协议格式 25页

Standard Device Protocol

Systems Enhancement Corporation

Revision 3.0.2

UPDATE:
XID915
XID3009

1. Introduction

This document specifies a standard protocol for device manufacturers to use in the design and implementation of a serial interface. Supported devices include UPS, environmental input/output units, and receptacle management units.

1.1 Revision 3.0 Enhancements

Revision 3.0 added improved three-phase support, checksums and extensions for optional auxiliary equipment operating in-tandem in a daisy chain or multi-drop environment. Support for up to 99 devices on a single bus or daisy-chain has been provided.

Operation without a UPS (i.e., only auxiliary devices) is supported in Revision 3.0.

1.1.1 Group Ids

Revision 3.0 introduces the concept of Group Identifiers (GIDs) and Extended Identifiers (XIDs). GIDs identify groups of related data, while XIDs identify atomic items within a GID. This greatly simplifies the syntax for getting and setting the many variables supported by the protocol. Special commands are provided to determine which variables are supported by the device.

1.1.2 Multi-drop and Chained Operation

For operation of multiple devices via a single interface, the protocol has been enhanced to provide specification of a device unit number in messages.

1.1.3 Compatibility

This protocol does not conflict with previous revisions of the standard UPS protocol. Users wishing to continue to use Revision 2.6 may do so. It is recommended, however, that migration to Revision 3.0 be considered, as the Revision 2.6 is likely to become obsolete in the future.

Groups Ids 1 through 9 of this protocol correspond to data items in Revision 2.6

2. Definition of available parameters

Note: All responses are returned in ASCII. **Type** is the internal representation of the value (in the UPS or auxiliary device) and is provided purely for the information of the interface programmer. **Byte** is a single memory octet. **Short** is a two-byte integer. **Long** is a four-byte integer. **String** is an ASCII string (not Zero terminated).

Length is defined as the number of bytes that may be sent from the UPS to the host. The UPS may send less than the maximum number of bytes. **Length** will apply only to variables of the type **string**. **Range** is defined as the minimum and maximum integer values which may be sent from the UPS to the host. The integer values may be zero padded, but this is not required. **Range** will apply only to variables of the types **byte, short,** and **long** with the maximum length of response being defined implicitly in the **Range** field. In some instances, only a defined set of integer values will be accepted by the host. This set will be specified in the description field.

2.01 UPS Identification Group — Group ID (GID) 1

This group contains information about the UPS and its manufacturer.

Parameter Name	Type	Length	Description	XID	R/W[1]	
Manufacturer	string	0 to 32	Name of the UPS manufacturer.	101	r	yes
Model	string	0 to 64	UPS Model designation.	102	r	yes
Software Version	string	0 to 32	UPS firmware/software version.	103	r	yes
Identification	string	0 to 64	String identifying the UPS.	104	r	yes

2.02 UPS Battery Group — Group ID (GID) 2

This group contains status information about the battery (or batteries) installed in the UPS.

Parameter Name	Type	Range	Description	XID	R/W	
Battery Condition	byte	0 to 2	0 = Good 1 = Weak 2 = Replace	201	r	yes
Battery Status	byte	0 to 2	0 = Battery OK 1 = Battery Low 2 = Battery Depleted	202	r	yes
Battery Charge	byte	0 to 4	0 = Floating 1 = Charging 2 = Resting 3 = Discharging 4 = Overcharging	203	r	yes
Seconds on Battery	long	0 to 99999	Seconds since UPS switched to battery.	204	r	yes
Estimated Minutes	short	0 to 999	Estimated time to battery charge depletion.	205	r	yes
Estimated Charge	short	0 to 999	Estimate of percent battery charge remaining.	206	r	yes
Battery Voltage #1	long	0 to 9999	Battery voltage in 0.1 volts DC.	207	r	yes
Battery Current #1	long	0 to 99999	Battery current in 0.1 amps DC.	208	r	yes
Battery Temperatur	short	-40 to 200	Battery temperature in Degrees C° celsius	209	r	yes
Battery Voltage #2	long	0 to 9999	Battery voltage in 0.1 volts DC.	210	r	no
Battery Current #2	long	0 to 99999	Battery current in 0.1 amps DC.	211	r	no
Total Minutes on Battery	long	0 to 99999	Number of minutes on battery since battery installed.[2]	212	r	no

2.03 UPS Input Group — Group ID (GID) 3

This group contains information concerning the input power to the UPS.

