TREK

TRAINING DATA

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1 What You Need to Know Before Reading This Document

Before reading the TReK Training Data document, you need to become familiar with the TReK Telemetry Tutorial (TREK-USER-002). The TReK Telemetry Tutorial describes telemetry concepts supported by TReK. Becoming familiar with these concepts will help you to understand some of the information provided in this document.

2 Introduction

The TReK install program includes a telemetry database file named TelemetryDatabase.mdb, and it includes files to support the Telemetry Trainer in creating CCSDS telemetry packets. The Telemetry Trainer will create the packets and then the TReK telemetry processing software will use the Telemetry Database to process the packets. The purpose of this document is to describe the packets and the data within the packets in order for you to be able to use this information in creating and running user products. Section 3 of this document will describe the packets and parameters. Section 4 will describe the data being generated by the Telemetry Trainer.

3 Telemetry Database Parameters

The files mentioned in the Introduction section of this document can be used by the TReK software to create and process 11 different CCSDS packets. The following sections will describe these packets and the parameters they contain. It should be noted that this document will not discuss the Enhanced Huntsville Operations Support Center System (EHS) protocol header data. 8 of the 11 packets have an EHS protocol header on them, but this document will only cover the data starting with the CCSDS Primary Header. 6 of the packets are payload type packets, 1 of the packets is a Suitcase Simulator packet, 1 of the packets is a CCSDS packet, 1 is a core type packet, and the other 2 are EHS Ground Support Equipment (GSE) packets.

3.1 Packet 1 (APID 2)

Packet 1 has a Packet ID (APID) value of 2 and a Format ID value of 1. It has a CCSDS Primary Header and Secondary Header which are in the format of an International Space Station (ISS) Ku-band packet. The length of the packet is 4096 bytes. It only contains 4 parameters within the data portion of the packet, and each of them are sampled 4 times in the packet.

Table 1 lists out the parameters that are in this packet. The table indicates the data type, total length, number of samples per packet, calibration type, and sensing type of each parameter. The first number listed in the Total Length column is the actual length of the parameter in bits, and the number in parentheses is the number of bytes required to store the parameter.

Parameter	Data Type	Total Length	Number of Samples	Calibration Type	Sensing Type
M_CP_VER_3	IDIS	3 (1)	1	None	None
M_CP_TYPE_1	IDIS	1 (1)	1	State Code	Expected State
M_CP_SHF_1	IDIS	1 (1)	1	None	None
M_CP_APID_11	IUNS	11 (2)	1	None	None
M_CP_SF_2	IDIS	2 (1)	1	None	None
M_CP_SC_14	IUNS	14 (2)	1	None	None
M_CP_PL_16	IUNS	16 (2)	1	None	None
M_CS_TIME_40	IUND	40 (5)	1	None	None
M_CS_TID_2	IDIS	2 (1)	1	None	None
M_CS_CWI_1	IDIS	1 (1)	1	None	None
M_CS_ZOE_1	IDIS	1 (1)	1	None	None
M_CS_PTYPE_4	IDIS	4 (1)	1	None	None
M_CS_VERID_16	IUNS	16 (2)	1	None	None
M_CS_DCCOUNT_16	IDIS	16 (2)	1	None	None
M_N_SASC_2040	SASC	2040 (255)	4	None	None
M_N_SASCB_2032	SASC	2032 (254)	4	None	None
M_N_SEBC_2040	SEBC	2040 (255)	4	None	None
M_N_SUND_2040	SUND	2040 (255)	4	None	None

Table 1 Packet 1 Parameter List

3.2 Packet 2 (APID 3)

Packet 2 has a Packet ID (APID) value of 3 and a Format ID value of 1. It has a CCSDS Primary Header and Secondary Header which are in the format of an International Space Station (ISS) Ku-band packet. The length of the packet is 116 bytes. It contains 6 subsets which are described in the following sections.

Subset 1:

Subset 1 has a Subset ID value of 8 and a Format ID value of 1. It contains normal sampled, super sampled, and counter dependent subsets. Its length is 100 bytes.

Subset 2:

Subset 2 has a Subset ID value of 9 and two different formats. One format has a Format ID value of 1 and the other has a Format ID value of 2. It is super sampled within subset 1 and contains normal sampled parameters. Its length is 24 bytes.

Subset 3:

Subset 3 has a Subset ID value of 10 and a Format ID value of 1. It is normal sampled within subset 1 and contains a normal sampled subset within it. Its length is 25 bytes.

Subset 4:

Subset 4 has a Subset ID value of 11 and a Format ID value of 1. It is normal sampled within subset 3 and contains normal sampled parameters. Its length is 18 bytes.

Subset 5:

Subset 5 has a Subset ID value of 12 and a Format ID value of 1. It is counter dependent within subset 1 and contains normal sampled parameters. The subset appears in the odd numbered occurrences of subset 1. Its length is 24 bytes.

Subset 6:

Subset 6 has a Subset ID value of 13 and a Format ID value of 1. It is counter dependent within subset 1 and contains normal sampled parameters. The subset appears in the even numbered occurrences of subset 1. Its length is 24 bytes.

Table 2 lists the parameters that are in this packet. The table indicates the data type, total length, number of samples per packet, calibration type, and sensing type of each parameter. The first number listed in the Total Length column is the actual length of the parameter in bits, and the number in parentheses is the number of bytes required to store the parameter.

Parameter	Data Type	Total Length	Number of Samples	Calibration Type	Sensing Type
M_CP_VER_3	IDIS	3 (1)	1	None	None
M_CP_TYPE_1	IDIS	1 (1)	1	State Code	Expected State
M_CP_SHF_1	IDIS	1 (1)	1	None	None
M_CP_APID_11	IUNS	11 (2)	1	None	None
M_CP_SF_2	IDIS	2 (1)	1	None	None
M_CP_SC_14	IUNS	14 (2)	1	None	None
M_CP_PL_16	IUNS	16 (2)	1	None	None
M_CS_TIME_40	IUND	40 (5)	1	None	None
M_CS_TID_2	IDIS	2 (1)	1	None	None
M_CS_CWI_1	IDIS	1 (1)	1	None	None
M_CS_ZOE_1	IDIS	1 (1)	1	None	None
M_CS_PTYPE_4	IDIS	4 (1)	1	None	None
M_CS_VERID_16	IUNS	16 (2)	1	None	None
M_CS_DCCOUNT_16	IDIS	16 (2)	1	None	None
M_SS_SS8_8	IDIS	8 (1)	1	None	None
M_SF_SF8_8	IDIS	8 (1)	1	None	None
M_C_PACK3_8	IUNS	8 (1)	1	None	None
M_SS_SS9_8	IDIS	8 (1)	2	None	None
M_SF_SF9_8	IDIS	8 (1)	2	None	None
M_N_SASCB_112	SASC	112 (14)	2	None	None

Table 2 Packet 2 Parameter List

Parameter	Data Type	Total Length	Number of Samples	Calibration Type	Sensing Type
M1_N_FEEE_64	FEEE	64 (8)	2	None	None
M2_N_SASCB_112	SASC	112(14)	2	None	None
M_SS_SS10_8	IDIS	8 (1)	1	None	None
M_SF_SF10_8	IDIS	8 (1)	1	None	None
M1_N_SASC_40	SASC	40 (5)	1	None	None
M_SS_SS11_8	IDIS	8 (1)	1	None	None
M_SF_SF11_8	IDIS	8 (1)	1	None	None
M_N_SASCB_96	SASC	96 (12)	1	None	None
M_N_ITWO_32	ITWO	32 (4)	1	None	None
M_SS_SS12_8	IDIS	8 (1)	1	None	None
M_SF_SF12_8	IDIS	8 (1)	1	None	None
M_N_SASC_160	SASC	160 (20)	1	None	None
M_N_ITWO_16	ITWO	16 (8)	1	Polynomial	None
M_SS_SS13_8	IDIS	8 (1)	1	None	None
M_SF_SF13_8	IDIS	8 (1)	1	None	None
M_N_IMAG_16	IMAG	16 (2)	1	None	None

Table 2 Packet 2 Parameter List (Continued)

3.3 Packet 3 (APID 4)

Packet 3 has a Packet ID (APID) value of 4 and a Format ID value of 1. It has a CCSDS Primary Header and Secondary Header which are in the format of an International Space Station (ISS) Ku-band packet. The length of the packet is 228 bytes. It contains 3 random subsets within the data portion of the packet. At most, Only 2 of the subsets will be in the packet at any given time. The subsets are defined in the following sections.

Subset 1:

Subset 1 has a Subset ID value of 14 and a Format ID value of 1. It is randomly sampled within packet 3 and contains normal and super sampled parameters. Its length is 106 bytes.

Subset 2:

Subset 2 has a Subset ID value of 15 and a Format ID value of 1. It is randomly sampled within packet 3 and contains normal and super sampled parameters. Its length is 106 bytes.

Subset 3:

Subset 3 has a Subset ID value of 16 and a Format ID value of 1. It is randomly sampled within packet 3 and contains normal and super sampled parameters. Its length is 106 bytes.

Table 3 lists the parameters that are in this packet. The table indicates the data type, total length, number of samples per packet, calibration type, and sensing type of each parameter. The first number listed in the Total Length column is the actual length of the parameter in bits, and the number in parentheses is the number of bytes required to store the parameter.

Parameter	Data Type	Total Length	Number of Samples	Calibration Type	Sensing Type
M_CP_VER_3	IDIS	3 (1)	1	None	None
M_CP_TYPE_1	IDIS	1 (1)	1	State Code	Expected State
M_CP_SHF_1	IDIS	1 (1)	1	None	None
M_CP_APID_11	IUNS	11 (2)	1	None	None
M_CP_SF_2	IDIS	2 (1)	1	None	None
M_CP_SC_14	IUNS	14 (2)	1	None	None
M_CP_PL_16	IUNS	16 (2)	1	None	None
M_CS_TIME_40	IUND	40 (5)	1	None	None
M_CS_TID_2	IDIS	2 (1)	1	None	None
M_CS_CWI_1	IDIS	1 (1)	1	None	None
M_CS_ZOE_1	IDIS	1 (1)	1	None	None
M_CS_PTYPE_4	IDIS	4 (1)	1	None	None
M_CS_VERID_16	IUNS	16 (2)	1	None	None
M_CS_DCCOUNT_16	IDIS	16 (2)	1	None	None
M_SS_SS14_16	IUNS	16(2)	2	None	None
M_SF_SF14_8	IUNS	8(1)	2	None	None
M_N_IMAG_32	IMAG	32(4)	2	None	None
M_N_ITWO_32	ITWO	32(4)	2	None	None
M_N_SUND_88	SUND	88(11)	10	None	None
M1_N_FEEE_64	FEEE	64(8)	10	None	None
M_SS_SS15_16	IUNS	16(2)	2	None	None
M_SF_SF15_8	IUNS	8(1)	2	None	None
M2_N_FEEE_64	FEEE	64(8)	10	None	None
M_SS_SS16_16	IUNS	16(2)	2	None	None
M_SF_SF16_8	IUNS	8(1)	2	None	None
M3_N_FEEE_64	FEEE	64(8)	10	None	None

Table 3 Packet 3 Parameter List

3.4 Packet 4 (APID 6)

Packet 4 has a Packet ID (APID) value of 6 and a Format ID value of 1. It has a CCSDS Primary Header and Secondary Header which are in the format of an International Space Station (ISS) Ku-band packet. The length of the packet is 38 bytes. It only contains 4 normal sampled parameters and one normal sampled subset within the data portion of the packet. The subset is defined in the following section.

Subset 1:

Subset 1 has a Subset ID value of 17 and a Format ID value of 1. It is normal sampled within packet 4 and contains normal sampled parameters. Its length is 14 bytes.

Table 4 lists the parameters that are in this packet. The table indicates the data type, total length, number of samples per packet, calibration type, and sensing type of each parameter. The first number listed in the Total Length column is the actual length of the parameter in bits, and the number in parentheses is the number of bytes required to store the parameter.

