAL baseplate temperature raw
	4	12	U12	LHKDP0CALEBPT PDU0 TEME CAL baseplate temperature raw
	4	12	U12	LHKDP0CALFBPT PDU0 TEMF CAL baseplate temperature raw

10.3.46 `DiagPduEnv2` (640/0x280)

Description:

"Diagnostic PDU Environmental Packet 2" Telemetry Packet

PDU Packet 2

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKDP0PHP0DSIT

Offset	S	L	Type	ITOS name, attribute(s), and description
				+Y VCHP 0 DSHP Interface temperature raw
	4	12	U12	LHKDP0PHP1DSIT +Y VCHP 1 DSHP Interface temperature raw
	4	12	U12	LHKDP0PHP2DSIT +Y VCHP 2 DSHP Interface temperature raw
	4	12	U12	LHKDP0PHP3DSIT +Y VCHP 3 DSHP Interface temperature raw
	4	12	U12	LHKDP0PHP4DSIT +Y VCHP 4 DSHP Interface temperature raw
	4	12	U12	LHKDP0PHP5DSIT +Y VCHP 5 DSHP Interface temperature raw
	4	12	U12	LHKDP0MHP0DSIT -Y VCHP 0 DSHP Interface temperature raw
	4	12	U12	LHKDP0MHP1DSIT -Y VCHP 1 DSHP Interface temperature raw
	4	12	U12	LHKDP0MHP2DSIT -Y VCHP 2 DSHP Interface temperature raw
	4	12	U12	LHKDP0MHP3DSIT -Y VCHP 3 DSHP Interface temperature raw
	4	12	U12	LHKDP0MHP4DSIT -Y VCHP 4 DSHP Interface temperature raw
	4	12	U12	LHKDP0MHP5DSIT -Y VCHP 5 DSHP Interface temperature raw
	4	12	U12	LHKDP0PHP0XLIT +Y VCHP 0 XLHP Interface temperature raw
	4	12	U12	LHKDP0PHP1XLIT +Y VCHP 1 XLHP Interface temperature raw
	4	12	U12	LHKDP0PHP2XLIT +Y VCHP 2 XLHP Interface temperature raw
	4	12	U12	LHKDP0PHP3XLIT +Y VCHP 3 XLHP Interface temperature raw
	4	12	U12	LHKDP0PHP4XLIT +Y VCHP 4 XLHP Interface temperature raw
	4	12	U12	LHKDP0PHP5XLIT +Y VCHP 5 XLHP Interface temperature raw
	4	12	U12	LHKDP0MHP0XLIT -Y VCHP 0 XLHP Interface temperature raw
	4	12	U12	LHKDP0MHP1XLIT -Y VCHP 1 XLHP Interface temperature raw
	4	12	U12	LHKDP0MHP2XLIT -Y VCHP 2 XLHP Interface temperature raw
	4	12	U12	LHKDP0MHP3XLIT -Y VCHP 3 XLHP Interface temperature raw
	4	12	U12	LHKDP0MHP4XLIT -Y VCHP 4 XLHP Interface temperature raw
	4	12	U12	LHKDP0MHP5XLIT -Y VCHP 5 XLHP Interface temperature raw
	4	12	U12	LHKDP0PHP0RVHT +Y VCHP 0 reservoir heater temperature raw
	4	12	U12	LHKDP0PHP1RVHT +Y VCHP 1 reservoir heater temperature raw
	4	12	U12	LHKDP0PHP2RVHT

Offset	S	L	Type	ITOS name, attribute(s), and description
				+Y VCHP 2 reservoir heater temperature raw
	4	12	U12	LHKDP0PHP3RVHT +Y VCHP 3 reservoir heater temperature raw
	4	12	U12	LHKDP0PHP4RVHT +Y VCHP 4 reservoir heater temperature raw
	4	12	U12	LHKDP0PHP5RVHT +Y VCHP 5 reservoir heater temperature raw
	4	12	U12	LHKDP0MHP0RVHT -Y VCHP 0 reservoir heater temperature raw
	4	12	U12	LHKDP0MHP1RVHT -Y VCHP 1 reservoir heater temperature raw
	4	12	U12	LHKDP0MHP2RVHT -Y VCHP 2 reservoir heater temperature raw
	4	12	U12	LHKDP0MHP3RVHT -Y VCHP 3 reservoir heater temperature raw
	4	12	U12	LHKDP0MHP4RVHT -Y VCHP 4 reservoir heater temperature raw
	4	12	U12	LHKDP0MHP5RVHT -Y VCHP 5 reservoir heater temperature raw

10.3.47 `DiagPduEnv3` (641/0x281)

Description:

"Diagnostic PDU Environmental Packet 3" Telemetry Packet

PDU Packet 3

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKDP0GRID0T Grid 0 temperature raw
	4	12	U12	LHKDP0GRID1T Grid 1 temperature raw
	4	12	U12	LHKDP0GRID2T Grid 2 temperature raw
	4	12	U12	LHKDP0GRID3T Grid 3 temperature raw
	4	12	U12	LHKDP0GRID4T Grid 4 temperature raw
	4	12	U12	LHKDP0GRID5T Grid 5 temperature raw
	4	12	U12	LHKDP0GRID6T Grid 6 temperature raw
	4	12	U12	LHKDP0GRID7T Grid 7 temperature raw
	4	12	U12	LHKDP0GRID8T Grid 8 temperature raw
	4	12	U12	LHKDP0GRID9T Grid 9 temperature raw
	4	12	U12	LHKDP0GRID10T Grid 10 temperature raw

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKDP0GRID11T Grid 11 temperature raw
	4	12	U12	LHKDP0ACDSHT0 ACD shell temperature 0 raw
	4	12	U12	LHKDP0ACDSHT1 ACD shell temperature 1 raw
	4	12	U12	LHKDP0ACDPRT0 ACD PMT rail temperature 0 raw
	4	12	U12	LHKDP0ACDPRT1 ACD PMT rail temperature 1 raw
	4	12	U12	LHKDP0ACDPRT2 ACD PMT rail temperature 2 raw
	4	12	U12	LHKDP0ACDPRT3 ACD PMT rail temperature 3 raw
	4	12	U12	LHKDP0ACDBGT0 ACD BEA grid temperature 0 raw
	4	12	U12	LHKDP0ACDBGT1 ACD BEA grid temperature 1 raw
	4	12	U12	LHKDP0RADAFHT0 Radiator 0 antifreeze heater temperature raw
	4	12	U12	LHKDP0RADAFHT1 Radiator 1 antifreeze heater temperature raw
	4	12	U12	LHKDP0GRADIFT0 Grid radiator 0 interface temperature raw
	4	12	U12	LHKDP0GRAD1IFT Grid radiator 1 interface temperature raw
	4	12	U12	LHKDP0GRAD2IFT Grid radiator 2 interface temperature raw
	4	12	U12	LHKDP0GRAD3IFT Grid radiator 3 interface temperature raw
	4	12	U12	LHKDP0RAD0T Radiator 0 temperature raw
	4	12	U12	LHKDP0RAD1T Radiator 1 temperature raw
	4	12	U12	LHKDP0RAD2T Radiator 2 temperature raw
	4	12	U12	LHKDP0RAD3T Radiator 3 temperature raw
	4	12	U12	LHKDP0RAD4T Radiator 4 temperature raw
	4	12	U12	LHKDP0RAD5T Radiator 5 temperature raw
	4	12	U12	LHKDP0RAD6T Radiator 6 temperature raw
	4	12	U12	LHKDP0RAD7T Radiator 7 temperature raw
	4	12	U12	LHKDP0RAD8T Radiator 8 temperature raw
	4	12	U12	LHKDP0RAD9T Radiator 9 temperature raw
	4	12	U12	LHKDP0RAD10T Radiator 10 temperature raw

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKDP0RAD11T Radiator 11 temperature raw

10.3.48 DiagPduEnv4 (642/0x282)

Description:

"Diagnostic PDU Environmental Packet 4" Telemetry Packet

PDU Packet 4

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x014	0	1	U1	LHKDP1TEMFPM; LDPDUTEMPWRST PDU1 TEMF Power Mgt Switch
	1	1	U1	LHKDP1TEMEPM PDU1 TEME Power Mgt Switch
	2	1	U1	LHKDP1TEMDPM PDU1 TEMD Power Mgt Switch
	3	1	U1	LHKDP1TEMCPM PDU1 TEMC Power Mgt Switch
	4	1	U1	LHKDP1TEMBPM PDU1 TEMB Power Mgt Switch
	5	1	U1	LHKDP1TEMAPM PDU1 TEMA Power Mgt Switch
	6	1	U1	LHKDP1TEM9PM PDU1 TEM9 Power Mgt Switch
	7	1	U1	LHKDP1TEM8PM PDU1 TEM8 Power Mgt Switch
	8	1	U1	LHKDP1TEM7PM PDU1 TEM7 Power Mgt Switch
	9	1	U1	LHKDP1TEM6PM PDU1 TEM6 Power Mgt Switch
	10	1	U1	LHKDP1TEM5PM PDU1 TEM5 Power Mgt Switch
	11	1	U1	LHKDP1TEM4PM PDU1 TEM4 Power Mgt Switch
	12	1	U1	LHKDP1TEM3PM PDU1 TEM3 Power Mgt Switch
	13	1	U1	LHKDP1TEM2PM PDU1 TEM2 Power Mgt Switch
	14	1	U1	LHKDP1TEM1PM PDU1 TEM1 Power Mgt Switch
	15	1	U1	LHKDP1TEM0PM PDU1 TEM0 Power Mgt Switch
	10	1	U1	LHKDP1EPU2CNVT PDU1 EPU2 Converter Switch
	11	1	U1	LHKDP1EPU1CNVT PDU1 EPU1 Converter Switch
	12	1	U1	LHKDP1EPU0CNVT PDU1 EPU0 Converter Switch
	13	1	U1	LHKDP1EPU2PM

Offset	S	L	Type	ITOS name, attribute(s), and description
				PDU1 EPU2 Power Mgt Switch
	14	1	U1	LHKDP1EPU1PM
				PDU1 EPU1 Power Mgt Switch
	15	1	U1	LHKDP1EPU0PM
				PDU1 EPU0 Power Mgt Switch
	13	1	U1	LHKDP1ACDCNVT
				PDU1 ACD Converter Switch
	14	1	I1	LHKDP1ACDPSP
				PDU1 ACD Power Supply Switch
	15	1	I1	LHKDP1ACDPM
				PDU1 ACD Power Mgt Switch
	4	12	U12	LHKDP1TEM033V
				PDU1 TEM0 3.3V digital raw
	4	12	U12	LHKDP1TEM133V
				PDU1 TEM1 3.3V digital raw
	4	12	U12	LHKDP1TEM233V
				PDU1 TEM2 3.3V digital raw
	4	12	U12	LHKDP1TEM333V
				PDU1 TEM3 3.3V digital raw
	4	12	U12	LHKDP1TEM433V
				PDU1 TEM4 3.3V digital raw
	4	12	U12	LHKDP1TEM533V
				PDU1 TEM5 3.3V digital raw
	4	12	U12	LHKDP1TEM633V
				PDU1 TEM6 3.3V digital raw
	4	12	U12	LHKDP1TEM733V
				PDU1 TEM7 3.3V digital raw
	4	12	U12	LHKDP1TEM833V
				PDU1 TEM8 3.3V digital raw
	4	12	U12	LHKDP1TEM933V
				PDU1 TEM9 3.3V digital raw
	4	12	U12	LHKDP1TEMA33V
				PDU1 TEMA 3.3V digital raw
	4	12	U12	LHKDP1TEMB33V
				PDU1 TEMB 3.3V digital raw
	4	12	U12	LHKDP1TEMC33V
				PDU1 TEMC 3.3V digital raw
	4	12	U12	LHKDP1TEMD33V
				PDU1 TEMD 3.3V digital raw
	4	12	U12	LHKDP1TEME33V
				PDU1 TEME 3.3V digital raw
	4	12	U12	LHKDP1TEMF33V
				PDU1 TEMF 3.3V digital raw
	4	12	U12	LHKDP1TEM0PCT
				PDU1 TEM0 PCB temperature raw
	4	12	U12	LHKDP1TEM1PCT
				PDU1 TEM1 PCB temperature raw
	4	12	U12	LHKDP1TEM2PCT
				PDU1 TEM2 PCB temperature raw
	4	12	U12	LHKDP1TEM3PCT
				PDU1 TEM3 PCB temperature raw
	4	12	U12	LHKDP1TEM4PCT

Offset	S	L	Type	ITOS name, attribute(s), and description
				PDU1 TEM4 PCB temperature raw
	4	12	U12	LHKDP1TEM5PCT PDU1 TEM5 PCB temperature raw
	4	12	U12	LHKDP1TEM6PCT PDU1 TEM6 PCB temperature raw
	4	12	U12	LHKDP1TEM7PCT PDU1 TEM7 PCB temperature raw
	4	12	U12	LHKDP1TEM8PCT PDU1 TEM8 PCB temperature raw
	4	12	U12	LHKDP1TEM9PCT PDU1 TEM9 PCB temperature raw
	4	12	U12	LHKDP1TEMAPCT PDU1 TEMA PCB temperature raw
	4	12	U12	LHKDP1TEMBPCT PDU1 TEMB PCB temperature raw
	4	12	U12	LHKDP1TEMCPCT PDU1 TEMC PCB temperature raw
	4	12	U12	LHKDP1TEMDPCT PDU1 TEMD PCB temperature raw
	4	12	U12	LHKDP1TEMEPCT PDU1 TEME PCB temperature raw
	4	12	U12	LHKDP1TEMFPCT PDU1 TEMF PCB temperature raw
	4	12	U12	LHKDP1EPU033V PDU1 EPU0 3.3V digital raw
	4	12	U12	LHKDP1EPU133V PDU1 EPU1 3.3V digital raw
	4	12	U12	LHKDP1EPU233V PDU1 EPU2 3.3V digital raw
	4	12	U12	LHKDP1EPU0T PDU1 EPU0 temperature raw
	4	12	U12	LHKDP1EPU1T PDU1 EPU1 temperature raw
	4	12	U12	LHKDP1EPU2T PDU1 EPU2 temperature raw

10.3.49 `DiagPduEnv5` (643/0x283)

Description:

"Diagnostic PDU Environmental Packet 5" Telemetry Packet

PDU Packet 5

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKDP1TEM0PST PDU1 TEM0 power supply temperature raw
	4	12	U12	LHKDP1TEM1PST PDU1 TEM1 power supply temperature raw
	4	12	U12	LHKDP1TEM2PST PDU1 TEM2 power supply temperature raw

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKDP1TEM3PST PDU1 TEM3 power supply temperature raw
	4	12	U12	LHKDP1TEM4PST PDU1 TEM4 power supply temperature raw
	4	12	U12	LHKDP1TEM5PST PDU1 TEM5 power supply temperature raw
	4	12	U12	LHKDP1TEM6PST PDU1 TEM6 power supply temperature raw
	4	12	U12	LHKDP1TEM7PST PDU1 TEM7 power supply temperature raw
	4	12	U12	LHKDP1TEM8PST PDU1 TEM8 power supply temperature raw
	4	12	U12	LHKDP1TEM9PST PDU1 TEM9 power supply temperature raw
	4	12	U12	LHKDP1TEMAPST PDU1 TEMA power supply temperature raw
	4	12	U12	LHKDP1TEMBPST PDU1 TEMB power supply temperature raw
	4	12	U12	LHKDP1TEMCPST PDU1 TEMC power supply temperature raw
	4	12	U12	LHKDP1TEMDPST PDU1 TEMD power supply temperature raw
	4	12	U12	LHKDP1TEMEPST PDU1 TEME power supply temperature raw
	4	12	U12	LHKDP1TEMFPST PDU1 TEMF power supply temperature raw
	4	12	U12	LHKDP1CAL0BPT PDU1 TEM0 CAL baseplate temperature raw
	4	12	U12	LHKDP1CAL1BPT PDU1 TEM1 CAL baseplate temperature raw
	4	12	U12	LHKDP1CAL2BPT PDU1 TEM2 CAL baseplate temperature raw
	4	12	U12	LHKDP1CAL3BPT PDU1 TEM3 CAL baseplate temperature raw
	4	12	U12	LHKDP1CAL4BPT PDU1 TEM4 CAL baseplate temperature raw
	4	12	U12	LHKDP1CAL5BPT PDU1 TEM5 CAL baseplate temperature raw
	4	12	U12	LHKDP1CAL6BPT PDU1 TEM6 CAL baseplate temperature raw
	4	12	U12	LHKDP1CAL7BPT PDU1 TEM7 CAL baseplate temperature raw
	4	12	U12	LHKDP1CAL8BPT PDU1 TEM8 CAL baseplate temperature raw
	4	12	U12	LHKDP1CAL9BPT PDU1 TEM9 CAL baseplate temperature raw
	4	12	U12	LHKDP1CALABPT PDU1 TEMA CAL baseplate temperature raw
	4	12	U12	LHKDP1CALBBPT PDU1 TEMB CAL baseplate temperature raw
	4	12	U12	LHKDP1CALCBPT PDU1 TEMC CAL baseplate temperature raw

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKDP1CALDBPT PDU1 TEMD CAL baseplate temperature raw
	4	12	U12	LHKDP1CALEBPT PDU1 TEME CAL baseplate temperature raw
	4	12	U12	LHKDP1CALFBPT PDU1 TEMF CAL baseplate temperature raw

10.3.50 `DiagPduEnv6` (644/0x284)

Description:

"Diagnostic PDU Environmental Packet 6" Telemetry Packet

PDU Packet 6

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKDP1PHP0DSIT +Y VCHP 0 DSHP Interface temperature raw
	4	12	U12	LHKDP1PHP1DSIT +Y VCHP 1 DSHP Interface temperature raw
	4	12	U12	LHKDP1PHP2DSIT +Y VCHP 2 DSHP Interface temperature raw
	4	12	U12	LHKDP1PHP3DSIT +Y VCHP 3 DSHP Interface temperature raw
	4	12	U12	LHKDP1PHP4DSIT +Y VCHP 4 DSHP Interface temperature raw
	4	12	U12	LHKDP1PHP5DSIT +Y VCHP 5 DSHP Interface temperature raw
	4	12	U12	LHKDP1MHP0DSIT -Y VCHP 0 DSHP Interface temperature raw
	4	12	U12	LHKDP1MHP1DSIT -Y VCHP 1 DSHP Interface temperature raw
	4	12	U12	LHKDP1MHP2DSIT -Y VCHP 2 DSHP Interface temperature raw
	4	12	U12	LHKDP1MHP3DSIT -Y VCHP 3 DSHP Interface temperature raw
	4	12	U12	LHKDP1MHP4DSIT -Y VCHP 4 DSHP Interface temperature raw
	4	12	U12	LHKDP1MHP5DSIT -Y VCHP 5 DSHP Interface temperature raw
	4	12	U12	LHKDP1PHP0XLIT +Y VCHP 0 XLHP Interface temperature raw
	4	12	U12	LHKDP1PHP1XLIT +Y VCHP 1 XLHP Interface temperature raw
	4	12	U12	LHKDP1PHP2XLIT +Y VCHP 2 XLHP Interface temperature raw
	4	12	U12	LHKDP1PHP3XLIT +Y VCHP 3 XLHP Interface temperature raw
	4	12	U12	LHKDP1PHP4XLIT +Y VCHP 4 XLHP Interface temperature raw
	4	12	U12	LHKDP1PHP5XLIT