Parameter Name	Type	Range	Description	XID	R/W	
Input Line Bads	long	0 to 999999	Number of out of tolerance conditions, since el. powerup	301	r	yes

[1] *Read/Write - Indicates whether the corresponding variable may be read or written. Note that some parameters with the +w attribute actually may not be writable depending upon the capabilities of the unit.*

[2] *Reset to 0 when new Battery Installed Date (XID 911) is set to a new date in the UPS configuration group.*

Input Num Lines	byte	1 to 3	Number of Phases (input).	302	r	yes
Input Power Factor	short	50 to 100	Present true power factor * 100	303	r	no
Input Frequency A	short	0 to 9999	Present input frequency in 0.1 Hz.	304	r	yes
Input Voltage A	short	0 to 9999	Present input voltage in 0.1 volts. Single Phase or Phase A to Phase B	305	r	no
Input Current A	long	0 to 99999	Present input current in 0.1 RMS Amps.	306	r	no
Input Power A	long	0 to 999999	Present input true power in Watts.	307	r	no
Input Apparent Power Phase A	long	0 to 999999	Present apparent power in VA	308	r	no
Input Voltage A to Neutral (rect.)	short	0 to 9999	Present input voltage in 0.1 volts. Phase A to Neutral	309	r	yes
Input Frequency B (bypass)	short	0 to 9999	Present input frequency in 0.1 Hz.	310	r	Yes
Input Voltage B	short	0 to 9999	Present input voltage in 0.1 volts. Phase B to Phase C	311	r	No
Input Current B	long	0 to 99999	Present input current in 0.1 RMS Amps.	312	r	No
Input Power B	long	0 to 999999	Present input true power in Watts.	313	r	No
Input Apparent Power Phase B	long	0 to 999999	Present apparent power in VA	314	r	No
Input Voltage B to Neutral (rect.)	short	0 to 9999	Present input voltage in 0.1 volts. Phase B to Neutral	315	r	Yes
Input Frequency C (bypass)	short	0 to 9999	Present input frequency in 0.1 Hz.	316	r	Yes
Input Voltage C	short	0 to 9999	Present input voltage in 0.1 volts. Phase C to Phase A	317	r	No
Input Current C	long	0 to 99999	Present input current in 0.1 RMS Amps.	318	r	No
Input Power C	long	0 to 999999	Present input true power in Watts.	319	r	No
Input Apparent Power Phase C	long	0 to 999999	Present apparent power in VA	320	r	No
Input Voltage C to Neutral (rect.)	short	0 to 9999	Present input voltage in 0.1 volts. Phase C to Neutral	321	r	Yes

2.04 UPS Output Group — Group ID (GID) 4

This group contains information concerning the output of the UPS.

Parameter Name	Type	Range	Description	XID	R/W	
Output Source	byte	0 to 5	Present source of output power 0 = Normal 1 = On Battery 2 = On Bypass 3 = Reducing 4 = Boosting 5 =manual byp 6= Service (switch Q2 open) 7=no source for fault	401	r	yes
Output Frequency	short	0 to 9999	Present output frequency in 0.1 Hz	402	r	Yes
Output Num Lines	byte	1 to 3	Number of Phases (output).	403	r	Yes
Output Power Factor A	short	50 to 100	Present true power factor * 100	404	r	Yes
Output Voltage A	short	0 to 9999	Present output voltage in 0.1 volts. Single Phase or Phase A to Phase B	405	r	No
Output Current A	long	0 to 99999	Present output current in 0.1 RMS Amps.	406	r	Yes