Parameter	Data Type	Total Length	Number of Samples	Calibration Type	Sensing Type
M_CP_VER_3	IDIS	3 (1)	1	None	None
M_CP_TYPE_1	IDIS	1 (1)	1	State Code	Expected State
M_CP_SHF_1	IDIS	1 (1)	1	None	None
M_CP_APID_11	IUNS	11 (2)	1	None	None
M_CP_SF_2	IDIS	2 (1)	1	None	None
M_CP_SC_14	IUNS	14 (2)	1	None	None
M_CP_PL_16	IUNS	16 (2)	1	None	None
M_CS_TIME_40	IUND	40 (5)	1	None	None
M_CS_TID_2	IDIS	2 (1)	1	None	None
M_CS_CWI_1	IDIS	1 (1)	1	None	None
M_CS_ZOE_1	IDIS	1 (1)	1	None	None
M_CS_PTYPE_4	IDIS	4 (1)	1	None	None
M_CS_VERID_16	IUNS	16 (2)	1	None	None
M_CS_DCCOUNT_16	IDIS	16 (2)	1	None	None
M_N_IUNS_32	IUNS	32 (4)	1	None	None
M_USER_IUND_32	IUND	32 (4)	1	None	None
M_SS_SS17_8	IDIS	8 (1)	1	None	None
M_SF_SF17_8	IDIS	8 (1)	1	None	None

Table 4 Packet 4 Parameter List

3.5 Packet 5 (APID 7)

Packet 5 has a Packet ID (APID) value of 7 and a Format ID value of 1. It has a CCSDS Primary Header and Secondary Header which are in the format of an International Space Station (ISS) Ku-band packet. The length of the packet is 1260 bytes. It contains normal sampled, super sampled, normal sampled group, and super sample group parameters within the data portion of the packet. These parameters have a variety of data types and lengths.

Table 5 lists the parameters that are in this packet. The table indicates the data type, total length, number of samples per packet, calibration type, and sensing type of each parameter. The first number listed in the Total Length column is the actual length of the parameter in bits, and the number in parentheses is the number of bytes required to store the parameter.

Note: This packet is also defined in the database as a Suitcase Simulator packet.

Parameter	Data Type	Total Length	Number of Samples	Calibration Type	Sensing Type
M_CP_VER_3	IDIS	3 (1)	1	None	None
M_CP_TYPE_1	IDIS	1 (1)	1	State Code	Expected State
M_CP_SHF_1	IDIS	1 (1)	1	None	None
M_CP_APID_11	IUNS	11 (2)	1	None	None
M_CP_SF_2	IDIS	2 (1)	1	None	None
M_CP_SC_14	IUNS	14 (2)	1	None	None
M_CP_PL_16	IUNS	16 (2)	1	None	None
M_CS_TIME_40	IUND	40 (5)	1	None	None
M_CS_TID_2	IDIS	2 (1)	1	None	None
M_CS_CWI_1	IDIS	1 (1)	1	None	None
M_CS_ZOE_1	IDIS	1 (1)	1	None	None
M_CS_PTYPE_4	IDIS	4 (1)	1	None	None
M_CS_VERID_16	IUNS	16 (2)	1	None	None
M_CS_DCCOUNT_16	IDIS	16 (2)	1	None	None
MSID001	SASC	176 (22)	1	None	None
MSID002	SASC	320 (40)	1	None	None
MSID003	SEBC	160 (20)	1	None	None
MSID004	SUND	800 (100)	1	None	None
MSID005	IDIS	3 (1)	1	None	None
MSID006	IMAG	5 (1)	1	None	None
MSID007	IUND	64 (8)	1	None	None
MSID008	IUNS	16 (2)	1	Polynomial	None
MSID009	ITWO	8 (1)	1	Point Pair	Limit
MSID010	ITWO	32 (4)	1	Polynomial	None
MSID011	IUNS	6 (1)	1	None	None
MSID012	SASC	160 (20)	1	None	None
MSID013	IDIS	26 (4)	1	None	None
MSID014	IUND	4 (1)	1	None	None
MSID015	IUNS	4 (1)	1	None	None
MSID016	ITWO	32 (4)	1	None	None
MSID017	IUNS	32 (4)	1	Polynomial	None
MSID018	IDIS	32 (4)	1	State Code	Expected State
MSID019	IMAG	32 (4)	1	None	None
MSID020	SEBC	2040 (255)	1	None	None
MSID021	IMAG	32 (4)	1	None	None
MSID022	IMAG	32 (4)	1	None	None
MSID023	IMAG	32 (4)	1	None	None
MSID024	IMAG	32 (4)	1	None	None
MSID025	IMAG	32 (4)	1	None	None
MSID026	IMAG	32 (4)	1	None	None
MSID027	IMAG	16 (2)	1	None	None
MSID028	IMAG	16 (2)	1	None	None
MSID029	IMAG	16 (2)	1	Polynomial	None
MSID030	IMAG	16 (2)	1	None	None

Table 5 Packet 5 Parameter List

Parameter	Data Type	Total Length	Number of Samples	Calibration Type	Sensing Type
MSID031	IMAG	16 (2)	1	None	None
MSID032	ITWO	32 (4)	1	None	None
MSID033	ITWO	32 (4)	1	None	None
MSID034	ITWO	32 (4)	1	None	None
MSID035	ITWO	32 (4)	1	None	None
MSID036	ITWO	32 (4)	1	None	None
MSID037	ITWO	8 (1)	1	None	None
MSID038	ITWO	32 (4)	1	None	None
MSID039	ITWO	32 (4)	1	None	None
MSID040	ITWO	32 (4)	1	None	None
MSID041	ITWO	32 (4)	1	None	None
MSID042	ITWO	32 (4)	1	None	None
MSID043	ITWO	32 (4)	1	None	None
MSID044	IUND	64 (8)	1	None	None
MSID045	IUND	16 (2)	1	None	None
MSID046	IDIS	3 (1)	1	None	None
MSID047	IDIS	4 (1)	1	None	None
MSID048	IDIS	3 (1)	1	None	None
MSID049	IMAG	4 (1)	1	None	None
MSID050	ITWO	7 (1)	1	None	None
MSID051	IUND	3 (1)	1	None	None
MSID052	ITWO	8 (1)	1	None	None
MSID053	ITWO	8 (1)	1	None	None
MSID054	ITWO	8 (1)	1	None	None
MSID055	ITWO	8 (1)	1	None	None
MSID056	ITWO	8 (1)	1	None	None
MSID057	IMAG	8 (1)	1	None	None
MSID058	IMAG	8 (1)	1	None	None
MSID059	IMAG	8 (1)	1	None	None
MSID060	IMAG	8 (1)	1	None	None
MSID061	IUNS	16 (2)	1	None	None
MSID062	IUNS	16 (2)	1	None	None
MSID063	IUNS	16 (2)	1	None	None
MSID064	IUNS	16 (2)	1	None	None
MSID065	IUNS	16 (2)	1	None	None
MSID066	IUNS	32 (4)	1	None	None
MSID067	IUNS	32 (4)	1	None	None
MSID068	IUNS	32 (4)	1	None	None
MSID069	IUNS	32 (4)	1	None	None
MSID070	IUNS	32 (4)	1	None	None
MSID071	IUND	64 (8)	1	None	None
MSID072	IUND	56 (7)	1	None	None
MSID073	IUND	48 (6)	1	None	None
MSID074	IUND	40 (5)	1	None	None
MSID075	IUND	32 (4)	1	None	None

Table 5 Packet 5 Parameter List (Continued)

Parameter	Data Type	Total Length	Number of Samples	Calibration Type	Sensing Type
MSID076	IUND	24 (3)	1	None	None
MSID077	IUND	16 (2)	1	None	None
MSID078	IUND	8 (1)	1	None	None
MSID079	IDIS	1 (1)	1	State Code	Expected State
MSID080	IDIS	1 (1)	1	None	None
MSID081	IDIS	1 (1)	1	None	None
MSID082	IDIS	1 (1)	1	None	None
MSID083	IDIS	1 (1)	1	None	None
MSID084	IDIS	1 (1)	1	None	None
MSID085	IDIS	1 (1)	1	None	None
MSID086	IDIS	1 (1)	1	None	None
MSID087	IUNS	8 (1)	1	None	None
MSID088	ITWO	32 (4)	1	None	None
MSID089	ITWO	32 (4)	1	None	None
MSID090	ITWO	32 (4)	1	None	None
MSID091	ITWO	32 (4)	1	None	None
MSID092	ITWO	32 (4)	1	None	None
MSID093	SASC	32 (4)	1	None	None
MSID094	SASC	40 (5)	1	None	None
MSID095	SASC	48 (6)	1	None	None
MSID096	SASC	96 (12)	1	None	None
MSID097	SASC	112 (14)	1	None	None
MSID098	SEBC	16 (2)	1	None	None
MSID099	SEBC	40 (5)	1	None	None
MSID100	SUND	8 (1)	1	None	None
MSID101	SASC	8 (1)	1	None	None
MSID102	SASC	800 (100)	1	None	None
MSID103	SEBC	800 (100)	1	None	None
MSID104	SUND	800 (100)	1	None	None
MSID105	SASC	800 (100)	1	None	None
MSID106	FEEE	32 (4)	4	Polynomial	None
MSID107	ITWO	16 (2)	3	Polynomial	None
MSID108	IUNS	12 (2)	4	None	None
MSID109	IDIS	4 (1)	1	State Code	None
MSID110	IUNS	5 (1)	4	Point Pair	Limit
MSID111	FEEE	32 (4)	1	None	None
MSID112	ITWO	16 (2)	1	None	None
MSID113	IMAG	8 (1)	1	None	None
MSID114	IMAG	4 (1)	2	None	None
MSID115	FEEE	64 (8)	1	Polynomial	Limit
MSID116	ITWO	32 (4)	1	None	None
MSID117	FEEE	32 (4)	1	None	None
MSID118	IUNS	16 (2)	1	None	None
MSID119	ITWO	16 (2)	1	None	None

Table 5 Packet 5 Parameter List (Continued)

Parameter	Data Type	Total Length	Number of Samples	Calibration Type	Sensing Type
MSID120	SASC	16 (2)	1	None	None
MSID121	FEEE	64 (8)	1	None	None
MSID122	ITWO	32 (4)	1	None	None
MSID123	ITWO	32 (4)	1	None	None
MSID124	SEBC	64 (8)	1	None	None
MSID125	ITWO	24 (3)	1	None	None
MSID126	ITWO	24 (3)	1	None	None
MSID127	SASC	80 (10)	3	None	None
MSID128	TEHS	56 (7)	2	None	None

Table 5 Packet 5 Parameter List (Continued)

3.6 Packet 6 (APID 24)

Packet 6 has a Packet ID (APID) value of 24 and a Format ID value of 1. It has a CCSDS Primary Header and Secondary Header which are in the format of an International Space Station (ISS) Ku-band packet. The length of the packet is 43 bytes. It contains normal sampled parameters within the data portion of the packet. These parameters have a variety of data types and lengths, and some of them share calibration, sensing, monitoring, and switching information.

Table 6 lists the parameters that are in this packet. The table indicates the data type, total length, number of samples per packet, calibration type, and sensing type of each parameter. The first number listed in the Total Length column is the actual length of the parameter in bits, and the number in parentheses is the number of bytes required to store the parameter.