Offset	S	L	Type	ITOS name, attribute(s), and description
				+Y VCHP 5 XLHP Interface temperature raw
	4	12	U12	LHKDP1MHP0XLIT -Y VCHP 0 XLHP Interface temperature raw
	4	12	U12	LHKDP1MHP1XLIT -Y VCHP 1 XLHP Interface temperature raw
	4	12	U12	LHKDP1MHP2XLIT -Y VCHP 2 XLHP Interface temperature raw
	4	12	U12	LHKDP1MHP3XLIT -Y VCHP 3 XLHP Interface temperature raw
	4	12	U12	LHKDP1MHP4XLIT -Y VCHP 4 XLHP Interface temperature raw
	4	12	U12	LHKDP1MHP5XLIT -Y VCHP 5 XLHP Interface temperature raw
	4	12	U12	LHKDP1PHP0RVHT +Y VCHP 0 reservoir heater temperature raw
	4	12	U12	LHKDP1PHP1RVHT +Y VCHP 1 reservoir heater temperature raw
	4	12	U12	LHKDP1PHP2RVHT +Y VCHP 2 reservoir heater temperature raw
	4	12	U12	LHKDP1PHP3RVHT +Y VCHP 3 reservoir heater temperature raw
	4	12	U12	LHKDP1PHP4RVHT +Y VCHP 4 reservoir heater temperature raw
	4	12	U12	LHKDP1PHP5RVHT +Y VCHP 5 reservoir heater temperature raw
	4	12	U12	LHKDP1MHP0RVHT -Y VCHP 0 reservoir heater temperature raw
	4	12	U12	LHKDP1MHP1RVHT -Y VCHP 1 reservoir heater temperature raw
	4	12	U12	LHKDP1MHP2RVHT -Y VCHP 2 reservoir heater temperature raw
	4	12	U12	LHKDP1MHP3RVHT -Y VCHP 3 reservoir heater temperature raw
	4	12	U12	LHKDP1MHP4RVHT -Y VCHP 4 reservoir heater temperature raw
	4	12	U12	LHKDP1MHP5RVHT -Y VCHP 5 reservoir heater temperature raw

10.3.51 `DiagPduEnv7` (645/0x285)

Description:

"Diagnostic PDU Environmental Packet 7" Telemetry Packet

PDU Packet 7

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKDP1GRID0T Grid 0 temperature raw
	4	12	U12	LHKDP1GRID1T Grid 1 temperature raw

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKDP1GRID2T
				Grid 2 temperature raw
	4	12	U12	LHKDP1GRID3T
				Grid 3 temperature raw
	4	12	U12	LHKDP1GRID4T
				Grid 4 temperature raw
	4	12	U12	LHKDP1GRID5T
				Grid 5 temperature raw
	4	12	U12	LHKDP1GRID6T
				Grid 6 temperature raw
	4	12	U12	LHKDP1GRID7T
				Grid 7 temperature raw
	4	12	U12	LHKDP1GRID8T
				Grid 8 temperature raw
	4	12	U12	LHKDP1GRID9T
				Grid 9 temperature raw
	4	12	U12	LHKDP1GRID10T
				Grid 10 temperature raw
	4	12	U12	LHKDP1GRID11T
				Grid 11 temperature raw
	4	12	U12	LHKDP1ACDSHT0
				ACD shell temperature 0 raw
	4	12	U12	LHKDP1ACDSHT1
				ACD shell temperature 1 raw
	4	12	U12	LHKDP1ACDPRT0
				ACD PMT rail temperature 0 raw
	4	12	U12	LHKDP1ACDPRT1
				ACD PMT rail temperature 1 raw
	4	12	U12	LHKDP1ACDPRT2
				ACD PMT rail temperature 2 raw
	4	12	U12	LHKDP1ACDPRT3
				ACD PMT rail temperature 3 raw
	4	12	U12	LHKDP1ACDBGT0
				ACD BEA grid temperature 0 raw
	4	12	U12	LHKDP1ACDBGT1
				ACD BEA grid temperature 1 raw
	4	12	U12	LHKDP1RADAFHT0
				Radiator 0 antifreeze heater temperature raw
	4	12	U12	LHKDP1RADAFHT1
				Radiator 1 antifreeze heater temperature raw
	4	12	U12	LHKDP1GRADIFT0
				Grid radiator 0 interface temperature raw
	4	12	U12	LHKDP1GRAD1IFT
				Grid radiator 1 interface temperature raw
	4	12	U12	LHKDP1GRAD2IFT
				Grid radiator 2 interface temperature raw
	4	12	U12	LHKDP1GRAD3IFT
				Grid radiator 3 interface temperature raw
	4	12	U12	LHKDP1RAD0T
				Radiator 0 temperature raw
	4	12	U12	LHKDP1RAD1T
				Radiator 1 temperature raw

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	12	U12	LHKDP1RAD2T Radiator 2 temperature raw
	4	12	U12	LHKDP1RAD3T Radiator 3 temperature raw
	4	12	U12	LHKDP1RAD4T Radiator 4 temperature raw
	4	12	U12	LHKDP1RAD5T Radiator 5 temperature raw
	4	12	U12	LHKDP1RAD6T Radiator 6 temperature raw
	4	12	U12	LHKDP1RAD7T Radiator 7 temperature raw
	4	12	U12	LHKDP1RAD8T Radiator 8 temperature raw
	4	12	U12	LHKDP1RAD9T Radiator 9 temperature raw
	4	12	U12	LHKDP1RAD10T Radiator 10 temperature raw
	4	12	U12	LHKDP1RAD11T Radiator 11 temperature raw

10.3.52 `DiagAemEnv0` (646/0x286)

Description:

"Diagnostic AEM Environmental Monitor Packet 0" Telemetry Packet

AEM Packet 0

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	1	U1	LHKDAEMFR11PWRST AEM Free 11 Power State
	5	1	U1	LHKDAEMFR10PWRST AEM Free 10 Power State
	6	1	U1	LHKDAEMFR9PWRST AEM Free 9 Power State
	7	1	U1	LHKDAEMFR8PWRST AEM Free 8 Power State
	8	1	U1	LHKDAEMFR7PWRST AEM Free 7 Power State
	9	1	U1	LHKDAEMFR6PWRST AEM Free 6 Power State
	10	1	U1	LHKDAEMFR5PWRST AEM Free 5 Power State
	11	1	U1	LHKDAEMFR4PWRST AEM Free 4 Power State
	12	1	U1	LHKDAEMFR3PWRST AEM Free 3 Power State
	13	1	U1	LHKDAEMFR2PWRST AEM Free 2 Power State
	14	1	U1	LHKDAEMFR1PWRST

Offset	S	L	Type	ITOS name, attribute(s), and description
				AEM Free 1 Power State
	15	1	U1	LHKDAEMFR0PWRST
				AEM Free 0 Power State
	4	12	U12	LHKDAEMFR0VD
				AEM free board 0 VDD raw
	4	12	U12	LHKDAEMFR0T
				AEM free board 0 temperature raw
	4	12	U12	LHKDAEMFR0V1
				AEM free board 0 HV1 raw
	4	12	U12	LHKDAEMFR0V2
				AEM free board 0 HV2 raw
	4	12	U12	LHKDAEMFR1VD
				AEM free board 1 VDD raw
	4	12	U12	LHKDAEMFR1T
				AEM free board 1 temperature raw
	4	12	U12	LHKDAEMFR1V1
				AEM free board 1 HV1 raw
	4	12	U12	LHKDAEMFR1V2
				AEM free board 1 HV2 raw
	4	12	U12	LHKDAEMFR2VD
				AEM free board 2 VDD raw
	4	12	U12	LHKDAEMFR2T
				AEM free board 2 temperature raw
	4	12	U12	LHKDAEMFR2V1
				AEM free board 2 HV1 raw
	4	12	U12	LHKDAEMFR2V2
				AEM free board 2 HV2 raw
	4	12	U12	LHKDAEMFR3VD
				AEM free board 3 VDD raw
	4	12	U12	LHKDAEMFR3T
				AEM free board 3 temperature raw
	4	12	U12	LHKDAEMFR3V1
				AEM free board 3 HV1 raw
	4	12	U12	LHKDAEMFR3V2
				AEM free board 3 HV2 raw
	4	12	U12	LHKDAEMFR4VD
				AEM free board 4 VDD raw
	4	12	U12	LHKDAEMFR4T
				AEM free board 4 temperature raw
	4	12	U12	LHKDAEMFR4V1
				AEM free board 4 HV1 raw
	4	12	U12	LHKDAEMFR4V2
				AEM free board 4 HV2 raw
	4	12	U12	LHKDAEMFR5VD
				AEM free board 5 VDD raw
	4	12	U12	LHKDAEMFR5T
				AEM free board 5 temperature raw
	4	12	U12	LHKDAEMFR5V1
				AEM free board 5 HV1 raw
	4	12	U12	LHKDAEMFR5V2
				AEM free board 5 HV2 raw
	4	12	U12	LHKDAEMFR6VD

Offset	S	L	Type	ITOS name, attribute(s), and description
				AEM free board 6 VDD raw
	4	12	U12	LHKDAEMFR6T AEM free board 6 temperature raw
	4	12	U12	LHKDAEMFR6V1 AEM free board 6 HV1 raw
	4	12	U12	LHKDAEMFR6V2 AEM free board 6 HV2 raw
	4	12	U12	LHKDAEMFR7VD AEM free board 7 VDD raw
	4	12	U12	LHKDAEMFR7T AEM free board 7 temperature raw
	4	12	U12	LHKDAEMFR7V1 AEM free board 7 HV1 raw
	4	12	U12	LHKDAEMFR7V2 AEM free board 7 HV2 raw
	4	12	U12	LHKDAEMFR8VD AEM free board 8 VDD raw
	4	12	U12	LHKDAEMFR8T AEM free board 8 temperature raw
	4	12	U12	LHKDAEMFR8V1 AEM free board 8 HV1 raw
	4	12	U12	LHKDAEMFR8V2 AEM free board 8 HV2 raw
	4	12	U12	LHKDAEMFR9VD AEM free board 9 VDD raw
	4	12	U12	LHKDAEMFR9T AEM free board 9 temperature raw
	4	12	U12	LHKDAEMFR9V1 AEM free board 9 HV1 raw
	4	12	U12	LHKDAEMFR9V2 AEM free board 9 HV2 raw
	4	12	U12	LHKDAEMFR10VD AEM free board 10 VDD raw
	4	12	U12	LHKDAEMFR10T AEM free board 10 temperature raw
	4	12	U12	LHKDAEMFR10V1 AEM free board 10 HV1 raw
	4	12	U12	LHKDAEMFR10V2 AEM free board 10 HV2 raw
	4	12	U12	LHKDAEMFR11VD AEM free board 11 VDD raw
	4	12	U12	LHKDAEMFR11T AEM free board 11 temperature raw
	4	12	U12	LHKDAEMFR11V1 AEM free board 11 HV1 raw
	4	12	U12	LHKDAEMFR11V2 AEM free board 11 HV2 raw

10.3.53 `DiagLrs0` (647/0x287)

Description:

"Diagnostic Low-rate Science Packet" Telemetry Packet

Contains TEM dead-time counters and GEM livetime counter

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x014	0	32	U1234	LHKDGLRSSEC GEM livetime read timestamp seconds
0x018	0	32	U1234	LHKDGLRSSUB GEM livetime read timestamp subseconds
0x01C	0	32	U1234	LHKDGLRSLIVE GEM Low-rate Science Livetime
0x020	0	32	U1234	LHKDGLRSPRESC GEM Low-rate Science Prescaled
0x024	0	32	U1234	LHKDGLRSDISC GEM Low-rate Science Discarded
0x028	0	32	U1234	LHKDGLRSSENT GEM Low-rate Science Sent
0x02C	0	32	U1234	LHKDTLRSSEC TEM deadtime read timestamp seconds
0x030	0	32	U1234	LHKDTLRSSUB TEM deadtime read timestamp seconds
0x034	0	24	U1234	LHKDT0TEMLRSDT TEM0 LRS Deadtime Counter
0x038	0	24	U1234	LHKDT1TEMLRSDT TEM1 LRS Deadtime Counter
0x03C	0	24	U1234	LHKDT2TEMLRSDT TEM2 LRS Deadtime Counter
0x040	0	24	U1234	LHKDT3TEMLRSDT TEM3 LRS Deadtime Counter
0x044	0	24	U1234	LHKDT4TEMLRSDT TEM4 LRS Deadtime Counter
0x048	0	24	U1234	LHKDT5TEMLRSDT TEM5 LRS Deadtime Counter
0x04C	0	24	U1234	LHKDT6TEMLRSDT TEM6 LRS Deadtime Counter
0x050	0	24	U1234	LHKDT7TEMLRSDT TEM7 LRS Deadtime Counter
0x054	0	24	U1234	LHKDT8TEMLRSDT TEM8 LRS Deadtime Counter
0x058	0	24	U1234	LHKDT9TEMLRSDT TEM9 LRS Deadtime Counter
0x05C	0	24	U1234	LHKDTATEMLRSDT TEMA LRS Deadtime Counter
0x060	0	24	U1234	LHKDTBTEMLRSDT TEMB LRS Deadtime Counter
0x064	0	24	U1234	LHKDTCTEMLRSDT TEMC LRS Deadtime Counter
0x068	0	24	U1234	LHKDTDTEMLRSDT

Offset	S	L	Type	ITOS name, attribute(s), and description
				TEMD LRS Deadtime Counter
0x06C	0	24	U1234	LHKDTETEMLRSDT TEME LRS Deadtime Counter
0x070	0	24	U1234	LHKDTFTEMLRSDT TEMF LRS Deadtime Counter

10.3.54 `DiagCmdCnt0` (648/0x288)

Description:

"Diagnostic Command Statistics Packet 0" Telemetry Packet

Contains task level command statistics

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x014	0	32	U1234	LHKDTSK0CMDSEC SIU task 0 command counter seconds
0x018	0	32	U1234	LHKDTSK0CMDSUB SIU task 0 command counter subseconds
0x01C	0	32	U1234	LHKDTSK0CMDSENT SIU task 0 command sent counter
0x020	0	16	U12	LHKDTSK0CMDDISP SIU task 0 command dispatch counter
0x022	0	16	U12	LHKDTSK0CMDEXEF SIU task 0 command execution failed counter
0x024	0	32	U1234	LHKDTSK1CMDSEC SIU task 1 command counter seconds
0x028	0	32	U1234	LHKDTSK1CMDSUB SIU task 1 command counter subseconds
0x02C	0	32	U1234	LHKDTSK1CMDSENT SIU task 1 command sent counter
0x030	0	16	U12	LHKDTSK1CMDDISP SIU task 1 command dispatch counter
0x032	0	16	U12	LHKDTSK1CMDEXEF SIU task 1 command execution failed counter
0x034	0	32	U1234	LHKDTSK2CMDSEC SIU task 2 command counter seconds
0x038	0	32	U1234	LHKDTSK2CMDSUB SIU task 2 command counter subseconds
0x03C	0	32	U1234	LHKDTSK2CMDSENT SIU task 2 command sent counter
0x040	0	16	U12	LHKDTSK2CMDDISP SIU task 2 command dispatch counter
0x042	0	16	U12	LHKDTSK2CMDEXEF SIU task 2 command execution failed counter
0x044	0	32	U1234	LHKDTSK3CMDSEC SIU task 3 command counter seconds
0x048	0	32	U1234	LHKDTSK3CMDSUB SIU task 3 command counter subseconds
0x04C	0	32	U1234	LHKDTSK3CMDSENT SIU task 3 command sent counter

Offset	S	L	Type	ITOS name, attribute(s), and description
0x050	0	16	U12	LHKDTSK3CMDDISP SIU task 3 command dispatch counter
0x052	0	16	U12	LHKDTSK3CMDEXEF SIU task 3 command execution failed counter
0x054	0	32	U1234	LHKDTSK4CMDSEC SIU task 4 command counter seconds
0x058	0	32	U1234	LHKDTSK4CMDSUB SIU task 4 command counter subseconds
0x05C	0	32	U1234	LHKDTSK4CMDSENT SIU task 4 command sent counter
0x060	0	16	U12	LHKDTSK4CMDDISP SIU task 4 command dispatch counter
0x062	0	16	U12	LHKDTSK4CMDEXEF SIU task 4 command execution failed counter
0x064	0	32	U1234	LHKDTSK5CMDSEC SIU task 5 command counter seconds
0x068	0	32	U1234	LHKDTSK5CMDSUB SIU task 5 command counter subseconds
0x06C	0	32	U1234	LHKDTSK5CMDSENT SIU task 5 command sent counter
0x070	0	16	U12	LHKDTSK5CMDDISP SIU task 5 command dispatch counter
0x072	0	16	U12	LHKDTSK5CMDEXEF SIU task 5 command execution failed counter

10.3.55 `DiagCmdCnt1` (649/0x289)

Description:

"Diagnostic Command Statistics Packet 1" Telemetry Packet

Contains task level command statistics.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x014	0	32	U1234	LHKDTSK6CMDSEC SIU task 6 command counter seconds
0x018	0	32	U1234	LHKDTSK6CMDSUB SIU task 6 command counter subseconds
0x01C	0	32	U1234	LHKDTSK6CMDSENT SIU task 6 command sent counter
0x020	0	16	U12	LHKDTSK6CMDDISP SIU task 6 command dispatch counter
0x022	0	16	U12	LHKDTSK6CMDEXEF SIU task 6 command execution failed counter
0x024	0	32	U1234	LHKDTSK7CMDSEC SIU task 7 command counter seconds
0x028	0	32	U1234	LHKDTSK7CMDSUB SIU task 7 command counter subseconds
0x02C	0	32	U1234	LHKDTSK7CMDSENT SIU task 7 command sent counter
0x030	0	16	U12	LHKDTSK7CMDDISP