Output Power A	long	0 to 999999	Present output true power in Watts.	407	r	Yes
Output Load A	short	0 to 999	Percent of UPS power capacity presently used.	408	r	Yes
Output Apparent Power A	long	0 to 999999	Present apparent power in VA for Phase A	409	r	Yes
Output Voltage A to Neutral	short	0 to 9999	Present output voltage in 0.1 volts. (Phase A to Neutral)	410	r	Yes
Output Power Factor B	short	50 to 100	Present true power factor * 100	423	r	Yes
Output Voltage B	short	0 to 9999	Present output voltage in 0.1 volts. Phase B to Phase C	411	r	No
Output Current B	long	0 to 99999	Present output current in 0.1 RMS Amps.	412	r	Yes
Output Power B	long	0 to 999999	Present output true power in Watts.	413	r	Yes
Output Load B	short	0 to 999	Percent of UPS power capacity presently used.	414	r	Yes
Output Apparent Power B	long	0 to 999999	Present apparent power in VA for Phase B	415	r	Yes
Output Voltage B to Neutral	short	0 to 9999	Present output voltage in 0.1 volts. (Phase B to Neutral)	416	r	Yes
Output Power Factor C	short	50 to 100	Present true power factor * 100	424	r	Yes
Output Voltage C	short	0 to 9999	Present output voltage in 0.1 volts. Phase C to Phase A	417	r	No
Output Current C	long	0 to 99999	Present output current in 0.1 RMS Amps.	418	r	Yes
Output Power C	long	0 to 999999	Present output true power in Watts.	419	r	Yes
Output Load C	short	0 to 999	Percent of UPS power capacity presently used.	420	r	Yes
Output Apparent Power C	long	0 to 999999	Present apparent power in VA for Phase C	421	r	Yes
Output Voltage C to Neutral	short	0 to 9999	Present output voltage in 0.1 volts. (Phase C to Neutral)	422	r	Yes

2.05 UPS Bypass Group — Group ID (GID) 5

This group contains information concerning the bypass on the UPS.

Parameter Name	Type	Range	Description	XID	R/W	
Bypass Frequency	short	0 to 9999	Present bypass frequency in 0.1 Hz.	501	r	Yes
Bypass Num Lines	byte	0 to 9	Number of Phases (bypass).	502	r	No
Bypass Voltage A	short	0 to 9999	Present bypass voltage in 0.1 volts Single Phase or Phase A to neutral and not to Phase B.	503	r	yes
Bypass Current A	long	0 to 99999	Present bypass current in 0.1 RMS Amps. Single Phase or Phase A to Phase B.	504	r	No
Bypass Power A	long	0 to 999999	Present bypass true power in Watts. Single Phase or Phase A to Phase B.	505	r	No
Bypass Voltage B	short	0 to 9999	Present bypass voltage in 0.1 volts. Phase B to neutral and not to Phase C.	506	r	yes
Bypass Current B	long	0 to 99999	Present bypass current in 0.1 RMS Amps. Phase B to Phase C.	507	r	No
Bypass Power B	long	0 to 999999	Present bypass true power in Watts. Phase B to Phase C.	508	r	No
Bypass Voltage C	short	0 to 9999	Present bypass voltage in 0.1 volts. Phase C to neutral and not to Phase A.	509	r	yes
Bypass Current C	long	0 to 99999	Present bypass current in 0.1 RMS Amps. Phase C to Phase A.	510	r	No
Bypass Power C	long	0 to 999999	Present bypass true power in Watts.	511	r	No
Bypass Voltage A	short	0 to 9999	Bypass Voltage A to neutral [V]	512	r	yes
Bypass Voltage B	short	0 to 9999	Bypass Voltage B to neutral [V]	513	r	yes
Bypass Voltage C	short	0 to 9999	Bypass Voltage C to neutral [V]	514	r	yes

2.06 UPS Alarm Group — Group ID (GID) 6

This group contains alarm status information from the UPS.