Parameter	Data Type	Total Length	Number of Samples	Calibration Type	Sensing Type
24_CP_VER_3	IUNS	3 (1)	1	None	None
24_CP_TYPE_1	IDIS	1 (1)	1	None	None
24_CP_SHF_1	IDIS	1 (1)	1	None	None
24_CP_APID_11	IUNS	11 (2)	1	None	None
24_CP_SF_2	IUNS	2 (1)	1	None	None
24_CP_SC_14	IUNS	14 (2)	1	None	None
24_CP_PL_16	IUNS	16 (2)	1	None	None
24_CS_TIME_40	TCUT	40 (5)	1	None	None
24_CS_TID_2	IUNS	2 (1)	1	None	None
24_CS_CWI_1	IDIS	1 (1)	1	None	None
24_CS_ZOE_1	IDIS	1 (1)	1	None	None
24_CS_PTYPE_4	IUNS	4 (1)	1	None	None
24_CS_VERID_16	IUNS	16 (2)	1	None	None
24_CS_DCCOUNT_16	IUNS	16 (2)	1	None	None
24_IUNS_8	IUNS	8(1)	1	None	None

Table 6 Packet 6 Parameter List

Parameter	Data Type	Total Length	Number of Samples	Calibration Type	Sensing Type
24_FEEE_32	FEEE	32(4)	1	None	None
24_IDIS_2	IDIS	2(1)	1	None	None
24_RECORDER1_ STATUS	IDIS	2(1)	1	State Code	None
24_RECORDER2_ STATUS	IDIS	2(1)	1	State Code	None
24_CAMERA1_ POWER	IDIS	1(1)	1	State Code	Expected State
24_CAMERA2_ POWER	IDIS	1 (1)	1	State Code	Expected State
24_COOLING_FAN_ POWER	IDIS	1 (1)	1	State Code	Expected State
24_TANK1_FLUID_ LEVEL	IMAG	16(2)	1	None	Limit
24_TANK2_FLUID_ LEVEL	IMAG	16(2)	1	None	Limit
24_TEMPERATURE_ GAUGE_100	FEEE	32(4)	1	Polynomial	None
24_TEMPERATURE_ GAUGE_200	FEEE	32(4)	1	Polynomial	None
24_MAIN_POWER	ITWO	32(4)	1	Point Pair	None
24_AUX_POWER	ITWO	32(4)	1	Point Pair	None

Table 6 Packet 6 Parameter List (Continued)

3.7 Packet 7 (APID 347)

Packet 7 has a Packet ID (APID) value of 347 and a Format ID value of 1. It has a CCSDS Primary Header and Secondary Header which are in the format of an International Space Station (ISS) Ku-band packet. It also contains an Express Rack header and has a packet type of Suitcase Simulator (SCS). The length of the packet is 132 bytes. It contains normal sampled and normal sampled group parameters within the data portion of the packet.

Table 7 lists the parameters that are in this packet. The table indicates the data type, total length, number of samples per packet, calibration type, and sensing type of each parameter. The first number listed in the Total Length column is the actual length of the parameter in bits, and the number in parentheses is the number of bytes required to store the parameter.

Parameter	Data Type	Total Length	Number of Samples	Calibration Type	Sensing Type
347CP_VERID	IUNS	3 (1)	1	None	None
347CP_TYPE	IUNS	1 (1)	1	None	None
347CP_SHF	IDIS	1 (1)	1	None	None
347CP_APID	IUNS	11 (2)	1	None	None
347CP_SF	IDIS	2 (1)	1	None	None
347CP_PSCOUNT	IUNS	14 (2)	1	None	None
347CP_PLENGTH	IUNS	16 (2)	1	None	None
347CS_TIME	IUND	40 (5)	1	None	None
347CS_TIMEID	IUNS	2 (1)	1	None	None
347CS_CHKWORD	IUNS	1 (1)	1	None	None
347CS_ZOE	IUNS	1 (1)	1	None	None
347CS_PKTTYPE	IUNS	4 (1)	1	None	None
347CS_VERSIONID	IUNS	16 (2)	1	None	None
347CS_DCCOUNT	IUNS	16 (2)	1	None	None
347EX_VERSION	IDIS	4(1)	1	None	None
347EX_COUNT	IUNS	12(2)	1	None	None
347EX_TYPE	IUNS	16(2)	1	None	None
347EX_CODES	IUNS	16(2)	1	None	None
347EX_CODED	IUNS	16(2)	1	None	None
347EX_TLMTYPE	IUNS	16(2)	1	None	None
347EX_SEQCOUNT	IUNS	16(2)	1	None	None
347EX_TIME	TGMT	32(4)	1	None	None
347M_001	IUNS	8(1)	100	None	None

Table 7 Packet 7 Parameter List

3.8 Packet 8 (APID 445)

Packet 8 has a Packet ID (APID) value of 445 and there are two formats. One of the Format IDs is 0 and the other is 1. It has a CCSDS Primary Header and Secondary Header which are in the format of an EHS GSE packet. The length of the packet for format 0 is 73 bytes and the length for format 1 is 53 bytes. Format 0 contains two unprocessed and one calibrated GSE parameters within the data portion of the packet. Format 1 contains two unprocessed GSE parameters within the data portion of the packet.

Table 8 lists the parameters that are in this packet for format 0 and Table 9 lists the parameters that are in this packet for format 1. The tables indicate the data type, total length, number of samples per packet, calibration type, and sensing type of each parameter. The first number listed in the Total Length column is the actual length of the parameter in bits, and the number in parentheses is the number of bytes required to store the parameter.

Parameter	Data Type	Total Length	Number of Samples	Calibration Type	Sensing Type
<<GSE_CPVER>>	IUNS	3 (1)	1	None	None
<<GSE_CPTYPE>>	IUNS	1 (1)	1	None	None
<<GSE_CPSHF>>	IDIS	1 (1)	1	None	None
<<GSE_CPAPID>>	IUNS	11 (2)	1	None	None
<<GSE_CPSF>>	IDIS	2 (1)	1	None	None
<<GSE_CPCOUNT>>	IUNS	14 (2)	1	None	None
<<GSE_CPLEN>>	IUNS	16 (2)	1	None	None
<<GSE_FORMATID>>	IUNS	3(1)	1	None	None
<<GSE_UN1>>	IUND	5(1)	1	None	None
IMAG_5	IMAG	5(1)	6	None	None
FEEE_32	FEEE	32(4)	3	None	None
FEEE_32	FEEE	32(4)	3	None	None

Table 8 Packet 8 Format 0 Parameter List

Parameter	Data Type	Total Length	Number of Samples	Calibration Type	Sensing Type
<<GSE_CPVER>>	IUNS	3 (1)	1	None	None
<<GSE_CPTYPE>>	IUNS	1 (1)	1	None	None
<<GSE_CPSHF>>	IDIS	1 (1)	1	None	None
<<GSE_CPAPID>>	IUNS	11 (2)	1	None	None
<<GSE_CPSF>>	IDIS	2 (1)	1	None	None
<<GSE_CPCOUNT>>	IUNS	14 (2)	1	None	None
<<GSE_CPLEN>>	IUNS	16 (2)	1	None	None
<<GSE_FORMATID>>	IUNS	3(1)	1	None	None
<<GSE_UN1>>	IUND	5(1)	1	None	None
SASC_80	SASC	80(10)	2	None	None
TEHS_56	TEHS	56(7)	1	None	None

Table 9 Packet 8 Format 1 Parameter List

3.9 Packet 9 (APID 776)

Packet 9 has a Packet ID (APID) value of 776 and a Format ID of 0. It has a CCSDS Primary Header and Secondary Header which are in the format of an EHS GSE packet. The length of the packet is 63 bytes. It contains one converted and one calibrated GSE parameters within the data portion of the packet.

Table 10 lists the parameters that are in this packet. The table indicates the data type, total length, number of samples per packet, calibration type, and sensing type of each parameter. The first number listed in the Total Length column is the actual length of the parameter in bits, and the number in parentheses is the number of bytes required to store the parameter.

Parameter	Data Type	Total Length	Number of Samples	Calibration Type	Sensing Type
<<GSE_CPVER>>	IUNS	3 (1)	1	None	None
<<GSE_CPTYPE>>	IUNS	1 (1)	1	None	None
<<GSE_CPSHF>>	IDIS	1 (1)	1	None	None
<<GSE_CPAPID>>	IUNS	11 (2)	1	None	None
<<GSE_CPSF>>	IDIS	2 (1)	1	None	None
<<GSE_CPCOUNT>>	IUNS	14 (2)	1	None	None
<<GSE_CPLEN>>	IUNS	16 (2)	1	None	None
<<GSE_FORMATID>>	IUNS	3(1)	1	None	None
<<GSE_UN1>>	IUND	5(1)	1	None	None
ITWO_32	ITWO	32(4)	5	None	None
ITWO_32	FEEE	32(4)	5	None	None

Table 10 Packet 9 Parameter List

3.10 Packet 10 (APID 54)

Packet 10 has a Packet ID (APID) value of 54 and a Format ID value of 1. It has a CCSDS Primary Header and Secondary Header which are in the format of an International Space Station (ISS) Ku-band packet. The length of the packet is 43 bytes. It contains normal sampled parameters within the data portion of the packet. These parameters have a variety of data types and lengths, and some of them share calibration, sensing, monitoring, and switching information.

Table 11 lists the parameters that are in this packet. The table indicates the data type, total length, number of samples per packet, calibration type, and sensing type of each parameter. The first number listed in the Total Length column is the actual length of the parameter in bits, and the number in parentheses is the number of bytes required to store the parameter.

Parameter	Data Type	Total Length	Number of Samples	Calibration Type	Sensing Type
54_CP_VER_3	IUNS	3 (1)	1	None	None
54_CP_TYPE_1	IDIS	1 (1)	1	None	None
54_CP_SHF_1	IDIS	1 (1)	1	None	None
54_CP_APID_11	IUNS	11 (2)	1	None	None
54_CP_SF_2	IUNS	2 (1)	1	None	None
54_CP_SC_14	IUNS	14 (2)	1	None	None
54_CP_PL_16	IUNS	16 (2)	1	None	None
54_CS_TIME_40	TCUT	40 (5)	1	None	None
54_CS_TID_2	IUNS	2 (1)	1	None	None
54_CS_CWI_1	IDIS	1 (1)	1	None	None
54_CS_ZOE_1	IDIS	1 (1)	1	None	None
54_CS_PTYPE_4	IUNS	4 (1)	1	None	None

Table 11 Packet 10 Parameter List

Parameter	Data Type	Total Length	Number of Samples	Calibration Type	Sensing Type
54_CS_VERID_16	IUNS	16 (2)	1	None	None
54_CS_DCCOUNT_16	IUNS	16 (2)	1	None	None
54_IUNS_8	IUNS	8(1)	1	None	None
54_FEEE_32	FEEE	32(4)	1	None	None
54_IDIS_2	IDIS	2(1)	1	None	None
54_RECORDER1_ STATUS	IDIS	2(1)	1	State Code	None
54_RECORDER2_ STATUS	IDIS	2(1)	1	State Code	None
54_CAMERA1_ POWER	IDIS	1(1)	1	State Code	Expected State
54_CAMERA2_ POWER	IDIS	1 (1)	1	State Code	Expected State
54_COOLING_FAN_ POWER	IDIS	1 (1)	1	State Code	Expected State
54_TANK1_FLUID_ LEVEL	IMAG	16(2)	1	None	Limit
54_TANK2_FLUID_ LEVEL	IMAG	16(2)	1	None	Limit
54_TEMPERATURE_ GAUGE_100	FEEE	32(4)	1	Polynomial	None
54_TEMPERATURE_ GAUGE_200	FEEE	32(4)	1	Polynomial	None
54_MAIN_POWER	ITWO	32(4)	1	Point Pair	None
54_AUX_POWER	ITWO	32(4)	1	Point Pair	None

Table 11 Packet 10 Parameter List (Continued)

3.11 Packet 11 (APID 94)

Packet 11 has a Packet ID (APID) value of 94 and a Format ID value of 1. It has a CCSDS Primary Header and Secondary Header which are in the format of an International Space Station (ISS) S-band packet. The length of the packet is 43 bytes. It contains normal sampled parameters within the data portion of the packet. These parameters have a variety of data types and lengths, and some of them share calibration, sensing, monitoring, and switching information.

Table 12 lists the parameters that are in this packet. The table indicates the data type, total length, number of samples per packet, calibration type, and sensing type of each parameter. The first number listed in the Total Length column is the actual length of the parameter in bits, and the number in parentheses is the number of bytes required to store the parameter.