Offset	S	L	Type	ITOS name, attribute(s), and description
				SIU task 7 command dispatch counter
0x032	0	16	U12	LHKDTSK7CMDEXEF SIU task 7 command execution failed counter
0x034	0	32	U1234	LHKDTSK8CMDSEC SIU task 8 command counter seconds
0x038	0	32	U1234	LHKDTSK8CMDSUB SIU task 8 command counter subseconds
0x03C	0	32	U1234	LHKDTSK8CMDSENT SIU task 8 command sent counter
0x040	0	16	U12	LHKDTSK8CMDDISP SIU task 8 command dispatch counter
0x042	0	16	U12	LHKDTSK8CMDEXEF SIU task 8 command execution failed counter
0x044	0	32	U1234	LHKDTSK9CMDSEC SIU task 9 command counter seconds
0x048	0	32	U1234	LHKDTSK9CMDSUB SIU task 9 command counter subseconds
0x04C	0	32	U1234	LHKDTSK9CMDSENT SIU task 9 command sent counter
0x050	0	16	U12	LHKDTSK9CMDDISP SIU task 9 command dispatch counter
0x052	0	16	U12	LHKDTSK9CMDEXEF SIU task 9 command execution failed counter
0x054	0	32	U1234	LHKDTSK10CMDSEC SIU task 10 command counter seconds
0x058	0	32	U1234	LHKDTSK10CMDSUB SIU task 10 command counter subseconds
0x05C	0	32	U1234	LHKDTSK10CMDSENT SIU task 10 command sent counter
0x060	0	16	U12	LHKDTSK10CMDDISP SIU task 10 command dispatch counter
0x062	0	16	U12	LHKDTSK10CMDEXEF SIU task 10 command execution failed counter
0x064	0	32	U1234	LHKDTSK11CMDSEC SIU task 11 command counter seconds
0x068	0	32	U1234	LHKDTSK11CMDSUB SIU task 11 command counter subseconds
0x06C	0	32	U1234	LHKDTSK11CMDSENT SIU task 11 command sent counter
0x070	0	16	U12	LHKDTSK11CMDDISP SIU task 11 command dispatch counter
0x072	0	16	U12	LHKDTSK11CMDEXEF SIU task 11 command execution failed counter

10.3.56 `DiagFileStats` (650/0x28A)

Description:

"Diagnositc File System Statistics Packet" Telemetry Packet

Contains FILE system statistics for each CPU.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x014	0	32	U1234	LHKDSFILSTATE SIU File System State
0x018	0	32	U1234	LHKDSFILCURSIZE SIU File Current Size
0x01C	0	32	U1234	LHKDSFILPKTCNT SIU File Packet Count
0x020	0	32	U1234	LHKDSFILERRCODE SIU File Error Code
0x024	0	32	U1234	LHKDSFILERRCNT SIU File Error Count
0x028	0	32	U1234	LHKDSFILCOMID SIU File Commit ID
0x02C	0	32	U1234	LHKDE0FILSTATE EPU 0 File System State
0x030	0	32	U1234	LHKDE0FILCURSIZE EPU 0 File Current Size
0x034	0	32	U1234	LHKDE0FILPKTCNT EPU 0 File Packet Count
0x038	0	32	U1234	LHKDE0FILERRCODE EPU 0 File Error Code
0x03C	0	32	U1234	LHKDE0FILERRCNT EPU 0 File Error Count
0x040	0	32	U1234	LHKDE0FILCOMID EPU 0 File Commit ID
0x044	0	32	U1234	LHKDE1FILSTATE EPU 1 File System State
0x048	0	32	U1234	LHKDE1FILCURSIZE EPU 1 File Current Size
0x04C	0	32	U1234	LHKDE1FILPKTCNT EPU 1 File Packet Count
0x050	0	32	U1234	LHKDE1FILERRCODE EPU 1 File Error Code
0x054	0	32	U1234	LHKDE1FILERRCNT EPU 1 File Error Count
0x058	0	32	U1234	LHKDE1FILCOMID EPU 1 File Commit ID
0x05C	0	32	U1234	LHKDE2FILSTATE EPU 2 File System State
0x060	0	32	U1234	LHKDE2FILCURSIZE EPU 2 File Current Size
0x064	0	32	U1234	LHKDE2FILPKTCNT EPU 2 File Packet Count
0x068	0	32	U1234	LHKDE2FILERRCODE EPU 2 File Error Code
0x06C	0	32	U1234	LHKDE2FILERRCNT EPU 2 File Error Count
0x070	0	32	U1234	LHKDE2FILCOMID EPU 2 File Commit ID

10.3.57 DiagCpuMetr (651/0x28B)

Description:

"Diagnostic CPU Metrics/RT Statistics Packet" Telemetry Packet

Contains CPU metrics for all LAT CPUs. Contains the 1553 RT driver statistics.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x014	0	32	U1234	LHKDRTERRCNT A count of the number of remote terminal errors
0x018	0	32	U1234	LHKDRTINTRCNT A count of the number of remote terminal device interrupts
0x01C	0	32	U1234	LHKDRTCRXPKTCNT A count of the number of CmdRx packets received by the remote terminal
0x020	0	32	U1234	LHKDRTCRXBYTCNT A count of the number of CmdRx bytes received by the remote terminal
0x024	0	32	U1234	LHKDRTCTXPKTCNT A count of the number of CmdTx packets sent by the remote terminal
0x028	0	32	U1234	LHKDRTCTXBYTCNT A count of the number of CmdTx bytes sent by the remote terminal
0x02C	0	32	U1234	LHKDRTHKPKTCNT A count of the number of HKP packets sent by the remote terminal
0x030	0	32	U1234	LHKDRTHKBYTCNT A count of the number of HKP bytes sent by the remote terminal
0x034	0	32	U1234	LHKDRTTLMPKTCNT A count of the number of Telem packets sent by the remote terminal (not HKP)
0x038	0	32	U1234	LHKDRTTLMBYTCNT A count of the number of Telem bytes sent by the remote terminal (not HKP)
0x03C	0	16	U12	LHKDSIUCPUJTEMP SIU CPU junction temperature
0x03E	0	16	U12	LHKDEPU0CPUJTEMP EPU0 CPU junction temperature
0x040	0	16	U12	LHKDEPU1CPUJTEMP EPU1 CPU junction temperature
0x042	0	16	U12	LHKDEPU2CPUJTEMP EPU2 CPU junction temperature

10.3.58 DiagMemStats0 (652/0x28C)

Description:

"Diagnostic Memory Load/Dump Statistics" Telemetry Packet

Contains the statistics for memory loads and dumps on the SIU and EPU0.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x014	0	32	U1234	LHKDSMEMLDSTAT SIU Status of most recent load action
0x018	0	32	U1234	LHKDSMEMLDACT SIU Memory load active flag

Offset	S	L	Type	ITOS name, attribute(s), and description
0x01C	0	32	U1234	LHKDSMEMLDSTART SIU Starting memory load address
0x020	0	32	U1234	LHKDSMEMLDBYTES SIU Memory load total bytes
0x024	0	32	U1234	LHKDSMEMLDOFST SIU Memory load offset
0x028	0	32	U1234	LHKDSMEMDMPSTAT SIU Memory dump status
0x02C	0	32	U1234	LHKDSMEMDMPACT SIU Memory dump active
0x030	0	32	U1234	LHKDSMEMDMPSTRT SIU Memory dump start address
0x034	0	32	U1234	LHKDSMEMDMPBYT SIU Memory dump bytes
0x038	0	32	U1234	LHKDSMEMDMPADDR SIU Memory dump address
0x03C	0	32	U1234	LHKDSMEMDMPFCDE SIU Memory dump function code
0x040	0	32	U1234	LHKDSMEM0MPTID SIU Memory dump transaction ID
0x044	0	32	U1234	LHKDE0MEMLDSTAT EPU0 Status of most recent load action
0x048	0	32	U1234	LHKDE0MEMLDACT EPU0 Memory load active flag
0x04C	0	32	U1234	LHKDE0MEMLDSTART EPU0 Starting memory load address
0x050	0	32	U1234	LHKDE0MEMLDBYTES EPU0 Memory load total bytes
0x054	0	32	U1234	LHKDE0MEMLDOFST EPU0 Memory load offset
0x058	0	32	U1234	LHKDE0MEMDMPSTAT EPU0 Memory dump status
0x05C	0	32	U1234	LHKDE0MEMDMPACT EPU0 Memory dump active
0x060	0	32	U1234	LHKDE0MEMDMPSTRT EPU0 Memory dump start address
0x064	0	32	U1234	LHKDE0MEMDMPBYT EPU0 Memory dump bytes
0x068	0	32	U1234	LHKDE0MEMDMPADDR EPU0 Memory dump address
0x06C	0	32	U1234	LHKDE0MEMDMPFCDE EPU0 Memory dump function code
0x070	0	32	U1234	LHKDE0MEMDMPTID EPU0 Memory dump transaction ID

10.3.59 `DiagMemStats1` (653/0x28D)

Description:

"Diagnostic Memory Load/Dump Statistics" Telemetry Packet

Contains the statistics for memory loads and dumps on the EPU1 and EPU2.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x014	0	32	U1234	LHKDE1MEMLDSTAT EPU1 Status of most recent load action
0x018	0	32	U1234	LHKDE1MEMLDACT EPU1 Memory load active flag
0x01C	0	32	U1234	LHKDE1MEMLDSTART EPU1 Starting memory load address
0x020	0	32	U1234	LHKDE1MEMLDBYTES EPU1 Memory load total bytes
0x024	0	32	U1234	LHKDE1MEMLDOFST EPU1 Memory load offset
0x028	0	32	U1234	LHKDE1MEMDMPSTAT EPU1 Memory dump status
0x02C	0	32	U1234	LHKDE1MEMDMPACT EPU1 Memory dump active
0x030	0	32	U1234	LHKDE1MEMDMPSTRT EPU1 Memory dump start address
0x034	0	32	U1234	LHKDE1MEMDMPBYT EPU1 Memory dump bytes
0x038	0	32	U1234	LHKDE1MEMDMPADDR EPU1 Memory dump address
0x03C	0	32	U1234	LHKDE1MEMDMPFCDE EPU1 Memory dump function code
0x040	0	32	U1234	LHKDE1MEMDMPTID EPU1 Memory dump transaction ID
0x044	0	32	U1234	LHKDE2MEMLDSTAT EPU2 Status of most recent load action
0x048	0	32	U1234	LHKDE2MEMLDACT EPU2 Memory load active flag
0x04C	0	32	U1234	LHKDE2MEMLDSTART EPU2 Starting memory load address
0x050	0	32	U1234	LHKDE2MEMLDBYTES EPU2 Memory load total bytes
0x054	0	32	U1234	LHKDE2MEMLDOFST EPU2 Memory load offset
0x058	0	32	U1234	LHKDE2MEMDMPSTAT EPU2 Memory dump status
0x05C	0	32	U1234	LHKDE2MEMDMPACT EPU2 Memory dump active
0x060	0	32	U1234	LHKDE2MEMDMPSTRT EPU2 Memory dump start address
0x064	0	32	U1234	LHKDE2MEMDMPBYT EPU2 Memory dump bytes
0x068	0	32	U1234	LHKDE2MEMDMPADDR EPU2 Memory dump address
0x06C	0	32	U1234	LHKDE2MEMDMPFCDE EPU2 Memory dump function code
0x070	0	32	U1234	LHKDE2MEMDMPTID EPU2 Memory dump transaction ID

10.3.60 RedLimAlrt (851/0x353)

Description:

"Red Limit Alert Packet" Telemetry Packet

This packet reports alert data related to an ADC limit threshold violation.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x00E	0	16	U12	LHKALRTREDDEV; LRLIMDEVICE Red limit device
0x010	0	16	U12	LHKALRTREDADC Red limit ADC number
0x012	0	16	U12	LHKALRTREDCNT Red limit counts
0x014	0	16	U12	LHKALRTREDLIM Red limit threshold

10.4 Algorithms

10.4.0 `LDTEMVADCCNV` (TEM Voltage Conversion) Algorithm

Description:

Definition:

C0	0.00000000	C4	0.00000000
C1	0.00122100	C5	0.00000000
C2	0.00000000	C6	0.00000000
C3	0.00000000	C7	0.00000000

Used by:

???

10.5 Discretes

10.5.0 LAEMFRPWRSTATES (AEM FREE Board Power States) Discrete

Description:

Converts AEM FREE board power status values to ON/OFF discrete states.

Definition:

0 AEM Free Board Off State (AEMFRBRDOFF)
Denotes the OFF power state for an AEM free board

1 AEM FREE Board On State (AEMFRBRDON)
Denotes the ON power state for an AEM FREE board.

Used by:

???

10.5.1 LAPDUPWRCNVTSTAT (ACD PDU Power Converter State) Discrete

Description:

Definition:

0 ACD PDU Converter Primary (LAPDUCNVTPRI)

1 ACD PDU Power Converter Redundant (LAPDUCNVTRED)

Used by:

???

10.5.2 LAPDUPWRSTATES (ACD PDU Power States) Discrete

Description:

Definition:

0 ACD PDU Power Off State (LAPDUPWROFFSTATE)

1 ACD PDU Power On State (LAPDUPWRONSTATE)

Used by:

???

10.5.3 LAPDUPWRSUPSTAT (ACD PDU Power Supply Sources) Discrete

Description:

Definition:

0 ACD PDU Power Supply Primary (LAPDUPWRSUPPRI)

1 ACD PDU Power Supply Redundant (LAPDUPWRSUPRED)

Used by:
???

10.5.4 LDPDUEPUCNVT (PDU EPU Converter) Discrete

Description:

Definition:

0 PDU EPU Converter Status Primary (LDPDUEPUCVTPRI)

1 PDU EPU Converter Status Redundant (LPDUEPUCVTRED)

Used by:
???

10.5.5 LDPDUEPUPWRST (EPU Power States) Discrete

Description:

Definition:

0 PDU EPU Power Off State (LDPDUEPUPWROFF)

1 PDU EPU Power On State (LDPDUEPUPWRON)

Used by:
???

10.5.6 LDPDUTEMPWRST (PDU TEM Power State) Discrete

Description:

Definition:

0 PDU TEM Power Off (LPDUTEMPWROFF)

1 PDU TEM Power On State (LPDUTEMPWRON)

Used by:
???

10.5.7 LHKSTATUSBITS (ADC status bit conversions) Discrete

Description:
Describes the discrete conversion of a 4 bit status value.

Definition:

0 Data OK status (`LHKSTATOK`)
Status indicating measurements was evaluated as OK.

1 Status Undefined (`LHKSTATUNDF`)
Indicates absence of data due to acquisition timeout or other failure.

2 Status Masked (`LHKSTATMSK`)
Indicates no evalutation status because value was masked as disabled.

3 ADC red limit status (`LHKREDSTAT`)
Status indicating an ADC red limit threshold violation.

Used by:
???

10.5.8 `LRLIMDEVICE` (Device Opcodes for Red Limit Alerts) Discrete

Description:
Enumerates the device opcode that exceeded a red limit.

Definition:

0 AEM Free Board 0 (`AEMFR0`)

1 AEM Free Board 1 (`AEMFR1`)

2 AEM Free Board 2 (`AEMFR2`)

3 AEM Free Board 3 (`AEMFR3`)

4 AEM Free Board 4 (`AEMFR4`)

5 AEM Free Board 5 (`AEMFR5`)

6 AEM Free Board 6 (`AEMFR6`)

7 AEM Free Board 7 (`AEMFR7`)

8 AEM Free Board 8 (`AEMFR8`)

9 AEM Free Board 9 (`AEMFR9`)

10 AEM Free Board 10 (`AEMFR10`)

11 AEM Free Board 11 (`AEMFR11`)

12 AEM DAB (`AEMDAB`)

Used by:
???

10.6 Limit Sets

10.6.0 `LABEAGTEMPADCLIM` (ACD BEA Grid Interface Temperature Limits) Limit

Description:

Definition:

Inversion flag	F
Limit switch	none
Red alert	0 - 2047
Yellow alert	0 - 2047

Used by:

???

10.6.1 `LAPMTRTEMPADCLIM` (ACD PMT Rail Temperature Limits) Limit

Description:

Definition:

Inversion flag	F
Limit switch	none
Red alert	0 - 2047
Yellow alert	0 - 2047

Used by:

???

10.6.2 `LASHLTEMPADCLIM` (ACD Shell Temperature Limits) Limit

Description:

Definition:

Inversion flag	F
Limit switch	none
Red alert	0 - 2047
Yellow alert	0 - 2047

Used by:

???

10.6.3 `LC33IADCLIM` (CAL 3.3I ADC limits) Limit

Description:

Describes the CAL 3.3 current ADC limit set

Definition:

Inversion flag	F
Limit switch	none

Red alert	0 - 2047
Yellow alert	0 - 2047

Used by:

???

10.6.4 `LC33VADCLIM` (CAL 3.3V ADC limits) Limit

Description:

Describes the CAL 3.3 volt adc limit set.

Definition:

Inversion flag	F
Limit switch	none
Red alert	0 - 2047
Yellow alert	0 - 2047

Used by:

???

10.6.5 `LCAFETADCLIM` (CAL AFFE temperature limits) Limit

Description:

Describes the CAL AFFE temperature limit set

Definition:

Inversion flag	F
Limit switch	none
Red alert	0 - 2047
Yellow alert	0 - 2047

Used by:

???

10.6.6 `LCBASPLADCLIM` (CAL Baseplate Temperature Limits) Limit

Description:

Definition:

Inversion flag	F
Limit switch	none
Red alert	0 - 2047
Yellow alert	0 - 2047

Used by:

???

10.6.7 LCBIASIADCLIM (CAL bias current limits) Limit

Description:

Describes the CAL bias current ADC limit set.

Definition:

Inversion flag	F
Limit switch	none
Red alert	0 - 2047
Yellow alert	0 - 2047

Used by:

???

10.6.8 LCBIASVADCLIM (CAL bias voltage limits) Limit

Description:

Describes the CAL bias voltage ADC limit set.

Definition:

Inversion flag	F
Limit switch	none
Red alert	0 - 2047
Yellow alert	0 - 2047

Used by:

???

10.6.9 LDAEMFRHV1ADCLIM (AEM Free Board HV1 Limits) Limit

Description:

Definition:

Inversion flag	F
Limit switch	none
Red alert	0 - 2047
Yellow alert	0 - 2047

Used by:

???

10.6.10 LDAEMFRHV2ADCLIM (AEM Free Board HV2 Limits) Limit

Description:

Definition:

Inversion flag	F
Limit switch	none

Red alert	0 - 2047
Yellow alert	0 - 2047

Used by:

???

10.6.11 `LDAEMFRTMPADCLIM` (AEM Free Board Temperature Limits) Limit

Description:

Definition:

Inversion flag	F
Limit switch	none
Red alert	0 - 2047
Yellow alert	0 - 2047

Used by:

???

