

APPENDIX C**TELEM.DAT - TELEMETRY LISTING**

Name	Block	Words	Len	DeviceName	Type	Comment
BS_TEMP_TOL	critical_telem	0 0	1		Fail	Temperature out of tolerance (1=fail)
BS_CURRENT_TOL	critical_telem	0 1	1		Fail	Current out of tolerance (1=fail)
BS_VOLTAGE_TOL	critical_telem	0 2	1		Fail	Voltage out of tolerance (1=fail)
BS_DEVICES_OK	critical_telem	0 3	1		Ok	Devices status (1=ok)
BS_PROM_BANK	critical_telem	0 4	1		PrimSec	Prom bank selection (0=primary/1=secondary)
spare_0	critical_telem	0 5	3		none	Spare, always 0
BS_TMF_BUS	critical_telem	0 8	1		Ok	TMF Bus Status (1=ok)
BS_SCIENCE_BUS	critical_telem	0 9	1		Ok	Science Bus Status (1=ok)
BS_CT_BUS	critical_telem	0 10	1		Ok	C&T Bus Status (1=ok)
CR_INST_AB	critical_telem	0 11	1		PrimSec	ICM ID jumper (0=Primary, 1=Backup)
SS_ICM_STATUS	critical_telem	0 12	2		ICMSync	ICM Status (0=unknown, 1=not sync, 2=ok)
BS_ICM_SEU	critical_telem	0 14	1		Fail	ICM SEU indicator (1=SEU)
BS_FATAL	critical_telem	0 15	1		Fail	Fatal ICM Condition Detected (1=yes)
SS_CMD_ERROR	critical_telem	1 0	8		CmdError	Instrument Command Error Code (0=ok)
SS_CMD_TOGGLE	critical_telem	1 8	4		Int4	Instrument Command Toggle count
SS_INST_MODE	critical_telem	1 12	3		InstMode	Instrument Mode (0-6)
BS_CMD_STATUS	critical_telem	1 15	1		Busy	Instrument Command Status (1=busy)
SS_CRITICAL_1_0	telem_block_1	0 0	16		Int16	critical telemetry, first word
SS_CRITICAL_1_1	telem_block_1	1 0	16		Int16	critical telemetry, second word
SS_TELEM_BLOCK_1	telem_block_1	2 0	8		Int8	Telemetry Block Number (1-8)
SS_MAJOR_CYCLE_1	telem_block_1	2 8	8		Int8	C&T bus Major Cycle # (0-63)
BS_FDIR_ON	telem_block_1	3 0	1		On	FDIR (0=off, 1=on)
BS_SAFE_ON	telem_block_1	3 1	1		On	Auto safe mode entry (0=no, 1=yes)
BS_TMF_SELECT	telem_block_1	3 2	1		PrimSec	TMF bus selection (0=A, 1=B)
BS_SCIENCE	telem_block_1	3 3	1		On	LRS Science Data (1=yes)
BS_ENGINEERING	telem_block_1	3 4	1		On	LRS Eng. Data (1=yes)
BS_HOUSEKEEPING	telem_block_1	3 5	1		On	LRS H/K Telemetry (1=yes)
BS Ancillary	telem_block_1	3 6	1		On	LRS Ancillary Data (1=yes)
BS_TEST_PACKET	telem_block_1	3 7	1		On	LRS Test Packet (1=yes)
BS_COOLER_ON	telem_block_1	3 8	1		On	Cooler on during Safe Mode (1=yes)
spare_3	telem_block_1	3 9	7		none	unused
BS_ICM_MLOAD_OK	telem_block_1	4 0	1		Ok	Last Memory load status (1=successful)
BS_ICM_MDUMP	telem_block_1	4 1	1		Busy	ICM Memory Dump (1=active)
BS_ICM_MLOAD	telem_block_1	4 2	1		Busy	ICM Memory Load (1=active)
BS_GETDATA_VALID	telem_block_1	4 3	1		Ok	NR_GETDATA valid (1=valid)
BS_MAINTENANCE	telem_block_1	4 4	1		Ok	Special Maint. Cmds. Enabled (1=yes)
BS_EEBURN	telem_block_1	4 5	1		Busy	EEBURN enable (0=no, 1=yes)
spare_4	telem_block_1	4 6	10		none	not used

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SS_LRS_FREE	telem_block_1	5	0	4	Int4	# of LRS buffers free
SS_LRS_TOTAL	telem_block_1	5	4	4	Int4	total number of LRS buffers allocated
SS_LRS_ERROR	telem_block_1	5	8	4	Int4	LRS bus error code, 1-n
spare_5	telem_block_1	5	12	4	none	not used
NR_GETDATA	telem_block_1	6	0	16	Int16	Return word for last GET_DATA cmd
SS_BOOT_STATUS	telem_block_1	7	0	16	Int16	ICM boot up error code
BS_COMM_SPM1	telem_block_1	8	0	1	Ok	SPM1 Interface status (1=ok)
BS_COMM_SPM2	telem_block_1	8	1	1	Ok	SPM2 Interface status (1=ok)
BS_COMM_PCDM	telem_block_1	8	2	1	Ok	PCDM Interface status (1=ok)
BS_COMM_SCDM	telem_block_1	8	3	1	Ok	SCDM Interface status (1=ok)
BS_COMM_PLDM	telem_block_1	8	4	1	Ok	PLDM Interface status (1=ok)
BS_COMM_TCMM	telem_block_1	8	5	1	Ok	TCMM Interface status (1=ok)
BS_COMM_COOLER	telem_block_1	8	6	1	Ok	Cooler Interface status (1=ok)
spare_8	telem_block_1	8	7	9	none	not used
BS_EEBURN_ON	telem_block_1	9	0	1	Busy	EEPROM program (1=active)
BS_EEBURN_STATUS	telem_block_1	9	1	1	Ok	EEPROM program status (1=pass)
BS_BURST_ON	telem_block_1	9	2	1	On	Burst data collection (1=on)
BS_BURST	telem_block_1	9	3	1	Ok	Burst status (1=pass)
SS_BURST_MODE	telem_block_1	9	4	4	Burst	Internal burst mode (0=off, 1=Init, 2=running, 3=done)
spare_9	telem_block_1	9	4	8	none	spare
CS_ICM_RELEASE	telem_block_1	10	0	8	Int8	ICM Firmware Release (0...)
CS_ICM_VERSION	telem_block_1	10	8	8	Int8	ICM Firmware Version (0...)
SS_HTR0_DET1	telem_block_1	11	0	3	Int3	detector 1 voltage status
SS_HTR0_DET2	telem_block_1	11	3	3	Int3	detector 2 voltage status
SS_HTR0_DET3	telem_block_1	11	6	3	Int3	detector 3 voltage status
SS_HTR0_DET4	telem_block_1	11	9	3	Int3	detector 4 voltage status
SS_HTR1_DET5	telem_block_1	11	12	3	Int3	detector 5 voltage status
spare_11	telem_block_1	11	15	1	none	not used
SS_HTR1_DET6	telem_block_1	12	0	3	Int3	detector 6 voltage status
SS_HTR1_DET7	telem_block_1	12	3	3	Int3	detector 7 voltage status
SS_HTR1_DET8	telem_block_1	12	6	3	Int3	detector 8 voltage status
spare_12	telem_block_1	12	9	7	none	not used
SS_HTR2_EARTH1	telem_block_1	13	0	3	Int3	PCA earth 1 voltage status
SS_HTR2_EARTH2	telem_block_1	13	3	3	Int3	PCA earth 2 voltage status
SS_HTR3_SPACE1	telem_block_1	13	6	3	Int3	PCA space 1 voltage status
spare_13	telem_block_1	13	9	7	none	not used
SS_HTR3_SPACE2	telem_block_1	14	0	3	Int3	PCA space 2 voltage status
SS_HTR4_EARTH	telem_block_1	14	3	3	Int3	Earth cover latch voltage status
SS_HTR5_SPACE	telem_block_1	14	6	3	Int3	Space cover latch voltage status
SS_HTR6_CAL1_1	telem_block_1	14	9	3	Int3	Cal source 1, pt 1 voltage status

