Entegris GV148 Commands Document

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DESCRIPTION:

This document details the serial commands, Status, and return codes for the GV148.

This document is auto generated directly from the source code of HMI/FIRMWARE.

There is an appendix included that provides more detailed information about some subjects.

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Commands

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SOFTWARE_RESET: Software Reset

This command will restart the unit Similar to a power-on condition.

Command Code: 2 SOFTWARE_RESET	
Send Data	*None*
Receive Data	*None*
Access Level	OPERATOR

WRITE_NOTE: Write user note Size: 500 bytes

This command is used to enter a user message into the log.

Command Code: 3 WRITE_NOTE	
Send Data	500 bytes data as defined below
Receive Data	*None*
Access Level	*NONE*

Write user note Structure			Size: 500 bytes
Type	Field		Description
0 STRING	Message[500]		User message Default: 0

CLEAR_ERRORS: Clear errors

This command clears the pending warnings and errors. Depending on the type of error, it may also re-initialize the unit.

Command Code: 4 CLEAR_ERRORS	
Send Data	*None*
Receive Data	*None*
Access Level	OPERATOR

START_MAINTENANCE: Go into Maintenance mode

This command will put the unit into maintenance mode.

Command Code: 6 START_MAINTENANCE	
Send Data	*None*
Receive Data	*None*
Access Level	ENGINEER

END_MAINTENANCE: End Maintenance mode

This command will remove the system from maintenance mode.

Command Code: 8 END_MAINTENANCE	
Send Data	*None*
Receive Data	*None*
Access Level	ENGINEER

TIME: Time Now Size: 4 bytes

Gets and sets the Real Time Clock value. The value is the number of seconds since 1970 (UNIX Epoch Time) in UTC timezone.

Command Code: 10 TIME	
Send Data	*None*
Receive Data	4 bytes data as defined below
Access Level	ENGINEER

Command Code: 11 WRITE TIME	
Send Data	4 bytes data as defined below
Receive Data	*None*
Access Level	ENGINEER

Time Now Structure		Size: 4 bytes
Type	Field	Description
0 ULONG	Time	UTC seconds from 1 Jan 1970 Min: 1381247363 Default: 0

GET_SVIDS: Get SVIDS

This command will accept a list of USHORT SVID values and return the appropriate data. Note: The size of the data depends on the SVID type. For strings the first USHORT is the length of the string.

Command Code: 21 GET_SVIDS	
Send Data	List of SVIDs (see SVIDs Appendix)
Receive Data	List of SVID data (see SVIDs Appendix)
Access Level	*NONE*

GET_ALARMS: Get Alarms Size: 8 bytes

Used to get a number of alarm records. See the Appendix for more detailed information about this command.

Command Code: 24 GET_ALARMS	
Send Data	8 bytes data as defined below
Receive Data	Alarms data (See Alarms Appendix)
Access Level	*NONE*

Get Alarms Structure		Size: 8 bytes
Type	Field	Description
0 ULONG	AlarmNumber	First alarm to get (0 means most recent) Default: 0
4 UINT16	Count	How many to get Min: 1 Max: 25 Default: 0
6 UINT16	Reserved	Reserved Default: 0

READ_RT_TRACES: Read Real Time Traces Size: 4 bytes

This is typically used every second to poll the unit for greater than 1 second of data. The return data includes a sample alignment number that is used to align the data correctly and discard the unused data. This allows real time display to overcome communication delays and retries. See the Appendix for more detailed information about this command.

Command Code: 26 READ_RT_TRACES	
Send Data	4 bytes data as defined below
Receive Data	Interleaved Trace data (See RT_TRACES Appendix)
Access Level	*NONE*

Read Real Time Traces Structure		Size: 4 bytes
Type	Field	Description
0 UINT16	Points	How many points to get Min: 1 Max: 50 Default: 0
2 UINT16	Traces	Which Traces See the Appendix for more. Min: 1 Max: ST_TRACE_ALL Default: 0

SYSTEMNAMES: System Names Size: 192 bytes

System names are strings stored in the unit as a convenience to identify it The strings can be read back with SVIDs as well.

Command Code: 64 SYSTEMNAMES	
Send Data	*None*
Receive Data	192 bytes data as defined below
Access Level	OWNER

Command Code: 65 WRITE SYSTEMNAMES	
Send Data	192 bytes data as defined below
Receive Data	*None*
Access Level	OWNER

System Names Structure		Size: 192 bytes
Type	Field	Description
0 STRING	CustomerName[24]	Customer Name Default: "End user name"
24 STRING	FabName[24]	Fab Name Default: "Fab name"
48 STRING	ToolName[24]	Tool Name Default: "Tool name"
72 STRING	Reserved1[24]	Reserved Default: 0
96 STRING	Reserved2[24]	Reserved Default: 0
120 STRING	ChemicalName[24]	Chemical name Default: "Chemical name"
144 STRING	SystemName[24]	System Name Default: "GV148"
168 STRING	FluidName[24]	Fluid Name/type Default: "Fluid Name"

VERSION: Get Version String Size: 104 bytes

Gets version and model numbers strings for the system firmware.

Command Code: 52 VERSION	
Send Data	*None*
Receive Data	104 bytes data as defined below
Access Level	*NONE*

Get Version String Structure		Size: 104 bytes
Type	Field	Description
0 STRING	reserved1[16]	reserved Default: 0
16 STRING	reserved2[16]	reserved Default: 0
32 STRING	Model[24]	Model Name Default: 0
56 STRING	Version[48]	Firmware Major Version Default: 0

FIRMWAREINFO: Get Firmware Information Size: 16 bytes

Gets version and other information about the firmware including product code.