10.6.12 `LDAEMFRVDDADCLIM` (AEM Free Board VDD Limits) Limit

Description:

Definition:

Inversion flag	F
Limit switch	none
Red alert	0 - 2047
Yellow alert	0 - 2047

Used by:

???

10.6.13 `LDEPUTEMPADCLIM` (EPU Temperature ADC Limits) Limit

Description:

Definition:

Inversion flag	F
Limit switch	none
Red alert	0 - 2047
Yellow alert	0 - 2047

Used by:

???

10.6.14 `LDEPUVADCLIM` (EPU Voltage ADC Limits) Limit

Description:

Definition:

Inversion flag	F
Limit switch	none
Red alert	0 - 2047
Yellow alert	0 - 2047

Used by:

???

10.6.15 `LDTEM33IADCLIM` (TEM 3.3I digital limits) Limit

Description:

Describes the TEM 3.3 current ADC limit set.

Definition:

Inversion flag	F
Limit switch	none
Red alert	0 - 2047
Yellow alert	0 - 2047

Used by:

???

10.6.16 `LDTEM33VADCLIM` (TEM digital 3.3V limits) Limit

Description:

Describes the TEM 3.3V digital ADC limit set.

Definition:

Inversion flag	F
Limit switch	none
Red alert	0 - 2047
Yellow alert	0 - 2047

Used by:

???

10.6.17 `LDTEMPCBTADCLIM` (TEM PCB Temperature Limits) Limit

Description:

Definition:

Inversion flag	F
Limit switch	none
Red alert	0 - 2047
Yellow alert	0 - 2047

Used by:

???

10.6.18 `LDTEMPSTADCLIM` (TEM Power Supply Temperature Limits) Limit

Description:

Definition:

Inversion flag	F
Limit switch	none
Red alert	0 - 2047
Yellow alert	0 - 2047

Used by:

???

10.6.19 `LMGRDRADIFADCLIM` (Grid Radiator Interface Temperature Limits) Limit

Description:

Definition:

Inversion flag	F
Limit switch	none
Red alert	0 - 2047
Yellow alert	0 - 2047

Used by:

???

10.6.20 `LMGRIDTEMPADCLIM` (Grid Temperature ADC Limits) Limit

Description:

Definition:

Inversion flag	F
Limit switch	none
Red alert	0 - 2048
Yellow alert	0 - 2047

Used by:

???

10.6.21 `LMRADAFHTRADCLIM` (Radiator Anitfreeze Heater Temperature Limits) Limit

Description:

Definition:

Inversion flag	F

Limit switch	none
Red alert	0 - 2047
Yellow alert	0 - 2047

Used by:

???

10.6.22 **LMRADTEMPADCLIM** (Radiator Temperature Limits) Limit

Description:

Definition:

Inversion flag	F
Limit switch	none
Red alert	0 - 2047
Yellow alert	0 - 2047

Used by:

???

10.6.23 **LMVCHPDSHPADCLIM** (VCHP-DSHP Interface Temperature Limits) Limit

Description:

Definition:

Inversion flag	F
Limit switch	none
Red alert	0 - 2047
Yellow alert	0 - 2047

Used by:

???

10.6.24 **LMVCHPRSVTADCLIM** (VCHP Reservoir Heater Temperature Limits) Limit

Description:

Definition:

Inversion flag	F
Limit switch	none
Red alert	0 - 2047
Yellow alert	0 - 2047

Used by:

???

10.6.25 **LMVCHPXLHPADCLIM** (VCHP-XLHP Interface Temperature Limits) Limit

Description:

Definition:

Inversion flag	F
Limit switch	none
Red alert	0 - 2047
Yellow alert	0 - 2047

Used by:

???

10.6.26 **LT15IADCLIM** (TKR 1.5I ADC limits) Limit

Description:

Describes the TKR 1.5I ADC limit set.

Definition:

Inversion flag	F
Limit switch	none
Red alert	0 - 2047
Yellow alert	0 - 2047

Used by:

???

10.6.27 **LT15VADCLIM** (TKR 1.5V ADC Limits) Limit

Description:

Describes the limit set for a TKR 1.5 volt ADC value.

Definition:

Inversion flag	F
Limit switch	none
Red alert	0 - 2047
Yellow alert	0 - 2047

Used by:

???

10.6.28 **LT25IADCLIM** (TKR 2.5I ADC limits) Limit

Description:

Describes the TKR 2.5I ADC limit set.

Definition:

Inversion flag	F

Limit switch	none
Red alert	0 - 2047
Yellow alert	0 - 2047

Used by:

???

10.6.29 `LT25VADCLIM` (TKR 2.5V ADC limits) Limit

Description:

Describes the limits for a TKR 2.5 volt ADC value.

Definition:

Inversion flag	F
Limit switch	none
Red alert	0 - 2047
Yellow alert	0 - 2047

Used by:

???

10.6.30 `LTBIASIADCLIM` (TKR bias current ADC limits) Limit

Description:

Describes the limit set for a TKR bias current ADC value.

Definition:

Inversion flag	F
Limit switch	none
Red alert	0 - 2047
Yellow alert	0 - 2047

Used by:

???

10.6.31 `LTBIASVADCLIM` (TKR bias voltage ADC limits) Limit

Description:

Describes the limit set for a TKR bias voltage ADC value.

Definition:

Inversion flag	F
Limit switch	none
Red alert	0 - 2047
Yellow alert	0 - 2047

Used by:

???

10.6.32 `LTCBLTADCLIM` (TKR cable temperature limits) Limit

Description:

Describes the TKR cable temperature ADC limit set.

Definition:

Inversion flag	F
Limit switch	none
Red alert	0 - 2047
Yellow alert	0 - 2047

Used by:

???

11 LMC Package

11.0 Overview

The LMC package handles the LAT multiplexed counters.

11.1 Command Packets

11.1.0 `cal_lrs` (1692/0x69C:0)

Description:

"CAL Low Rate Science Counters" Telecommand Packet

Start collection of CAL low rate science counter data

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x008	0	16	U12	LMCINTERVAL ?
0x00A	0	16	U12	LMCCOUNT ?
0x00C	0	32	U1234	LMCCALMASK ?
0x010	0	16	U12	LMCTEMMASK ?

11.1.1 `tkr_lrs` (1692/0x69C:1)

Description:

"TKR Low Rate Science Counters" Telecommand Packet

Starts collection of TKR 3-in-a-row counters.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x008	0	16	U12	LMCINTERVAL ?
0x00A	0	16	U12	LMCCOUNT ?
0x00C	0	16	U12	LMCTKRMASK ?
0x00E	0	16	U12	LMCTEMMASK ?

11.1.2 `acd_tile_pair` (1692/0x69C:2)

Description:

"ACD Tile Counter (Pair)" Telecommand Packet

Starts collection of a pair of ACD tile counters.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x008	0	16	U12	LMCINTERVAL ?
0x00A	0	16	U12	LMCCOUNT ?
0x00C	0	16	U12	LMCTILEID0 ?
0x00E	0	16	U12	LMCTILEID1 ?

11.1.3 `acd_tile_all` (1692/0x69C:3)

Description:

"ACD Tile Counters (All)" Telecommand Packet

Starts collection of all ACD tile counters.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x008	0	16	U12	LMCINTERVAL ?
0x00A	0	16	U12	LMCCOUNT ?

11.1.4 `stop_count` (1692/0x69C:4)

Description:

"Stop Active Counter" Telecommand Packet

Stop the active counter

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x008	0	32	U1234	LMCCOUNTOPCODE ?

11.2 Telemetry Packets

11.2.0 cal_cnt (705/0x2C1)

Description:

"CAL Low Rate Science Counters" Telemetry Packet

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x00E	0	16	U12	LDMSK ?
0x010	0	32	U1234	LLMSK ?
0x014	0	32	U1234	LCNTRS0DT ?
0x018	0	32	U1234	LCNTRS0CNT ?
0x01C	0	32	U1234	LCNTRS1DT ?
0x020	0	32	U1234	LCNTRS1CNT ?
0x024	0	32	U1234	LCNTRS2DT ?
0x028	0	32	U1234	LCNTRS2CNT ?
0x02C	0	32	U1234	LCNTRS3DT ?
0x030	0	32	U1234	LCNTRS3CNT ?
0x034	0	32	U1234	LCNTRS4DT ?
0x038	0	32	U1234	LCNTRS4CNT ?
0x03C	0	32	U1234	LCNTRS5DT ?
0x040	0	32	U1234	LCNTRS5CNT ?
0x044	0	32	U1234	LCNTRS6DT ?
0x048	0	32	U1234	LCNTRS6CNT ?
0x04C	0	32	U1234	LCNTRS7DT ?
0x050	0	32	U1234	LCNTRS7CNT ?
0x054	0	32	U1234	LCNTRS8DT ?
0x058	0	32	U1234	LCNTRS8CNT ?
0x05C	0	32	U1234	LCNTRS9DT ?

Offset	S	L	Type	ITOS name, attribute(s), and description
0x060	0	32	U1234	LCNTRS9CNT ?
0x064	0	32	U1234	LCNTRS10DT ?
0x068	0	32	U1234	LCNTRS10CNT ?
0x06C	0	32	U1234	LCNTRS11DT ?
0x070	0	32	U1234	LCNTRS11CNT ?
0x074	0	32	U1234	LCNTRS12DT ?
0x078	0	32	U1234	LCNTRS12CNT ?
0x07C	0	32	U1234	LCNTRS13DT ?
0x080	0	32	U1234	LCNTRS13CNT ?
0x084	0	32	U1234	LCNTRS14DT ?
0x088	0	32	U1234	LCNTRS14CNT ?
0x08C	0	32	U1234	LCNTRS15DT ?
0x090	0	32	U1234	LCNTRS15CNT ?

11.2.1 `tkr_cnt` (706/0x2C2)

Description:

"TKR Low Rate Science Counters" Telemetry Packet

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x00E	0	16	U12	LDMSK ?
0x010	0	32	U1234	LLMSK ?
0x014	0	32	U1234	LCNTRS0DT ?
0x018	0	32	U1234	LCNTRS0CNT ?
0x01C	0	32	U1234	LCNTRS1DT ?
0x020	0	32	U1234	LCNTRS1CNT ?
0x024	0	32	U1234	LCNTRS2DT ?
0x028	0	32	U1234	LCNTRS2CNT ?

Offset	S	L	Type	ITOS name, attribute(s), and description
0x02C	0	32	U1234	LCNTRS3DT ?
0x030	0	32	U1234	LCNTRS3CNT ?
0x034	0	32	U1234	LCNTRS4DT ?
0x038	0	32	U1234	LCNTRS4CNT ?
0x03C	0	32	U1234	LCNTRS5DT ?
0x040	0	32	U1234	LCNTRS5CNT ?
0x044	0	32	U1234	LCNTRS6DT ?
0x048	0	32	U1234	LCNTRS6CNT ?
0x04C	0	32	U1234	LCNTRS7DT ?
0x050	0	32	U1234	LCNTRS7CNT ?
0x054	0	32	U1234	LCNTRS8DT ?
0x058	0	32	U1234	LCNTRS8CNT ?
0x05C	0	32	U1234	LCNTRS9DT ?
0x060	0	32	U1234	LCNTRS9CNT ?
0x064	0	32	U1234	LCNTRS10DT ?
0x068	0	32	U1234	LCNTRS10CNT ?
0x06C	0	32	U1234	LCNTRS11DT ?
0x070	0	32	U1234	LCNTRS11CNT ?
0x074	0	32	U1234	LCNTRS12DT ?
0x078	0	32	U1234	LCNTRS12CNT ?
0x07C	0	32	U1234	LCNTRS13DT ?
0x080	0	32	U1234	LCNTRS13CNT ?
0x084	0	32	U1234	LCNTRS14DT ?
0x088	0	32	U1234	LCNTRS14CNT ?
0x08C	0	32	U1234	LCNTRS15DT ?
0x090	0	32	U1234	LCNTRS15CNT ?

Offset	S	L	Type	ITOS name, attribute(s), and description
0x094	0	32	U1234	LCNTRS16DT ?
0x098	0	32	U1234	LCNTRS16CNT ?
0x09C	0	32	U1234	LCNTRS17DT ?
0x0A0	0	32	U1234	LCNTRS17CNT ?
0x0A4	0	32	U1234	LCNTRS18DT ?
0x0A8	0	32	U1234	LCNTRS18CNT ?
0x0AC	0	32	U1234	LCNTRS19DT ?
0x0B0	0	32	U1234	LCNTRS19CNT ?
0x0B4	0	32	U1234	LCNTRS20DT ?
0x0B8	0	32	U1234	LCNTRS20CNT ?
0x0BC	0	32	U1234	LCNTRS21DT ?
0x0C0	0	32	U1234	LCNTRS21CNT ?
0x0C4	0	32	U1234	LCNTRS22DT ?
0x0C8	0	32	U1234	LCNTRS22CNT ?
0x0CC	0	32	U1234	LCNTRS23DT ?
0x0D0	0	32	U1234	LCNTRS23CNT ?
0x0D4	0	32	U1234	LCNTRS24DT ?
0x0D8	0	32	U1234	LCNTRS24CNT ?
0x0DC	0	32	U1234	LCNTRS25DT ?
0x0E0	0	32	U1234	LCNTRS25CNT ?
0x0E4	0	32	U1234	LCNTRS26DT ?
0x0E8	0	32	U1234	LCNTRS26CNT ?
0x0EC	0	32	U1234	LCNTRS27DT ?
0x0F0	0	32	U1234	LCNTRS27CNT ?
0x0F4	0	32	U1234	LCNTRS28DT ?
0x0F8	0	32	U1234	LCNTRS28CNT ?

Offset	S	L	Type	ITOS name, attribute(s), and description
0x0FC	0	32	U1234	LCNTRS29DT ?
0x100	0	32	U1234	LCNTRS29CNT ?
0x104	0	32	U1234	LCNTRS30DT ?
0x108	0	32	U1234	LCNTRS30CNT ?
0x10C	0	32	U1234	LCNTRS31DT ?
0x110	0	32	U1234	LCNTRS31CNT ?

11.2.2 acd_cnt (707/0x2C3)

Description:

"ACD Tile Counters" Telemetry Packet

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x00E	0	16	U12	LSPARE ?
0x010	0	16	U12	LCNTRS0TILE_0 ?
0x012	0	16	U12	LCNTRS0TILE_1 ?
0x014	0	32	U1234	LCNTRS0DT ?
0x018	0	32	U1234	LCNTRS0CNT ?
0x01C	0	16	U12	LCNTRS1TILE_0 ?
0x01E	0	16	U12	LCNTRS1TILE_1 ?
0x020	0	32	U1234	LCNTRS1DT ?
0x024	0	32	U1234	LCNTRS1CNT ?
0x028	0	16	U12	LCNTRS2TILE_0 ?
0x02A	0	16	U12	LCNTRS2TILE_1 ?
0x02C	0	32	U1234	LCNTRS2DT ?
0x030	0	32	U1234	LCNTRS2CNT ?
0x034	0	16	U12	LCNTRS3TILE_0 ?
0x036	0	16	U12	LCNTRS3TILE_1 ?

Offset	S	L	Type	ITOS name, attribute(s), and description
0x038	0	32	U1234	LCNTRS3DT ?
0x03C	0	32	U1234	LCNTRS3CNT ?
0x040	0	16	U12	LCNTRS4TILE_0 ?
0x042	0	16	U12	LCNTRS4TILE_1 ?
0x044	0	32	U1234	LCNTRS4DT ?
0x048	0	32	U1234	LCNTRS4CNT ?
0x04C	0	16	U12	LCNTRS5TILE_0 ?
0x04E	0	16	U12	LCNTRS5TILE_1 ?
0x050	0	32	U1234	LCNTRS5DT ?
0x054	0	32	U1234	LCNTRS5CNT ?
0x058	0	16	U12	LCNTRS6TILE_0 ?
0x05A	0	16	U12	LCNTRS6TILE_1 ?
0x05C	0	32	U1234	LCNTRS6DT ?
0x060	0	32	U1234	LCNTRS6CNT ?
0x064	0	16	U12	LCNTRS7TILE_0 ?
0x066	0	16	U12	LCNTRS7TILE_1 ?
0x068	0	32	U1234	LCNTRS7DT ?
0x06C	0	32	U1234	LCNTRS7CNT ?
0x070	0	16	U12	LCNTRS8TILE_0 ?
0x072	0	16	U12	LCNTRS8TILE_1 ?
0x074	0	32	U1234	LCNTRS8DT ?
0x078	0	32	U1234	LCNTRS8CNT ?
0x07C	0	16	U12	LCNTRS9TILE_0 ?
0x07E	0	16	U12	LCNTRS9TILE_1 ?
0x080	0	32	U1234	LCNTRS9DT ?
0x084	0	32	U1234	LCNTRS9CNT ?

Offset	S	L	Type	ITOS name, attribute(s), and description
0x088	0	16	U12	LCNTRS10TILE_0 ?
0x08A	0	16	U12	LCNTRS10TILE_1 ?
0x08C	0	32	U1234	LCNTRS10DT ?
0x090	0	32	U1234	LCNTRS10CNT ?
0x094	0	16	U12	LCNTRS11TILE_0 ?
0x096	0	16	U12	LCNTRS11TILE_1 ?
0x098	0	32	U1234	LCNTRS11DT ?
0x09C	0	32	U1234	LCNTRS11CNT ?
0x0A0	0	16	U12	LCNTRS12TILE_0 ?
0x0A2	0	16	U12	LCNTRS12TILE_1 ?
0x0A4	0	32	U1234	LCNTRS12DT ?
0x0A8	0	32	U1234	LCNTRS12CNT ?
0x0AC	0	16	U12	LCNTRS13TILE_0 ?
0x0AE	0	16	U12	LCNTRS13TILE_1 ?
0x0B0	0	32	U1234	LCNTRS13DT ?
0x0B4	0	32	U1234	LCNTRS13CNT ?
0x0B8	0	16	U12	LCNTRS14TILE_0 ?
0x0BA	0	16	U12	LCNTRS14TILE_1 ?
0x0BC	0	32	U1234	LCNTRS14DT ?
0x0C0	0	32	U1234	LCNTRS14CNT ?
0x0C4	0	16	U12	LCNTRS15TILE_0 ?
0x0C6	0	16	U12	LCNTRS15TILE_1 ?
0x0C8	0	32	U1234	LCNTRS15DT ?
0x0CC	0	32	U1234	LCNTRS15CNT ?
0x0D0	0	16	U12	LCNTRS16TILE_0 ?
0x0D2	0	16	U12	LCNTRS16TILE_1 ?