Parameter	Data Type	Total Length	Number of Samples	Calibration Type	Sensing Type
94_CP_VER_3	IUNS	3 (1)	1	None	None
94_CP_TYPE_1	IDIS	1 (1)	1	None	None
94_CP_SHF_1	IDIS	1 (1)	1	None	None
94_CP_APID_11	IUNS	11 (2)	1	None	None
94_CP_SF_2	IUNS	2 (1)	1	None	None
94_CP_SC_14	IUNS	14 (2)	1	None	None
94_CP_PL_16	IUNS	16 (2)	1	None	None
94_CS_TIME_40	TCUT	40 (5)	1	None	None
94_CS_TID_2	IUNS	2 (1)	1	None	None
94_CS_CWI_1	IDIS	1 (1)	1	None	None
94_CS_ZOE_1	IDIS	1 (1)	1	None	None
94_CS_PTYPE_4	IUNS	4 (1)	1	None	None
94_CS_SP1	IUNS	1 (1)	1	None	None
94_CS_ELEMENTID	IUNS	4 (1)	1	None	None
94_CS_DATA_ PACKET	IUNS	1 (1)	1	None	None
94_CS_VERID_4	IUNS	4 (1)	1	None	None
94_CS_FORMATID	IUNS	6 (1)	1	None	None
94_CS_SP2	IUNS	9 (2)	1	None	None
94_CS_FRAMEID	IUNS	7 (1)	1	None	None
94_IUNS_8	IUNS	8(1)	1	None	None
94_FEEE_32	FEEE	32(4)	1	None	None
94_IDIS_2	IDIS	2(1)	1	None	None
94_RECORDER1_ STATUS	IDIS	2(1)	1	State Code	None
94_RECORDER2_ STATUS	IDIS	2(1)	1	State Code	None
94_CAMERA1_ POWER	IDIS	1(1)	1	State Code	Expected State
94_CAMERA2_ POWER	IDIS	1 (1)	1	State Code	Expected State
94_COOLING_FAN_ POWER	IDIS	1 (1)	1	State Code	Expected State
94_TANK1_FLUID_ LEVEL	IMAG	16(2)	1	None	Limit
94_TANK2_FLUID_ LEVEL	IMAG	16(2)	1	None	Limit
94_TEMPERATURE_ GAUGE_100	FEEE	32(4)	1	Polynomial	None
94_TEMPERATURE_ GAUGE_200	FEEE	32(4)	1	Polynomial	None
94_MAIN_POWER	ITWO	32(4)	1	Point Pair	None
94_AUX_POWER	ITWO	32(4)	1	Point Pair	None

Table 12 Packet 11 Parameter List

3.12 Packet 12 (APID 13)

Packet 12 has a Packet ID (APID) value of 13 and a Format ID value of 1. It has an FDP header on the front of a VCDU packet. The length of the packet is 1100 bytes. It contains normal sampled parameters and fill data within the data portion of the packet.

Table 13 lists the parameters that are in this packet. The table indicates the data type, total length, number of samples per packet, calibration type, and sensing type of each parameter. The first number listed in the Total Length column is the actual length of the parameter in bits, and the number in parentheses is the number of bytes required to store the parameter.

Parameter	Data Type	Total Length	Number of Samples	Calibration Type	Sensing Type
13_VERS_NUM	IUNS	2 (1)	1	None	None
13_SCRAFT_ID	IUNS	8 (1)	1	None	None
13_VCID	IUNS	6 (1)	1	None	None
13_VC_SEQCOUNT	IUNS	24 (3)	1	None	None
13_REPLAYFLAG	IUNS	1 (1)	1	None	None
13_SPARE1	IUNS	7 (1)	1	None	None

Table 13 Packet 12 Parameter List

3.13 Packet 13 (APID 16)

Packet 13 has a Packet ID (APID) value of 16 and a Format ID value of 1. It is a VCDU packet with a VCDU Header. The length of the packet is 1100 bytes. It contains normal sampled parameters and fill data within the data portion of the packet.

Table 14 lists the parameters that are in this packet. The table indicates the data type, total length, number of samples per packet, calibration type, and sensing type of each parameter. The first number listed in the Total Length column is the actual length of the parameter in bits, and the number in parentheses is the number of bytes required to store the parameter.

Parameter	Data Type	Total Length	Number of Samples	Calibration Type	Sensing Type
16_VERS_NUM	IUNS	2 (1)	1	None	None
16_SCRAFT_ID	IUNS	8 (1)	1	None	None
16_VCID	IUNS	6 (1)	1	None	None
16_VC_SEQCOUNT	IUNS	24 (3)	1	None	None
16_REPLAYFLAG	IUNS	1 (1)	1	None	None
16_SPARE1	IUNS	7 (1)	1	None	None

Table 14 Packet 13 Parameter List

3.14 Packet 14 (APID 84)

Packet 14 has a Packet ID (APID) value of 84 and a Format ID value of 1. It is a PRCU packet and has a CCSDS Primary Header and Secondary Header which are in the format of an International Space Station (ISS) Ku-band packet. The length of the packet is 43 bytes. It contains normal sampled parameters within the data portion of the packet. These parameters have a variety of data types and lengths, and some of them share calibration, sensing, monitoring, and switching information.

Table 15 lists the parameters that are in this packet. The table indicates the data type, total length, number of samples per packet, calibration type, and sensing type of each parameter. The first number listed in the Total Length column is the actual length of the parameter in bits, and the number in parentheses is the number of bytes required to store the parameter.

Parameter	Data Type	Total Length	Number of Samples	Calibration Type	Sensing Type
84_CP_VER_3	IUNS	3 (1)	1	None	None
84_CP_TYPE_1	IDIS	1 (1)	1	None	None
84_CP_SHF_1	IDIS	1 (1)	1	None	None
84_CP_APID_11	IUNS	11 (2)	1	None	None
84_CP_SF_2	IUNS	2 (1)	1	None	None
84_CP_SC_14	IUNS	14 (2)	1	None	None
84_CP_PL_16	IUNS	16 (2)	1	None	None
84_CS_TIME_40	TCUT	40 (5)	1	None	None
84_CS_TID_2	IUNS	2 (1)	1	None	None
84_CS_CWI_1	IDIS	1 (1)	1	None	None
84_CS_ZOE_1	IDIS	1 (1)	1	None	None
84_CS_PTYPE_4	IUNS	4 (1)	1	None	None
84_CS_SP1	IUNS	1 (1)	1	None	None
84_CS_ELEMENTID	IUNS	4 (1)	1	None	None
84_CS_DATA_ PACKET	IUNS	1 (1)	1	None	None
84_CS_VERID_4	IUNS	4 (1)	1	None	None
84_CS_FORMATID	IUNS	6 (1)	1	None	None
84_CS_SP2	IUNS	9 (2)	1	None	None
84_CS_FRAMEID	IUNS	7 (1)	1	None	None
84_IUNS_8	IUNS	8(1)	1	None	None
84_FEEE_32	FEEE	32(4)	1	None	None
84_IDIS_2	IDIS	2(1)	1	None	None
84_RECORDER1_ STATUS	IDIS	2(1)	1	State Code	None
84_RECORDER2_ STATUS	IDIS	2(1)	1	State Code	None
84_CAMERA1_ POWER	IDIS	1(1)	1	State Code	Expected State

Table 15 Packet 14 Parameter List

Parameter	Data Type	Total Length	Number of Samples	Calibration Type	Sensing Type
84_CAMERA2_ POWER	IDIS	1 (1)	1	State Code	Expected State
84_COOLING_FAN_ POWER	IDIS	1 (1)	1	State Code	Expected State
84_TANK1_FLUID_ LEVEL	IMAG	16(2)	1	None	Limit
84_TANK2_FLUID_ LEVEL	IMAG	16(2)	1	None	Limit
84_TEMPERATURE_ GAUGE_100	FEEE	32(4)	1	Polynomial	None
84_TEMPERATURE_ GAUGE_200	FEEE	32(4)	1	Polynomial	None
84_MAIN_POWER	ITWO	32(4)	1	Point Pair	None
84_AUX_POWER	ITWO	32(4)	1	Point Pair	None

Table 15 Packet 14 Parameter List (Continued)

3.15 Packet 15 (APID 51)

Packet 15 has a Packet ID (APID) value of 51 and a Format ID value of 1. It is an UFO packet that has no parameters or identifying data. The length of the packet is 65535 bytes.

3.16 Packet 16 (APID 43)

Packet 16 has a Packet ID (APID) value of 43 and a Format ID value of 1. It is an EXPRESS packet with an EXPRESS Primary and Secondary Header. The length of the packet is 272 bytes. It contains normal sampled parameters within the data portion of the packet.

Table 16 lists the parameters that are in this packet. The table indicates the data type, total length, number of samples per packet, calibration type, and sensing type of each parameter. The first number listed in the Total Length column is the actual length of the parameter in bits, and the number in parentheses is the number of bytes required to store the parameter.

Parameter	Data Type	Total Length	Number of Samples	Calibration Type	Sensing Type
43EX_SYNC	IUNS	16 (2)	1	None	None
43EX_HVERSION	IUNS	4 (1)	1	None	None
43EX_MBC	IUNS	12 (2)	1	None	None
43EX_MSGTYPE	IUNS	16 (2)	1	None	None
43EX_FCSOURCE	IUNS	16 (2)	1	None	None
43EX_FCDEST	IUNS	16 (2)	1	None	None
43EX_TLMTYPE	IUNS	16 (2)	1	None	None
43EX_SCOUNT	IUNS	16 (2)	1	None	None
43EX_TIME	TGMT	32 (4)	1	None	None
M_N_SASCB_2032	SASC	2032 (254)	1	None	None

Table 16 Packet 16 Parameter List

3.17 Packet 17 (APID 69)

Packet 17 has a Packet ID (APID) value of 69 and a Format ID value of 1. It is an IMAQ ASCII packet that has no parameters or identifying data. The length of the packet is 65535 bytes.

4 Data Generated By Telemetry Trainer

This section describes the data generated by the Telemetry Trainer for each packet. The Telemetry Trainer application generates data based on files found in the TReK installation directory under gen_files. An explanation on the format of these files is provided also. It is recommended that you don't change these files. However, if you choose to change the generator file, it is suggested that you make a copy of the original file.

4.1 Header Data

There are a few values in the header of each packet that are of interest to you as a user. The APID and Protocol Type are generated from values in the files used by Telemetry Trainer. The Protocol Type will always be PDSS Payload (value = 11) for PDSS Payload Packets and GSE (value = 6) for Ground Support Equipment Packets. The APID will be set according to the APID value selected for transmission.

The data mode is set based on the user selection in the Add A Packet dialog. The default data mode for this dialog is Real-Time (value = 0).

4.2 User Data

The Telemetry Trainer generates the data types and uses the scheme shown in Table 17 for generating their values. Please note that not all data types supported by TReK Telemetry Processing are currently supported by the Telemetry Trainer.

Data Type	Values
ASCII Character String (SASC)	Fixed String
Byte Swapped ASCII Character String (SASCB)	Fixed String
EBCDIC Character String (SEBC)	Fixed String
Undefined Byte String (SUND)	Fixed Hexadecimal
Discrete Integer (IDIS)	Fixed Hexadecimal
Sign and Magnitude Integer (IMAG)	Variable Number
Two's Complement Signed Integer (ITWO)	Variable Number
Two's Complement Word Swapped Signed Integer (ITWOW)	Variable Number
Undefined Integer (IUND)	Fixed Hexadecimal
Unsigned Integer (IUNS)	Variable Number
IEEE Floating Point (FEEE)	Variable Number
EHS Time Word (TEHS)	Current System GMT

Table 17 Telemetry Trainer Data Types and Values

The values are generated according to the information found in the Telemetry Trainer files. A brief description of each means of generating data is described below.

Fixed String
The data types that use a fixed string simply convert the value in the generator file into the appropriate type and place the converted value into the packet. If the string is not long enough to fill the entire width, the remaining bytes for the parameter are zeros. If the string is too large, as much of the string as possible is placed in the packet beginning with the first character.