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SS_HTR6_CAL1_2	telem_block_1	14	12	3 DEV_HTR_CALIB1	Int3	Cal source 1, pt 2 voltage status
spare_14	telem_block_1	14	15	1	none	not used
SS_HTR7_CAL2_1	telem_block_1	15	0	3 DEV_HTR_CALIB2	Int3	Cal source 2, pt 1 voltage status
SS_HTR7_CAL2_2	telem_block_1	15	3	3 DEV_HTR_CALIB2	Int3	Cal source 2, pt 2 voltage status
SS_HTR8_CAL3_1	telem_block_1	15	6	3 DEV_HTR_CALIB3	Int3	Cal source 3, pt 1 voltage status
SS_HTR8_CAL3_2	telem_block_1	15	9	3 DEV_HTR_CALIB3	Int3	Cal source 3, pt 2 voltage status
SS_HTR9_CAL4_1	telem_block_1	15	12	3 DEV_HTR_CALIB4	Int3	Cal source 4, pt 1 voltage status
spare_15	telem_block_1	15	15	1	none	not used
SS_HTR9_CAL4_2	telem_block_1	16	0	3 DEV_HTR_CALIB4	Int3	Cal source 4, pt 2 voltage status
SS_HTR10_SIEVE1	telem_block_1	16	3	3 DEV_HTR_SIEVE1	Int3	Sieve 1 voltage status
SS_HTR11_SIEVE2	telem_block_1	16	6	3 DEV_HTR_SIEVE2	Int3	Sieve 2 voltage status
SS_HTR12_SIEVE3	telem_block_1	16	9	3 DEV_HTR_SIEVE3	Int3	Sieve 3 voltage status
SS_HTR13_SIEVE4	telem_block_1	16	12	3 DEV_HTR_SIEVE4	Int3	Sieve 4 voltage status
BS_LIMIT_AMP	telem_block_1	16	15	1	Fail	PMC amplitude/temperature limit not in tolerance
SS_LIMIT_ZONE	telem_block_1	17	0	8	Zone	limit trip value (green=1, yellowLo=2, yellowHi=3, redLo=4, redHi=5)
SS_LIMIT_DEVICE	telem_block_1	17	8	8	Int8	limit trip device #
SS_SELECT_TABLE	telem_block_1	18	0	16	Int16	select_table command status
SS_DEV_INIT	telem_block_1	19	0	16	Int16	dev_init command status
SS_SET_DEVICE	telem_block_1	20	0	16	Int16	set_device command status
SS_SET_HEATER	telem_block_1	21	0	8	Int8	set_heater command status
SS_RESET_DEVICE	telem_block_1	21	8	8	Int8	reset_device command status
SS_ENABLE_FUSE	telem_block_1	22	0	8	Int8	enable_fuse command status
SS_DISABLE_FUSE	telem_block_1	22	8	8	Int8	disable_fuse command status
SS_EN_DETECTOR	telem_block_1	23	0	8	Int8	enable_detector command status
SS_DIS_DETECTOR	telem_block_1	23	8	8	Int8	disable_detector command status
SS_ON_DEVICE	telem_block_1	24	0	8	Int8	turn_on_device command status
SS_OFF_DEVICE	telem_block_1	24	8	8	Int8	turn_off_device status
software_spare1	telem_block_1	25	0	16	none	Reserved
software_spare2	telem_block_1	26	0	16	none	Reserved
software_spare3	telem_block_1	27	0	16	none	Reserved
BS_COOLER_TEMP	telem_block_1	28	0	1	Toggle	set_cooler_temp command status toggle
BS_COOLER_DIODE	telem_block_1	28	1	1	Toggle	set_cooler_diode command status toggle
BS_MOVE_MIRROR	telem_block_1	28	2	1	Toggle	move_mirror command status toggle
BS_PASS_CMD	telem_block_1	28	3	1	Toggle	pass_command command status toggle
BS_PASS_DATA	telem_block_1	28	4	1	Toggle	pass_data command status toggle
BS_PASS_MSL	telem_block_1	28	5	1	Toggle	pass_msl command status toggle
loggle_spare4	telem_block_1	28	6	1	Toggle	Reserved
BS_SET_TELEM	telem_block_1	28	7	1	Toggle	set_telem command status toggle
loggle_spare0	telem_block_1	28	8	8	none	Reserved

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BS_FREQSCAN_OK	telem_block_1	29	0	1		none	Frequency scan is ok
toggle_spare5	telem_block_1	29	1	15		none	
toggle_spare2	telem_block_1	30	0	16		none	Reserved
toggle_spare3	telem_block_1	31	0	16		none	Reserved
SS_CRITICAL_2_0	telem_block_2	0	0	16		Int16	critical telemetry, first word
SS_CRITICAL_2_1	telem_block_2	1	0	16		Int16	critical telemetry, second word
SS_TELEM_BLOCK_2	telem_block_2	2	0	8		Int8	Telemetry Block Number
SS_MAJOR_CYCLE_2	telem_block_2	2	8	8		Int8	MIL-STD-1553B Major Cycle
SS_DEV_LATCH1	telem_block_2	3	0	2		Status	Earth port latch position status
SS_DEV_LATCH2	telem_block_2	3	2	2		Status	Space latch position status
BS_DEV_COVERS	telem_block_2	3	4	1		Armed	Port covers armed status
SS_DEV_COVER1	telem_block_2	3	5	2		Status	Earth cover position status
SS_DEV_COVER2	telem_block_2	3	7	2		Status	Space cover position status
spare_3	telem_block_2	3	9	7		none	unused
CR_DEV_MIRROR1	telem_block_2	4	0	2	DEV_MIRROR1	State	Mirror 1 state
SS_DEV_MIRROR1	telem_block_2	4	2	2	DEV_MIRROR1	Status	Mirror 1 Status
CR_DEV_MIRROR2	telem_block_2	4	4	2	DEV_MIRROR2	State	Mirror 2 state
SS_DEV_MIRROR2	telem_block_2	4	6	2	DEV_MIRROR2	Status	Mirror 2 Status
CR_DEV_MIRROR3	telem_block_2	4	8	2	DEV_MIRROR3	State	Mirror 3 state
SS_DEV_MIRROR3	telem_block_2	4	10	2	DEV_MIRROR3	Status	Mirror 3 Status
CR_DEV_MIRROR4	telem_block_2	4	12	2	DEV_MIRROR4	State	Mirror 4 state
SS_DEV_MIRROR4	telem_block_2	4	14	2	DEV_MIRROR4	Status	Mirror 4 Status
CR_DEV_CHOP1	telem_block_2	5	0	2	DEV_CHOPPER1	State	Chopper 1 state
SS_DEV_CHOP1	telem_block_2	5	2	2	DEV_CHOPPER1	Status	Chopper 1 Status
CR_DEV_CHOP2	telem_block_2	5	4	2	DEV_CHOPPER2	State	Chopper 2 state
SS_DEV_CHOP2	telem_block_2	5	6	2	DEV_CHOPPER2	Status	Chopper 2 Status
CR_DEV_CHOP3	telem_block_2	5	8	2	DEV_CHOPPER3	State	Chopper 3 state
SS_DEV_CHOP3	telem_block_2	5	10	2	DEV_CHOPPER3	Status	Chopper 3 Status
CR_DEV_CHOP4	telem_block_2	5	12	2	DEV_CHOPPER4	State	Chopper 4 state
SS_DEV_CHOP4	telem_block_2	5	14	2	DEV_CHOPPER4	Status	Chopper 4 Status
CR_DEV_LMC1	telem_block_2	6	0	2	DEV_LMC1	State	LMC 1 State
SS_DEV_LMC1	telem_block_2	6	2	2	DEV_LMC1	Status	LMC 1 Status
CR_DEV_LMC2	telem_block_2	6	4	2	DEV_LMC2	State	LMC 2 State
SS_DEV_LMC2	telem_block_2	6	6	2	DEV_LMC2	Status	LMC 2 Status
CR_DEV_LMC3	telem_block_2	6	8	2	DEV_LMC3	State	LMC 3 State
SS_DEV_LMC3	telem_block_2	6	10	2	DEV_LMC3	Status	LMC 3 Status
CR_DEV_LMC4	telem_block_2	6	12	2	DEV_LMC4	State	LMC 4 State
SS_DEV_LMC4	telem_block_2	6	14	2	DEV_LMC4	Status	LMC 4 Status
CR_DEV_PMC1	telem_block_2	7	0	2	DEV_PMC1	State	PMC 1 State