Offset	S	L	Type	ITOS name, attribute(s), and description
0x0D4	0	32	U1234	LCNTRS16DT ?
0x0D8	0	32	U1234	LCNTRS16CNT ?
0x0DC	0	16	U12	LCNTRS17TILE_0 ?
0x0DE	0	16	U12	LCNTRS17TILE_1 ?
0x0E0	0	32	U1234	LCNTRS17DT ?
0x0E4	0	32	U1234	LCNTRS17CNT ?
0x0E8	0	16	U12	LCNTRS18TILE_0 ?
0x0EA	0	16	U12	LCNTRS18TILE_1 ?
0x0EC	0	32	U1234	LCNTRS18DT ?
0x0F0	0	32	U1234	LCNTRS18CNT ?
0x0F4	0	16	U12	LCNTRS19TILE_0 ?
0x0F6	0	16	U12	LCNTRS19TILE_1 ?
0x0F8	0	32	U1234	LCNTRS19DT ?
0x0FC	0	32	U1234	LCNTRS19CNT ?
0x100	0	16	U12	LCNTRS20TILE_0 ?
0x102	0	16	U12	LCNTRS20TILE_1 ?
0x104	0	32	U1234	LCNTRS20DT ?
0x108	0	32	U1234	LCNTRS20CNT ?
0x10C	0	16	U12	LCNTRS21TILE_0 ?
0x10E	0	16	U12	LCNTRS21TILE_1 ?
0x110	0	32	U1234	LCNTRS21DT ?
0x114	0	32	U1234	LCNTRS21CNT ?
0x118	0	16	U12	LCNTRS22TILE_0 ?
0x11A	0	16	U12	LCNTRS22TILE_1 ?
0x11C	0	32	U1234	LCNTRS22DT ?
0x120	0	32	U1234	LCNTRS22CNT ?

Offset	S	L	Type	ITOS name, attribute(s), and description
0x124	0	16	U12	LCNTRS23TILE_0 ?
0x126	0	16	U12	LCNTRS23TILE_1 ?
0x128	0	32	U1234	LCNTRS23DT ?
0x12C	0	32	U1234	LCNTRS23CNT ?
0x130	0	16	U12	LCNTRS24TILE_0 ?
0x132	0	16	U12	LCNTRS24TILE_1 ?
0x134	0	32	U1234	LCNTRS24DT ?
0x138	0	32	U1234	LCNTRS24CNT ?
0x13C	0	16	U12	LCNTRS25TILE_0 ?
0x13E	0	16	U12	LCNTRS25TILE_1 ?
0x140	0	32	U1234	LCNTRS25DT ?
0x144	0	32	U1234	LCNTRS25CNT ?
0x148	0	16	U12	LCNTRS26TILE_0 ?
0x14A	0	16	U12	LCNTRS26TILE_1 ?
0x14C	0	32	U1234	LCNTRS26DT ?
0x150	0	32	U1234	LCNTRS26CNT ?

12 LSM Package

12.0 Overview

The LSM package processes the seven telecommands per second that the spacecraft sends the LAT continuously to inform the LAT of things like orbital position, time, etc. LSM runs in its own task.

The package supports the following functions:

- Wall clock time services (GPS)

12.1 Command Packets

12.1.0 `LLSMSIATTITUDE` (1793/0x701:1)

Description:

"SC Attitude Broadcast Message" Telecommand Packet

The SC sends this message 5 times a second on the CTDB bus. It contains information about the SC-J2000 attitude.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x008	0	32	U1234	? ?
0x00C	0	32	U1234	? ?
0x010	0	64	F12345678	? ?
0x018	0	64	F12345678	? ?
0x020	0	64	F12345678	? ?
0x028	0	64	F12345678	? ?
0x030	0	32	F1234	? ?
0x034	0	32	F1234	? ?
0x038	0	32	F1234	? ?

12.1.1 `LLSMSIANCILLARY` (1793/0x701:2)

Description:

"SC Ancillary Broadcast Message" Telecommand Packet

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x008	0	32	U1234	? ?

Offset	S	L	Type	ITOS name, attribute(s), and description
0x00C	0	32	U1234	? ?
0x010	0	32	F1234	? ?
0x014	0	32	F1234	? ?
0x018	0	32	F1234	? ?
0x01C	0	32	F1234	? ?
0x020	0	32	F1234	? ?
0x024	0	32	F1234	? ?
0x028	0	8	U1	? ?
0x029	0	8	U1	? ?
0x02A	0	16	U12	? ?

12.1.2 LLSMSITIMETONE (1793/0x701:3)

Description:

"SC Timetone Broadcast Message" Telecommand Packet

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x008	0	32	U1234	? ?
0x00C	0	16	U12	? ?

13 LTC Package

13.0 Overview

The LTC package provides the LAT thermal control mechanism. It reads temperatures from within the instrument, and on that basis, decides how much heat to dump. LTC runs as its own task.

13.0.0 `ReStart` (1605/0x645:1)

Description:

"Restart and initialize Thermal Control" Telecommand Packet

Restart thermal control by reading configuration files and initializing. Depending on paramter may start active control or passive operation.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
`0x008`	0	32	`U1234`	`LTCCFGFID` File identification number
`0x00C`	0	32	`U1234`	`LTCSNSRFID` File identification number

13.0.1 `Start` (1605/0x645:2)

Description:

"Start control" Telecommand Packet

Start active or passive control.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
`0x008`	0	16	`U12`	`LTCACTORPASS` Unsigned 16-bit word

13.0.2 `Stop` (1605/0x645:3)

Description:

"Terminate Thermal Control processing" Telecommand Packet

Terminates thermal control processing tasks, but message processing remains.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description

13.0.3 `SetMode` (1605/0x645:4)

Description:

"Set thermal control mode to active or passive." Telecommand Packet

Sets thermal control processing to active or processing. Active is normal control by turning on or off heat pipe reservoir heaters to keep termperature within specified limits. Passive does all normal control processing, but does not send commands to heaters.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
`0x008`	0	16	`U12`	`LTCACTORPASS` Unsigned 16-bit word

13.0.4 `HtrOnOffCtl` (1605/0x645:5)

Description:

"Set heater to always on, or off or automatic control." Telecommand Packet

Sets a specified heater to on, or off or automatic control.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
`0x008`	0	16	`U12`	`LTCHTRNUM` Unsigned 16-bit word
`0x00A`	0	16	`U12`	`LTCONOFFCTL` Unsigned 16-bit word

13.0.5 `SetParam` (1605/0x645:6)

Description:

"Set control parameters to new values." Telecommand Packet

Sets reservoir and RIT temperature control limits to new values for all or a specified heat pipe. New values are used immediately.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
`0x008`	0	16	`U12`	`LTCHTPIPESEL` Unsigned 16-bit word
`0x00A`	0	32	`F1234`	`LTCRESLO` 32-bit real number.
`0x00E`	0	32	`F1234`	`LTCRESHI` 32-bit real number.
`0x012`	0	32	`F1234`	`LTCRITLO` 32-bit real number.
`0x016`	0	32	`F1234`	`LTCRITHI` 32-bit real number.
`0x01A`	0	32	`F1234`	`LTCDBDELTA`

Offset	S	L	Type	ITOS name, attribute(s), and description
				32-bit real number.

13.0.6 `SetTlmFreq` (1605/0x645:7)

Description:

"Set LTC telemetry frequency, 0 is off." Telecommand Packet

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
`0x008`	0	16	`U12`	`LTCTLMFREQ` Unsigned 16-bit word

13.1 Telemetry Packets

13.1.0 `DiagLTC` (700/0x2BC)

Description:

"LAT Thermal Control diagnostic telemetry" Telemetry Packet

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
`0x00E`	0	4	`U1`	? ?
	4	4	`U1`	? ?
	8	4	`U1`	? ?
	12	4	`U1`	? ?
`0x010`	0	4	`U1`	? ?
	4	4	`U1`	? ?
	8	4	`U1`	? ?
	12	4	`U1`	? ?
`0x012`	0	4	`U1`	? ?
	4	4	`U1`	? ?
	8	4	`U1`	? ?
	12	4	`U1`	? ?
`0x014`	0	4	`U1`	? ?

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	4	U1	? ?
	8	4	U1	? ?
	12	4	U1	? ?
0x016	0	4	U1	? ?
	4	4	U1	? ?
	8	4	U1	? ?
	12	4	U1	? ?
0x018	0	4	U1	? ?
	4	4	U1	? ?
	8	4	U1	? ?
	12	4	U1	? ?
0x01A	0	4	U1	? ?
	4	4	U1	? ?
	8	4	U1	? ?
	12	4	U1	? ?
0x01C	0	4	U1	? ?
	4	4	U1	? ?
	8	4	U1	? ?
	12	4	U1	? ?
0x01E	0	4	U1	? ?
	4	4	U1	? ?
	8	4	U1	? ?
	12	4	U1	? ?
0x020	0	4	U1	? ?
	4	4	U1	? ?
	8	4	U1	? ?

Offset	S	L	Type	ITOS name, attribute(s), and description
	12	4	U1	? ?
0x022	0	4	U1	? ?
	4	4	U1	? ?
	8	4	U1	? ?
	12	4	U1	? ?
0x024	0	4	U1	? ?
	4	4	U1	? ?
	8	4	U1	? ?
	12	4	U1	? ?
0x026	0	4	U1	? ?
	4	4	U1	? ?
0x027	0	4	U1	? ?
	4	4	U1	? ?
0x028	0	4	U1	? ?
	4	4	U1	? ?
0x029	0	4	U1	? ?
	4	4	U1	? ?
0x02A	0	4	U1	? ?
	4	4	U1	? ?
0x02B	0	4	U1	? ?
	4	4	U1	? ?
0x02C	0	4	U1	? ?
	4	4	U1	? ?
0x02D	0	4	U1	? ?
	4	4	U1	? ?
0x02E	0	4	U1	? ?

Offset	S	L	Type	ITOS name, attribute(s), and description
	4	4	U1	? ?
0x02F	0	4	U1	? ?
	4	4	U1	? ?
0x030	0	4	U1	? ?
	4	4	U1	? ?
0x031	0	4	U1	? ?
	4	4	U1	? ?
0x032	0	16	U12	? ?
0x034	0	16	U12	? ?
0x036	0	16	U12	? ?
0x038	0	16	U12	? ?
0x03A	0	16	U12	? ?
0x03C	0	16	U12	? ?
0x03E	0	16	U12	? ?
0x040	0	16	U12	? ?
0x042	0	16	U12	? ?
0x044	0	16	U12	? ?
0x046	0	16	U12	? ?
0x048	0	16	U12	? ?
0x04A	0	16	U12	? ?
0x04C	0	16	U12	? ?
0x04E	0	16	U12	? ?
0x050	0	16	U12	? ?
0x052	0	16	U12	? ?
0x054	0	16	U12	? ?
0x056	0	16	U12	? ?

Offset	S	L	Type	ITOS name, attribute(s), and description
0x058	0	16	U12	? ?
0x05A	0	16	U12	? ?
0x05C	0	16	U12	? ?
0x05E	0	16	U12	? ?
0x060	0	16	U12	? ?
0x062	0	16	U12	? ?
0x064	0	16	U12	? ?
0x066	0	16	U12	? ?
0x068	0	16	U12	? ?
0x06A	0	16	U12	? ?
0x06C	0	16	U12	? ?
0x06E	0	16	U12	? ?
0x070	0	16	U12	? ?
0x072	0	16	U12	? ?
0x074	0	16	U12	? ?
0x076	0	16	U12	? ?
0x078	0	16	U12	? ?
0x07A	0	16	U12	? ?
0x07C	0	16	U12	? ?
0x07E	0	16	U12	? ?
0x080	0	16	U12	? ?
0x082	0	16	U12	? ?
0x084	0	16	U12	? ?
0x086	0	16	U12	? ?
0x088	0	16	U12	? ?
0x08A	0	16	U12	? ?

Offset	S	L	Type	ITOS name, attribute(s), and description
0x08C	0	16	U12	? ?
0x08E	0	16	U12	? ?
0x090	0	16	U12	? ?
0x092	0	16	U12	? ?
0x094	0	16	U12	? ?
0x096	0	16	U12	? ?
0x098	0	16	U12	? ?
0x09A	0	16	U12	? ?
0x09C	0	16	U12	? ?
0x09E	0	16	U12	? ?
0x0A0	0	16	U12	? ?
0x0A2	0	16	U12	? ?
0x0A4	0	16	U12	? ?
0x0A6	0	16	U12	? ?
0x0A8	0	16	U12	? ?
0x0AA	0	16	U12	? ?
0x0AC	0	16	U12	? ?
0x0AE	0	16	U12	? ?
0x0B0	0	16	U12	? ?
0x0B2	0	16	U12	? ?
0x0B4	0	16	U12	? ?
0x0B6	0	16	U12	? ?
0x0B8	0	16	U12	? ?
0x0BA	0	16	U12	? ?
0x0BC	0	16	U12	? ?
0x0BE	0	16	U12	? ?

Offset	S	L	Type	ITOS name, attribute(s), and description
0x0C0	0	16	U12	? ?
0x0C2	0	16	U12	? ?
0x0C4	0	16	I12	? ?
0x0C6	0	16	I12	? ?
0x0C8	0	16	I12	? ?
0x0CA	0	16	I12	? ?
0x0CC	0	16	I12	? ?
0x0CE	0	16	I12	? ?
0x0D0	0	16	I12	? ?
0x0D2	0	16	I12	? ?
0x0D4	0	16	I12	? ?
0x0D6	0	16	I12	? ?
0x0D8	0	16	I12	? ?
0x0DA	0	16	I12	? ?
0x0DC	0	16	I12	? ?
0x0DE	0	16	I12	? ?
0x0E0	0	16	I12	? ?
0x0E2	0	16	I12	? ?
0x0E4	0	16	I12	? ?
0x0E6	0	16	I12	? ?
0x0E8	0	16	I12	? ?
0x0EA	0	16	I12	? ?
0x0EC	0	16	I12	? ?
0x0EE	0	16	I12	? ?
0x0F0	0	16	I12	? ?
0x0F2	0	16	I12	? ?

Offset	S	L	Type	ITOS name, attribute(s), and description
`0x0F4`	0	16	`U12`	? ?

14 MEM Package

14.0 Overview

The MEM package contains routines that are specific to the Memory Dump/Load facility.

14.1 Command Packets

14.1.0 `LMEMDUMPMEM` (1604/0x644:0)

Description:

"Memory Data Dump" Telecommand Packet

Dump data from a region of memory.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x008	0	4	U12	LMEMLATUNIT ?
	4	12	U12	LMEMTRANID ?
0x00A	0	16	U12	LMEMPAD ?
0x00C	0	16	U12	LMEMADDRESSHI ?
	16	16	U12	? ?
0x010	0	16	U12	LMEMSIZEHI ?
	16	16	U12	LMEMSIZELO ?

14.1.1 `LMEMDUMPCANCEL` (1604/0x644:1)

Description:

"Memory Dump Cancel" Telecommand Packet

Cancel a memory dump operation.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x008	0	4	U12	LMEMLATUNIT ?
	4	12	U12	LMEMTRANID ?

14.1.2 LMEMDUMPPCI (1604/0x644:2)

Description:

"PCI Device Header Dump" Telecommand Packet

Dump data from a PCI device header.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x008	0	4	U12	LMEMLATUNIT ?
	4	12	U12	LMEMTRANID ?
0x00A	0	1	U12	LMEMPCIBUS ?
	1	5	U12	LMEMPCIDEVICE ?
	6	2	U12	LMEMPCIFUNCTION ?
	8	8	U12	LMEMPCIOFFSET ?

14.1.3 LMEMDUMPREG (1604/0x644:3)

Description:

"Processor Register Dump" Telecommand Packet

Dump CPU register values.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x008	0	4	U12	LMEMLATUNIT ?
	4	12	U12	LMEMTRANID ?

14.1.4 LMEMLOADMEM (1604/0x644:4)

Description:

"Memory Write" Telecommand Packet

Load data to a region in memory.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x008	0	4	U12	LMEMLATUNIT ?
	4	12	U12	LMEMTRANID ?

Offset	S	L	Type	ITOS name, attribute(s), and description
0x00A	0	16	U12	LMEMSIZE ?
0x00C	0	16	U12	LMEMADDRHI ?
	16	16	U12	LMEMADDRLO ?
0x010	0	16	U12	LMEMDATA00HI ?
0x012	0	16	U12	LMEMDATA00LO ?
0x014	0	16	U12	LMEMDATA01HI ?
0x016	0	16	U12	LMEMDATA01LO ?
0x018	0	16	U12	LMEMDATA02HI ?
0x01A	0	16	U12	LMEMDATA02LO ?
0x01C	0	16	U12	LMEMDATA03HI ?
0x01E	0	16	U12	LMEMDATA03LO ?
0x020	0	16	U12	LMEMDATA04HI ?
0x022	0	16	U12	LMEMDATA04LO ?
0x024	0	16	U12	LMEMDATA05HI ?
0x026	0	16	U12	LMEMDATA05LO ?
0x028	0	16	U12	LMEMDATA06HI ?
0x02A	0	16	U12	LMEMDATA06LO ?
0x02C	0	16	U12	LMEMDATA07HI ?
0x02E	0	16	U12	LMEMDATA07LO ?
0x030	0	16	U12	LMEMDATA08HI ?
0x032	0	16	U12	LMEMDATA08LO ?
0x034	0	16	U12	LMEMDATA09HI ?
0x036	0	16	U12	LMEMDATA09LO ?
0x038	0	16	U12	LMEMDATA10HI ?
0x03A	0	16	U12	LMEMDATA10LO ?

14.1.5 LMEMLOADPCI (1604/0x644:5)

Description:

"PCI Device Header Write" Telecommand Packet

Load data to a PCI device header.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x008	0	4	U12	LMEMLATUNIT ?
	4	12	U12	LMEMTRANID ?
0x00A	0	1	U12	LMEMPCIBUS ?
	1	5	U12	LMEMPCIDEVICE ?
	6	2	U12	LMEMPCIFUNCTION ?
	8	8	U12	LMEMPCIOFFSET ?
0x00C	0	16	U12	LMEMDATA ?

14.1.6 LMEMLOADREG (1604/0x644:6)

Description:

"Processor Register Write" Telecommand Packet

Load data to CPU registers.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x008	0	4	U12	LMEMLATUNIT ?
	4	12	U12	LMEMTRANID ?
0x00A	0	16	U12	LMEMSIZE ?
0x00C	0	16	U12	LMEMOFFSETHI ?
	16	16	U12	LMEMOFFSETLO ?
0x010	0	16	U12	LMEMDATA00HI ?
0x012	0	16	U12	LMEMDATA00LO ?
0x014	0	16	U12	LMEMDATA01HI ?
0x016	0	16	U12	LMEMDATA01LO ?