Fixed Hexadecimal
The data types that use a fixed hexadecimal place the hexadecimal pattern directly into the packet. If the hexadecimal pattern is not long enough to fill the entire width, the remaining bytes for the parameter are zeros. If the hexadecimal pattern is too large, as much of it as possible is placed in the packet beginning with the first byte. For lengths that are not on byte boundaries, the input value is right justified. For example, for a 3 bit value of binary 101 the hexadecimal value is 05.

Variable Number
Integers (except IDIS and IUND) and floating-point numbers are generated using a start value and delta value with a minimum and maximum value. The start value is the first value used. The delta value is added to the value of the previous sample to determine the newest value. Once the value reaches the maximum, it is reset to the minimum. When it reaches the minimum, it is reset to the maximum.

The start, delta, minimum, and maximum values are all specified as floating point numbers. For integers, the actual value is determined immediately before it is placed in the packet. Therefore, a value that has a delta of .5 will increment every two times.

Current System GMT
The time types are generated based on the current GMT time of the system generating the packet.

GSE Packets
The overall status for all GSE packet data is “OK” (zero) unless otherwise specified. The number of samples sent is always the maximum number that can be sent for the particular parameter. The EHS status character is fixed and may not always correspond to a real EHS status character. The capability for TReK to simulate GSE packets is to allow you to understand how TReK works with GSE packets and not to fully simulate what may happen with GSE packets generated by the Payload Operations Integration Center (POIC).

Parameter Name	**Number Samples**	**Data Type**	**Bit Length (Bytes)**	**Value(s)**	**Notes (APID = 2)**
M_N_SASC_2040	4	SASC	2040 (255)	*Sample 1:* This is the first of four SASC Strings in APID 2. *Sample 2:* This is the second of four SASC Strings in APID 2. *Sample 3:* This is the third of four SASC Strings in APID 2. *Sample 4:* This is the fourth of four SASC Strings in APID 2.	Fixed String
M_N_SASCB_2032	4	SASCB	2032 (254)	*Sample 1:* This is the first of four ASCII Byte Swapped Strings in APID 2. *Sample 2:* This is the second of four ASCII Byte Swapped Strings in APID 2. *Sample 3:* This is the third of four ASCII Byte Swapped Strings in APID 2. *Sample 4:* This is the fourth of four ASCII Byte Swapped Strings in APID 2.	Fixed String
M_N_SEBC_2040	4	SEBC	2040 (255)	*Sample 1:* This is the first of four EBCDIC Strings in APID 2. *Sample 2:* This is the second of four EBCDIC Strings in APID 2. *Sample 3:* This is the third of four EBCDIC Strings in APID 2. *Sample 4:* This is the fourth of four EBCDIC Strings in APID 2.	Fixed String

M_N_SUND_2040	4	SUND	2040 (255)	*Sample 1:*
				`101112131415161718191a1b1c1d1e1f`
				Sample 2:
				`202122232425262728292a2b2c2d2e2f`
				Sample 3:
				`303132333435363738393a3b3c3d3e3f`
				Sample 4:
					Fixed Hexadecimal

Parameter Name	Number Samples	Data Type	Bit Length (Bytes)	Value(s)	Notes (APID = 2)
				404142434445464748494a4b4c4d4e4f	

Table 18 Data Values for PDSS Payload Packet APID = 2

Parameter Name	**Number Samples**	**Data Type**	**Bit Length (Bytes)**	**Value(s)**	**Notes (APID = 3)**
M_N_SASCB_112	1	SASC	112 (14)	In Subset 9!	Byte Swapped
M1_N_FEEE_64	1	FEEE	64 (8)	*Start Value:* 0 *Delta Value:* 2.5 *Minimum:* 0 *Maximum:* 1000	
M1_N_SASC_40	1	SASC	40 (5)	Howdy	
M_N_SASCB_96	1	SASC	96 (12)	In Subset 11	Byte Swapped
M_N_ITWO_32	1	ITWO	32 (4)	*Start Value:* 5000 *Delta Value:* -1 *Minimum:* 0 *Maximum:* 5000	
M_N_SASC_160	1	SASC	160 (20)	String in Subset 12. *(if subset was 12)* String in Subset 13. *(if subset was 13)*	In Subset 12 and 13.
M_N_ITWO_16	1	ITWO	16 (2)	*Start Value:* 0 *Delta Value:* 10 *Minimum:* 0 *Maximum:* 10,000	
M_N_IMAG_16	1	IMAG	16 (2)	*Start Value:* 0 *Delta Value:* -10 *Minimum:* -10,000 *Maximum:* 0	

Table 19 Data Values for PDSS Payload Packet APID = 3

Parameter Name	**Number Samples**	**Data Type**	**Bit Length (Bytes)**	**Value(s)**	**Notes (APID = 4)**
M_N_IMAG_32	1	IMAG	32 (4)	*Start Value:* 0 *Delta Value:* 1 *Minimum:* 0 *Maximum:* 10,000	This parameter is in Subsets 14, 15, and 16.
M_N_ITWO_32	1	ITWO	32 (4)	*Start Value:* 10,000 *Delta Value:* -1 *Minimum:* 0 *Maximum:* 10,000	This parameter is in Subsets 14, 15, and 16.
M_N_SUND_88	5	SUND	88 (11)	*Sample 1:* `0011223344556677889900AA` *Sample 2:* `0011223344556677889900BB` *Sample 3:* `0011223344556677889900CC` *Sample 4:* `0011223344556677889900DD` *Sample 5:* `0011223344556677889900EE`	This parameter is in Subsets 14, 15, and 16.
M1_N_FEEE_64	5	FEEE	64 (8)	*Sample 1:* *Start Value:* 0 *Delta Value:* 0.1 *Minimum:* 0 *Maximum:* 100 *Sample 2:* *Start Value:* 0 *Delta Value:* 0.2 *Minimum:* 0 *Maximum:* 100 *Sample 3:* *Start Value:* 0 *Delta Value:* 0.3 *Minimum:* 0 *Maximum:* 100 *Sample 4:*	This parameter is in Subset 14.

Parameter Name	Number Samples	Data Type	Bit Length (Bytes)	Value(s)	Notes (APID = 4)
				Start Value: 0 *Delta Value:* 0.4 *Minimum:* 0 *Maximum:* 100 *Sample 5:* *Start Value:* 0 *Delta Value:* 0.5 *Minimum:* 0 *Maximum:* 100	
M2_N_FEEE_64	5	FEEE	64 (8)	*Sample 1:* *Start Value:* 100 *Delta Value:* 0.1 *Minimum:* 100 *Maximum:* 200 *Sample 2:* *Start Value:* 100 *Delta Value:* 0.2 *Minimum:* 100 *Maximum:* 200 *Sample 3:* *Start Value:* 100 *Delta Value:* 0.3 *Minimum:* 100 *Maximum:* 200 *Sample 4:* *Start Value:* 100 *Delta Value:* 0.4 *Minimum:* 100 *Maximum:* 200 *Sample 5:* *Start Value:* 100	This parameter is in Subset 15.

Parameter Name	Number Samples	Data Type	Bit Length (Bytes)	Value(s)	Notes (APID = 4)
				Delta Value: 0.5 *Minimum:* 100 *Maximum:* 200	
M3_N_FEEE_64	5	FEEE	64 (8)	*Sample 1:* *Start Value:* 200 *Delta Value:* 0.1 *Minimum:* 200 *Maximum:* 300 *Sample 2:* *Start Value:* 200 *Delta Value:* 0.2 *Minimum:* 200 *Maximum:* 300 *Sample 3:* *Start Value:* 200 *Delta Value:* 0.3 *Minimum:* 200 *Maximum:* 300 *Sample 4:* *Start Value:* 200 *Delta Value:* 0.4 *Minimum:* 200 *Maximum:* 300 *Sample 5:* *Start Value:* 200 *Delta Value:* 0.5 *Minimum:* 200 *Maximum:* 300	This parameter is in Subset 16.

Table 20 Data Values for PDSS Payload Packet APID = 4

Parameter Name	Number Samples	Data Type	Bit Length (Bytes)	Value(s)	Notes (APID = 6)
M_N_IUNS_32	1	IUNS	32 (4)	*Start Value:* 0 *Delta Value:* 1 *Minimum:* 0 *Maximum:* 1,000,000	Variable Number
M_USER_IUND_32	1	IUNS	32 (4)	*Start Value:* 0 *Delta Value:* 2 *Minimum:* 0 *Maximum:* 2,000,000	IUNS value used to simulate unknown type.
M_SS_SS17_8	1	IDIS	8 (1)	11	Subset ID = 17
M_SS_SF17_8	1	IDIS	8 (1)	01	Subset FMT = 1
SUB_DATA	1	SUND	96 (12)	*Data Set 1:* 029739010293311402967134 *Data Set 2:* 029942040295253802970027 *Data Set 3:* 029804040296616502975098 *Data Set 4:* 030422520297207103001714 *Data Set 5:* 030749530298373203024718 *Data Set 6:* 031569760298513703063832 *Data Set 7:* 031850920299074503091990 *Data Set 8:* 032220830305144503132013 *Data Set 9:* 032594570307506103181527 *Data Set 10:* 033396010315159003206050 *Data Set 11:* 034750850319891503272910 *Data Set 12:* 036030710332104003448361	Hexadecimal data for the subset. The 12 bytes of a data set are placed in the subset. Data sets are sent once and then switched to next one. Order is 1, 2, …, 12, 1, 2, …

Table 21 Data Values for PDSS Payload Packet APID = 6

Parameter Name	**Number Samples**	**Data Type**	**Bit Length (Bytes)**	**Value(s)**	**Notes (APID = 7)**
MSID001	1	SASC	176 (22)	*Data Set 1 (1):* String is for MSID001. *Data Set 2 (5):* 2nd one for MSID001. *Data Set 3 (1):* Yet another string. *Data Set 4 (4):* Loop back to first.	
MSID002	1	SASC	320 (40)	*Data Set 1 (5):* ASCII Byte Swapped String, the first. *Data Set 2 (2):* ASCII Byte Swapped String, part II.	Byte Swapped
MSID003	1	SEBC	160 (20)	*Data Set 1 (1):* ASCII Byte Swapped String, the first. *Data Set 2 (10):* ASCII Byte Swapped String, part II.	
MSID004	1	SUND	800 (100)	`000102030405060708090a0b0c0d0e0f101112131415161718191a1b1c1d1e1f202122232425262728292a2b2c2d2e2f303132333435363738393a3b3c3d3e3f404142434445464748494a4b4c4d4e4f505152535455565758595a5b5c5d5e5f60616263`	Increasing hex values 0x00 to 0x63.
MSID005	1	IDIS	3 (1)	`07`	Binary 111
MSID006	1	IMAG	5 (1)	*Start Value:* -1 *Delta Value:* 1 *Minimum:* -7 *Maximum:* 7	Doesn't use full range (-15 to 15).
MSID007	1	IUND	64 (8)	*Data Set 1 (1):* `1122334455667788` *Data Set 2 (1):* `2233445566778899` *Data Set 3 (1):* `33445566778899AA` *Data Set 4 (1):* `445566778899AABB` *Data Set 5 (1):* `5566778899AABBCC` *Data Set 6 (1):* `66778899AABBCCDD` *Data Set 7 (1):* `778899AABBCCDDEE` *Data Set 8 (1):* `8899AABBCCDDEEFF`	
MSID008	1	IUNS	16 (2)	*Start Value:* 0 *Delta Value:* 2	