Command Code: 54 FIRMWAREINFO	
Send Data	*None*
Receive Data	16 bytes data as defined below
Access Level	*NONE*

Get Firmware Information Structure		Size: 16 bytes
Type	Field	Description
0 UINT16	ProductQualifier	Qualifer for ProductCode to be valid Default: 6789
2 UINT16	Comms_Version	Communications protocol version Default: 0
4 UINT16	MajorVersion	Major Version Number Default: 1004
6 UINT16	ModuleType	Interface Module Type Default: 0
8 UINT16	MinorVersion	Firmware Minor Version Default: "BUMP"
10 UINT16	ProductCode	Product ID Code Default: 0
12 UINT16	MapSize	NV Map size (deprecated) Default: 0
14 UINT16	CRC	CRC (deprecated) Default: 0

CYCLECOUNTERS: Get Cycle Counters Size: 32 bytes

Reads all of the resettable and non-resettable cycle counters.

Command Code: 60 CYCLECOUNTERS	
Send Data	*None*
Receive Data	32 bytes data as defined below
Access Level	*NONE*

Get Cycle Counters Structure			Size: 32 bytes
	Type	Field	Description
0	ULONG	CycleRecordNum	Record Number Default: 0
4	ULONG	CycleCounts	Total Cycles Default: 0
8	ULONG	PowerCycles	Total Power Cycles Default: 0
12	ULONG	CycleCounts_reset_A	Resettable A Cycles Default: 0
16	ULONG	PowerCycles_reset_A	Resettable A Power Cycles Default: 0
20	ULONG	CycleCounts_reset_B	Resettable B Cycles Default: 0
24	ULONG	PowerCycles_reset_B	Resettable B Power Cycles Default: 0
28	UINT16	Reserved	For alignment Default: 0
30	UINT16	CRC	CRC Default: 0

SYSTEM_PARAMETERS: System Parameters Size: 100 bytes

This command reads and writes the System Parameters.

Command Code: 66 SYSTEM_PARAMETERS	
Send Data	*None*
Receive Data	100 bytes data as defined below
Access Level	OPERATOR

Command Code: 67 WRITE SYSTEM_PARAMETERS	
Send Data	100 bytes data as defined below
Receive Data	*None*
Access Level	OPERATOR

System Parameters Structure		Size: 100 bytes
Type	Field	Description
0 UINT16	Address	Serial Address Min: 1 Max: 63 Default: 1 Sets the device communication address, default is address 1. If changed, remember to select the new address when establishing a new connection
2 UINT16	MaintenanceModeTimeoutEnable	Maint. Mode Enable Max: 1 Default: 0 Values: Disable=0, Enable=1 When enabled, this feature allows communication with the device, but prevents any other operation from executing (Like RI Rezero)
4 UINT16	MaintenanceModeTimeout_min	Maint. Mode Timeout Max: 1000 Default: 120 Units: Minutes Sets the timeout value after which the device is removed from maintanance mode
6 UINT16	SerialTriggerEnable	Serial Trigger Enable Max: 1 Default: 1 Values: Disable=0, Enable=1 When enabled, the device allows serial commands to start certain functions when commanded via HMI Software (Like RI Rezero)

8	FLOAT	Analog_Output_Concn_Min	Concn 4mA Output Min: -10000 Max: 10000 Default: 0 Units: CONC_UNIT Sets the Concentration 4mA Output
12	FLOAT	Analog_Output_Concn_Max	Concn 20mA Output Min: 0 Max: 10000 Default: 100 Units: CONC_UNIT Sets the Concentration 20mA Output
16	FLOAT	Analog_Output_Temperature_Min	Temp 4mA Output Min: 5 Max: 50 Default: 15 Units: Degrees Sets the Temperature 4mA Output
20	FLOAT	Analog_Output_Temperature_Max	Temp 20mA Output Min: 5 Max: 50 Default: 40 Units: Degrees Sets the Temperature 20mA Output
24	FLOAT	Analog_Output_RI_Min	RI 4mA Output Min: 1.28 Max: 1.44 Default: 1.332987 Units: nD Sets the RI 4mA Output
28	FLOAT	Analog_Output_RI_Max	RI 20mA Output Min: 1.28 Max: 1.44 Default: 1.4 Units: nD Sets the RI 20mA Output
32	UINT16	SerialTerminationEnable	Serial Termination Resistor Max: 1 Default: 0 Values: Disable=0, Enable=1 Sets the 120ohm termination resistor for Serial Communication
34	UINT16	PP_WeightedAverage_ds	Sensor Averaging Max: 1000 Default: 16 Units: seconds * 10 Sets the Pixel Position and Temperature weighted averaging in seconds

Offset	Type	Name	Description
36	FLOAT	RI_Rezero_Target_RI	Digital Input RI Rezero Value Min: 1.32 Max: 1.4 Default: 1.332987 Units: nD Sets the RI Rezero target value
40	ULONG	RI_Rezero_Avg_ms	Digital Input RI Rezero Time Min: 1000 Max: 60000 Default: 20000 Units: seconds * 1000 Sets the Rezero averaging time duration
44	UINT16	ChemistryNum	Primary Chem # for TCC Max: 12 Default: 1 Values: Disable=0, #1=1, #2=2, #3=3, #4=4, #5=5, #6=6, #7=7, #8=8, #9=9, #10=10, #11=11, #12=12 Sets the primary chemistry number (1-12) for application of TCC to Refractive Index (typically set for DIW)
46	UINT16	RI_Rezero_ChemistryNum	Secondary Chem # for TCC Max: 12 Default: 2 Values: Disable=0, #1=1, #2=2, #3=3, #4=4, #5=5, #6=6, #7=7, #8=8, #9=9, #10=10, #11=11, #12=12 Sets the secondary chemistry number (1-12) for application of TCC to Refractive Index (typically set for Chemistry)
48	FLOAT	RI_Rezero_Stablity	RI Rezero Stablity Max Min: 1e-06 Max: 0.1 Default: 2e-05 Units: nD Sets the maximum allowable STDEV of the RI reading in order to pass the RI Rezero selftest
52	FLOAT	Temp_Rezero_Stablity	Temp Rezero Stablity Max Min: 0.01 Max: 10 Default: 0.02 Units: Degrees Sets the maximum allowable STDEV of the Temperature reading in order to pass the RI Rezero selftest
56	FLOAT	ConcentrationRezero	Concentration Offset Min: -100 Max: 100 Default: 0 Units: CONC_UNIT Sets an offset value which is applied to Concentration output reading
60	FLOAT	reserved3	reserved Default: 0