SS_DEV_PMC1	telem_block_2	7	2	2 DEV_PMC1	Status	PMC 1 Status
CR_DEV_PMC2	telem_block_2	7	4	2 DEV_PMC2	State	PMC 2 State
SS_DEV_PMC2	telem_block_2	7	6	2 DEV_PMC2	Status	PMC 2 Status
CR_DEV_SPM1	telem_block_2	7	8	2 DEV_SPM1	State	SPM 1 State
SS_DEV_SPM1	telem_block_2	7	10	2 DEV_SPM1	Status	Signal Processing 1 Status
CR_DEV_SPM2	telem_block_2	7	12	2 DEV_SPM2	State	SPM 2 State
SS_DEV_SPM2	telem_block_2	7	14	2 DEV_SPM2	Status	Signal Processing 2 Status
spare_8	telem_block_2	8	0	2	none	not used
SS_DEV_TCMM	telem_block_2	8	2	2 DEV_TCMM	Status	TCMM status (only 0, 2, and 3 valid)
spare_8a	telem_block_2	8	4	2	none	not used
SS_DEV_PCDM	telem_block_2	8	6	2 DEV_PCDM	Status	PCDM status (only, 0, 2, and 3 valid)
CR_HTR_NEST1	telem_block_2	8	8	2 DEV_HTR_DETECTOR1	State	Detector heater 1 State
SS_HTR_NEST1	telem_block_2	8	10	2 DEV_HTR_DETECTOR1	Status	Status of detector heater, table 1
CR_HTR_NEST2	telem_block_2	8	12	2 DEV_HTR_DETECTOR2	State	Detector heater 2 State
SS_HTR_NEST2	telem_block_2	8	14	2 DEV_HTR_DETECTOR2	Status	Status of detector heater, table 2
CR_HTR_CAL1	telem_block_2	9	0	2 DEV_HTR_CALIB1	State	Calibration source 1 State
SS_HTR_CAL1	telem_block_2	9	2	2 DEV_HTR_CALIB1	Status	Status of calibration source 1
CR_HTR_CAL2	telem_block_2	9	4	2 DEV_HTR_CALIB2	State	Calibration source 2 State
SS_HTR_CAL2	telem_block_2	9	6	2 DEV_HTR_CALIB2	Status	Status of calibration source 2
CR_HTR_CAL3	telem_block_2	9	8	2 DEV_HTR_CALIB3	State	Calibration source 3 State
SS_HTR_CAL3	telem_block_2	9	10	2 DEV_HTR_CALIB3	Status	Status of calibration source 3
CR_HTR_CAL4	telem_block_2	9	12	2 DEV_HTR_CALIB4	State	Calibration source 4 State
SS_HTR_CAL4	telem_block_2	9	14	2 DEV_HTR_CALIB4	Status	Status of calibration source 4
CR_HTR_SIEVE1	telem_block_2	10	0	2 DEV_HTR_SIEVE1	State	sieve 1 heater State
SS_HTR_SIEVE1	telem_block_2	10	2	2 DEV_HTR_SIEVE1	Status	sieve 1 heater status
CR_HTR_SIEVE2	telem_block_2	10	4	2 DEV_HTR_SIEVE2	State	sieve 2 heater State
SS_HTR_SIEVE2	telem_block_2	10	6	2 DEV_HTR_SIEVE2	Status	sieve 2 heater status
CR_HTR_SIEVE3	telem_block_2	10	8	2 DEV_HTR_SIEVE3	State	sieve 3 heater State
SS_HTR_SIEVE3	telem_block_2	10	10	2 DEV_HTR_SIEVE3	Status	sieve 3 heater status
CR_HTR_SIEVE4	telem_block_2	10	12	2 DEV_HTR_SIEVE4	State	sieve 4 heater State
SS_HTR_SIEVE4	telem_block_2	10	14	2 DEV_HTR_SIEVE4	Status	sieve 4 heater status
CR_DEV_COOLER	telem_block_2	11	0	2 DEV_COOLER	State	Cooler State
SS_DEV_COOLER	telem_block_2	11	2	2 DEV_COOLER	Status	Cooler Status
SS_DEV_COOLMODE	telem_block_2	11	4	2 DEV_COOLER	CoolerMode	cooler mode (0=off, 1=Temperature mode, 2=Manual mode, 3=not used)
SS_DEV_COOLVMODE	telem_block_2	11	6	2 DEV_COOLER	CoolerVMMode	cooler vibration mode (0=DECS off, 1=Position DECS, 2=Acceleration DECS, 3=not used)
spare_11	telem_block_2	11	8	8	none	not used
SS_FREQSCAN_STEP	telem_block_2	12	0	8	Int8	PMC Frequency scan step
SS_FREQSCAN_PMC	telem_block_2	12	8	8	Int8	PMC Frequency scan PMC#

SS_FREQSCAN_FREQ	telem_block_2	13	0	16	Int16	PMC Frequency scan frequency
SS_FREQSCAN_AMP	telem_block_2	14	0	16	Int16	PMC Frequency scan amplitude
SR_DEV_MIRROR1	telem_block_2	15	0	8	Int8	scan mirror 1 raw status
SR_DEV_MIRROR2	telem_block_2	15	8	8	Int8	scan mirror 2 raw status
SR_DEV_MIRROR3	telem_block_2	16	0	8	Int8	scan mirror 3 raw status
SR_DEV_MIRROR4	telem_block_2	16	8	8	Int8	scan mirror 4 raw status
SR_DEV_CHOP1	telem_block_2	17	0	8	Int8	chopper 1 raw status
SR_DEV_CHOP2	telem_block_2	17	8	8	Int8	chopper 2 raw status
SR_DEV_CHOP3	telem_block_2	18	0	8	Int8	chopper 3 raw status
SR_DEV_CHOP4	telem_block_2	18	8	8	Int8	chopper 4 raw status
SR_DEV_LMC1	telem_block_2	19	0	8	Int8	LMC 1 raw status
SR_DEV_LMC2	telem_block_2	19	8	8	Int8	LMC 2 raw status
SR_DEV_LMC3	telem_block_2	20	0	8	Int8	LMC 3 raw status
SR_DEV_LMC4	telem_block_2	20	8	8	Int8	LMC 4 raw status
SR_DEV_PMC1	telem_block_2	21	0	8	Int8	PMC 1 raw status
SR_DEV_PMC2	telem_block_2	21	8	8	Int8	PMC 2 raw status
SR_DEV_SPM1	telem_block_2	22	0	16	RawStatus	SPM 1 raw status
SR_DEV_SPM2	telem_block_2	23	0	16	RawStatus	SPM 2 raw status
SR_DEV_TCMM	telem_block_2	24	0	16	RawStatus	TCMM raw status
SR_MIRROR1_POS	telem_block_2	25	0	16	Int16	mirror 1 raw status, bit 15: 0=valid
SR_MIRROR2_POS	telem_block_2	26	0	16	Int16	mirror 2 raw status, bit 15: 0=valid
SR_MIRROR3_POS	telem_block_2	27	0	16	Int16	mirror 3 raw status, bit 15: 0=valid
SR_MIRROR4_POS	telem_block_2	28	0	16	Int16	mirror 4 raw status, bit 15: 0=valid
SR_DMA_0	telem_block_2	29	0	16	Int16	# of DMA words channel 0
SR_DMA_1	telem_block_2	30	0	16	Int16	# of DMA words - channel 1
CS_ICM_CRC	telem_block_2	31	0	16	Int16	Boot CRC value
SS_CRITICAL_3_0	telem_block_3	0	0	16	Int16	critical telemetry, first word
SS_CRITICAL_3_1	telem_block_3	1	0	16	Int16	critical telemetry, second word
SS_TELEM_BLOCK_3	telem_block_3	2	0	8	Int8	Telemetry Block Number
SS_MAJOR_CYCLE_3	telem_block_3	2	8	8	Int8	C&T Major Cycle number
TR_COOLER_ATEM	telem_block_3	3	0	16	Int16	atem command temperature value
SR_COMP_X_VIB	telem_block_3	4	0	16	Int16	compressor X vibration (rms)
SR_COMP_Y_VIB	telem_block_3	5	0	16	Int16	compressor Y vibration (rms)
SR_DISP_X_VIB	telem_block_3	6	0	16	Int16	displacer X vibration (rms)
SR_DISP_Y_VIB	telem_block_3	7	0	16	Int16	displacer Y vibration (rms)
SR_COMP_Z_VIB	telem_block_3	8	0	16	Int16	compressor Z vibration (rms)
SR_DISP_Z_VIB	telem_block_3	9	0	16	Int16	displacer Z vibration (rms)
SR_COMP_A_POS	telem_block_3	10	0	16	Int16	compressor A position (rms)
SR_DISP_A_POS	telem_block_3	11	0	16	Int16	displacer A position (rms)