Parameter Name	Number Samples	Data Type	Bit Length (Bytes)	Value(s)	Notes (APID = 7)
				Minimum: 0 *Maximum:* 500	
MSID009	1	ITWO	8 (1)	*Start Value:* 127 *Delta Value:* -1 *Minimum:* -128 *Maximum:* 127	
MSID010	1	ITWO	32 (4)	*Start Value:* -7000 *Delta Value:* 5 *Minimum:* -10,000 *Maximum:* 10,000	Word Swapped
MSID011	1	IUNS	6 (1)	*Start Value:* 0 *Delta Value:* 1 *Minimum:* 0 *Maximum:* 63	
MSID012	1	SASC	160 (20)	This is MSID012.	
MSID013	1	IDIS	26 (4)	`0FD52B1`	
MSID014	1	IUND	4 (1)	`09`	
MSID015	1	IUNS	4 (1)	*Start Value:* 15 *Delta Value:* -1 *Minimum:* 0 *Maximum:* 15	
MSID016	1	ITWO	32 (4)	*Start Value:* 0 *Delta Value:* 100 *Minimum:* 0 *Maximum:* 1,000,000	
MSID017	1	IUNS	32 (4)	*Start Value:* 0 *Delta Value:* 5 *Minimum:* 0 *Maximum:* 10,000	
MSID018	1	IDIS	32 (4)	`FEBCD987`	
MSID019	1	IMAG	32 (4)	*Start Value:* -500	

Parameter Name	Number Samples	Data Type	Bit Length (Bytes)	Value(s)	Notes (APID = 7)
				Delta Value: 1 *Minimum:* -500 *Maximum:* 500	
MSID020	1	SEBC	2040 (255)	This is a very, very long SEBC string. The length in the database is 255 bytes (2040 bits).	
MSID021	1	IMAG	32 (4)	*Start Value:* -10,000 *Delta Value:* 1000 *Minimum:* -100,000 *Maximum:* 0	
MSID022	1	IMAG	32 (4)	*Start Value:* 10,000 *Delta Value:* -1,000 *Minimum:* 0 *Maximum:* 100,000	
MSID023	1	IMAG	32 (4)	*Start Value:* 0 *Delta Value:* 3 *Minimum:* -30 *Maximum:* 30	
MSID024	1	IMAG	32 (4)	*Start Value:* 0 *Delta Value:* -3 *Minimum:* -30 *Maximum:* 30	
MSID025	1	IMAG	32 (4)	*Start Value:* 56 *Delta Value:* -8 *Minimum:* 0 *Maximum:* 112	
MSID026	1	IMAG	32 (4)	*Start Value:* 0 *Delta Value:* 7 *Minimum:* -700 *Maximum:* 7000	
MSID027	1	IMAG	16 (2)	*Start Value:* 111 *Delta Value:* 11	

Parameter Name	Number Samples	Data Type	Bit Length (Bytes)	Value(s)	Notes (APID = 7)
				Minimum: 0 *Maximum:* 10,000	
MSID028	1	IMAG	16 (2)	*Start Value:* 123 *Delta Value:* 123 *Minimum:* 0 *Maximum:* 12,300	
MSID029	1	IMAG	16 (2)	*Start Value:* 0 *Delta Value:* -5 *Minimum:* -1000 *Maximum:* 0	
MSID030	1	IMAG	16 (2)	*Start Value:* 0 *Delta Value:* 2 *Minimum:* 0 *Maximum:* 1000	
MSID031	1	IMAG	16 (2)	*Start Value:* 0 *Delta Value:* -2 *Minimum:* -1000 *Maximum:* 0	
MSID032	1	ITWO	32 (4)	*Start Value:* -1 *Delta Value:* -1 *Minimum:* -100 *Maximum:* 100	
MSID033	1	ITWO	32 (4)	*Start Value:* -987,654 *Delta Value:* 1500 *Minimum:* -1,000,000 *Maximum:* 0	
MSID034	1	ITWO	32 (4)	*Start Value:* 12 *Delta Value:* 34 *Minimum:* -1000 *Maximum:* 50	
MSID035	1	ITWO	32 (4)	*Start Value:* 0	

Parameter Name	Number Samples	Data Type	Bit Length (Bytes)	Value(s)	Notes (APID = 7)
				Delta Value: -3 *Minimum:* -100 *Maximum:* 300	
MSID036	1	ITWO	32 (4)	*Start Value:* -100,000 *Delta Value:* 10 *Minimum:* -100,000 *Maximum:* 0	
MSID037	1	ITWO	8 (1)	*Start Value:* -128 *Delta Value:* 1 *Minimum:* -128 *Maximum:* -100	
MSID038	1	ITWO	32 (4)	*Start Value:* 6 *Delta Value:* 3 *Minimum:* 0 *Maximum:* 1,000,000	Word Swapped
MSID039	1	ITWO	32 (4)	*Start Value:* 727 *Delta Value:* 747 *Minimum:* 0 *Maximum:* 1,000,000	Word Swapped
MSID040	1	ITWO	32 (4)	*Start Value:* 600 *Delta Value:* -4 *Minimum:* -100 *Maximum:* 600	Word Swapped
MSID041	1	ITWO	32 (4)	*Start Value:* 321 *Delta Value:* -123 *Minimum:* 0 *Maximum:* 10,000	Word Swapped
MSID042	1	ITWO	32 (4)	*Start Value:* 0 *Delta Value:* 99 *Minimum:* 0 *Maximum:* 990,000	Word Swapped

Parameter Name	Number Samples	Data Type	Bit Length (Bytes)	Value(s)	Notes (APID = 7)
MSID043	1	ITWO	32 (4)	*Start Value:* 0 *Delta Value:* -99 *Minimum:* -9900 *Maximum:* 9900	Word Swapped
MSID044	1	IUND	64 (8)	`0011223344556677`	
MSID045	1	IUND	16 (2)	`8899`	
MSID046	1	IDIS	3 (1)	`04`	Binary 100
MSID047	1	IDIS	4 (1)	`0F`	Binary 1111
MSID048	1	IDIS	3 (1)	`00`	Binary 000
MSID049	1	IMAG	4 (1)	*Start Value:* -7 *Delta Value:* 1 *Minimum:* -7 *Maximum:* 7	
MSID050	1	ITWO	7 (1)	*Start Value:* 0 *Delta Value:* 1 *Minimum:* 0 *Maximum:* 50	
MSID051	1	IUND	3 (1)	`02`	Binary 010
MSID052	1	ITWO	8 (1)	*Start Value:* 127 *Delta Value:* -3 *Minimum:* -128 *Maximum:* 127	
MSID053	1	ITWO	8 (1)	*Start Value:* -128 *Delta Value:* 3 *Minimum:* -128 *Maximum:* 127	
MSID054	1	ITWO	8 (1)	*Start Value:* 127 *Delta Value:* -1 *Minimum:* -128 *Maximum:* 127	
MSID055	1	ITWO	8 (1)	*Start Value:* 127	

Parameter Name	Number Samples	Data Type	Bit Length (Bytes)	Value(s)	Notes (APID = 7)
				Delta Value: -2 *Minimum:* -128 *Maximum:* 127	
MSID056	1	ITWO	8 (1)	*Start Value:* 127 *Delta Value:* -4 *Minimum:* -128 *Maximum:* 127	
MSID057	1	IMAG	8 (1)	*Start Value:* -127 *Delta Value:* 2 *Minimum:* -127 *Maximum:* 127	
MSID058	1	IMAG	8 (1)	*Start Value:* 127 *Delta Value:* -2 *Minimum:* -127 *Maximum:* 127	
MSID059	1	IMAG	8 (1)	*Start Value:* 1 *Delta Value:* 1 *Minimum:* -127 *Maximum:* 127	
MSID060	1	IMAG	8 (1)	*Start Value:* -1 *Delta Value:* -1 *Minimum:* -127 *Maximum:* 127	
MSID061	1	IUNS	16 (2)	*Start Value:* 65,535 *Delta Value:* -1 *Minimum:* 0 *Maximum:* 65,535	
MSID062	1	IUNS	16 (2)	*Start Value:* 0 *Delta Value:* 1 *Minimum:* 0 *Maximum:* 65,535	

Parameter Name	Number Samples	Data Type	Bit Length (Bytes)	Value(s)	Notes (APID = 7)
MSID063	1	IUNS	16 (2)	*Start Value:* 65,535 *Delta Value:* -2 *Minimum:* 0 *Maximum:* 65,535	
MSID064	1	IUNS	16 (2)	*Start Value:* 0 *Delta Value:* 2 *Minimum:* 0 *Maximum:* 65,535	
MSID065	1	IUNS	16 (2)	*Start Value:* 65,535 *Delta Value:* -10 *Minimum:* 0 *Maximum:* 65,535	
MSID066	1	IUNS	32 (4)	*Start Value:* 0 *Delta Value:* 10 *Minimum:* 0 *Maximum:* 10,000,000	
MSID067	1	IUNS	32 (4)	*Start Value:* 0 *Delta Value:* 12 *Minimum:* 0 *Maximum:* 10,000,000	
MSID068	1	IUNS	32 (4)	*Start Value:* 0 *Delta Value:* 19 *Minimum:* 0 *Maximum:* 10,000,000	
MSID069	1	IUNS	32 (4)	*Start Value:* 0 *Delta Value:* 1967 *Minimum:* 0 *Maximum:* 10,000,000	
MSID070	1	IUNS	32 (4)	*Start Value:* 0 *Delta Value:* 6 *Minimum:* 0	

Parameter Name	Number Samples	Data Type	Bit Length (Bytes)	Value(s)	Notes (APID = 7)
				Maximum: 10,000,000	
MSID071	1	IUND	64 (8)	`f0e1d2c3b4a59687`	
MSID072	1	IUND	56 (7)	`11223344556677`	
MSID073	1	IUND	48 (6)	`112233445566`	
MSID074	1	IUND	40 (5)	`1122334455`	
MSID075	1	IUND	32 (4)	`11223344`	
MSID076	1	IUND	24 (3)	`112233`	
MSID077	1	IUND	16 (2)	`1122`	
MSID078	1	IUND	8 (1)	`11`	
MSID079	1	IDIS	1 (1)	`01`	Binary 1
MSID080	1	IDIS	1 (1)	`00`	Binary 0
MSID081	1	IDIS	1 (1)	`01`	Binary 1
MSID082	1	IDIS	1 (1)	`00`	Binary 0
MSID083	1	IDIS	1 (1)	`01`	Binary 1
MSID084	1	IDIS	1 (1)	`00`	Binary 0
MSID085	1	IDIS	1 (1)	`01`	Binary 1
MSID086	1	IDIS	1 (1)	`00`	Binary 0
MSID087	1	IUNS	8 (1)	*Start Value:* 0 *Delta Value:* 8 *Minimum:* 0 *Maximum:* 255	
MSID088	1	ITWO	32 (4)	*Start Value:* 0 *Delta Value:* -22 *Minimum:* -100,000 *Maximum:* 100,000	Word Swapped
MSID089	1	ITWO	32 (4)	*Start Value:* 0 *Delta Value:* -44 *Minimum:* -100,000 *Maximum:* 100,000	Word Swapped
MSID090	1	ITWO	32 (4)	*Start Value:* 0	Word Swapped

Parameter Name	Number Samples	Data Type	Bit Length (Bytes)	Value(s)	Notes (APID = 7)
				Delta Value: -66 *Minimum:* -100,000 *Maximum:* 100,000	
MSID091	1	ITWO	32 (4)	*Start Value:* 0 *Delta Value:* -88 *Minimum:* -100,000 *Maximum:* 100,000	Word Swapped
MSID092	1	ITWO	32 (4)	*Start Value:* 0 *Delta Value:* -110 *Minimum:* -100,000 *Maximum:* 100,000	Word Swapped
MSID093	1	SASC	32 (4)	Four	NULL not in packet.
MSID094	1	SASC	40 (5)	Five!	NULL not in packet.
MSID095	1	SASC	48 (6)	!@$#&)	NULL not in packet.
MSID096	1	SASC	96 (12)	Twelve (12)!	Byte Swapped
MSID097	1	SASC	112 (14)	The time is …	Byte Swapped
MSID098	1	SEBC	16 (2)	#&	NULL not in packet.
MSID099	1	SEBC	40 (5)	<>,.~	NULL not in packet.
MSID100	1	SUND	8 (1)	A6	
MSID101	1	SASC	8 (1)	J	
MSID102	1	SASC	800 (100)	This string should contain 100 bytes, but it doesn't.	
MSID103	1	SEBC	800 (100)	*Data Set 1 (5):* Only you can prevent forest fires. *Data Set 2 (5):* Of course, what can you do about lightning?	
MSID104	1	SUND	800 (100)	636261605f5e5d5c5b5a595857565554535251504f4e 4d4c4b4a4948474645444342414 03f3e3d3c3b3a3938 3736353433323 1302f2e2d2c2b2a2928272625242322	Decreasing hex values 0x63 to 0x00.