64 FLOAT	reserved4	reserved Default: 0
68 FLOAT	reserved5	reserved Default: 0
72 FLOAT	reserved6	reserved Default: 0
76 FLOAT	reserved7	reserved Default: 0
80 FLOAT	reserved8	reserved Default: 0
84 FLOAT	reserved9	reserved Default: 0
88 FLOAT	reserved10	reserved Default: 0
92 ULONG	Time	Last saved Default: 0 Displays the date and time when this structure was last saved
96 ULONG	Cycle	Cycle when written Default: 0

ANALOG_PARAMETERS: Analog Parameters Size: 48 bytes

This command reads and writes the System Parameters.

Command Code: 103 ANALOG_PARAMETERS	
Send Data	*None*
Receive Data	48 bytes data as defined below
Access Level	OPERATOR

Command Code: 104 WRITE ANALOG_PARAMETERS	
Send Data	48 bytes data as defined below
Receive Data	*None*
Access Level	OPERATOR

Analog Parameters Structure			Size: 48 bytes
	Type	Field	Description
0	UINT16	AnalogOutput1_TrimModeEnable	Concentration Trim Mode Max: 1 Default: 0 Values: Disable=0, Enable=1 Enables trim mode for 4-20mA anlog output 1
2	UINT16	AnalogOutput2_TrimModeEnable	Temperature Trim Mode Max: 1 Default: 0 Values: Disable=0, Enable=1 Enables trim mode for 4-20mA anlog output 2
4	UINT16	AnalogOutput3_TrimModeEnable	RI Trim Mode Max: 1 Default: 0 Values: Disable=0, Enable=1 Enables trim mode for 4-20mA anlog output 3
6	UINT16	reserved1	reserved Default: 0
8	FLOAT	AnalogOutput1_ForceValue	Concentration ForceValue Min: 4 Max: 20 Default: 4 Units: mA When trim mode enabled for output, forces the output to this value for trimming

12	FLOAT	AnalogOutput2_ForceValue	Temperature ForceValue Min: 4 Max: 20 Default: 4 Units: mA When trim mode enabled for output, forces the output to this value for trimming
16	FLOAT	AnalogOutput3_ForceValue	RI ForceValue Min: 4 Max: 20 Default: 4 Units: mA When trim mode enabled for output, forces the output to this value for trimming
20	INT16	AnalogOutput1_Trim_4mA	Concentration: 4mA Trim Min: -250 Max: 250 Default: 0 Units: Counts Sets a trim value applied to the Analog Output 4mA point for Concentration
22	INT16	AnalogOutput1_Trim_20mA	Concentration: 20mA Trim Min: -250 Max: 250 Default: 0 Units: Counts Sets a trim value applied to the Analog Output 20mA point for Concentration
24	INT16	AnalogOutput2_Trim_4mA	Temperature: 4mA Trim Min: -250 Max: 250 Default: 0 Units: Counts Sets a trim value applied to the Analog Output 4mA point for Temperature
26	INT16	AnalogOutput2_Trim_20mA	Temperature: 20mA Trim Min: -250 Max: 250 Default: 0 Units: Counts Sets a trim value applied to the Analog Output 20mA point for Temperature
28	INT16	AnalogOutput3_Trim_4mA	RI: 4mA Trim Min: -250 Max: 250 Default: 0 Units: Counts Sets a trim value applied to the Analog Output 4mA point for Refractive Index

30 INT16	AnalogOutput3_Trim_20mA	RI: 20mA Trim Min: -250 Max: 250 Default: 0 Units: Counts Sets a trim value applied to the Analog Output 20mA point for Refractive Index
32 FLOAT	reserved2	reserved Default: 0
36 FLOAT	reserved3	reserved Default: 0
40 ULONG	Time	Last saved Default: 0 Displays the date and time when this structure was last saved
44 ULONG	Cycle	Cycle when written Default: 0

RTSTATUS: Get Real Time Status Size: 76 bytes

Command Code: 100 RTSTATUS	
Send Data	*None*
Receive Data	76 bytes data as defined below
Access Level	NONE

Get Real Time Status Structure		Size: 76 bytes
Type	Field	Description
0 INT16	Status	System Status Default: 0 Test
2 UINT16	Indicators	Status bit indicators Default: 0
4 ULONG	LastCycle	Cycle Num of last completed Default: 0
8 UINT16	reserved7	reserved Default: 0
10 UINT16	reserved8	reserved Default: 0
12 UINT16	reserved9	reserved Default: 0
14 UINT16	reserved1	reserved Default: 0
16 ULONG	TotalCycleCounts	Cycle Default: 0
20 ULONG	ResettableCycleCounts	Cycle on Filter Default: 0
24 UINT16	CriticalErrors	counts Critical System Errors after they are logged Default: 0
26 UINT16	Errors	counts System Errors after they are logged Default: 0
28 UINT16	Warnings	counts System Warnings after they are logged Default: 0
30 UINT16	Infos	counts System infos after they are logged Default: 0
32 UINT16	TotalAlarms	counts total uncleared alarms after they are logged Default: 0
34 UINT16	reserved2	reserved Default: 0