SR_COMP_B_POS	telem_block_3	12	0	16	Int16	compressor B position (rms)
SR_DISP_B_POS	telem_block_3	13	0	16	Int16	displacer B position (rms)
IR_COMP_A_MOTOR	telem_block_3	14	0	16	Int16	compressor A motor current (rms)
IR_COMP_B_MOTOR	telem_block_3	15	0	16	Int16	compressor B motor current (rms)
IR_DISP_A_MOTOR	telem_block_3	16	0	16	Int16	displacer A motor current (rms)
IR_DISP_B_MOTOR	telem_block_3	17	0	16	Int16	displacer B motor current (rms)
VR_M12VDC	telem_block_3	18	0	16	Int16	-12VDC monitor
VR_M15VDC	telem_block_3	19	0	16	Int16	-15VDC monitor
TR_COOL_CDE_1	telem_block_3	20	0	16	Int16	electronics temperature 1
TR_COOL_CDE_2	telem_block_3	21	0	16	Int16	electronics temperature 2
TR_COOL_CDE_3	telem_block_3	22	0	16	Int16	electronics temperature 3
TR_COOL_DISP1	telem_block_3	23	0	16	Int16	displacer 1 temperature
TR_COOL_DISP2	telem_block_3	24	0	16	Int16	displacer 2 temperature
VR_P15VDC	telem_block_3	25	0	16	Int16	+15VDC monitor
VR_P12VDC	telem_block_3	26	0	16	Int16	+12VDC monitor
VR_P5VDC	telem_block_3	27	0	16	Int16	+5VDC monitor
TR_COLD_TIP1_W	telem_block_3	28	0	16	Int16	temp diode 1 wide (50K to 300K)
TR_COLD_TIP2_W	telem_block_3	29	0	16	Int16	temp diode 2 wide (50K to 300K)
TR_TEMP_DIODE_RN	telem_block_3	30	0	16	Int16	temp diode reference narrow (offset)
TR_COLD_TIP1_N	telem_block_3	31	0	16	Int16	temp diode 1 narrow (50K to 100K)
SS_CRITICAL_4_0	telem_block_4	0	0	16	Int16	critical telemetry, first word
SS_CRITICAL_4_1	telem_block_4	1	0	16	Int16	critical telemetry, second word
SS_TELEM_BLOCK_4	telem_block_4	2	0	8	Int8	Telemetry Block Number
SS_MAJOR_CYCLE_4	telem_block_4	2	8	8	Int8	C&T Major Cycle number
TR_COLD_TIP2_N	telem_block_4	3	0	16	Int16	temp diode 2 narrow (50K to 100K)
TR_TEMP_DIODE_RW	telem_block_4	4	0	16	Int16	temp diode reference wide (offset)
IR_SCAN1_MTR	telem_block_4	5	0	16	Current	SCDM current monitor, scan motor 1
IR_SCAN2_MTR	telem_block_4	6	0	16	Current	SCDM current monitor, scan motor 2
IR_SCAN3_MTR	telem_block_4	7	0	16	Current	SCDM current monitor, scan motor 3
IR_SCAN4_MTR	telem_block_4	8	0	16	Current	SCDM current monitor, scan motor 4
IR_CHOP1_MTR	telem_block_4	9	0	16	Current	SCDM current monitor, chopper 1
IR_CHOP2_MTR	telem_block_4	10	0	16	Current	SCDM current monitor, chopper 2
IR_CHOP3_MTR	telem_block_4	11	0	16	Current	SCDM current monitor, chopper 3
IR_CHOP4_MTR	telem_block_4	12	0	16	Current	SCDM current monitor, chopper 4
IR_LMC1_MTR	telem_block_4	13	0	16	Current	PLDM current monitor, LMC 1 motor
IR_LMC2_MTR	telem_block_4	14	0	16	Current	PLDM current monitor, LMC 2 motor
IR_LMC3_MTR	telem_block_4	15	0	16	Current	PLDM current monitor, LMC 3 motor
IR_LMC4_MTR	telem_block_4	16	0	16	Current	PLDM current monitor, LMC 4 motor
IR_PMC1_MTR	telem_block_4	17	0	16	Current	PLDM current monitor, PMC 1 motor

IR_PMC2_MTR	telem_block_4	18	0	16	DEV_PMC2	Current	PLDM current monitor, PMC 2 motor
NR_LAST_CMD	telem_block_4	19	0	16		Int16	Last instrument command processed
NR_SOFT0	telem_block_4	20	0	16		Int16	software watch point
NR_SOFT1	telem_block_4	21	0	16		Int16	software watch point
NR_SOFT2	telem_block_4	22	0	16		Int16	software watch point
NR_SOFT3	telem_block_4	23	0	16		Int16	software watch point
NR_SOFT4	telem_block_4	24	0	16		Int16	software watch point
NR_SOFT5	telem_block_4	25	0	16		Int16	software watch point
NR_SOFT6	telem_block_4	26	0	16		Int16	software watch point
NR_SOFT7	telem_block_4	27	0	16		Int16	software watch point
NR_SOFT8	telem_block_4	28	0	16		Int16	software watch point
NR_SOFT9	telem_block_4	29	0	16		Int16	software watch point
NR_SOFT10	telem_block_4	30	0	16		Int16	software watch point
NR_SOFT11	telem_block_4	31	0	16		Int16	software watch point
SS_CRITICAL_5_0	telem_block_5	0	0	16		Int16	critical telemetry, first word
SS_CRITICAL_5_1	telem_block_5	1	0	16		Int16	critical telemetry, second word
SS_TELEM_BLOCK_5	telem_block_5	2	0	8		Int8	Telemetry Block Number
SS_MAJOR_CYCLE_5	telem_block_5	2	8	8		Int8	C&T Major Cycle number
TR_COOL_COMP1	telem_block_5	3	0	16	DEV_TCMM	Thermistor	compressor 1 temp.
TR_COOL_COMP2	telem_block_5	4	0	16	DEV_TCMM	Thermistor	compressor 2 temp.
TR_SCAN1_MTR	telem_block_5	5	0	16	DEV_TCMM	Thermistor	Scan motor 1 temperature
TR_SCAN2_MTR	telem_block_5	6	0	16	DEV_TCMM	Thermistor	Scan motor 2 temperature
TR_SCAN3_MTR	telem_block_5	7	0	16	DEV_TCMM	Thermistor	Scan motor 3 temperature
TR_SCAN4_MTR	telem_block_5	8	0	16	DEV_TCMM	Thermistor	Scan motor 4 temperature
TR_CHOP1_MTR	telem_block_5	9	0	16	DEV_TCMM	Thermistor	Chopper 1 motor temperature
TR_CHOP2_MTR	telem_block_5	10	0	16	DEV_TCMM	Thermistor	Chopper 2 motor temperature
TR_CHOP3_MTR	telem_block_5	11	0	16	DEV_TCMM	Thermistor	Chopper 3 motor temperature
TR_CHOP4_MTR	telem_block_5	12	0	16	DEV_TCMM	Thermistor	Chopper 4 motor temperature
TR_LMC1_MTR	telem_block_5	13	0	16	DEV_TCMM	Thermistor	LMC1 motor temperature
TR_LMC2_MTR	telem_block_5	14	0	16	DEV_TCMM	Thermistor	LMC2 motor temperature
TR_LMC3_MTR	telem_block_5	15	0	16	DEV_TCMM	Thermistor	LMC3 motor temperature
TR_LMC4_MTR	telem_block_5	16	0	16	DEV_TCMM	Thermistor	LMC4 motor temperature
TR_PMC1_MTR	telem_block_5	17	0	16	DEV_TCMM	Thermistor	PMC1 motor temperature
TR_PMC2_MTR	telem_block_5	18	0	16	DEV_TCMM	Thermistor	PMC2 motor temperature
TR_SPM1	telem_block_5	19	0	16	DEV_TCMM	Thermistor	SPM1 temperature
TR_SPM2	telem_block_5	20	0	16	DEV_TCMM	Thermistor	SPM2 Temperature
TR_TCMM_A_1	telem_block_5	21	0	16	DEV_TCMM	Thermistor	TCMM A temp. point 1
TR_TCMM_A_2	telem_block_5	22	0	16	DEV_TCMM	Thermistor	TCMM A temp. point 2
TR_TCMM_B_1	telem_block_5	23	0	16	DEV_TCMM	Thermistor	TCMM B temperature point 1