Offset	S	L	Type	ITOS name, attribute(s), and description
0x018	0	16	U12	LMEMDATA02HI ?
0x01A	0	16	U12	LMEMDATA02LO ?
0x01C	0	16	U12	LMEMDATA03HI ?
0x01E	0	16	U12	LMEMDATA03LO ?
0x020	0	16	U12	LMEMDATA04HI ?
0x022	0	16	U12	LMEMDATA04LO ?
0x024	0	16	U12	LMEMDATA05HI ?
0x026	0	16	U12	LMEMDATA05LO ?
0x028	0	16	U12	LMEMDATA06HI ?
0x02A	0	16	U12	LMEMDATA06LO ?
0x02C	0	16	U12	LMEMDATA07HI ?
0x02E	0	16	U12	LMEMDATA07LO ?
0x030	0	16	U12	LMEMDATA08HI ?
0x032	0	16	U12	LMEMDATA08LO ?
0x034	0	16	U12	LMEMDATA09HI ?
0x036	0	16	U12	LMEMDATA09LO ?
0x038	0	16	U12	LMEMDATA10HI ?
0x03A	0	16	U12	LMEMDATA10LO ?

14.1.7 LMEMDUMPPOOL (1604/0x644:7)

Description:

"Memory Pool Status Dump" Telecommand Packet

Dump the statistics for a memory pool.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x008	0	4	U12	LMEMLATUNIT ?
	4	12	U12	LMEMTRANID ?
0x00A	0	16	U12	LMEMPOOLID

Offset	S	L	Type	ITOS name, attribute(s), and description
				?

14.1.8 LMEMDUMPSYMVAL (1604/0x644:8)

Description:

"Memory Symbol Lookup" Telecommand Packet

Dump the value of a symbol.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x008	0	4	U12	LMEMLATUNIT ?
	4	12	U12	LMEMTRANID ?
0x00A	0	8	U1	LMEMSIZE ?
0x00B	0	8	U1	LMEMPAD ?
0x00C	0	8	U1	LMEMNAME00 ?
0x00D	0	8	U1	LMEMNAME01 ?
0x00E	0	8	U1	LMEMNAME02 ?
0x00F	0	8	U1	LMEMNAME03 ?
0x010	0	8	U1	LMEMNAME04 ?
0x011	0	8	U1	LMEMNAME05 ?
0x012	0	8	U1	LMEMNAME06 ?
0x013	0	8	U1	LMEMNAME07 ?
0x014	0	8	U1	LMEMNAME08 ?
0x015	0	8	U1	LMEMNAME09 ?
0x016	0	8	U1	LMEMNAME10 ?
0x017	0	8	U1	LMEMNAME11 ?
0x018	0	8	U1	LMEMNAME12 ?
0x019	0	8	U1	LMEMNAME13 ?
0x01A	0	8	U1	LMEMNAME14 ?
0x01B	0	8	U1	LMEMNAME15 ?

Offset	S	L	Type	ITOS name, attribute(s), and description
0x01C	0	8	U1	LMEMNAME16 ?
0x01D	0	8	U1	LMEMNAME17 ?
0x01E	0	8	U1	LMEMNAME18 ?
0x01F	0	8	U1	LMEMNAME19 ?
0x020	0	8	U1	LMEMNAME20 ?
0x021	0	8	U1	LMEMNAME21 ?
0x022	0	8	U1	LMEMNAME22 ?
0x023	0	8	U1	LMEMNAME23 ?
0x024	0	8	U1	LMEMNAME24 ?
0x025	0	8	U1	LMEMNAME25 ?
0x026	0	8	U1	LMEMNAME26 ?
0x027	0	8	U1	LMEMNAME27 ?
0x028	0	8	U1	LMEMNAME28 ?
0x029	0	8	U1	LMEMNAME29 ?
0x02A	0	8	U1	LMEMNAME30 ?
0x02B	0	8	U1	LMEMNAME31 ?
0x02C	0	8	U1	LMEMNAME32 ?
0x02D	0	8	U1	LMEMNAME33 ?
0x02E	0	8	U1	LMEMNAME34 ?
0x02F	0	8	U1	LMEMNAME35 ?
0x030	0	8	U1	LMEMNAME36 ?
0x031	0	8	U1	LMEMNAME37 ?
0x032	0	8	U1	LMEMNAME38 ?
0x033	0	8	U1	LMEMNAME39 ?
0x034	0	8	U1	LMEMNAME40 ?
0x035	0	8	U1	LMEMNAME41 ?

Offset	S	L	Type	ITOS name, attribute(s), and description
0x036	0	8	U1	LMEMNAME42 ?
0x037	0	8	U1	LMEMNAME43 ?
0x038	0	8	U1	LMEMNAME44 ?
0x039	0	8	U1	LMEMNAME45 ?
0x03A	0	8	U1	LMEMNAME46 ?
0x03B	0	8	U1	LMEMNAME47 ?

14.1.9 `LMEMDUMPSYMREL` (1604/0x644:9)

Description:

"Memory Dump Symbol Relative" Telecommand Packet

Dump memory data starting at an offset relative to a symbol.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x008	0	4	U12	LMEMLATUNIT ?
	4	12	U12	LMEMTRANID ?
0x00A	0	16	U12	LMEMPAD1 ?
0x00C	0	16	U12	LMEMOFFSETHI ?
	16	16	U12	LMEMOFFSETLO ?
0x010	0	16	U12	LMEMSIZEHI ?
	16	16	U12	LMEMSIZELO ?
0x014	0	8	U1	LMEMNAMESIZE ?
0x015	0	8	U1	LMEMPAD2 ?
0x016	0	16	U12	LMEMPAD3 ?
0x018	0	8	U1	LMEMNAME00 ?
0x019	0	8	U1	LMEMNAME01 ?
0x01A	0	8	U1	LMEMNAME02 ?
0x01B	0	8	U1	LMEMNAME03 ?
0x01C	0	8	U1	LMEMNAME04

Offset	S	L	Type	ITOS name, attribute(s), and description
				?
0x01D	0	8	U1	LMEMNAME05
				?
0x01E	0	8	U1	LMEMNAME06
				?
0x01F	0	8	U1	LMEMNAME07
				?
0x020	0	8	U1	LMEMNAME08
				?
0x021	0	8	U1	LMEMNAME09
				?
0x022	0	8	U1	LMEMNAME10
				?
0x023	0	8	U1	LMEMNAME11
				?
0x024	0	8	U1	LMEMNAME12
				?
0x025	0	8	U1	LMEMNAME13
				?
0x026	0	8	U1	LMEMNAME14
				?
0x027	0	8	U1	LMEMNAME15
				?
0x028	0	8	U1	LMEMNAME16
				?
0x029	0	8	U1	LMEMNAME17
				?
0x02A	0	8	U1	LMEMNAME18
				?
0x02B	0	8	U1	LMEMNAME19
				?
0x02C	0	8	U1	LMEMNAME20
				?
0x02D	0	8	U1	LMEMNAME21
				?
0x02E	0	8	U1	LMEMNAME22
				?
0x02F	0	8	U1	LMEMNAME23
				?
0x030	0	8	U1	LMEMNAME24
				?
0x031	0	8	U1	LMEMNAME25
				?
0x032	0	8	U1	LMEMNAME26
				?
0x033	0	8	U1	LMEMNAME27
				?
0x034	0	8	U1	LMEMNAME28
				?
0x035	0	8	U1	LMEMNAME29
				?
0x036	0	8	U1	LMEMNAME30

Offset	S	L	Type	ITOS name, attribute(s), and description
				?
0x037	0	8	U1	LMEMNAME31 ?
0x038	0	8	U1	LMEMNAME32 ?
0x039	0	8	U1	LMEMNAME33 ?
0x03A	0	8	U1	LMEMNAME34 ?
0x03B	0	8	U1	LMEMNAME35 ?

14.1.10 **LMEMDUMPNEXT** (1604/0x644:100)

Description:

"Send Next Dump Packet" Telecommand Packet

Send the next chunk of memory dump data.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x008	0	4	U12	LMEMLATUNIT ?
	4	12	U12	LMEMTRANID ?

14.2 Telemetry Packets

14.2.0 LMEMPOOLDATA (785/0x311)

Description:

"Memory Pool Statistics Dump" Telemetry Packet

Dump of memory pool statistics.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x00E	0	4	U12	LMEMTPOOLLATUNIT ?
	4	12	U12	LMEMTPOOLTRANID ?
0x010	0	16	U12	LMEMTPOOLID ?
0x012	0	16	U12	LMEMTPOOLPAD ?
0x014	0	32	U1234	LMEMTPOOLFREBYT ?
0x018	0	32	U1234	LMEMTPOOLFREBLK ?
0x01C	0	32	U1234	LMEMTPOOLMAXBLK ?
0x020	0	32	U1234	LMEMTPOOLALCBYT ?
0x024	0	32	U1234	LMEMTPOOLALCBLK ?

14.2.1 LMEMSYMVAL (786/0x312)

Description:

"Symbol Value Dump" Telemetry Packet

Dump of a symbol's 32-bit value.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x00E	0	4	U12	LMEMTSYMLATUNIT ?
	4	12	U12	LMEMTSYMTRANID ?
0x010	0	32	U1234	LMEMTSYMVALUE ?
0x014	0	8	U1	LMEMTSYMNAMESIZE ?
0x015	0	8	U1	LMEMTSYMPAD8 ?
0x016	0	16	U12	LMEMTSYMPAD16 ?

Offset	S	L	Type	ITOS name, attribute(s), and description
0x018	0	8	U1	LMEMTSYMNAME00 ?
0x019	0	8	U1	LMEMTSYMNAME01 ?
0x01A	0	8	U1	LMEMTSYMNAME02 ?
0x01B	0	8	U1	LMEMTSYMNAME03 ?
0x01C	0	8	U1	LMEMTSYMNAME04 ?
0x01D	0	8	U1	LMEMTSYMNAME05 ?
0x01E	0	8	U1	LMEMTSYMNAME06 ?
0x01F	0	8	U1	LMEMTSYMNAME07 ?
0x020	0	8	U1	LMEMTSYMNAME08 ?
0x021	0	8	U1	LMEMTSYMNAME09 ?
0x022	0	8	U1	LMEMTSYMNAME10 ?
0x023	0	8	U1	LMEMTSYMNAME11 ?
0x024	0	8	U1	LMEMTSYMNAME12 ?
0x025	0	8	U1	LMEMTSYMNAME13 ?
0x026	0	8	U1	LMEMTSYMNAME14 ?
0x027	0	8	U1	LMEMTSYMNAME15 ?
0x028	0	8	U1	LMEMTSYMNAME16 ?
0x029	0	8	U1	LMEMTSYMNAME17 ?
0x02A	0	8	U1	LMEMTSYMNAME18 ?
0x02B	0	8	U1	LMEMTSYMNAME19 ?
0x02C	0	8	U1	LMEMTSYMNAME20 ?
0x02D	0	8	U1	LMEMTSYMNAME21 ?
0x02E	0	8	U1	LMEMTSYMNAME22 ?
0x02F	0	8	U1	LMEMTSYMNAME23 ?
0x030	0	8	U1	LMEMTSYMNAME24 ?
0x031	0	8	U1	LMEMTSYMNAME25 ?

Offset	S	L	Type	ITOS name, attribute(s), and description
0x032	0	8	U1	LMEMTSYMNAME26 ?
0x033	0	8	U1	LMEMTSYMNAME27 ?
0x034	0	8	U1	LMEMTSYMNAME28 ?
0x035	0	8	U1	LMEMTSYMNAME29 ?
0x036	0	8	U1	LMEMTSYMNAME30 ?
0x037	0	8	U1	LMEMTSYMNAME31 ?
0x038	0	8	U1	LMEMTSYMNAME32 ?
0x039	0	8	U1	LMEMTSYMNAME33 ?
0x03A	0	8	U1	LMEMTSYMNAME34 ?
0x03B	0	8	U1	LMEMTSYMNAME35 ?
0x03C	0	8	U1	LMEMTSYMNAME36 ?
0x03D	0	8	U1	LMEMTSYMNAME37 ?
0x03E	0	8	U1	LMEMTSYMNAME38 ?
0x03F	0	8	U1	LMEMTSYMNAME39 ?
0x040	0	8	U1	LMEMTSYMNAME40 ?
0x041	0	8	U1	LMEMTSYMNAME41 ?
0x042	0	8	U1	LMEMTSYMNAME42 ?
0x043	0	8	U1	LMEMTSYMNAME43 ?
0x044	0	8	U1	LMEMTSYMNAME44 ?
0x045	0	8	U1	LMEMTSYMNAME45 ?
0x046	0	8	U1	LMEMTSYMNAME46 ?
0x047	0	8	U1	LMEMTSYMNAME47 ?

14.2.2 `LMEMSIUDATA` (788/0x314)

Description:

"SIU Memory Dump Data" Telemetry Packet

Memory dump data from the SIU.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x00E	0	4	U12	LMEMTSIULATUNIT ?
	4	12	U12	LMEMTSIUTRANID ?
0x010	0	32	U1234	LMEMTSIUADDRESS ?
0x014	0	16	U12	LMEMTSIUWORDCNT ?
0x016	0	16	U12	LMEMTSIUCMDFUNC ?
0x018	0	32	U1234	LMEMTSIUDATA0 ?
0x01C	0	32	U1234	LMEMTSIUDATA1 ?
0x020	0	32	U1234	LMEMTSIUDATA2 ?
0x024	0	32	U1234	LMEMTSIUDATA3 ?
0x028	0	32	U1234	LMEMTSIUDATA4 ?
0x02C	0	32	U1234	LMEMTSIUDATA5 ?
0x030	0	32	U1234	LMEMTSIUDATA6 ?
0x034	0	32	U1234	LMEMTSIUDATA7 ?
0x038	0	32	U1234	LMEMTSIUDATA8 ?
0x03C	0	32	U1234	LMEMTSIUDATA9 ?
0x040	0	32	U1234	LMEMTSIUDATA10 ?
0x044	0	32	U1234	LMEMTSIUDATA11 ?
0x048	0	32	U1234	LMEMTSIUDATA12 ?
0x04C	0	32	U1234	LMEMTSIUDATA13 ?
0x050	0	32	U1234	LMEMTSIUDATA14 ?
0x054	0	32	U1234	LMEMTSIUDATA15 ?
0x058	0	32	U1234	LMEMTSIUDATA16 ?
0x05C	0	32	U1234	LMEMTSIUDATA17 ?
0x060	0	32	U1234	LMEMTSIUDATA18 ?
0x064	0	32	U1234	LMEMTSIUDATA19 ?
0x068	0	32	U1234	LMEMTSIUDATA20

Offset	S	L	Type	ITOS name, attribute(s), and description
				?
0x06C	0	32	U1234	LMEMTSIUDATA21 ?
0x070	0	32	U1234	LMEMTSIUDATA22 ?
0x074	0	32	U1234	LMEMTSIUDATA23 ?
0x078	0	32	U1234	LMEMTSIUDATA24 ?
0x07C	0	32	U1234	LMEMTSIUDATA25 ?
0x080	0	32	U1234	LMEMTSIUDATA26 ?
0x084	0	32	U1234	LMEMTSIUDATA27 ?
0x088	0	32	U1234	LMEMTSIUDATA28 ?
0x08C	0	32	U1234	LMEMTSIUDATA29 ?
0x090	0	32	U1234	LMEMTSIUDATA30 ?
0x094	0	32	U1234	LMEMTSIUDATA31 ?
0x098	0	32	U1234	LMEMTSIUDATA32 ?
0x09C	0	32	U1234	LMEMTSIUDATA33 ?
0x0A0	0	32	U1234	LMEMTSIUDATA34 ?
0x0A4	0	32	U1234	LMEMTSIUDATA35 ?
0x0A8	0	32	U1234	LMEMTSIUDATA36 ?
0x0AC	0	32	U1234	LMEMTSIUDATA37 ?
0x0B0	0	32	U1234	LMEMTSIUDATA38 ?
0x0B4	0	32	U1234	LMEMTSIUDATA39 ?
0x0B8	0	32	U1234	LMEMTSIUDATA40 ?
0x0BC	0	32	U1234	LMEMTSIUDATA41 ?
0x0C0	0	32	U1234	LMEMTSIUDATA42 ?
0x0C4	0	32	U1234	LMEMTSIUDATA43 ?
0x0C8	0	32	U1234	LMEMTSIUDATA44 ?
0x0CC	0	32	U1234	LMEMTSIUDATA45 ?
0x0D0	0	32	U1234	LMEMTSIUDATA46

Offset	S	L	Type	ITOS name, attribute(s), and description
0x0D4	0	32	U1234	? LMEMTSIUDATA47
0x0D8	0	32	U1234	? LMEMTSIUDATA48
0x0DC	0	32	U1234	? LMEMTSIUDATA49
0x0E0	0	32	U1234	? LMEMTSIUDATA50
0x0E4	0	32	U1234	? LMEMTSIUDATA51
0x0E8	0	32	U1234	? LMEMTSIUDATA52
0x0EC	0	32	U1234	? LMEMTSIUDATA53
0x0F0	0	32	U1234	? LMEMTSIUDATA54
0x0F4	0	32	U1234	? LMEMTSIUDATA55
0x0F8	0	32	U1234	? LMEMTSIUDATA56
0x0FC	0	32	U1234	? LMEMTSIUDATA57
0x100	0	32	U1234	? LMEMTSIUDATA58
0x104	0	32	U1234	? LMEMTSIUDATA59
0x108	0	32	U1234	? LMEMTSIUDATA60
0x10C	0	32	U1234	? LMEMTSIUDATA61
0x110	0	32	U1234	? LMEMTSIUDATA62
0x114	0	32	U1234	? LMEMTSIUDATA63
0x118	0	32	U1234	? LMEMTSIUDATA64
0x11C	0	32	U1234	? LMEMTSIUDATA65
0x120	0	32	U1234	? LMEMTSIUDATA66
0x124	0	32	U1234	? LMEMTSIUDATA67
0x128	0	32	U1234	? LMEMTSIUDATA68
0x12C	0	32	U1234	? LMEMTSIUDATA69
0x130	0	32	U1234	? LMEMTSIUDATA70
0x134	0	32	U1234	? LMEMTSIUDATA71
0x138	0	32	U1234	? LMEMTSIUDATA72

Offset	S	L	Type	ITOS name, attribute(s), and description
				?
0x13C	0	32	U1234	LMEMTSIUDATA73 ?
0x140	0	32	U1234	LMEMTSIUDATA74 ?
0x144	0	32	U1234	LMEMTSIUDATA75 ?
0x148	0	32	U1234	LMEMTSIUDATA76 ?
0x14C	0	32	U1234	LMEMTSIUDATA77 ?
0x150	0	32	U1234	LMEMTSIUDATA78 ?
0x154	0	32	U1234	LMEMTSIUDATA79 ?
0x158	0	32	U1234	LMEMTSIUDATA80 ?
0x15C	0	32	U1234	LMEMTSIUDATA81 ?
0x160	0	32	U1234	LMEMTSIUDATA82 ?
0x164	0	32	U1234	LMEMTSIUDATA83 ?
0x168	0	32	U1234	LMEMTSIUDATA84 ?
0x16C	0	32	U1234	LMEMTSIUDATA85 ?
0x170	0	32	U1234	LMEMTSIUDATA86 ?
0x174	0	32	U1234	LMEMTSIUDATA87 ?
0x178	0	32	U1234	LMEMTSIUDATA88 ?
0x17C	0	32	U1234	LMEMTSIUDATA89 ?