36	ULONG	NewestAlarmNum	Number of newest alarm Default: 0
40	ULONG	NewestRecordNum	Number of newest record Default: 0
44	ULONG	LastClearedRecord	# of the last cleared record Default: 0
48	ULONG	LastClearedAlarm	# of the last cleared alarm Default: 0
52	ULONG	ProfileCycle	Most recent cycle Default: 0
56	UINT16	FirmwareImage	Firmware Image used Default: 0
58	UINT16	FirmwareImageInfo_0	FIRMWARE_IMAGE_INFO_0 Default: 0
60	UINT16	FirmwareImageInfo_1	FIRMWARE_IMAGE_INFO_1 Default: 0
62	UINT16	Serial	FirmwareImageInfo Serial Default: 0
64	ULONG	PowerCycles	Total Power Cycles Default: 0
68	UINT16	reserved3	reserved Default: 0
70	UINT16	reserved4	reserved Default: 0
72	UINT16	reserved5	reserved Default: 0
74	UINT16	reserved6	reserved Default: 0

VOLTAGESTATUS: Get System Voltage Status Size: 16 bytes

Command Code: 108 VOLTAGESTATUS	
Send Data	*None*
Receive Data	16 bytes data as defined below
Access Level	NONE

Get System Voltage Status Structure		Size: 16 bytes
Type	Field	Description
0 UINT16	mV_24_0_VDC	mV_24_0_VDC Default: 0
2 UINT16	mV_5_0_VDC	mV_5_0_VDC Default: 0
4 UINT16	mV_3_0_VDC	mV_3_0_VDC Default: 0
6 UINT16	mV_3_3_VDC	mV_3_3_VDC Default: 0
8 UINT16	mV_1_9_VDC	mV_1_9_VDC Default: 0
10 UINT16	Battery	Battery Interrupt Bits Default: 0
12 UINT16	reserved1	Reserved1 Default: 0
14 UINT16	reserved2	Reserved2 Default: 0

SENSOR_INITIALIZATION_LED_ONLY: Sensor Initialization LED Only

This command will reset the LED intensity, while leaving the air reference alone.

Command Code: 160 SENSOR_INITIALIZATION_LED_ONLY	
Send Data	*None*
Receive Data	*None*
Access Level	OPERATOR

SENSOR_INITIALIZATION_STATUS: Sensor Initialization Status Size: 4 bytes

This command will provide the status of the most recent sensor initialization performed.

Command Code: 165 SENSOR_INITIALIZATION_STATUS	
Send Data	*None*
Receive Data	4 bytes data as defined below
Access Level	OPERATOR

Sensor Initialization Status Structure Size: 4 bytes			
	Type	Field	Description
0	UINT16	Status	Sensor Initialization Status Default: 0 0=Successful, 1=In Process, 2=Fail
2	UINT16	reserved	reserved Default: 0

TEST_STATUS: Test Status Size: 20 bytes

Returns the status of the current or previously run diagnostic test

Command Code: 200 TEST_STATUS	
Send Data	*None*
Receive Data	20 bytes data as defined below
Access Level	NONE

Test Status Structure			Size: 20 bytes
	Type	Field	Description
0	UINT16	Status	Test Status Default: 0 0=Idle,1=Running
2	INT16	Complete	Percent Complete Default: 0
4	UINT16	Result	Test Result Default: 0 0=NOT RUN, 1=FAIL, 2=PASS, 3=INCOMPLETE
6	UINT16	Test	Command Code of test Default: 0
8	INT16	Cancelled	Test has been cancelled Default: 0 0=NOT CANCELLED, 1=CANCELLED
10	UINT16	reserved1	reserved Default: 0
12	ULONG	Time	Time Written Default: 0
16	ULONG	Cycle	Cycle when written Default: 0

TEST_CANCEL: Cancel Self Test

This command will cancel a self test that is running.

Command Code: 203 TEST_CANCEL	
Send Data	*None*
Receive Data	*None*
Access Level	OPERATOR

TEST_SENSOR_REZERO: Self Test: Refractive Index Rezero Size: 44 bytes

This command will perform a system self test to calculate the offset between the desired RI and actual measured RI

Command Code: 216 TEST_SENSOR_REZERO	
Send Data	*None*
Receive Data	44 bytes data as defined below
Access Level	ENGINEER

Command Code: 217 WRITE TEST_SENSOR_REZERO	
Send Data	44 bytes data as defined below
Receive Data	*None*
Access Level	ENGINEER

Self Test: Refractive Index Rezero Structure Size: 44 bytes			
	Type	Field	Description
0	FLOAT	Target_RI	Input: RI Value to Rezero Min: 1.32 Max: 1.4 Default: 1.332987 Units: nD Sets the target RI Rezero Value
4	ULONG	Averaging_ms	Input: Averaging Time Min: 1000 Max: 60000 Default: 20000 Units: seconds * 1000 Sets the Rezero averaging time
8	FLOAT	Pre_Calculated_Offset_RI	Result: Pre Delta RI Default: 0 Units: nD Displays the measured offset from target prior to the Rezero operation
12	FLOAT	Pre_Concn_Percent	Result: Pre Avg Conc % Default: 0 Units: % Displays the averaged Concentration prior to the Rezero operation
16	FLOAT	Pre_RefractiveIndex	Result: Pre Avg RI Default: 0 Units: nD Displays the averaged Refractive Index prior to the Rezero operation