Parameter Name	Number Samples	Data Type	Bit Length (Bytes)	Value(s)	Notes (APID = 7)
				21201f1e1d1c1b1a191817161514131211100f0e0d0c0b0a09080706050403020100	
MSID105	1	SASC	800 (100)	Repeat this string! Repeat this string! Et Cetera!	Byte Swapped
MSID106	4	FEEE	32 (4)	*Sample 1:* *Start Value:* 0 *Delta Value:* 1.5 *Minimum:* -150 *Maximum:* 150 *Sample 2:* *Start Value:* 0 *Delta Value:* -1.5 *Minimum:* -150 *Maximum:* 150 *Sample 3:* *Start Value:* 0 *Delta Value:* .3 *Minimum:* -30 *Maximum:* 300 *Sample 4:* *Start Value:* 10,000 *Delta Value:* -0.4178 *Minimum:* 0 *Maximum:* 10,000	
MSID107	3	ITWO	16 (2)	*Sample 1:* *Start Value:* 0 *Delta Value:* 3 *Minimum:* -65,536 *Maximum:* 65,535 *Sample 2:* *Start Value:* 1 *Delta Value:* 3	

Parameter Name	Number Samples	Data Type	Bit Length (Bytes)	Value(s)	Notes (APID = 7)
				Minimum: -65,536 *Maximum:* 65,535 *Sample 3:* *Start Value:* 2 *Delta Value:* 3 *Minimum:* -65,536 *Maximum:* 65,535	
MSID108	4	IUNS	12 (2)	*Sample 1:* *Start Value:* 0 *Delta Value:* 4 *Minimum:* 0 *Maximum:* 4095 *Sample 2:* *Start Value:* 1 *Delta Value:* 4 *Minimum:* 0 *Maximum:* 4095 *Sample 3:* *Start Value:* 2 *Delta Value:* 4 *Minimum:* 0 *Maximum:* 4095 *Sample 4:* *Start Value:* 3 *Delta Value:* 4 *Minimum:* 0 *Maximum:* 4095	
MSID109	1	IDIS	4 (1)	`0F`	Binary 1111
MSID110	4	IUNS	5 (1)	*Sample 1:* *Start Value:* 0 *Delta Value:* 4	

Parameter Name	Number Samples	Data Type	Bit Length (Bytes)	Value(s)	Notes (APID = 7)
				Minimum: 0 *Maximum:* 31 *Sample 2:* *Start Value:* 1 *Delta Value:* 4 *Minimum:* 0 *Maximum:* 31 *Sample 3:* *Start Value:* 2 *Delta Value:* 4 *Minimum:* 0 *Maximum:* 31 *Sample 4:* *Start Value:* 3 *Delta Value:* 4 *Minimum:* 0 *Maximum:* 31	
MSID111	1	FEEE	32 (4)	*Start Value:* 0 *Delta Value:* 0.1 *Minimum:* -10,000 *Maximum:* 10,000	
MSID112	1	ITWO	16 (2)	*Start Value:* 0 *Delta Value:* 11 *Minimum:* -60,000 *Maximum:* 60,000	
MSID113	1	IMAG	8 (1)	*Start Value:* -127 *Delta Value:* 1 *Minimum:* -127 *Maximum:* 127	
MSID114	2	IMAG	4 (1)	*Sample 1:* *Start Value:* -7	

Parameter Name	Number Samples	Data Type	Bit Length (Bytes)	Value(s)	Notes (APID = 7)
				Delta Value: 1 *Minimum:* -7 *Maximum:* 7 *Sample 2:* *Start Value:* 7 *Delta Value:* 1 *Minimum:* -7 *Maximum:* 7	
MSID115	1	FEEE	64 (8)	*Start Value:* 0 *Delta Value:* -0.1 *Minimum:* -10,000 *Maximum:* 10,000	
MSID116	1	ITWO	32 (4)	*Start Value:* 0 *Delta Value:* 1 *Minimum:* -1000 *Maximum:* 1000	
MSID117	1	FEEE	32 (4)	*Start Value:* 0 *Delta Value:* 2.5 *Minimum:* -100 *Maximum:* 100	
MSID118	1	IUNS	16 (2)	*Start Value:* 0 *Delta Value:* 1 *Minimum:* 0 *Maximum:* 65,535	
MSID119	1	ITWO	16 (2)	*Start Value:* 0 *Delta Value:* -1 *Minimum:* -32,000 *Maximum:* 32,000	
MSID120	1	SASC	16 (2)	*Data Set 1 (1):* J *Data Set 2 (1):* E *Data Set 3 (2):* F	

Parameter Name	Number Samples	Data Type	Bit Length (Bytes)	Value(s)	Notes (APID = 7)
MSID121	1	FEEE	64 (8)	*Start Value:* 20.5 *Delta Value:* -1.25 *Minimum:* -500 *Maximum:* 100	
MSID122	1	ITWO	32 (4)	*Start Value:* 0 *Delta Value:* 1 *Minimum:* -100 *Maximum:* 100	
MSID123	1	ITWO	32 (4)	*Start Value:* 0 *Delta Value:* -1 *Minimum:* -100 *Maximum:* 100	
MSID124	1	SEBC	64 (8)	*Data Set 1 (1):* Hello *Data Set 2 (1):* World!	
MSID125	1	ITWO	24 (3)	*Start Value:* 0 *Delta Value:* 1 *Minimum:* -1000 *Maximum:* 1000	
MSID126	1	ITWO	24 (3)	*Start Value:* 0 *Delta Value:* -1 *Minimum:* -1000 *Maximum:* 1000	
MSID127	3	SASC	80 (10)	*Sample 1:* First *Sample 2:* Second *Sample 3:* Third	
MSID128	2	TEHS	56 (7)	*Current system GMT Time of computer generating the packet.*	

Table 22 Data Values for PDSS Payload Packet APID = 7

Parameter Name	Number Samples	Data Type	Bit Length (Bytes)	Value(s)	Notes (APID = 24)
24_IUNS_8	1	IUNS	8 (1)	*Start Value:* 0 *Delta Value:* 1 *Minimum:* 0 *Maximum:* 255	
24_FEEE_32	1	FEEE	32 (4)	*Start Value:* 0 *Delta Value:* 0.1 *Minimum:* 0 *Maximum:* 1000	
24_IDIS_2	1	IDIS	2 (1)	00	
24_RECORDER1_STATUS	1	IDIS	2 (1)	00	Recorder 1 Off
24_RECORDER2_STATUS	1	IDIS	2 (1)	03	Recorder 2 On (Binary 11)
24_CAMERA1_POWER	1	IDIS	1 (1)	Data Set 1 (100): 00 Data Set 2 (50): 01	Camera 1 Off, then On
24_CAMERA2_POWER	1	IDIS	1 (1)	Data Set 1 (100): 01 Data Set 2 (50): 00	Camera 2 On, then Off
24_COOLING_FAN_POWER	1	IDIS	1 (1)	01	Cooling Fan Power On
24_TANK1_FLUID_LEVEL	1	IMAG	16 (2)	*Start Value:* 100 *Delta Value:* 1 *Minimum:* 30 *Maximum:* 4750	
24_TANK2_FLUID_LEVEL	1	IMAG	16 (2)	*Start Value:* 4500 *Delta Value:* -1 *Minimum:* 50 *Maximum:* 4500	
24_TEMPERATURE_GAUGE_100	1	FEEE	32 (4)	*Start Value:* 150 *Delta Value:* 0.075 *Minimum:* 0	

Parameter Name	Number Samples	Data Type	Bit Length (Bytes)	Value(s)	Notes (APID = 24)
				Maximum: 350	
24_TEMPERATURE_GAUGE_200	1	FEEE	32 (4)	*Start Value:* 140 *Delta Value:* 0.1 *Minimum:* 0 *Maximum:* 350	
24_MAIN_POWER	1	ITWO	32 (4)	*Start Value:* 0 *Delta Value:* 1 *Minimum:* 0 *Maximum:* 1000	
24_AUX_POWER	1	ITWO	32 (4)	*Start Value:* 1000 *Delta Value:* -1 *Minimum:* 0 *Maximum:* 1000	

Table 23 Data Values for PDSS Payload Packet APID = 24

Parameter Name	Number Samples	Data Type	Bit Length (Bytes)	Value(s)	Notes (APID = 347)
EXPRESS_HEADER	1	SUND	128 (16)	0072009c00210001000100010000000	Express Header
347M_001	1	SUND	800 (100)	000102030405060708090a0b0c0d0e0f101112131415 161718191a1b1c1d1e1f202122232425262728292a2b 2c2d2e2f303132333435363738393a3b3c3d3e3f4041 4243444546474849 4a4b4c4d4e4f5051525354555657 58595a5b5c5d5e5f60616263	CCSDS Data following the Express Header

Table 24 Data Values for Suitcase Simulator Packet APID = 347

Parameter Name	**Number Samples**	**Data Type**	**Bit Length (Bytes)**	**Value(s)**	**Notes (APID = 445)**
IMAG_5 (UN)	6	IMAG	5 (1)	*Sample 1:* *Start Value:* 0 *Delta Value:* 1 *Minimum:* -15 *Maximum:* 15 *Sample 2:* *Start Value:* 1 *Delta Value:* 1 *Minimum:* -15 *Maximum:* 15 *Sample 3:* *Start Value:* 2 *Delta Value:* 1 *Minimum:* -15 *Maximum:* 15 *Sample 4:* *Start Value:* 3 *Delta Value:* 1 *Minimum:* -15 *Maximum:* 15 *Sample 5:* *Start Value:* 4 *Delta Value:* 1 *Minimum:* -15 *Maximum:* 15 *Sample 6:* *Start Value:* 5 *Delta Value:* 1 *Minimum:* -15 *Maximum:* 15	The overall status associated with this parameter has a value of 0x00000005. TReK will not process this parameter because of the error unless you allow this (or all) errors as specified in the Telemetry Processing Users Guide (TREK-USER-002). This parameter contains unprocessed data.

Parameter Name	**Number Samples**	**Data Type**	**Bit Length (Bytes)**	**Value(s)**	**Notes (APID = 445)**
FEEE_32 (UN)	3	FEEE	32 (4)	*Sample 1:* *Start Value:* 0 *Delta Value:* 0.01 *Minimum:* -1 *Maximum:* 1 *Sample 2:* *Start Value:* 10 *Delta Value:* -0.5 *Minimum:* -4.5 *Maximum:* 100 *Sample 3:* *Start Value:* 100 *Delta Value:* 0.8 *Minimum:* -100 *Maximum:* 150	This parameter contains unprocessed data.
FEEE_32 (CA)	3	FEEE	32 (4)	*Sample 1:* *Start Value:* 1000 *Delta Value:* 0.01 *Minimum:* 1000 *Maximum:* 1001 *Sample 2:* *Start Value:* 2000 *Delta Value:* 0.01 *Minimum:* 2000 *Maximum:* 2001 *Sample 3:* *Start Value:* 3000 *Delta Value:* 0.01 *Minimum:* 3000 *Maximum:* 3001	This parameter contains calibrated data.
SASC_80 (UN)	2	SASC	80 (10)	*Sample 1:* Hello	This parameter

Parameter Name	Number Samples	Data Type	Bit Length (Bytes)	Value(s)	Notes (APID = 445)
				Sample 2: World	contains unprocessed data.
TEHS_56 (UN)	1	TEHS	56 (7)	Current GMT Time	This parameter contains unprocessed data.