TR_TCMMB_2	telem_block_5	24	0	16	DEV_TCMM	Thermistor	TCMM B temperature point 2
TR_PSM	telem_block_5	25	0	16	DEV_TCMM	Thermistor	PSM Temperature Point
TR_BPLT_1	telem_block_5	26	0	16	DEV_TCMM	Thermistor	Base Plate, Temperature Point 1
TR_BPLT_2	telem_block_5	27	0	16	DEV_TCMM	Thermistor	Base Plate, Temperature Point 2
TR_BPLT_3	telem_block_5	28	0	16	DEV_TCMM	Thermistor	Base Plate, Temperature Point 3
NR_COOL_TX_TOTAL	telem_block_5	29	0	16		Int16	Cooler - total characters transmitted
NR_COOL_RX_TOTAL	telem_block_5	30	0	16		Int16	Cooler - total characters received
NR_COOL_RX_COUNT	telem_block_5	31	0	8		Int8	Cooler - receive count
NR_COOL_RX_ERROR	telem_block_5	31	8	8		Int8	Cooler - receive error code
SS_CRITICAL_6_0	telem_block_6	0	0	16		Int16	critical telemetry, first word
SS_CRITICAL_6_1	telem_block_6	1	0	16		Int16	critical telemetry, second word
SS_TELEM_BLOCK_6	telem_block_6	2	0	8		Int8	Telemetry Block Number
SS_MAJOR_CYCLE_6	telem_block_6	2	8	8		Int8	C&T Major Cycle number
TR_THERM1_HI	telem_block_6	3	0	16	DEV_TCMM	Thermistor	TCMM Thermistor high ref, bank 1
TR_THERM1_LO	telem_block_6	4	0	16	DEV_TCMM	Thermistor	TCMM Thermistor low ref, bank 1
TR_THERM2_HI	telem_block_6	5	0	16	DEV_TCMM	Thermistor	TCMM Thermistor ref, bank 2
TR_THERM2_LO	telem_block_6	6	0	16	DEV_TCMM	Thermistor	TCMM Thermistor low ref, bank 2
TR_THERM3_HI	telem_block_6	7	0	16	DEV_TCMM	Thermistor	TCMM Thermistor high ref, bank 3
TR_THERM3_LO	telem_block_6	8	0	16	DEV_TCMM	Thermistor	TCMM Thermistor low ref, bank 3
TR_THERM4_HI	telem_block_6	9	0	16	DEV_TCMM	Thermistor	TCMM Thermistor high ref, bank 4
TR_THERM4_LO	telem_block_6	10	0	16	DEV_TCMM	Thermistor	TCMM Thermistor low ref, bank 4
TR_SPARE_1	telem_block_6	11	0	16	DEV_TCMM	Thermistor	Spare, 0
TR_SPARE_2	telem_block_6	12	0	16	DEV_TCMM	Thermistor	Spare, 0
TR_SPARE_3	telem_block_6	13	0	16	DEV_TCMM	Thermistor	Spare, 0
CS_TIME_CODE	telem_block_6	14	0	16		Int16	ICM firmware time code hhmm
CS_DATE_CODE	telem_block_6	15	0	16		Int16	ICM firmware date code ymdd
NR_COOL_DGAIN0	telem_block_6	16	0	16		Int16	cooler dgain 0 setting
NR_COOL_DGAIN1	telem_block_6	17	0	16		Int16	cooler dgain 1 setting
NR_COOL_DGAIN2	telem_block_6	18	0	16		Int16	cooler dgain 2 setting
NR_COOL_DGAIN3	telem_block_6	19	0	16		Int16	cooler dgain 3 setting
NR_COOL_DSHIF0	telem_block_6	20	0	16		Int16	cooler dshif 0 setting
NR_COOL_DSHIF1	telem_block_6	21	0	16		Int16	cooler dshif 1 setting
NR_COOL_DSHIF2	telem_block_6	22	0	16		Int16	cooler dshif 2 setting
NR_COOL_DSHIF3	telem_block_6	23	0	16		Int16	cooler dshif 3 setting
NR_COOL_MIN0	telem_block_6	24	0	16		Int16	cooler wmin 0 setting
NR_COOL_MIN1	telem_block_6	25	0	16		Int16	cooler wmin 0 setting
NR_COOL_MIN2	telem_block_6	26	0	16		Int16	cooler wmin 0 setting
NR_COOL_MIN3	telem_block_6	27	0	16		Int16	cooler wmin 0 setting
NR_COOL_MAX0	telem_block_6	28	0	16		Int16	cooler wmax 0 setting

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NR_COOL_MAX1	telem_block_6	29	0	16	Int16	cooler wmax 1 setting
NR_COOL_MAX2	telem_block_6	30	0	16	Int16	cooler wmax 2 setting
NR_COOL_MAX3	telem_block_6	31	0	16	Int16	cooler wmax 3 setting
SS_CRITICAL_7_0	telem_block_7	0	0	16	Int16	critical telemetry, first word
SS_CRITICAL_7_1	telem_block_7	1	0	16	Int16	critical telemetry, second word
SS_TELEM_BLOCK_7	telem_block_7	2	0	8	Int8	Telemetry Block Number
SS_MAJOR_CYCLE_7	telem_block_7	2	8	8	Int8	C&T Major Cycle number
TS_ENG_POINT1	telem_block_7	3	0	16	Int16	Engineering temperature point 1
TS_ENG_POINT2	telem_block_7	4	0	16	Int16	Engineering temperature point 2
TS_ENG_POINT3	telem_block_7	5	0	16	Int16	Engineering temperature point 3
TS_ENG_POINT4	telem_block_7	6	0	16	Int16	Engineering temperature point 4
TS_ENG_POINT5	telem_block_7	7	0	16	Int16	Engineering temperature point 5
TS_ENG_POINT6	telem_block_7	8	0	16	Int16	Engineering temperature point 6
TS_ENG_POINT7	telem_block_7	9	0	16	Int16	Engineering temperature point 7
TS_ENG_POINT8	telem_block_7	10	0	16	Int16	Engineering temperature point 8
TS_ENG_POINT9	telem_block_7	11	0	16	Int16	Engineering temperature point 9
TS_ENG_POINT10	telem_block_7	12	0	16	Int16	Engineering temperature point 10
TS_ENG_POINT11	telem_block_7	13	0	16	Int16	Engineering temperature point 11
TS_ENG_POINT12	telem_block_7	14	0	16	Int16	Engineering temperature point 12
TS_ENG_POINT13	telem_block_7	15	0	16	Int16	Engineering temperature point 13
TS_ENG_POINT14	telem_block_7	16	0	16	Int16	Engineering temperature point 14
TS_ENG_POINT15	telem_block_7	17	0	16	Int16	Engineering temperature point 15
TS_ENG_POINT16	telem_block_7	18	0	16	Int16	Engineering temperature point 16
TS_ENG_POINT17	telem_block_7	19	0	16	Int16	Engineering temperature point 17
TS_ENG_POINT18	telem_block_7	20	0	16	Int16	Engineering temperature point 18
TS_ENG_POINT19	telem_block_7	21	0	16	Int16	Engineering temperature point 19
TS_ENG_POINT20	telem_block_7	22	0	16	Int16	Engineering temperature point 20
TS_ENG_POINT21	telem_block_7	23	0	16	Int16	Engineering temperature point 21
TS_ENG_POINT22	telem_block_7	24	0	16	Int16	Engineering temperature point 22
TS_ENG_POINT23	telem_block_7	25	0	16	Int16	Engineering temperature point 23
TS_ENG_POINT24	telem_block_7	26	0	16	Int16	Engineering temperature point 24
TS_ENG_POINT25	telem_block_7	27	0	16	Int16	Engineering temperature point 25
TS_ENG_POINT26	telem_block_7	28	0	16	Int16	Engineering temperature point 26
TS_ENG_POINT27	telem_block_7	29	0	16	Int16	Engineering temperature point 27
TS_ENG_POINT28	telem_block_7	30	0	16	Int16	Engineering temperature point 28
TS_ENG_POINT29	telem_block_7	31	0	16	Int16	Engineering temperature point 29
SS_CRITICAL_8_0	telem_block_8	0	0	16	Int16	critical telemetry, first word
SS_CRITICAL_8_1	telem_block_8	1	0	16	Int16	critical telemetry, second word