20 FLOAT	Pre_PixelPosition	Result: Pre Avg PP Default: 0 Units: PP Displays the averaged Pixel Position prior to the Rezero operation
24 FLOAT	Post_Calculated_Offset_RI	Result: Post Delta RI Default: 0 Units: nD Displays the measured offset from target after the Rezero operation
28 FLOAT	Post_Concn_Percent	Result: Post Avg Conc % Default: 0 Units: % Displays the averaged Concentration after the Rezero operation
32 FLOAT	Post_RefractiveIndex	Result: Post Avg RI Default: 0 Units: nD Displays the averaged Refractive Index after the Rezero operation
36 FLOAT	Post_PixelPosition	Result: Post Avg PP Default: 0 Units: PP Displays the averaged Pixel Position after the Rezero operation
40 FLOAT	Sensor_stddev_RI	Result: Sensor Stability Default: 0 Units: nD Displays the sensor stability during Rezero operation

TEST_ANALOG_OUTPUTS: Self Test: Analog Outputs Size: 12 bytes

This command will perform a system self test setting the analog outputs

Command Code: 163 TEST_ANALOG_OUTPUTS	
Send Data	*None*
Receive Data	12 bytes data as defined below
Access Level	ENGINEER

Command Code: 164 WRITE TEST_ANALOG_OUTPUTS	
Send Data	12 bytes data as defined below
Receive Data	*None*
Access Level	ENGINEER

Self Test: Analog Outputs Structure Size: 12 bytes		
Type	Field	Description
0 ULONG	Duration_ms	Input: Self Test Duration Min: 1000 Max: 3600000 Default: 30000 Units: seconds * 1000 This sets the amount of time the analog output would be forced low, high or to its current value
4 UINT16	ConcnOutput	Input: Concentration Output Max: 2 Default: 0 Values: Normal=0, Low=1, High=2 Forces the Concentration analog output low, high or to its current value (normal)
6 UINT16	TempOutput	Input: Temperature Output Max: 2 Default: 0 Values: Normal=0, Low=1, High=2 Forces the Temperature analog output low, high or to its current value (normal)
8 UINT16	RIOutput	Input: RI Output Max: 2 Default: 0 Values: Normal=0, Low=1, High=2 Forces the Refractive Index analog output low, high or to its current value (normal)
10 UINT16	reserved	reserved Default: 0

SYSTEMMONITOR: System Monitor Size: 12 bytes

This command is used to monitor the system ouptuts

Command Code: 166 SYSTEMMONITOR	
Send Data	*None*
Receive Data	12 bytes data as defined below
Access Level	NONE

System Monitor Structure			Size: 12 bytes
	Type	Field	Description
0	FLOAT	Fluid_Temperature	Sensor Fluid Temperature Default: 0 Units: DegC
4	FLOAT	RefractiveIndex	Refractive Index Default: 0 Units: nD
8	FLOAT	Concentration	Concentration Default: 0

CONCN_CALIBRATION: Concentration Calibration Size: 316 bytes

This command will get and set calibration coefficients needed to conver RI to CONCN %.

Command Code: 175 CONCN_CALIBRATION	
Send Data	*None*
Receive Data	316 bytes data as defined below
Access Level	ENGINEER

Command Code: 176 WRITE CONCN_CALIBRATION	
Send Data	316 bytes data as defined below
Receive Data	*None*
Access Level	ENGINEER

Concentration Calibration Structure		Size: 316 bytes
Type	Field	Description
0 FLOAT	Concn_Percent[30]	Concentration values Default: 0xffff
120 FLOAT	RI_nD[30]	RI values (nD) Default: 0xffff Units: RI
240 UINT16	Algorithm	Curve Fit Algorithm Max: 4 Default: 1 Values: Segments=0, 1st Ord Poly=1, 2nd Ord Poly=2, 3rd Ord Poly=3, User Coeff=4 Sets the curve fit algorithm to use. 'Segments' uses linear interpolation between data table points. '1st Ord Poly, 2nd Ord Poly or 3rd Ord Poly' sets the order of a polynomial fit. 'User Coeff' allows for manual coefficient entry of a polynominal fit
242 UINT16	reserved1	reserved Default: 0
244 INT64	User_Intercept	Intercept Default: 0 Units: * 1000
252 INT64	User_FirstOrder	1st Order Coefficient Default: 0 Units: * 1000
260 INT64	User_SecondOrder	2nd Order Coefficient Default: 0 Units: * 1000

268	INT64	User_ThirdOrder	3rd Order Coefficient Default: 0 Units: * 1000
276	INT64	ConcnRI_Intercept	Intercept Default: 0 Units: * 1000
284	INT64	ConcnRI_FirstOrder	1st Order Coefficient Default: 0 Units: * 1000
292	INT64	ConcnRI_SecondOrder	2nd Order Coefficient Default: 0 Units: * 1000
300	INT64	ConcnRI_ThirdOrder	3rd Order Coefficient Default: 0 Units: * 1000
308	ULONG	Time	Time Written Default: 0
312	ULONG	Cycle	Cycle when written Default: 0

RITEMPCOMP_CALIBRATION: RI TempComp Calibration Size: 56 bytes

This command reads and writes the RI Temperature Compensation Calibration parameters

Command Code: 177 RITEMPCOMP_CALIBRATION	
Send Data	*None*
Receive Data	56 bytes data as defined below
Access Level	ENGINEER

Command Code: 178 WRITE RITEMPCOMP_CALIBRATION	
Send Data	56 bytes data as defined below
Receive Data	*None*
Access Level	ENGINEER