Parameter Name	Type	Range	Description	XID	R/W	
General Alarm #1[3]	byte	0 or 1	0 = OK 1 = Fault	C601	r	no
General Alarm #2	byte	0 or 1	0 = OK 1 = Fault	602	r	no
General Alarm #3	byte	0 or 1	0 = OK 1 = Fault	603	r	no
General Alarm #4	byte	0 or 1	0 = OK 1 = Fault	604	r	no
General Alarm #5	byte	0 or 1	0 = OK 1 = Fault	605	r	no
General Alarm #6	byte	0 or 1	0 = OK 1 = Fault	606	r	no
General Alarm #7	byte	0 or 1	0 = OK 1 = Fault	607	r	no
General Alarm #8	byte	0 or 1	0 = OK 1 = Fault	608	r	no
General Alarm #9	byte	0 or 1	0 = OK 1 = Fault	609	r	no
General Alarm #10	byte	0 or 1	0 = OK 1 = Fault	610	r	no
General Alarm #11	byte	0 or 1	0 = OK 1 = Fault	611	r	No

[3] *General Alarms are defined by the equipment manufacturer*

General Alarm #12	byte	0 or 1	0 = OK 1 = Fault	612	r	No
General Alarm #13	byte	0 or 1	0 = OK 1 = Fault	613	r	No
General Alarm #14	byte	0 or 1	0 = OK 1 = Fault	614	r	No
General Alarm #15	byte	0 or 1	0 = OK 1 = Fault	615	r	No
General Alarm #16	byte	0 or 1	0 = OK 1 = Fault	616	r	No
Alarm Temperature	byte	0 or 1	0 = Temperature OK 1 = Over Temperature	617	r	Yes
Alarm Input Bad	byte	0 or 1	0 = Input OK 1 = Input Fault	618	r	Yes
Alarm Output Bad	byte	0 or 1	0 = Output OK 1 = Output Fault	619	r	Yes
Alarm Overload	byte	0 or 1	0 = UPS not Overloaded 1 = UPS Overloaded	620	r	Yes
Alarm Bypass Bad	byte	0 or 1	0 = Bypass OK 1 = Bypass Fault	621	r	Yes
Alarm Output Off	byte	0 or 1	0 = Output On 1 = Output Off	622	r	Yes
Alarm UPS Shutdown	byte	0 or 1	0 = UPS not Shutdown 1 = UPS Shutdown	623	r	Yes
Alarm Charger Failure	byte	0 or 1	0 = Charger OK 1 = Charger Fault	624	r	Yes
Alarm System Off	byte	0 or 1	0 = System On 1 = System Off	625	r	Yes
Alarm Fan Failure	byte	0 or 1	0 = Fan OK 1 = Fan Fault	626	r	Yes
Alarm Fuse Failure	byte	0 or 1	0 = Fuse OK 1 = Fuse Fault	627	r	No
Alarm General Fault	byte	0 or 1	0 = General system OK 1 = General system Fault	628	r	Yes
Alarm Awaiting Power	byte	0 or 1	0 = Not Awaiting Power 1 = Awaiting Power	629	r	Yes
Alarm Shutdown Pending	byte	0 or 1	0 = No shutdown Pending 1 = Shutdown Pending	630	r	Yes
Alarm Shutdown Imminent	byte	0 or 1	0 = No Shutdown Imminent 1 = Shutdown Imminent	631	r	Yes
Alarm Ambient Temperature	byte	0 or 1	0 = Temperature OK 1 = Over or Under Temperature	632	r	No
Alarm Inverter Temperature	byte	0 or 1	0 = Temperature OK 1 = Over or Under Temperature	633	r	Yes
Alarm Bypass Temperature	byte	0 or 1	0 = Temperature OK 1 = Over or Under Temperature	634	r	No
Alarm Battery Temperature	byte	0 or 1	0 = Temperature OK 1 = Over or Under Temperature	635	r	No
Alarm Inverter Failure	byte	0 or 1	0 = Inverter OK 1 = Inverter Fault	636	r	Yes
Alarm Emergency Power Off	byte	0 or 1	0 = EPO Not Activated 1 = EPO Activated	637	r	Yes
Alarm Battery Grounding Error	byte	0 or 1	0 = Battery Ground OK 1 = Battery Ground Fault	638	r	No
Alarm Battery Circuit Breaker Open	byte	0 or 1	0 = Battery CB Closed 1 = Battery CB Open	639	r	Yes
Alarm Synchronization Error	byte	0 or 1	0 = Sync OK 1 = Sync Error	640	r	Yes
Alarm Loss of redundancy Error	byte	0 or 1	0 = redundancy OK 1 = Redundancy loss	641	r	Yes