15 PBC Package

15.0 Overview

The PBC package contains routines that are specific to the Primary Boot Code.

The package supports the following functions:

- RAD750 boot and crate initialization

15.1 Command Packets

15.1.0 LBTSTART (1600/0x640:0)

Description:

"Boot code no-op" Telecommand Packet

No-op command for the PBC.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x008	0	16	U12	LPBCLATUNIT ?

15.1.1 LBTRESET (1600/0x640:1)

Description:

"Warm reboot" Telecommand Packet

Initiate a warm reboot of the unit.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x008	0	16	U12	LPBCLATUNIT ?
0x00A	0	16	U12	LPBCPAD ?
0x00C	0	32	U1234	LPBCPRIFLAGS ?

15.1.2 LBTERRDUMP (1600/0x640:2)

Description:

"Error code pop" Telecommand Packet

Pop the next error code from the PBC error queue.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x008	0	16	U12	LPBCLATUNIT ?

15.1.3 `LBTRTOSEXEC` (1600/0x640:3)

Description:

"Boot RTOS" Telecommand Packet

Start the RTOS.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
`0x008`	0	16	`U12`	`LPBCLATUNIT` ?
`0x00A`	0	16	`U12`	`LPBCPAD` ?
`0x00C`	0	32	`U1234`	`LPBCSBCFLAGS` ?

15.1.4 `LBTBAD` (1600/0x640:4)

Description:

"Invalid boot command" Telecommand Packet

Boot command with an invalid function code. This is used for testing the PBC.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
`0x008`	0	16	`U12`	`LPBCLATUNIT` ?

15.2 Telemetry Packets

15.2.0 LBTHKP (512/0x200)

Description:

"Boot housekeeping telemetry" Telemetry Packet

Boot housekeeping telemetry.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x00E	0	16	U12	LPBCBOOTSTAT ?
0x010	0	16	U12	LPBCTOTALERRCNT ?
0x012	0	16	U12	LPBCQUEUEERRCNT ?
0x014	0	32	U1234	LPBCNEXTERRWORD ?
0x018	0	16	U12	LPBCTCRECVCNT ?
0x01A	0	16	U12	LPBCTCACCCNT ?
0x01C	0	32	U1234	LPBCLASTERRWORD ?
0x020	0	5	U12	LPBCLASTFUNC ?
	5	11	U12	LPBCLASTAPID ?
0x022	0	16	U12	LPBCSPARE1 ?
0x024	0	16	U12	LPBCSPARE2 ?
0x026	0	16	U12	LPBCFILESTAT ?
0x028	0	16	U12	LPBCFILEPKTCNT ?
0x02A	0	16	U12	LPBCSCRUBADDRHI ?
0x02C	0	16	U12	LPBCBOOTTYPE ?
0x02E	0	16	U12	LPBCMEMDUMPWC ?
0x030	0	32	U1234	LPBCMEMDUMPADDR ?
0x034	0	32	U1234	LPBCMEMDUMPDAT00 ?
0x038	0	32	U1234	LPBCMEMDUMPDAT01 ?
0x03C	0	32	U1234	LPBCMEMDUMPDAT02 ?
0x040	0	32	U1234	LPBCMEMDUMPDAT03

Offset	S	L	Type	ITOS name, attribute(s), and description
				?
0x044	0	32	U1234	LPBCMEMDUMPDAT04 ?
0x048	0	32	U1234	LPBCMEMDUMPDAT05 ?
0x04C	0	32	U1234	LPBCMEMDUMPDAT06 ?
0x050	0	32	U1234	LPBCMEMDUMPDAT07 ?
0x054	0	32	U1234	LPBCMEMDUMPDAT08 ?
0x058	0	32	U1234	LPBCMEMDUMPDAT09 ?
0x05C	0	32	U1234	LPBCMEMDUMPDAT10 ?
0x060	0	32	U1234	LPBCMEMDUMPDAT11 ?
0x064	0	32	U1234	LPBCMEMDUMPDAT12 ?
0x068	0	32	U1234	LPBCMEMDUMPDAT13 ?
0x06C	0	32	U1234	LPBCMEMDUMPDAT14 ?
0x070	0	32	U1234	LPBCMEMDUMPDAT15 ?

15.2.1 LBTEPU0HKP (609/0x261)

Description:

"EPU 0 Boot Housekeeping Telemetry" Telemetry Packet

Boot housekeeping telemetry from EPU 0.

Layout:

Offset	S	L	Type	ITOS name, attribute(s), and description
0x00E	0	16	U12	LPBC0BOOTSTAT ?
0x010	0	16	U12	LPBC0TOTALERRCNT ?
0x012	0	16	U12	LPBC0QUEUEERRCNT ?
0x014	0	32	U1234	LPBC0NEXTERRWORD ?
0x018	0	16	U12	LPBC0TCRECVCNT ?
0x01A	0	16	U12	LPBC0TCACCCNT ?
0x01C	0	32	U1234	LPBC0LASTERRWORD ?
0x020	0	5	U12	LPBC0LASTFUNC ?

Offset	S	L	Type	ITOS name, attribute(s), and description
	5	11	U12	LPBC0LASTAPID ?
0x022	0	16	U12	LPBC0SPARE1 ?
0x024	0	16	U12	LPBC0SPARE2 ?
0x026	0	16	U12	LPBC0FILESTAT ?
0x028	0	16	U12	LPBC0FILEPKTCNT ?
0x02A	0	16	U12	LPBC0SCRUBADDRHI ?
0x02C	0	16	U12	LPBC0BOOTTYPE ?
0x02E	0	16	U12	LPBC0DUMPWC ?
0x030	0	32	U1234	LPBC0DUMPADDR ?
0x034	0	32	U1234	LPBC0DUMPDATA00 ?
0x038	0	32	U1234	LPBC0DUMPDATA01 ?
0x03C	0	32	U1234	LPBC0DUMPDATA02 ?
0x040	0	32	U1234	LPBC0DUMPDATA03 ?
0x044	0	32	U1234	LPBC0DUMPDATA04 ?
0x048	0	32	U1234	LPBC0DUMPDATA05 ?
0x04C	0	32	U1234	LPBC0DUMPDATA06 ?
0x050	0	32	U1234	LPBC0DUMPDATA07 ?
0x054	0	32	U1234	LPBC0DUMPDATA08 ?
0x058	0	32	U1234	LPBC0DUMPDATA09 ?
0x05C	0	32	U1234	LPBC0DUMPDATA10 ?
0x060	0	32	U1234	LPBC0DUMPDATA11 ?
0x064	0	32	U1234	LPBC0DUMPDATA12 ?
0x068	0	32	U1234	LPBC0DUMPDATA13 ?
0x06C	0	32	U1234	LPBC0DUMPDATA14 ?
0x070	0	32	U1234	LPBC0DUMPDATA15 ?

16 Telecommand Packet Index, by APID

APID	FC	Cmd. Packet (I)	Section	Description (I)
0x640	0	LPBCSTART	PBC/cmd/LBTSTART/000_P.LBTSTART.shtml:%	Boot code no-op
0x640	1	LPBCRESET	PBC/cmd/LBTRESET/000_P.LBTRESET.shtml:%	Warm reboot
0x640	2	LPBCERRDUMP	PBC/cmd/LBTERRDUMP/000_P.LBTERRDUMP.shtml:%	Error code pop
0x640	3	LPBCRTOSEXEC	PBC/cmd/LBTRTOSEXEC/000_P.LBTRTOSEXEC.shtml:%	Boot RTOS
0x640	4	LPBCBADCMD	PBC/cmd/LBTBAD/000_P.LBTBAD.shtml:%	Invalid boot command
0x641	0	LFILUPLSTART	FILE/cmd/LFILUPLSTART/000_P.LFILUPLSTART.shtml:%	File Upload Start
0x641	1	LFILUPLCANCEL	FILE/cmd/LFILUPLCANCEL/000_P.LFILUPLCANCEL.shtml:%	File Upload Cancel
0x641	2	LFILUPLCOMMIT	FILE/cmd/LFILUPLCOMMIT/000_P.LFILUPLCOMMIT.shtml:%	File Upload Commit
0x641	3	LFILUPLDATA	FILE/cmd/LFILUPLDATA/000_P.LFILUPLDATA.shtml:%	File Upload Data
0x641	4	LFILUPLEPU	FILE/cmd/LFILUPLEPU/000_P.LFILUPLEPU.shtml:%	File Upload to EPU
0x644	0	LMEMDUMPMEM	MEM/cmd/LMEMDUMPMEM/000_P.LMEMDUMPMEM.shtml:%	Memory Data Dump
0x644	1	LMEMDUMPCANCEL	MEM/cmd/LMEMDUMPCANCEL/000_P.LMEMDUMPCANCEL.shtml:%	Memory Dump Cancel
0x644	2	LMEMDUMPPCI	MEM/cmd/LMEMDUMPPCI/000_P.LMEMDUMPPCI.shtml:%	PCI Device Header Dump
0x644	3	LMEMDUMPREG	MEM/cmd/LMEMDUMPREG/000_P.LMEMDUMPREG.shtml:%	Processor Register Dump
0x644	4	LMEMLOADMEM	MEM/cmd/LMEMLOADMEM/000_P.LMEMLOADMEM.shtml:%	Memory Write
[illegible]	[illegible]	[illegible]	[illegible]	PCI Device Header Write
[illegible]	[illegible]	[illegible]	[illegible]	Processor Register Write
[illegible]	[illegible]	[illegible]	[illegible]	Memory Pool Status Dump
[illegible]	[illegible]	[illegible]	[illegible]	Memory Symbol Lookup
[illegible]	[illegible]	[illegible]	[illegible]	Memory Dump Symbol Relative
[illegible]	[illegible]	[illegible]	[illegible]	Send Next Dump Packet
[illegible]	[illegible]	[illegible]	[illegible]	Restart and initialize Thermal Control
[illegible]	[illegible]	[illegible]	[illegible]	Start control
[illegible]	[illegible]	[illegible]	[illegible]	Terminate Thermal Control processing
[illegible]	[illegible]	[illegible]	[illegible]	Set thermal control mode to active or passive.
[illegible]	[illegible]	[illegible]	[illegible]	Set heater to always on, or off or automatic control.
[illegible]	[illegible]	[illegible]	[illegible]	Set control parameters to new values.
[illegible]	[illegible]	[illegible]	[illegible]	Set LTC telemetry frequency, 0 is off
[illegible]	[illegible]	[illegible]	[illegible]	File Delete
[illegible]	[illegible]	[illegible]	[illegible]	File Copy Local
[illegible]	[illegible]	[illegible]	[illegible]	Directory Create
[illegible]	[illegible]	[illegible]	[illegible]	Directory Delete
[illegible]	[illegible]	[illegible]	[illegible]	File Dump CTDB
[illegible]	[illegible]	[illegible]	[illegible]	Directory Dump
[illegible]	[illegible]	[illegible]	[illegible]	File System Status
[illegible]	[illegible]	[illegible]	[illegible]	Request a Housekeeping Diagnostic Packet
[illegible]	[illegible]	[illegible]	[illegible]	System Reset
[illegible]	[illegible]	[illegible]	[illegible]	Stop Diagnostic Sample
[illegible]	[illegible]	[illegible]	[illegible]	Change task messaging level
[illegible]	[illegible]	[illegible]	[illegible]	Change task command confirmation level
[illegible]	[illegible]	[illegible]	[illegible]	CAL Low Rate Science Counters
[illegible]	[illegible]	[illegible]	[illegible]	TKR Low Rate Science Counters
[illegible]	[illegible]	[illegible]	[illegible]	ACD Tile Counter (Pair)
[illegible]	[illegible]	[illegible]	[illegible]	ACD Tile Counters (All)
[illegible]	[illegible]	[illegible]	[illegible]	Stop Science Counter
[illegible]	[illegible]	[illegible]	[illegible]	SC Attitude Broadcast Message
[illegible]	[illegible]	[illegible]	[illegible]	SC Ancillary Broadcast Message
0x701	[illegible]	[illegible]	LSM/cmd/LLSMSTIMETONE/000_P.LLSMSTIMETONE.shtml:%	SC Timetone Broadcast Message

17 Telecommand Packet Index, by Mnemonic (ITOS)

Cmd. Packet (I)	APID	FC	Section	Description (I)
CmdResponse	0x695	1	LCM/cmd/cmdResponse/000_P.cmdResponse.shtml:%	Change task command confirmation level
LFILUPLCANCEL	0x641	1	FILE/cmd/LFILUPLCANCEL/000_P.LFILUPLCANCEL.shtml:%	File Upload Cancel
LFILUPLCOMMIT	0x641	2	FILE/cmd/LFILUPLCOMMIT/000_P.LFILUPLCOMMIT.shtml:%	File Upload Commit
LFILUPLDATA	0x641	3	FILE/cmd/LFILUPLDATA/000_P.LFILUPLDATA.shtml:%	File Upload Data
LFILUPLEPU	0x641	4	FILE/cmd/LFILUPLEPU/000_P.LFILUPLEPU.shtml:%	File Upload to EPU
LFILUPLSTART	0x641	0	FILE/cmd/LFILUPLSTART/000_P.LFILUPLSTART.shtml:%	File Upload Start
LHKREQDIAGPKT	0x650	0	LHK/cmd/ReqDiagPacket/000_P.ReqDiagPacket.shtml:%	Request a Housekeeping Diagnostic Packet
LHKSTOPDIAG	0x650	2	LHK/cmd/StopDiag/000_P.StopDiag.shtml:%	Stop Diagnostic Sample
LHKSYSRESET	0x650	1	LHK/cmd/SysReset/000_P.SysReset.shtml:%	System Reset
LLFSDIRCREATE	0x648	2	LFS/cmd/LLFSDIRCREATE/000_P.LLFSDIRCREATE.shtml:%	Directory Create
LLFSDIRDELETE	0x648	3	LFS/cmd/LLFSDIRDELETE/000_P.LLFSDIRDELETE.shtml:%	Directory Delete
LLFSDIRDUMP	0x648	5	LFS/cmd/LLFSDIRDUMP/000_P.LLFSDIRDUMP.shtml:%	Directory Dump
LLFSFILECOPY	0x648	1	LFS/cmd/LLFSFILECOPY/000_P.LLFSFILECOPY.shtml:%	File Copy Local
LLFSFILEDELETE	0x648	0	LFS/cmd/LLFSFILEDELETE/000_P.LLFSFILEDELETE.shtml:%	File Delete
LLFSFILEDUMPC	0x648	4	LFS/cmd/LLFSFILEDUMPC/000_P.LLFSFILEDUMPC.shtml:%	File Dump CTDB
LLFSSYSSTATUS	0x648	6	LFS/cmd/LLFSSYSSTATUS/000_P.LLFSSYSSTATUS.shtml:%	File System Status
LMCACDTILEALL	0x69C	3	LMC/cmd/acd_tile_all/000_P.acd_tile_all.shtml:%	ACD Tile Counters (All)
LMCACDTILEPAIR	0x69C	2	LMC/cmd/acd_tile_pair/000_P.acd_tile_pair.shtml:%	ACD Tile Counter (Pair)
LMCCALLRS	0x69C	0	LMC/cmd/cal_lrs/000_P.cal_lrs.shtml:%	CAL Low Rate Science Counters
LMCSTOPCOUNT	0x69C	4	LMC/cmd/stop_count/000_P.stop_count.shtml:%	Stop Active Counter
LMCTKRLRS	0x69C	1	LMC/cmd/tkr_lrs/000_P.tkr_lrs.shtml:%	TKR Low Rate Science Counters
LMEMDUMPCANCEL	0x644	1	MEM/cmd/LMEMDUMPCANCEL/000_P.LMEMDUMPCANCEL.shtml:%	Memory Dump Cancel
LMEMDUMPMEM	0x644	0	MEM/cmd/LMEMDUMPMEM/000_P.LMEMDUMPMEM.shtml:%	Memory Data Dump
LMEMDUMPNEXT	0x644	100	MEM/cmd/LMEMDUMPNEXT/000_P.LMEMDUMPNEXT.shtml:%	Send Next Dump Packet
LMEMDUMPPCI	0x644	2	MEM/cmd/LMEMDUMPPCI/000_P.LMEMDUMPPCI.shtml:%	PCI Device Header Dump
LMEMDUMPPOOL	0x644	7	MEM/cmd/LMEMDUMPPOOL/000_P.LMEMDUMPPOOL.shtml:%	Memory Pool Status Dump
LMEMDUMPREG	0x644	3	MEM/cmd/LMEMDUMPREG/000_P.LMEMDUMPREG.shtml:%	Processor Register Dump
LMEMDUMPSYMREL	0x644	9	MEM/cmd/LMEMDUMPSYMREL/000_P.LMEMDUMPSYMREL.shtml:%	Memory Dump Symbol Relative
LMEMDUMPSYMVAL	0x644	8	MEM/cmd/LMEMDUMPSYMVAL/000_P.LMEMDUMPSYMVAL.shtml:%	Memory Symbol Lookup
LMEMLOADMEM	0x644	4	MEM/cmd/LMEMLOADMEM/000_P.LMEMLOADMEM.shtml:%	Memory Write
LMEMLOADPCI	0x644	5	MEM/cmd/LMEMLOADPCI/000_P.LMEMLOADPCI.shtml:%	PCI Device Header Write
LMEMLOADREG	0x644	6	MEM/cmd/LMEMLOADREG/000_P.LMEMLOADREG.shtml:%	Processor Register Write
LPBCBADCMD	0x640	4	PBC/cmd/LBTBAD/000_P.LBTBAD.shtml:%	Invalid boot command
LPBCERRDUMP	0x640	2	PBC/cmd/LBTERRDUMP/000_P.LBTERRDUMP.shtml:%	Error code pop
LPBCRESET	0x640	1	PBC/cmd/LBTRESET/000_P.LBTRESET.shtml:%	Warm reboot
LPBCRTOSEXEC	0x640	3	PBC/cmd/LBTRTOSEXEC/000_P.LBTRTOSEXEC.shtml:%	Boot RTOS
LPBCSTART	0x640	0	PBC/cmd/LBTSTART/000_P.LBTSTART.shtml:%	Boot code no-op
LTCHtrOnOffCtl	0x645	5	LTC/cmd/HtrOnOffCtl/000_P.HtrOnOffCtl.shtml:%	Set heater to always on, or off or automatic control.
LTCReStart	0x645	1	LTC/cmd/ReStart/000_P.ReStart.shtml:%	Restart and initialize Thermal Control
LTCSetMode	0x645	4	LTC/cmd/SetMode/000_P.SetMode.shtml:%	Set thermal control mode to active or passive.
LTCSetParam	0x645	6	LTC/cmd/SetParam/000_P.SetParam.shtml:%	Set control parameters to new values.
LTCSetTlmFreq	0x645	7	LTC/cmd/SetTlmFreq/000_P.SetTlmFreq.shtml:%	Set LTC telemetry frequency, 0 is off.
LTCStart	0x645	2	LTC/cmd/Start/000_P.Start.shtml:%	Start control
LTCStop	0x645	3	LTC/cmd/Stop/000_P.Stop.shtml:%	Terminate Thermal Control processing
MsgResponse	0x695	0	LCM/cmd/msgResponse/000_P.msgResponse.shtml:%	Change task messaging level