RI TempComp Calibration Structure		Size: 56 bytes
Type	Field	Description
0 UINT16	ChemistryNum	Chemistry number Max: 12 Default: 1 This selects the chemistry number
2 UINT16	Algorithm	Curve Fit Algorithm Max: 1 Default: 0 Values: 1st Ord Poly=0, 2nd Ord Poly=1 Sets the polynomial fit order to use; 1st order polynomial or second order polynomial
4 STRING	ChemistryTitle[32]	Description Default: "Chemistry Title" This sets the name for the corresponding chemistry number
36 FLOAT	RI_TCC_1st_C1	RI Temp Comp 1st Order Fit C1 Min: -100 Max: 100 Default: 0 1st order temperature compensation constant C1
40 FLOAT	RI_TCC_2nd_C1	RI Temp Comp 2nd Order Fit C1 Min: -100 Max: 100 Default: 0 2nd order temperature compensation constant C1
44 FLOAT	RI_TCC_2nd_C2	RI Temp Comp 2nd Order Fit C2 Min: -100 Max: 100 Default: 0 2nd order temperature compensation constant C2

| 48 ULONG | Time | Last saved
Default: 0
Displays the date and time when this structure was last saved |
| 52 ULONG | Cycle | Cycle when written
Default: 0 |

CHEMISTRYNAMES: Chemistry Names Size: 384 bytes

Chemistry names are strings stored in the unit as a convenience to identify it.

Command Code: 90	CHEMISTRYNAMES
Send Data	*None*
Receive Data	384 bytes data as defined below
Access Level	OWNER

Chemistry Names Structure		Size: 384 bytes
Type	**Field**	**Description**
0 STRING	ChemistryTitleOne[32]	Description Default: 0
32 STRING	ChemistryTitleTwo[32]	Description Default: 0
64 STRING	ChemistryTitleThree[32]	Description Default: 0
96 STRING	ChemistryTitleFour[32]	Description Default: 0
128 STRING	ChemistryTitleFive[32]	Description Default: 0
160 STRING	ChemistryTitleSix[32]	Description Default: 0
192 STRING	ChemistryTitleSeven[32]	Description Default: 0
224 STRING	ChemistryTitleEight[32]	Description Default: 0
256 STRING	ChemistryTitleNine[32]	Description Default: 0
288 STRING	ChemistryTitleTen[32]	Description Default: 0
320 STRING	ChemistryTitleEleven[32]	Description Default: 0
352 STRING	ChemistryTitleTwelve[32]	Description Default: 0

CLEAR_CONCN_CALIBRATION: Clear Concentration Calibration Table

This command clears the concentration calibration table.

Command Code: 237 CLEAR_CONCN_CALIBRATION	
Send Data	*None*
Receive Data	*None*
Access Level	OPERATOR

CLEAR_REZERO: ClearRezero

This command clears the offset for the active led. This offset was a result of performing a sensor rezero self test.

Command Code: 214 CLEAR_REZERO	
Send Data	*None*
Receive Data	*None*
Access Level	OPERATOR

CLEAR_TEMPERATURE_REZERO: ClearTemperatureRezero

This command clears the offset for the active led. This offset was a result of performing a sensor rezero self test.

Command Code: 242 CLEAR_TEMPERATURE_REZERO	
Send Data	*None*
Receive Data	*None*
Access Level	OPERATOR

RESTORE_FACTORY_CONFIGURATION: Restore Factory Configuration from NV Ram

This command restores the Factory configured structures from NV Ram.

Command Code: 12	RESTORE_FACTORY_CONFIGURATION
Send Data	*None*
Receive Data	*None*
Access Level	OPERATOR

Status Codes

0	Monitoring
1	Operation Pending
80	Initializing Sensor
100	Starting profile operation
1000	System Initialization Pending
1001	Start System Initialization
1600	Rezeroing Refractive Index
1800	Rezeroing Fluid Temperature
1900	Testing Analog Outputs
4990	Clear Error Pending
4995	Downloading Firmware
8887	System is in Maintenance Mode with a Timeout
8888	System is in Maintenance Mode
9998	System Error
9999	Critical System Error
10001	System is not connected
10002	System attempting to connect

Sensor Error Codes

`20000`   The sensor has become disconnected from the system or is malfunctioning. Try cycling power or inspect unit for damage.

`20001`   The sensor is malfunctioning. Try cycling power or inspect unit for damage.

`20002`   The sensor is malfunctioning. Try cycling power or inspect unit for damage.

`20003`   The sensor cannot obtain a valid reading. The sensor needs to be re-initialized.

`20004`   The sensor cannot obtain a valid reading. The refractive index calibration is not valid. Try factory restoring the configuration.

`20005`   The sensor cannot obtain a valid temperature measurement, it may have come disconnected from the system or is malfunctioning.

`30000`   The sensor cannot obtain a valid reading. No valid reading on any pixel. The sensor may be defective.

`30001`   The sensor cannot obtain a valid temperature measurement. Please ensure the sensor is not in extreme temperature conditions.

`30002`   The sensor cannot obtain a valid reading. The sensor may be exposed to air, ensure chemistry is sufficiently being supplied to sensor.

`30003`   The sensor cannot obtain a valid reading. The sensor may be exposed to too much light, reduce the sensor exposure to ambient light.

`30004`   The sensor received too much light during a light read. The sensor may be exposed to too much light, reduce the sensor exposure to ambient light.

`30005`   The sensor cannot obtain a valid reading. The sensor is measuring on the very edge of its capability, modify the refractive index of the chemistry.