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SS_TELEM_BLOCK_8	telem_block_8	2	0	8	Int8	Telemetry Block Number
SS_MAJOR_CYCLE_8	telem_block_8	2	8	8	Int8	C&T Major Cycle number
SR_CT_STATUS	telem_block_8	3	0	16	Int16	C&T BCRTM status register
SR_CT_COMMAND	telem_block_8	4	0	16	Int16	C&T BCRTM current 1553 command register
SR_LRS_STATUS	telem_block_8	5	0	16	Int16	LRS BCRTM status register
SR_LRS_COMMAND	telem_block_8	6	0	16	Int16	LRS BCRTM current 1553 command register
NR_EVENT_MAXTIME	telem_block_8	7	0	8	Int8	Event queue - maximum time (ms)
NR_EVENT_TIME	telem_block_8	7	8	8	Int16	Event queue - current event time (ms)
NR_EVENT_FUNC	telem_block_8	8	0	16	Int16	Event queue - current event function address
NR_EVENT_DELTA	telem_block_8	9	0	16	Int16	Event queue - current delta time
NR_EVENT_QUEUED	telem_block_8	10	0	16	Int16	Event queue - number of events queued
NR_EVENT_MAXFUN	telem_block_8	11	0	16	Int16	Event queue - function address of maximum event
NR_EVENT_MAXPAR	telem_block_8	12	0	16	Int16	Event queue - parameter value of maximum event
NR_EVENT_MAXPTR	telem_block_8	13	0	16	Int16	Event queue - pointer value of maximum event
SR_EARTH_STATUS	telem_block_8	14	0	16	Int16	Earth port status, see following bit descriptions
//BS_EARTH_DOOR	telem_block_8	14	0	1	NotOpen	Earth port, door open encoder
//BS_EARTH_LATCH	telem_block_8	14	1	1	Opened	Earth port, latch status
//BS_EARTH_LIMIT	telem_block_8	14	2	1	Open	Earth port, latch limit switch
//BS_EARTH_HEATER	telem_block_8	14	3	1	Enable	Earth port, heater enable status
//BS_EARTH_DIR	telem_block_8	14	4	1	Direction	Earth port, direction status
//BS_EARTH_MOTOR	telem_block_8	14	5	1	Enable	Earth port, motor enable status
//BS_EARTH_LE	telem_block_8	14	6	1	Enable	Earth port, latch enable status
//BS_EARTH_LSO	telem_block_8	14	7	1	On	Earth port, limit switch override
//BS_EARTH_ARM	telem_block_8	14	8	1	Armed	Earth port, arm status
//BS_EARTH_LCS	telem_block_8	14	9	1	Open	Earth port, latch command status
//SR_EARTH_UNUSED	telem_block_8	14	10	6	none	Earth port, spare
SR_SPACE_STATUS	telem_block_8	15	0	16	Int16	Space port status, see following bit descriptions
//BS_SPACE_DOOR	telem_block_8	15	0	1	NotOpen	Space port, door open encoder
//BS_SPACE_LATCH	telem_block_8	15	1	1	Opened	Space port, latch status
//BS_SPACE_LIMIT	telem_block_8	15	2	1	Open	Space port, latch limit switch
//BS_SPACE_HEATER	telem_block_8	15	3	1	Enable	Space port, heater enable status
//BS_SPACE_DIR	telem_block_8	15	4	1	Direction	Space port, direction status
//BS_SPACE_MOTOR	telem_block_8	15	5	1	Enable	Space port, motor enable status
//BS_SPACE_LE	telem_block_8	15	6	1	Enable	Space port, latch enable status
//BS_SPACE_LSO	telem_block_8	15	7	1	On	Space port, limit switch override
//BS_SPACE_ARM	telem_block_8	15	8	1	Armed	Space port, arm status
//BS_SPACE_LCS	telem_block_8	15	9	1	Open	Space port, latch command status
//SR_SPACE_UNUSED	telem_block_8	15	10	6	none	Space port, spare
TR_EARTH_MOTOR	telem_block_8	16	0	16	Thermistor	Earth port, motor temperature
TR_EARTH_BEARING	telem_block_8	17	0	16	Thermistor	Earth port, bearing temperature