2.07 UPS Test Group — Group ID (GID) 7

This group contains test results and settable test options.Only battery test

Parameter Name	Type	Range	Description	XID	R/W	
Test Results Summar	byte	0 to 5	0 = No test performed 1 = Test Passed 2 = Test in progress 3 = General Test failed 4 = Battery Test failed	701	r	yes

			5 = Deep Battery Test failed			
Test Results Detai	string	0 to 64	Additional information about the last self test.	702	r	no
Test Type	short	-1 to 3	-1 = Abort test in progress 0 = No test 1 = General Systems Test Only battery test 2 and 3 2 = Quick Battery Test 3 = Deep Battery Calibration	703	r+w	yes

2.08 UPS Control Group — Group ID (GID) 8

This group contains settable control variables for the UPS.

Parameter Name	Type	Range	Description	XID	R/W	
Shutdown Type	byte	1 or 2	Shutdown action to be taken: 1 = UPS output only 2 = Entire UPS	801	r+w	Yes
Shutdown After Delay	long	-1 to 9999999	Perform shutdown action defined by Shutdown Type after indicated number of seconds. -1 = Cancel shutdown 0 = Shutdown immediately	802	r+w	Yes
Startup After Delay	long	-1 to 9999999	Start output after indicated number of seconds. -1 = Cancel countdown 0 = Start output immediately	803	r+w	Yes
Reboot With Duration	long	0 to 9999999	Perform immediate shutdown action defined by Shutdown Type and wait indicated number of seconds before restarting.	804	r+w	Yes
Auto Restart	byte	1 or 2	Flag indicating whether UPS should be automatically restarted after a shutdown. 1 = Automatic 2 = Manual Restart	805	r+w	Yes

2.09 UPS Configuration Group — Group ID (GID) 9

This group contains configuration information for basic UPS configuration.

Parameter Name	Type	Range	Description	XID	R/W	
Nominal Input Voltage	short	0 to 999	Nominal input voltage in Volts.	901	r	Yes
Nominal Input Frequency	short	0 to 9999	Nominal input frequency in 0.1 Hz.	902	r	Yes
Nominal Output Voltage	short	0 to 999	Nominal output voltage in Volts.	903	r	Yes
Nominal Output Frequenc	short	0 to 9999	Nominal output frequency in 0.1 Hz.	904	r	Yes
Nominal Volt-Amp Rating	long	0 to 999999	Nominal Volt-Amp rating.	905	r	Yes
Nominal Output Power	long	0 to 999999	Nominal true power rating in Watts.	906	r	Yes
Nominal Low Battery Tim	byte	0 to 99	Number of estimated minutes remaining at which a low battery condition is declared.	907	r	Yes
Audible Alarm	byte	1 to 4	State of the audible alarm: 1 = Disabled 2 = Enabled 3 = Muted 4 = Disabled Until Low Battery(non sopportato)Warning	908	r+w	Yes
Low Voltage Transfer Point	short	0 to 999	Minimum input line voltage in Volts before UPS transfers to battery backup.	909	r+w	No
High Voltage Transfer Point	short	0 to 999	Maximum input line voltage in Volts before UPS transfers to battery backup.	910	r+w	No
Battery Installed Date	string	8	The date that the battery was installed in the UPS (format yyyymmdd).	911	r+w	No
Nominal Battery Life	long	0 to 99999	The length of nominal useful battery life in days.	912	r+w	No
Single unit/parallel un if parallell nr of unit system	byte	0 to 99	0 = single UPS, N = ID-number of the UPS, in the parallel system	913	r	Yea
Separate input and Byp mains	byte	0 or 1	0 = Rectifier and Bypass inputs are the same 1 = inputs are separated	914	r	yes

Parallel strategy:	byte		1: capacity parallel 2: n+1 redundabcy parallel system 3:Single unit	915	r	yes

2.10 Auxiliary Identification Group Group ID (GID) 10 NO

This group contains identification information for the Auxiliary device, including read-only flags as well as settable option flags. The meaning of these flags is defined by the device manufacturer.