Return Codes

0	Good
1	Size Error
2	Unknown Command
3	Bad CRC
4	Comm Error
5	Non volatile Error
6	The system is busy with a previous command. Please wait for READY status, then try again.
7	Unknown Internal Error (should not happen)
8	Bad Diagnostic
9	Diag failed
10	One or more of the values you just entered is above the maximum value for that parameter. The problem fields are highlighted in red.
11	One or more of the values you just entered is below the minimum value for that parameter. The problem fields are highlighted in red.
12	SVID List too large
13	Unknown SVID
14	Flash too many segments
15	Flash Illegal Address
16	Flash segment overlap
17	Flash no segment
18	Flash Duplicate
19	Download not sequential
20	Error in firmware image (number of segments)
21	Error in firmware image (CRC)
22	No firmware validation code received
23	Dataflash failure
24	Dataflash verify failure
25	Dataflash failed CRC
26	Dataflash read size mismatch
27	Dataflash chiperror failure
28	No records available
29	Error decoding trace data
30	No profile for this cycle
31	Bounds error for profile data start
32	Serial Trigger commmands have been disabled
33	N/A
34	EEPROM failure
35	EEPROM failed CRC
36	EEPROM write in progress
37	Module already processing command request
38	Module NV memory timed out
39	Module NV errors detected

40	Module NV data verification error detected
70	Bad Chemistry Number
71	Step change from base to test RI needs to exceed +-0.0002nD Accuracy Band
76	Total recipe volume too low
77	Total recipe volume too high
84	Bad Curve Number
86	Lower RI bounds of RI exceeded
87	Upper RI bounds of RI exceeded
88	Lower concentration bounds exceeded
89	Upper concentration bounds exceeded
90	Invalid RI or Concentration entry in table
91	Duplicate entry in table
92	Entries in table create duplicate Concentration for one RI
93	Table contains only one valid entry
94	Sensor Initialization in progress. Loading and Recording curves are disabled during this process.
95	Bad air reference has been calculated
96	Sensor is in an error state
97	Background light is too high for sensor to execute requested operation
98	Temperature is too extreme for sensor to execute requested operation
99	Sensor is unable to execute requested operation
100	Sensor does not have sufficient chemistry to execute requested operation
101	Sensor initialization is incomplete.
102	Background light is too high for sensor to execute requested operation
103	Sensor busy line not responding.
104	Sensor initialization is incomplete.
255	This is the max code

Trace Bits

1	Concentration Low Byte
2	Concentration High Byte
4	Refractive Index Low Byte
8	Refractive Index High Byte
16	System Status
32	Sensor Fluid Temp

Trace Numbers

0   Concentration Low Byte
1   Concentration High Byte
2   Refractive Index Low Byte
3   Refractive Index High Byte
4   System Status
5   Sensor Fluid Temp

SVIDs

SVID	Size	Type	Data	Description
10	24	STRING	Sheet 2:.Model[24]	Model Name
11	48	STRING	Sheet 2:<Commands>.Version[48]	Firmware Major Version
12	24	STRING	Sheet 2:<Commands>.CustomerName[24]	Customer Name
13	24	STRING	Sheet 2:<Commands>.FabName[24]	Fab Name
14	24	STRING	Sheet 2:<Commands>.ToolName[24]	Tool Name
17	24	STRING	Sheet 2:<Commands>.ChemicalName[24]	Chemical name
18	24	STRING	Sheet 2:<Commands>.SystemName[24]	System Name
19	24	STRING	Sheet 2:<Commands>.FluidName[24]	Fluid Name/type
257	2	INT16	Sheet 2:.Status	System Status
769	2	UINT16	Sheet 2:<Commands>.ProductQualifier	Qualifer for ProductCode to be valid
770	2	UINT16	Sheet 2:<Commands>.Comms_Version	Communications protocol version
771	2	UINT16	Sheet 2:<Commands>.MajorVersion	Major Version Number
772	2	UINT16	Sheet 2:.ModuleType	Interface Module Type
773	2	UINT16	Sheet 2:<Commands>.MinorVersion	Firmware Minor Version
774	2	UINT16	Sheet 2:<Commands>.ProductCode	Product ID Code
799	2	UINT16	Sheet 2:<Commands>.CriticalErrors	counts Critical System Errors after they are logged
800	2	UINT16	Sheet 2:.Errors	counts System Errors after they are logged
801	2	UINT16	Sheet 2:.Warnings	counts System Warnings after they are logged
802	2	UINT16	Sheet 2:.Infos	counts System infos after they are logged
803	2	UINT16	Sheet 2:<Commands>.TotalAlarms	counts total uncleared alarms after they are logged
849	2	UINT16	Sheet 2:.Algorithm	Curve Fit Algorithm
1025	4	ULONG	Sheet 2:.Time	UTC seconds from 1 Jan 1970