TR_EARTH_LATCH	telem_block_8	18	0	16	DEV_PCDM	Thermistor	Earth port, latch temperature
TR_EARTH_BAFFLE	telem_block_8	19	0	16	DEV_PCDM	Thermistor	Earth port, baffel temperature
VR_PCDM_REF28	telem_block_8	20	0	16	DEV_PCDM	Voltage	PCDM +28V reference
VR_PCDM_REF14	telem_block_8	21	0	16	DEV_PCDM	Voltage	PCDM +13.7V reference
VR_PCDM_REF5	telem_block_8	22	0	16	DEV_PCDM	Voltage	PCDM +5V reference
VR_PCDM_SPARE1	telem_block_8	23	0	16	DEV_PCDM	Voltage	PCDM spare
TR_SPACE_MOTOR	telem_block_8	24	0	16	DEV_PCDM	Thermistor	Space port, motor temperature
TR_SPACE_BEARING	telem_block_8	25	0	16	DEV_PCDM	Thermistor	Space port, bearing temperature
TR_SPACE_LATCH	telem_block_8	26	0	16	DEV_PCDM	Thermistor	Space port, latch temperature
TR_SPACE_BAFFLE	telem_block_8	27	0	16	DEV_PCDM	Thermistor	Space port, baffel temperature
TR_PCDM_REF_H	telem_block_8	28	0	16	DEV_PCDM	Voltage	PCDM temperature reference high
TR_PCDM_REF_L	telem_block_8	29	0	16	DEV_PCDM	Voltage	PCDM temperature reference low
TR_PCDM_SPARE1	telem_block_8	30	0	16	DEV_PCDM	Voltage	PCDM spare
TR_PCDM_SPARE2	telem_block_8	31	0	16	DEV_PCDM	Voltage	PCDM spare
Engineering Data Points							
TS_ENG_CAL1_1	eng_data	0	0	16	DEV_TCMM	PRT	calibration source 1, PRT 1
TS_ENG_CAL1_1RH	eng_data	1	0	16	DEV_TCMM	PRT	calibration source 1, PRT 1, ref hi
TS_ENG_CAL1_1RL	eng_data	2	0	16	DEV_TCMM	PRT	calibration source 1, PRT 1, ref lo
TS_ENG_CAL1_2	eng_data	3	0	16	DEV_TCMM	PRT	calibration source 1, PRT 2
TS_ENG_CAL1_2RH	eng_data	4	0	16	DEV_TCMM	PRT	calibration source 1, PRT 2, ref hi
TS_ENG_CAL1_2RL	eng_data	5	0	16	DEV_TCMM	PRT	calibration source 1, PRT 2, ref lo
TS_ENG_CAL2_1	eng_data	6	0	16	DEV_TCMM	PRT	calibration source 2, PRT 1
TS_ENG_CAL2_1RH	eng_data	7	0	16	DEV_TCMM	PRT	calibration source 2, PRT 1, ref hi
TS_ENG_CAL2_1RL	eng_data	8	0	16	DEV_TCMM	PRT	calibration source 2, PRT 1, ref lo
TS_ENG_CAL2_2	eng_data	9	0	16	DEV_TCMM	PRT	calibration source 2, PRT 2
TS_ENG_CAL2_2RH	eng_data	10	0	16	DEV_TCMM	PRT	calibration source 2, PRT 2, ref hi
TS_ENG_CAL2_2RL	eng_data	11	0	16	DEV_TCMM	PRT	calibration source 2, PRT 2, ref lo
TS_ENG_CAL3_1	eng_data	12	0	16	DEV_TCMM	PRT	calibration source 3, PRT 1
TS_ENG_CAL3_1RH	eng_data	13	0	16	DEV_TCMM	PRT	calibration source 3, PRT 1, ref hi
TS_ENG_CAL3_1RL	eng_data	14	0	16	DEV_TCMM	PRT	calibration source 3, PRT 1, ref lo
TS_ENG_CAL3_2	eng_data	15	0	16	DEV_TCMM	PRT	calibration source 3, PRT 2
TS_ENG_CAL3_2RH	eng_data	16	0	16	DEV_TCMM	PRT	calibration source 3, PRT 2, ref hi
TS_ENG_CAL3_2RL	eng_data	17	0	16	DEV_TCMM	PRT	calibration source 3, PRT 2, ref lo
TS_ENG_CAL4_1	eng_data	18	0	16	DEV_TCMM	PRT	calibration source 4, PRT 1
TS_ENG_CAL4_1RH	eng_data	19	0	16	DEV_TCMM	PRT	calibration source 4, PRT 1, ref hi
TS_ENG_CAL4_1RL	eng_data	20	0	16	DEV_TCMM	PRT	calibration source 4, PRT 1, ref lo
TS_ENG_CAL4_2	eng_data	21	0	16	DEV_TCMM	PRT	calibration source 4, PRT 2
TS_ENG_CAL4_2RH	eng_data	22	0	16	DEV_TCMM	PRT	calibration source 4, PRT 2, ref hi
TS_ENG_CAL4_2RL	eng_data	23	0	16	DEV_TCMM	PRT	calibration source 4, PRT 2, ref lo

TR_ENG_LMC1	eng_data	24	0	16 DEV_TCMM	Thermistor	LMC1 GAS, thermistor
TR_ENG_LMC2	eng_data	25	0	16 DEV_TCMM	Thermistor	LMC2 GAS, thermistor
TR_ENG_LMC3	eng_data	26	0	16 DEV_TCMM	Thermistor	LMC3 GAS, thermistor
TR_ENG_LMC4	eng_data	27	0	16 DEV_TCMM	Thermistor	LMC4 GAS, thermistor
TR_ENG_PMC1	eng_data	28	0	16 DEV_TCMM	Thermistor	PMC1 GAS, thermistor
TR_ENG_PMC2	eng_data	29	0	16 DEV_TCMM	Thermistor	PMC2 GAS, thermistor
TS_ENG_SIEVE1	eng_data	30	0	16 DEV_TCMM	PRT	sieve 1, PRT
TS_ENG_SIEVE1_RH	eng_data	31	0	16 DEV_TCMM	PRT	sieve 1, PRT, ref hi
TS_ENG_SIEVE1_RL	eng_data	32	0	16 DEV_TCMM	PRT	sieve 1, PRT, ref lo
TS_ENG_SIEVE2	eng_data	33	0	16 DEV_TCMM	PRT	sieve 2, PRT
TS_ENG_SIEVE2_RH	eng_data	34	0	16 DEV_TCMM	PRT	sieve 2, PRT, ref hi
TS_ENG_SIEVE2_RL	eng_data	35	0	16 DEV_TCMM	PRT	sieve 2, PRT, ref lo
TS_ENG_SIEVE3	eng_data	36	0	16 DEV_TCMM	PRT	sieve 3, PRT
TS_ENG_SIEVE3_RH	eng_data	37	0	16 DEV_TCMM	PRT	sieve 3, PRT, ref hi
TS_ENG_SIEVE3_RL	eng_data	38	0	16 DEV_TCMM	PRT	sieve 3, PRT, ref lo
TS_ENG_SIEVE4	eng_data	39	0	16 DEV_TCMM	PRT	sieve 4, PRT
TS_ENG_SIEVE4_RH	eng_data	40	0	16 DEV_TCMM	PRT	sieve 4, PRT, ref hi
TS_ENG_SIEVE4_RL	eng_data	41	0	16 DEV_TCMM	PRT	sieve 4, PRT, ref lo
TR_ENG_DIODE1_HI	eng_data	42	0	16 DEV_TCMM	Diode1	diode reference, high, bank 1
TR_ENG_DIODE1_LO	eng_data	43	0	16 DEV_TCMM	Diode1	diode reference, low, bank 1
TR_ENG_FILTER1	eng_data	44	0	16 DEV_TCMM	Diode1	cold filter 1
TR_ENG_FILTER3	eng_data	45	0	16 DEV_TCMM	Diode1	cold filter 3
TR_ENG_FILTER5	eng_data	46	0	16 DEV_TCMM	Diode1	cold filter 5
TR_ENG_FILTER7	eng_data	47	0	16 DEV_TCMM	Diode1	cold filter 7
TR_ENG_DETECTOR1	eng_data	48	0	16 DEV_TCMM	Diode0	detector 1
TR_ENG_DETECTOR2	eng_data	49	0	16 DEV_TCMM	Diode0	detector 2
TR_ENG_DETECTOR3	eng_data	50	0	16 DEV_TCMM	Diode0	detector 3
TR_ENG_DETECTOR4	eng_data	51	0	16 DEV_TCMM	Diode0	detector 4
TR_ENG_DETECTOR5	eng_data	52	0	16 DEV_TCMM	Diode0	detector 5
TR_ENG_DETECTOR6	eng_data	53	0	16 DEV_TCMM	Diode0	detector 6
TR_ENG_DETECTOR7	eng_data	54	0	16 DEV_TCMM	Diode0	detector 7
TR_ENG_DETECTOR8	eng_data	55	0	16 DEV_TCMM	Diode0	detector 8
TR_ENG_THERM1_HI	eng_data	56	0	16 DEV_TCMM	Thermistor	thermistor reference 1, high
TR_ENG_THERM1_LO	eng_data	57	0	16 DEV_TCMM	Thermistor	thermistor reference 1, low
TR_ENG_THERM2_HI	eng_data	58	0	16 DEV_TCMM	Thermistor	thermistor reference 2, high
TR_ENG_THERM2_LO	eng_data	59	0	16 DEV_TCMM	Thermistor	thermistor reference 2, low
TR_ENG_THERM3_HI	eng_data	60	0	16 DEV_TCMM	Thermistor	thermistor reference 3, high
TR_ENG_THERM3_LO	eng_data	61	0	16 DEV_TCMM	Thermistor	thermistor reference 3, low
TR_ENG_THERM4_HI	eng_data	62	0	16 DEV_TCMM	Thermistor	thermistor reference 4, high
TR_ENG_THERM4_LO	eng_data	63	0	16 DEV_TCMM	Thermistor	thermistor reference 4, low