Parameter Name	Type	Length	Description	XID	R/W
Manufacturer	string	0 to 32	Name of the aux product mfr.	1001	r
Model	string	0 to 64	Auxiliary product Model designation.	1002	r
Software Version	string	0 to 32	Firmware/software version.	1003	r
Identification	string	0 to 64	String identifying the Device.	1004	r
Unit Number	byte	1 to 16	Unit Number	1005	r
Number of Writes	long	0 to 99999	Number of times EEPROM written. Implementation is vendor specific.	1006	r
Configuration #1	short	0 to 9999	Vendor Specific Flags	1007	r
Configuration #2	short	0 to 9999	Vendor Specific Flags	1008	r
Configuration #3	short	0 to 9999	Vendor Specific Flags	1009	r
Configuration #4	short	0 to 9999	Vendor Specific Flags	1010	r
User Configuration Flag #1	short	0 to 9999	Vendor Specific Flags	1011	r+w
User Configuration Flag #2	short	0 to 9999	Vendor Specific Flags	1012	r+w
User Configuration Flag #3	short	0 to 9999	Vendor Specific Flags	1013	r+w
User Configuration Flag #4	short	0 to 9999	Vendor Specific Flags	1014	r+w

2.11 Receptacle Identification Group Group ID (GID) 11 NO

This group contains information on receptacle names.

Parameter Name	Type	Length	Description	XID	R/W
Receptacle #1 Name	string	0 to 24	Name of receptacle 1	1101	r+w
Receptacle #2 Name	string	0 to 24	Name of receptacle 2	1102	r+w
Receptacle #3 Name	string	0 to 24	Name of receptacle 3	1103	r+w
Receptacle #4 Name	string	0 to 24	Name of receptacle 4	1104	r+w
Receptacle #5 Name	string	0 to 24	Name of receptacle 5	1105	r+w
Receptacle #6 Name	string	0 to 24	Name of receptacle 6	1106	r+w
Receptacle #7 Name	string	0 to 24	Name of receptacle 7	1107	r+w
Receptacle #8 Name	string	0 to 24	Name of receptacle 8	1108	r+w
Receptacle #9 Name	string	0 to 24	Name of receptacle 9	1109	r+w
Receptacle #10 Name	string	0 to 24	Name of receptacle 10	1110	r+w
Receptacle #11 Name	string	0 to 24	Name of receptacle 11	1111	r+w
Receptacle #12 Name	string	0 to 24	Name of receptacle 12	1112	r+w
Receptacle #13 Name	string	0 to 24	Name of receptacle 13	1113	r+w
Receptacle #14 Name	string	0 to 24	Name of receptacle 14	1114	r+w
Receptacle #15 Name	string	0 to 24	Name of receptacle 15	1115	r+w
Receptacle #16 Name	string	0 to 24	Name of receptacle 16	1116	r+w

2.12 Contact Identification Group Group ID (GID) 12 NO

This group contains contact names.

Parameter Name	Type	Length	Description	XID	R/W
Contact Input #1 Name	string	0 to 24	Name of Contact Input #1	1201	r+w
Contact Input #2 Name	string	0 to 24	Name of Contact Input #2	1202	r+w
Contact Input #3 Name	string	0 to 24	Name of Contact Input #3	1203	r+w
Contact Input #4 Name	string	0 to 24	Name of Contact Input #4	1204	r+w
Contact Input #5 Name	string	0 to 24	Name of Contact Input #5	1205	r+w
Contact Input #6 Name	string	0 to 24	Name of Contact Input #6	1206	r+w
Contact Input #7 Name	string	0 to 24	Name of Contact Input #7	1207	r+w
Contact Input #8 Name	string	0 to 24	Name of Contact Input #8	1208	r+w