18 Telecommand Enumeration Index, by Name

Enumeration	Section	Description
CMD_CNT_SEL	ISIS/att/_/E.CMD_CNT_SEL.shtml:%	Selects count to return as diagnostic telemetry
EPU_ID	ISIS/att/_/E.EPU_ID.shtml:%	Enumeration of the EPUs
FILEDEVICE	ISIS/att/_/E.FILEDEVICE.shtml:%	Code for file device
ON_OFF_SELECTOR	ISIS/att/_/E.ON_OFF_SELECTOR.shtml:%	Enumeration of the options for the simple on-off selector
P_S_SELECTOR	ISIS/att/_/E.P_S_SELECTOR.shtml:%	Enumeration for the simple primary-secondary selector
PDU_ID	ISIS/att/_/E.PDU_ID.shtml:%	Identifies a PDU
SCIPATTYPE	ISIS/att/_/E.SCIPATTYPE.shtml:%	Science data generation pattern types
SIU_ID	ISIS/att/_/E.SIU_ID.shtml:%	Enumeration of the possible SIU IDs

19 Telecommand Range Index, by Name

Range	Section	Description
bits_12_range	ISIS/att/_/R.bits_12_range.shtml:%	Range for 12-bit fields
cmd_cnt_range	ISIS/att/_/R.cmd_cnt_range.shtml:%	Range for command count selection
epu_range	ISIS/att/_/R.epu_range.shtml:%	EPU number range
LHKAPIDRNG	LHK/att/_/R.LHKAPIDRNG.shtml:%	LHK APID Range
LHKDIAGINTV	LHK/att/_/R.LHKDIAGINTV.shtml:%	Diagnostic Interval
LHKDIAGPKTCNT	LHK/att/_/R.LHKDIAGPKTCNT.shtml:%	Diagnostic Packet Count
on_off_range	ISIS/att/_/R.on_off_range.shtml:%	On and off selector range
p_s_range	ISIS/att/_/R.p_s_range.shtml:%	Primary and secondary selector range
pdu_id_range	ISIS/att/_/R.pdu_id_range.shtml:%	PDU ID range
siu_id_range	ISIS/att/_/R.siu_id_range.shtml:%	SIU ID range
tem_mask_range	ISIS/att/_/R.tem_mask_range.shtml:%	TEM mask range

20 Telemetry Packet Index, by APID

APID	Section	Description (I)
0x200	PBC/tlm/LBTHKP/000_P.LBTHKP.shtml:%	Boot housekeeping telemetry
0x210	LHK/tlm/TemEnvPwr0/000_P.TemEnvPwr0.shtml:%	TEM Power Packet 0
0x211	LHK/tlm/TemEnvPwr1/000_P.TemEnvPwr1.shtml:%	TEM Power Packet 1
0x212	LHK/tlm/TemEnvPwr2/000_P.TemEnvPwr2.shtml:%	TEM Power Packet 2
0x213	LHK/tlm/TemEnvPwr3/000_P.TemEnvPwr3.shtml:%	TEM Power Packet 3
0x214	LHK/tlm/TemEnvPwr4/000_P.TemEnvPwr4.shtml:%	TEM Power Packet 4
0x215	LHK/tlm/TemEnvPwr5/000_P.TemEnvPwr5.shtml:%	TEM Power Packet 5
0x216	LHK/tlm/TemEnvTemp0/000_P.TemEnvTemp0.shtml:%	TEM Temperature Packet 0
0x217	LHK/tlm/TemEnvTemp1/000_P.TemEnvTemp1.shtml:%	TEM Temperature Packet 1
0x218	LHK/tlm/TemEnvTemp2/000_P.TemEnvTemp2.shtml:%	TEM Temperature Packet 2
0x219	LHK/tlm/TemEnvTemp3/000_P.TemEnvTemp3.shtml:%	TEM Temperature Packet 3
0x21A	LHK/tlm/TemEnvTemp4/000_P.TemEnvTemp4.shtml:%	TEM Temperature Packet 4
0x21B	LHK/tlm/TemEnvTemp5/000_P.TemEnvTemp5.shtml:%	TEM Temperature Packet 5
0x21C	LHK/tlm/TemEnvTemp6/000_P.TemEnvTemp6.shtml:%	TEM Temperature Packet 6
0x21D	LHK/tlm/TemEnvTemp7/000_P.TemEnvTemp7.shtml:%	TEM Temperature Packet 7
[illegible]	LHK/tlm/PduEnv0/000_P.PduEnv0.shtml:%	PDU Environmental Packet 0
[illegible]	LHK/tlm/PduEnv1/000_P.PduEnv1.shtml:%	PDU Environmental Packet 1
[illegible]	LHK/tlm/PduEnv2/000_P.PduEnv2.shtml:%	PDU Environmental Packet 2
[illegible]	LHK/tlm/PduEnv3/000_P.PduEnv3.shtml:%	PDU Environmental Packet 3
[illegible]	LHK/tlm/PduEnv4/000_P.PduEnv4.shtml:%	PDU Environmental Packet 4
[illegible]	LHK/tlm/PduEnv5/000_P.PduEnv5.shtml:%	PDU Environmental Packet 5
[illegible]	LHK/tlm/PduEnv6/000_P.PduEnv6.shtml:%	PDU Environmental Packet 6
[illegible]	LHK/tlm/PduEnv7/000_P.PduEnv7.shtml:%	PDU Environmental Packet 7
[illegible]	[illegible]/tlm/AemEnv0/000_P.AemEnv0.shtml:%	AEM Environmental Monitor Packet 0
[illegible]	[illegible]/tlm/Lrs0/000_P.Lrs0.shtml:%	Low-rate Science Packet
[illegible]	[illegible]/tlm/CmdCnt0/000_P.CmdCnt0.shtml:%	Command Statistics Packet 0
[illegible]	[illegible]/tlm/CmdCnt1/000_P.CmdCnt1.shtml:%	Command Statistics Packet 1
[illegible]	[illegible]/tlm/FileStats/000_P.FileStats.shtml:%	File System Statistics Packet
[illegible]	[illegible]/tlm/CpuMet/000_P.CpuMet.shtml:%	CPU Metrics/RT Statistics Packet
[illegible]	[illegible]/tlm/MemStats0/000_P.MemStats0.shtml:%	Memory Load/Dump Statistics
[illegible]	[illegible]	Memory Load/Dump Statistics
[illegible]	[illegible]	EPU 0 Boot Housekeeping Telemetry
[illegible]	[illegible]/tlm/DiagTemEnvPwr0/000_P.DiagTemEnvPwr0.shtml:%	Diagnostic TEM Power Packet 0
[illegible]	[illegible]/tlm/DiagTemEnvPwr1/000_P.DiagTemEnvPwr1.shtml:%	Diagnostic TEM Power Packet 1
[illegible]	[illegible]/tlm/DiagTemEnvPwr2/000_P.DiagTemEnvPwr2.shtml:%	Diagnostic TEM Power Packet 2
[illegible]	[illegible]/tlm/DiagTemEnvPwr3/000_P.DiagTemEnvPwr3.shtml:%	Diagnostic TEM Power Packet 3
[illegible]	[illegible]/tlm/DiagTemEnvPwr4/000_P.DiagTemEnvPwr4.shtml:%	Diagnostic TEM Power Packet 4
[illegible]	[illegible]/tlm/DiagTemEnvPwr5/000_P.DiagTemEnvPwr5.shtml:%	Diagnostic TEM Power Packet 5
[illegible]	[illegible]/tlm/DiagTemEnvTemp0/000_P.DiagTemEnvTemp0.shtml:%	Diagnostic TEM Temperature Packet 0
[illegible]	[illegible]/tlm/DiagTemEnvTemp1/000_P.DiagTemEnvTemp1.shtml:%	Diagnostic TEM Temperature Packet 1
[illegible]	[illegible]/tlm/DiagTemEnvTemp2/000_P.DiagTemEnvTemp2.shtml:%	Diagnostic TEM Temperature Packet 2
[illegible]	[illegible]/tlm/DiagTemEnvTemp3/000_P.DiagTemEnvTemp3.shtml:%	Diagnostic TEM Temperature Packet 3
[illegible]	[illegible]/tlm/DiagTemEnvTemp4/000_P.DiagTemEnvTemp4.shtml:%	Diagnostic TEM Temperature Packet 4
[illegible]	[illegible]/tlm/DiagTemEnvTemp5/000_P.DiagTemEnvTemp5.shtml:%	Diagnostic TEM Temperature Packet 5
[illegible]	[illegible]/tlm/DiagTemEnvTemp6/000_P.DiagTemEnvTemp6.shtml:%	Diagnostic TEM Temperature Packet 6
[illegible]	[illegible]/tlm/DiagTemEnvTemp7/000_P.DiagTemEnvTemp7.shtml:%	Diagnostic TEM Temperature Packet 7
[illegible]	[illegible]/tlm/DiagPduEnv0/000_P.DiagPduEnv0.shtml:%	Diagnostic PDU Environmental Packet 0
[illegible]	[illegible]/tlm/DiagPduEnv1/000_P.DiagPduEnv1.shtml:%	Diagnostic PDU Environmental Packet 1
[illegible]	[illegible]/tlm/DiagPduEnv2/000_P.DiagPduEnv2.shtml:%	Diagnostic PDU Environmental Packet 2
[illegible]	[illegible]/tlm/DiagPduEnv3/000_P.DiagPduEnv3.shtml:%	Diagnostic PDU Environmental Packet 3
[illegible]	[illegible]/tlm/DiagPduEnv4/000_P.DiagPduEnv4.shtml:%	Diagnostic PDU Environmental Packet 4

APID	Section	Description (L[illegible])
[illegible]	[illegible]	Diagnostic PDU Environmental Packet 5
[illegible]	[illegible]	Diagnostic PDU Environmental Packet 6
[illegible]	[illegible]	Diagnostic PDU Environmental Packet 7
[illegible]	[illegible]	Diagnostic [illegible] Environmental Monitor Packet 0
[illegible]	[illegible]	Diagnostic Low rate Science Packet
[illegible]	[illegible]	Diagnostic Command Statistics Packet
[illegible]	[illegible]	Diagnostic Command Statistics Packet 1
[illegible]	[illegible]	Diagnostic File System Statistics Packet
[illegible]	[illegible]	Diagnostic [illegible] Metrics/DB Statistics Packet
[illegible]	[illegible]	Diagnostic Memory Load/Dump Statistics
[illegible]	[illegible]	Diagnostic Memory Load/Dump Statistics
[illegible]	[illegible]	[illegible] Thermal Control diagnostic telemetry
[illegible]	[illegible]	[illegible] Low Rate Science Counters
[illegible]	[illegible]	[illegible] Rate Science Counters
[illegible]	[illegible]	[illegible] Double Counters
[illegible]	[illegible]	Response to command [illegible]
[illegible]	[illegible]	Memory Pool Statistics Dump
[illegible]	[illegible]	[illegible] Value Dump
[illegible]	[illegible]	[illegible] Memory Dump Data
[illegible]	[illegible]	Directory Listing Report
[illegible]	[illegible]	[illegible] Listing Report
[illegible]	[illegible]	File System Status Report
[illegible]	[illegible]	File Dump Data CTDB
[illegible]	[illegible]	Red Limit Alert Packet

21 Telemetry Analog Conv. Index, by Name

Analog Conv.	Section	Description
LDTEMVADCCNV	LHK/att/_/A.LDTEMVADCCNV.shtml:%	TEM Voltage Conversion

22 Telemetry Discrete Conv. Index, by Name

Discrete Conv.	Section	Description
ITC_NODEID	ITC/att/_/D.ITC_NODEID.shtml:%	Discrete list of ITC nodes
ITC_TASKID	ITC/att/_/D.ITC_TASKID.shtml:%	Discrete list of ITC task IDs
LAEMFRPWRSTATES	LHK/att/_/D.LAEMFRPWRSTATES.shtml:%	AEM FREE Board Power States
LAPDUPWRCNVTSTAT	LHK/att/_/D.LAPDUPWRCNVTSTAT.shtml:%	ACD PDU Power Converter State
LAPDUPWRSTATES	LHK/att/_/D.LAPDUPWRSTATES.shtml:%	ACD PDU Power States
LAPDUPWRSUPSTAT	LHK/att/_/D.LAPDUPWRSUPSTAT.shtml:%	ACD PDU Power Supply Sources
LDPDUEPUCNVT	LHK/att/_/D.LDPDUEPUCNVT.shtml:%	PDU EPU Converter
LDPDUEPUPWRST	LHK/att/_/D.LDPDUEPUPWRST.shtml:%	EPU Power States
LDPDUTEMPWRST	LHK/att/_/D.LDPDUTEMPWRST.shtml:%	PDU TEM Power State
LHKSTATUSBITS	LHK/att/_/D.LHKSTATUSBITS.shtml:%	ADC status bit conversions
LRLIMDEVICE	LHK/att/_/D.LRLIMDEVICE.shtml:%	Device Opcodes for Red Limit Alerts

23 Telemetry Limit Set Index, by Name

Limit Set	Section	Description
LABEAGTEMPADCLIM	LHK/att/_/L.LABEAGTEMPADCLIM.shtml:%	ACD BEA Grid Interface Temperature Limits
LAPMTRTEMPADCLIM	LHK/att/_/L.LAPMTRTEMPADCLIM.shtml:%	ACD PMT Rail Temperature Limits
LASHLTEMPADCLIM	LHK/att/_/L.LASHLTEMPADCLIM.shtml:%	ACD Shell Temperature Limits
LC33IADCLIM	LHK/att/_/L.LC33IADCLIM.shtml:%	CAL 3.3I ADC limits
LC33VADCLIM	LHK/att/_/L.LC33VADCLIM.shtml:%	CAL 3.3V ADC limits
LCAFETADCLIM	LHK/att/_/L.LCAFETADCLIM.shtml:%	CAL AFFE temperature limits
LCBASPLADCLIM	LHK/att/_/L.LCBASPLADCLIM.shtml:%	CAL Baseplate Temperature Limits
LCBIASIADCLIM	LHK/att/_/L.LCBIASIADCLIM.shtml:%	CAL bias current limits
LCBIASVADCLIM	LHK/att/_/L.LCBIASVADCLIM.shtml:%	CAL bias voltage limits
LDAEMFRHV1ADCLIM	LHK/att/_/L.LDAEMFRHV1ADCLIM.shtml:%	AEM Free Board HV1 Limits
LDAEMFRHV2ADCLIM	LHK/att/_/L.LDAEMFRHV2ADCLIM.shtml:%	AEM Free Board HV2 Limits
LDAEMFRTMPADCLIM	LHK/att/_/L.LDAEMFRTMPADCLIM.shtml:%	AEM Free Board Temperature Limits
LDAEMFRVDDADCLIM	LHK/att/_/L.LDAEMFRVDDADCLIM.shtml:%	AEM Free Board VDD Limits
LDEPUTEMPADCLIM	LHK/att/_/L.LDEPUTEMPADCLIM.shtml:%	EPU Temperature ADC Limits
LDEPUVADCLIM	LHK/att/_/L.LDEPUVADCLIM.shtml:%	EPU Voltage ADC Limits
LDTEM33IADCLIM	LHK/att/_/L.LDTEM33IADCLIM.shtml:%	TEM 3.3I digital limits
LDTEM33VADCLIM	LHK/att/_/L.LDTEM33VADCLIM.shtml:%	TEM digital 3.3V limits
LDTEMPCBTADCLIM	LHK/att/_/L.LDTEMPCBTADCLIM.shtml:%	TEM PCB Temperature Limits
LDTEMPSTADCLIM	LHK/att/_/L.LDTEMPSTADCLIM.shtml:%	TEM Power Supply Temperature Limits
LMGRDRADIFADCLIM	LHK/att/_/L.LMGRDRADIFADCLIM.shtml:%	Grid Radiator Interface Temperature Limits
LMGRIDTEMPADCLIM	LHK/att/_/L.LMGRIDTEMPADCLIM.shtml:%	Grid Temperature ADC Limits
LMRADAFHTRADCLIM	LHK/att/_/L.LMRADAFHTRADCLIM.shtml:%	Radiator Anitfreeze Heater Temperature Limits
LMRADTEMPADCLIM	LHK/att/_/L.LMRADTEMPADCLIM.shtml:%	Radiator Temperature Limits
LMVCHPDSHPADCLIM	LHK/att/_/L.LMVCHPDSHPADCLIM.shtml:%	VCHP-DSHP Interface Temperature Limits
LMVCHPRSVTADCLIM	LHK/att/_/L.LMVCHPRSVTADCLIM.shtml:%	VCHP Reservoir Heater Temperature Limits
LMVCHPXLHPADCLIM	LHK/att/_/L.LMVCHPXLHPADCLIM.shtml:%	VCHP-XLHP Interface Temperature Limits
LT15IADCLIM	LHK/att/_/L.LT15IADCLIM.shtml:%	TKR 1.5I ADC limits
LT15VADCLIM	LHK/att/_/L.LT15VADCLIM.shtml:%	TKR 1.5V ADC Limits
LT25IADCLIM	LHK/att/_/L.LT25IADCLIM.shtml:%	TKR 2.5I ADC limits
LT25VADCLIM	LHK/att/_/L.LT25VADCLIM.shtml:%	TKR 2.5V ADC limits
LTBIASIADCLIM	LHK/att/_/L.LTBIASIADCLIM.shtml:%	TKR bias current ADC limits
LTBIASVADCLIM	LHK/att/_/L.LTBIASVADCLIM.shtml:%	TKR bias voltage ADC limits
LTCBLTADCLIM	LHK/att/_/L.LTCBLTADCLIM.shtml:%	TKR cable temperature limits