1026	4	ULONG	Sheet 2:<Commands>.CycleCounts	Total Cycles
1027	4	ULONG	Sheet 2:<Commands>.PowerCycles	Total Power Cycles
1033	4	ULONG	Sheet 2:<Commands>.CycleCounts_reset_A	Resettable A Cycles
1034	4	ULONG	Sheet 2:<Commands>.PowerCycles_reset_A	Resettable A Power Cycles
1040	4	ULONG	Sheet 2:<Commands>.CycleCounts_reset_B	Resettable B Cycles
1041	4	ULONG	Sheet 2:<Commands>.PowerCycles_reset_B	Resettable B Power Cycles
1048	4	ULONG	Sheet 2:<Commands>.NewestAlarmNum	Number of newest alarm
1049	4	ULONG	Sheet 2:<Commands>.NewestRecordNum	Number of newest record
1056	4	ULONG	Sheet 2:.LastCycle	Cycle Num of last completed
1057	4	ULONG	Sheet 2:<Commands>.LastClearedRecord	# of the last cleared record
1058	4	ULONG	Sheet 2:<Commands>.ProfileCycle	Most recent cycle
1536	8	xxx	Sheet 2:<Commands>.User_Intercept	Intercept
1537	8	xxx	Sheet 2:<Commands>.User_FirstOrder	1st Order Coefficient
1538	8	xxx	Sheet 2:<Commands>.User_SecondOrder	2nd Order Coefficient
1539	8	xxx	Sheet 2:<Commands>.User_ThirdOrder	3rd Order Coefficient
1540	8	xxx	Sheet 2:<Commands>.ConcnRI_Intercept	Intercept
1541	8	xxx	Sheet 2:<Commands>.ConcnRI_FirstOrder	1st Order Coefficient
1542	8	xxx	Sheet 2:<Commands>.ConcnRI_SecondOrder	2nd Order Coefficient
1543	8	xxx	Sheet 2:<Commands>.ConcnRI_ThirdOrder	3rd Order Coefficient

Appendix

Alarms

Alarms are informational records that are used to log events that occur in the system. Information about individual alarm codes are in a separate alarms document. Each alarm has a code, a timestamp, an ID number, and 4 bytes of data. Alarms are classified as one of 5 types: The ID number is a unique number starting at for each alarm used for retrieval.

None: 0 - Not classified
Information: 1 - Information only.
Warning: 2 - Initiates Warning condition in the system
Error: 3 - Initiates Error condition in the system
Critical: 4 - Initiates Error condition in the system.

Alarms are retrieved with the GET_ALARMS command by sending the first alarm number to retrieve and a count of how many alarms to return. As a special case alarm number 0 for Start is always the most recent alarm.

NOTE: The GET_ALARMS command may have to search through thousands of log records to find alarm log records. To eliminate this possibily long time and stop communication timeouts the GET_ALARMS command will terminate after 500mS of searching and gathering and return without all of the requested alarms. It may take several subsequent commands to get all of the desired alarms. The most recent alarm number and also be found as TotalAlarms in the RTSTATUS command.

The data for each alarm is:

UINT16 Size 14 words (28 bytes)
UINT16 RecordType 1 for alarm record
ULONG CycleNum "System cycle number"
ULONG TimeStamp "date and time stamp"
ULONG RecordNumber

ULONG AlarmNumber "Alarm Number"
UINT16 Code "Alarm Code -- defined below"
UINT16 AlarmSeverity "Info, warning, error, critical error"
ULONG Data "Alarm specific data"

Alarm specific data can be decoded and used in the strings as variables below.

The long (4 byte) data is decoded like this:

BYTE0 BYTE1 BYTE2 BYTE3
WORD0 WORD1
LONG

The variables used are shown here.

$ULONG LONG Display as integer

$LONG LONG (signed value) Display as integer
$SHORT0 WORD0 (signed value) Display as integer
$SHORT1 WORD1 (signed value) Display as integer
$USHORT0 WORD0 Display as integer
$USHORT1 WORD1 Display as integer
$CSECS0 WORD0 .01 of a second Display as float: 1.23
$CSECS1 WORD1 .01 of a second Display as float: 1.23
$TIME LONG UTC time since 1970, display as string using local TZ
$MODULE LONG Display as a string description of the module type
$CPERC0 WORD0 Display as % divide by 100
$CPERC1 WORD1 Display as % divide by 100

Bounds Check Errors

When a write command generates bounds limit errors the return code form the command is the first bouds error detected. The command will also return a list of error codes and field index for all bounds errors detected. This way the HMI or track software can display all of the errors at once.

For each bounds limit error 2 UINT16 values are returned in the data as the error code and the field index. Field indices start at 0 for the first field, 1 for the second, etc.

Real Time Traces

The real time traces will return recent real time data for many samples and traces in one command. The command was created to allow efficient transfer of about 10 samples per second and to allow this data to be aligned with no jitter introduced by the serial or network communications to the monitor.

Typlically the monitor is polled with this command every second for 12-15 points at a time. The first ULONG (4 bytes) is the latest sample index and it used to calculate the next data point to display.

The real time data is collected internally every 100mS for all the traces. This command can provide more than 10 of the most recent samples. By getting more than 10 (1 second) of data any gaps caused by delays or retries of the command can be handled. For example:

1: Request 14 samples:
The monitor returns an index value of 1234 and the 14 samples of data.
2: Wait 1 second and request 14 samples
With no communications delay the monitor would return an index of 1244 and the data. This means that the usable new data is 1244-1234=10 samples of new data.

3: Wait 1 second and request 14 samples
This time there was a delay and a retry in the communications and the monitor returned an index of 1256 and the 14 points of data. 1256-1244=12 samples of new data and no loss of data.

Each sample can contain any of the available traces and is interleaved from lowest bit value to highest. Use 255 to get all 8 traces of data or 1 to get just Dispense Pressure.

Trace Bits - See the Trace Bits earlier in this document.

SVIDs

The SVID command allows the system to be queried for specific data values in command. A list of System Variable ID values are sent as UINT16 data in the command. The command will return the requested data in the same order as it was requested. Note that different data types have different sizes (in bytes) as defined below:

'INT16' : 2
'UINT16' : 2,
'INT64' : 8,
'LONG' : 4,
'ULONG' : 4,
'FLOAT' : 4, IEEE 32 bit floating point
'STRING' : 2 bytes (USHORT) is the size of the returned string in
bytes followed the string of bytes.

The actual SVID values may change for different firmware revisions so the list is published with new firmware versions.