TR_ENG_CHOP1	eng_data	64	0	16 DEV_TCM	Thermistor	chopper 1, thermistor
TR_ENG_CHOP2	eng_data	65	0	16 DEV_TCM	Thermistor	chopper 2, thermistor
TR_ENG_CHOP3	eng_data	66	0	16 DEV_TCM	Thermistor	chopper 3, thermistor
TR_ENG_CHOP4	eng_data	67	0	16 DEV_TCM	Thermistor	chopper 4, thermistor
TR_ENG_OPT1_1	eng_data	68	0	16 DEV_TCM	Thermistor	optical table 1, thermistor 1
TR_ENG_OPT1_2	eng_data	69	0	16 DEV_TCM	Thermistor	optical table 1, thermistor 2
TR_ENG_OPT1_3	eng_data	70	0	16 DEV_TCM	Thermistor	optical table 1, thermistor 3
TR_ENG_OPT1_4	eng_data	71	0	16 DEV_TCM	Thermistor	optical table 1, thermistor 4
TR_ENG_OPT2_1	eng_data	72	0	16 DEV_TCM	Thermistor	optical table 2, thermistor 1
TR_ENG_OPT2_2	eng_data	73	0	16 DEV_TCM	Thermistor	optical table 2, thermistor 2
TR_ENG_OPT2_3	eng_data	74	0	16 DEV_TCM	Thermistor	optical table 2, thermistor 3
TR_ENG_OPT2_4	eng_data	75	0	16 DEV_TCM	Thermistor	optical table 2, thermistor 4
TR_ENG_SCAN1	eng_data	76	0	16 DEV_TCM	Thermistor	scan mirror 1
TR_ENG_SCAN2	eng_data	77	0	16 DEV_TCM	Thermistor	scan mirror 2
TR_ENG_SCAN3	eng_data	78	0	16 DEV_TCM	Thermistor	scan mirror 3
TR_ENG_SCAN4	eng_data	79	0	16 DEV_TCM	Thermistor	scan mirror 4
TR_ENG_DIODE2_HI	eng_data	80	0	16 DEV_TCM	Diode2	diode reference, high, bank 2
TR_ENG_DIODE2_LO	eng_data	81	0	16 DEV_TCM	Diode2	diode reference, low, bank 2
TR_ENG_PRESS1	eng_data	82	0	16 DEV_TCM	Thermistor	temp. of pressure 1, thermistor
TR_ENG_PRESS2	eng_data	83	0	16 DEV_TCM	Thermistor	temp. of pressure 2, thermistor
TR_ENG_PRESS3	eng_data	84	0	16 DEV_TCM	Thermistor	temp. of pressure 3, thermistor
TR_ENG_PRESS4	eng_data	85	0	16 DEV_TCM	Thermistor	temp. of pressure 4, thermistor
VR_ENG_PRESS1	eng_data	86	0	16 DEV_TCM	Pressure	pressure 1
VR_ENG_PRESS1_RH	eng_data	87	0	16 DEV_TCM	Pressure	pressure 1 high ref
VR_ENG_PRESS1_RL	eng_data	88	0	16 DEV_TCM	Pressure	pressure 1 low ref
VR_ENG_PRESS2	eng_data	89	0	16 DEV_TCM	Pressure	pressure 2
VR_ENG_PRESS2_RH	eng_data	90	0	16 DEV_TCM	Pressure	pressure 2 high ref
VR_ENG_PRESS2_RL	eng_data	91	0	16 DEV_TCM	Pressure	pressure 2 low ref
VR_ENG_PRESS3	eng_data	92	0	16 DEV_TCM	Pressure	pressure 3
VR_ENG_PRESS3_RH	eng_data	93	0	16 DEV_TCM	Pressure	pressure 3 high ref
VR_ENG_PRESS3_RL	eng_data	94	0	16 DEV_TCM	Pressure	pressure 3 low ref
VR_ENG_PRESS4	eng_data	95	0	16 DEV_TCM	Pressure	pressure 4
VR_ENG_PRESS4_RH	eng_data	96	0	16 DEV_TCM	Pressure	pressure 4 high ref
VR_ENG_PRESS4_RL	eng_data	97	0	16 DEV_TCM	Pressure	pressure 4 low ref
VR_ENG_PMC1_PPO	eng_data	98	0	16 DEV_PMC1	Position	PMC1 positional pick-off amplitude
VR_ENG_PMC2_PPO	eng_data	99	0	16 DEV_PMC2	Position	PMC2 positional pick-off amplitude
//NR_ENG_PMC1_FREQ	eng_data	100	0	16 DEV_PMC1	Freq	PMC1 free-run frequency - OBSOLETE
//NR_ENG_PMC2_FREQ	eng_data	101	0	16 DEV_PMC2	Freq	PMC2 free-run frequency - OBSOLETE
VR_ENG_PMC1_PERR	eng_data	100	0	16 DEV_PMC1	Voltage	PMC1 Phase Error
VR_ENG_PMC2_PERR	eng_data	101	0	16 DEV_PMC2	Voltage	PMC2 Phase Error

VR_HTR_NEST1	eng_data	102	0	16 DEV_TCMM	Voltage	Heater Voltage - Detector Nest 1
VR_HTR_NEST2	eng_data	103	0	16 DEV_TCMM	Voltage	Heater Voltage - Detector Nest 2
VR_CAL_1	eng_data	104	0	16 DEV_TCMM	Voltage	Heater Voltage - Calibration Source 1
VR_CAL_2	eng_data	105	0	16 DEV_TCMM	Voltage	Heater Voltage - Calibration Source 2
VR_CAL_3	eng_data	106	0	16 DEV_TCMM	Voltage	Heater Voltage - Calibration Source 3
VR_CAL_4	eng_data	107	0	16 DEV_TCMM	Voltage	Heater Voltage - Calibration Source 4
VR_SIEVE_1	eng_data	108	0	16 DEV_TCMM	Voltage	Heater Voltage - Sieve 1
VR_SIEVE_2	eng_data	109	0	16 DEV_TCMM	Voltage	Heater Voltage - Sieve 2
VR_SIEVE_3	eng_data	110	0	16 DEV_TCMM	Voltage	Heater Voltage - Sieve 3
VR_SIEVE_4	eng_data	111	0	16 DEV_TCMM	Voltage	Heater Voltage - Sieve 4
VR_HTR_REF_HI	eng_data	112	0	16 DEV_TCMM	Voltage	Heater Voltage - Reference HI
VR_HTR_REF_LO	eng_data	113	0	16 DEV_TCMM	Voltage	Heater Voltage - Reference Lo
VR_LMC1_MOTOR	eng_data	114	0	16 DEV_LMC1	Voltage	Motor Voltage - LMC1
VR_LMC2_MOTOR	eng_data	115	0	16 DEV_LMC2	Voltage	Motor Voltage - LMC2
VR_LMC3_MOTOR	eng_data	116	0	16 DEV_LMC3	Voltage	Motor Voltage - LMC3
VR_LMC4_MOTOR	eng_data	117	0	16 DEV_LMC4	Voltage	Motor Voltage - LMC4
VR_MIRROR1_MOTOR	eng_data	118	0	16 DEV_MIRROR1	Voltage	Motor Voltage - Mirror 1
VR_MIRROR2_MOTOR	eng_data	119	0	16 DEV_MIRROR2	Voltage	Motor Voltage - Mirror 2
VR_MIRROR3_MOTOR	eng_data	120	0	16 DEV_MIRROR3	Voltage	Motor Voltage - Mirror 3
VR_MIRROR4_MOTOR	eng_data	121	0	16 DEV_MIRROR4	Voltage	Motor Voltage - Mirror 4
VR_CHOP1_MOTOR	eng_data	122	0	16 DEV_CHOPPER1	Voltage	Motor Voltage - Chopper 1
VR_CHOP2_MOTOR	eng_data	123	0	16 DEV_CHOPPER2	Voltage	Motor Voltage - Chopper 2
VR_CHOP3_MOTOR	eng_data	124	0	16 DEV_CHOPPER3	Voltage	Motor Voltage - Chopper 3
VR_CHOP4_MOTOR	eng_data	125	0	16 DEV_CHOPPER4	Voltage	Motor Voltage - Chopper 4
VR_PMC1_MOTOR	eng_data	126	0	16 DEV_PMC1	Voltage	Motor Voltage - PMC 1
VR_PMC2_MOTOR	eng_data	127	0	16 DEV_PMC2	Voltage	Motor Voltage - PMC 2