Table 25 Data Values for GSE Packet APID = 445

Parameter Name	Number Samples	Data Type	Bit Length (Bytes)	Value(s)	Notes (APID = 776)
ITWO_32 (CO)	5	ITWO	32 (4)	*Sample 1:* *Start Value:* 0 *Delta Value:* 1 *Minimum:* -15 *Maximum:* 15 *Sample 2:* *Start Value:* 1 *Delta Value:* 1 *Minimum:* -15 *Maximum:* 15 *Sample 3:* *Start Value:* 2 *Delta Value:* 1 *Minimum:* -15 *Maximum:* 15 *Sample 4:* *Start Value:* 3 *Delta Value:* 1 *Minimum:* -15 *Maximum:* 15 *Sample 5:* *Start Value:* 4 *Delta Value:* 1 *Minimum:* -15 *Maximum:* 15	This parameter contains converted data.
ITWO_32 (CA)	5	FEEE	32 (4)	*Sample 1:* *Start Value:* 10 *Delta Value:* 0.01 *Minimum:* 0 *Maximum:* 15	This parameter contains calibrated data. (Note: Integer data calibrates

Parameter Name	Number Samples	Data Type	Bit Length (Bytes)	Value(s)	Notes (APID = 776)
				Sample 2: *Start Value:* 11 *Delta Value:* 0.01 *Minimum:* 0 *Maximum:* 15 *Sample 3:* *Start Value:* 12 *Delta Value:* 0.01 *Minimum:* 0 *Maximum:* 15 *Sample 4:* *Start Value:* 13 *Delta Value:* 0.01 *Minimum:* 0 *Maximum:* 15 *Sample 5:* *Start Value:* 14 *Delta Value:* 0.01 *Minimum:* 0 *Maximum:* 15	to a floating point number).

Table 26 Data Values for GSE Packet APID = 776

Appendix A Glossary

Note: This Glossary is global to all TReK documentation. All entries listed may not be referenced within this document.

Application Programming Interface (API)	A set of functions used by an application program to provide access to a system's capabilities.
Application Process Identifier (APID)	An 11-bit field in the CCSDS primary packet header that identifies the source-destination pair for ISS packets. The type bit in the primary header tells you whether the APID is a payload or system source-destination.
Calibration	The transformation of a parameter to a desired physical unit or text state code.
Communications Outage Recorder	System that captures and stores payload science, health and status, and ancillary data during TDRSS zone of exclusion.
Consultative Committee for Space Data Systems (CCSDS) format	Data formatted in accordance with recommendations or standards of the CCSDS.
Consultative Committee for Space Data Systems (CCSDS) packet	A source packet comprised of a 6-octet CCSDS defined primary header followed by an optional secondary header and source data, which together may not exceed 65535 octets.
Conversion	Transformation of downlinked spacecraft data types to ground system platform data types.
Custom Data Packet	A packet containing a subset of parameters that can be selected by the user at the time of request.
Cyclic Display Update Mode	A continuous update of parameters for a particular display.
Decommutation (Decom)	Extraction of a parameter from telemetry.
Discrete Values	Telemetry values that have states (e.g., on or off).

Dump	During periods when communications with the spacecraft are unavailable, data is recorded onboard and played back during the next period when communications resume. This data, as it is being recorded onboard, is encoded with an onboard embedded time and is referred to as dump data.
Enhanced HOSC System (EHS)	Upgraded support capabilities of the HOSC systems to provide multi-functional support for multiple projects. It incorporates all systems required to perform data acquisition and distribution, telemetry processing, command services, database services, mission support services, and system monitor and control services.
Exception Monitoring	A background process capable of continuously monitoring selected parameters for Limit or Expected State violations. Violation notification is provided through a text message.
Expected State Sensing	Process of detecting a text state code generator in an off-nominal state.
EXPRESS	An EXPRESS Rack is a standardized payload rack system that transports, stores and supports experiments aboard the International Space Station. EXPRESS stands for EXpedite the PRocessing of Experiments to the Space Station.
File transfer protocol (ftp)	Protocol to deliver file-structured information from one host to another.
Flight ancillary data	A set of selected core system data and payload health and status data collected by the USOS Payload MDM, used by experimenters to interpret payload experiment results.

Grayed out	Refers to a menu item that has been made insensitive, which is visually shown by making the menu text gray rather than black. Items that are grayed out are not currently available.
Greenwich Mean Time (GMT)	The solar time for the meridian passing through Greenwich, England. It is used as a basis for calculating time throughout most of the world.
Ground ancillary data	A set of selected core system data and payload health and status data collected by the POIC, which is used by experimenters to interpret payload experiment results. Ground Ancillary Data can also contain computed parameters (pseudos).
Ground receipt time	Time of packet origination. The time from the IRIG-B time signal received.
Ground Support Equipment (GSE)	GSE refers to equipment that is brought in by the user (i.e. equipment that is not provided by the POIC).
Ground Support Equipment Packet	A CCSDS Packet that contains data extracted from any of the data processed by the Supporting Facility and the format of the packet is defined in the Supporting Facility's telemetry database.
Huntsville Operations Support Center (HOSC)	A facility located at the Marshall Space Flight Center (MSFC) that provides scientists and engineers the tools necessary for monitoring, commanding, and controlling various elements of space vehicle, payload, and science experiments. Support consists of real-time operations planning and analysis, inter- and intra-center ground operations coordination, facility and data system resource planning and scheduling, data systems monitor and control operations, and data flow coordination.

IMAQ ASCII	A packet type that was added to TReK to support a very specific application related to NASA's Return to Flight activities. It is not applicable to ISS. It is used to interface with an infrared camera that communicates via ASCII data.
Limit Sensing	Process of detecting caution and warning conditions for a parameter with a numerical value.
Line Outage Recorder Playback	A capability provided by White Sands Complex (WSC) to play back tapes generated at WSC during ground system communication outages.
Measurement Stimulus Identifier (MSID)	Equivalent to a parameter.
Monitoring	A parameter value is checked for sensing violations. A message is generated if the value is out of limits or out of an expected state.
Parameter	TReK uses the generic term parameter to mean any piece of data within a packet. Sometimes called a measurement or MSID in POIC terminology.
Payload Data Library (PDL)	An application that provides the interface for the user to specify which capabilities and requirements are needed to command and control his payload.
Payload Data Services Systems (PDSS)	The data distribution system for ISS. Able to route data based upon user to any of a number of destinations.
Payload Health and Status Data	Information originating at a payload that reveals the payload's operational condition, resource usage, and its safety/anomaly conditions that could result in damage to the payload, its environment or the crew.
Payload Operations Integration Center (POIC)	Manages the execution of on-orbit ISS payloads and payload support systems in coordination/unison with distributed International Partner Payload Control Centers, Telescience Support Centers (TSC's) and payload-unique remote facilities.

Payload Rack Checkout Unit (PRCU)	The Payload Rack Checkout Unit is used to verify payload to International Space Station interfaces for U.S. Payloads.
Playback	Data retrieved from some recording medium and transmitted to one or more users.
Pseudo Telemetry (pseudo data)	Values that are created from calculations instead of directly transported telemetry data. This pseudo data can be created from computations or scripts and can be displayed on the local PC.
Remotely Generated Command	A command sent by a remote user whose content is in a raw bit pattern format. The commands differ from predefined or modifiable commands in that the content is not stored in the POIC Project Command Database (PCDB).
Science data	Sensor or computational data generated by payloads for the purpose of conducting scientific experiments.
Subset	A collection of parameters from the total parameter set that is bounded as an integer number of octets but does not constitute the packet itself. A mini-packet.
Super sampled	A parameter is super sampled if it occurs more than once in a packet.
Swap Type	A flag in the Parameter Table of the TReK database that indicates if the specified datatype is byte swapped (B), word swapped (W), byte and word swapped (X), byte reversal (R), word reversal (V) or has no swapping (N).
Switching	A parameter's value can be used to switch between different calibration and sensing sets. There are two types of switching on TReK: range and state code.

Transmission Control Protocol (TCP)	TCP is a connection-oriented protocol that guarantees delivery of data.
Transmission Control Protocol (TCP) Client	A TCP Client initiates the TCP connection to connect to the other party.
Transmission Control Protocol (TCP) Server	A TCP Server waits for (and accepts connections from) the other party.
Telemetry	Transmission of data collected form a source in space to a ground support facility. Telemetry is downlink only.
Telescience Support Center (TSC)	A TSC is a NASA funded facility that provides the capability to plan and operate on-orbit facility class payloads and experiments, other payloads and experiments, and instruments.
User Application	Any end-user developed software program that uses the TReK Application Programming Interface software. Used synonymously with User Product.
User Data Summary Message (UDSM)	Packet type sent by PDSS that contains information on the number of packets sent during a given time frame for a PDSS Payload packet. For details on UDSM packets, see the POIC to Generic User IDD (SSP-50305).
Uplink format	The bit pattern of the command or file uplinked.
User Datagram Protocol (UDP)	UDP is a connection-less oriented protocol that does not guarantee delivery of data. In the TCP/IP protocol suite, the UDP provides the primary mechanism that application programs use to send datagrams to other application programs. In addition to the data sent, each UDP message contains both a destination port number and a fully qualified source and destination addresses making it possible for the UDP software on the destination to deliver the message to the correct recipient process and for the recipient process to send a reply.

User Product	Any end-user developed software program that uses the TReK Application Programming Interface software. Used synonymously with User Application.
Web	Term used to indicate access via HTTP protocol; also referred to as the World Wide Web (WWW).

Appendix B Acronyms

Note: This acronym list is global to all TReK documentation. Some acronyms listed may not be referenced within this document.

AOS	Acquisition of Signal
API	Application Programming Interface
APID	Application Process Identifier
ASCII	American Standard Code for Information Interchange
CAR	Command Acceptance Response
CAR1	First Command Acceptance Response
CAR2	Second Command Acceptance Response
CCSDS	Consultative Committee for Space Data Systems
CDB	Command Database
CDP	Custom Data Packet
COR	Communication Outage Recorder
COTS	Commercial-off-the-shelf
CRR	Command Reaction Response
DSM	Data Storage Manager
EHS	Enhanced Huntsville Operations Support Center (HOSC)
ERIS	EHS Remote Interface System
ERR	EHS Receipt Response
EXPRESS	Expediting the Process of Experiments to the Space Station
ES	Expected State
FAQ	Frequently Asked Question
FDP	Functionally Distributed Processor
FSV	Flight System Verifier
FSV1	First Flight System Verifier
FSV2	Second Flight System Verifier
FPD	Flight Projects Directorate
FTP	File Transfer Protocol
GMT	Greenwich Mean Time
GRT	Ground Receipt Time
GSE	Ground Support Equipment
HOSC	Huntsville Operations Support Center
ICD	Interface Control Document
IMAQ ASCII	Image Acquisition ASCII
IP	Internet Protocol
ISS	International Space Station
LDP	Logical Data Path
LES	Limit/Expected State
LOR	Line Outage Recorder
LOS	Loss of Signal
MCC-H	Mission Control Center – Houston
MOP	Mission, Operational Support Mode, and Project
MSFC	Marshall Space Flight Center

MSID	Measurement Stimulus Identifier
NASA	National Aeronautics and Space Administration
OCDB	Operational Command Database
OS	Operating System
PC	Personal Computer, also Polynomial Coefficient
PCDB	POIC Project Command Database
PDL	Payload Data Library
PDSS	Payload Data Services System
PGUIDD	POIC to Generic User Interface Definition Document
POIC	Payload Operations Integration Center
PP	Point Pair
PRCU	Payload Rack Checkout Unit
PSIV	Payload Software Integration and Verification
RPSM	Retrieval Processing Summary Message
SC	State Code
SCS	Suitcase Simulator
SSP	Space Station Program
SSCC	Space Station Control Center
SSPF	Space Station Processing Facility
TCP	Transmission Control Protocol
TReK	Telescience Resource Kit
TRR	TReK Receipt Response
TSC	Telescience Support Center
UDP	User Datagram Protocol
UDSM	User Data Summary Message
URL	Uniform Resource Locator
USOS	United States On-Orbit Segment
VCDU	Virtual Channel Data Unit
VCR	Video Cassette Recorder
VPN	Virtual Private Network