Contact Input #9 Name	string	0 to 24	Name of Contact Input #1	1209	r+w
Contact Input #10 Name	string	0 to 24	Name of Contact Input #2	1210	r+w
Contact Input #11 Name	string	0 to 24	Name of Contact Input #3	1211	r+w
Contact Input #12 Name	string	0 to 24	Name of Contact Input #4	1212	r+w
Contact Input #13 Name	string	0 to 24	Name of Contact Input #5	1213	r+w
Contact Input #14 Name	string	0 to 24	Name of Contact Input #6	1214	r+w
Contact Input #15 Name	string	0 to 24	Name of Contact Input #7	1215	r+w
Contact Input #16 Name	string	0 to 24	Name of Contact Input #8	1216	r+w
Contact Output #1 Name	string	0 to 24	Name of Contact Output #1	1217	r+w
Contact Output #2 Name	string	0 to 24	Name of Contact Output #2	1218	r+w
Contact Output #3 Name	string	0 to 24	Name of Contact Output #3	1219	r+w
Contact Output #4 Name	string	0 to 24	Name of Contact Output #4	1220	r+w
Contact Output #5 Name	string	0 to 24	Name of Contact Output #5	1221	r+w
Contact Output #6 Name	string	0 to 24	Name of Contact Output #6	1222	r+w
Contact Output #7 Name	string	0 to 24	Name of Contact Output #7	1223	r+w
Contact Output #8 Name	string	0 to 24	Name of Contact Output #8	1224	r+w

2.13 Analog Identification Group Group ID (GID) 13 NO

This group contains analog input/output names.

Parameter Name	Type	Length	Description	XID	R/W
Analog Input #1 Name	string	0 to 24	Name of Analog Output #1	1301	r+w
Analog Input #2 Name	string	0 to 24	Name of Analog Output #2	1302	r+w
Analog Input #3 Name	string	0 to 24	Name of Analog Output #3	1303	r+w
Analog Input #4 Name	string	0 to 24	Name of Analog Output #4	1304	r+w
Analog Input #5 Name	string	0 to 24	Name of Analog Output #5	1305	r+w
Analog Input #6 Name	string	0 to 24	Name of Analog Output #6	1306	r+w
Analog Input #7 Name	string	0 to 24	Name of Analog Output #7	1307	r+w
Analog Input #8 Name	string	0 to 24	Name of Analog Output #8	1308	r+w
Analog Output #1 Name	string	0 to 24	Name of Analog Output #1	1309	r+w
Analog Output #2 Name	string	0 to 24	Name of Analog Output #2	1310	r+w
Analog Output #3 Name	string	0 to 24	Name of Analog Output #3	1311	r+w
Analog Output #4 Name	string	0 to 24	Name of Analog Output #4	1312	r+w
Analog Output #5 Name	string	0 to 24	Name of Analog Output #5	1313	r+w
Analog Output #6 Name	string	0 to 24	Name of Analog Output #6	1314	r+w
Analog Output #7 Name	string	0 to 24	Name of Analog Output #7	1315	r+w
Analog Output #8 Name	string	0 to 24	Name of Analog Output #8	1316	r+w

2.14 Receptacle Status Group A Group ID (GID) 14 NO

This group contains status information from the receptacle management unit.

Parameter Name	Type	Range	Description	XID	R/W
Receptacle Unit Status	byte	0, 1, or 2	0 = All Outputs Off 1 = Some Outputs On 2 = All Outputs On	1401	R
Receptacle #1 Status	byte	0 to 4	0 = Off 1 = On 2 = Off Transitioning to On 3 = On Transitioning to Off 4 = Cycle scheduled	1402	R
Receptacle #2 Status	byte	0 to 4	See above	1403	R
Receptacle #3 Status	byte	0 to 4	See above	1404	R
Receptacle #4 Status	byte	0 to 4	See above	1405	R
Receptacle #5 Status	byte	0 to 4	See above	1406	R
Receptacle #6 Status	byte	0 to 4	See above	1407	R
Receptacle #7 Status	byte	0 to 4	See above	1408	R
Receptacle #8 Status	byte	0 to 4	See above	1409	R
Receptacle #9 Status	byte	0 to 4	See above	1410	R
Receptacle #10 Status	byte	0 to 4	See above	1411	R
Receptacle #11 Status	byte	0 to 4	See above	1412	R
Receptacle #12 Status	byte	0 to 4	See above	1413	R
Receptacle #13 Status	byte	0 to 4	See above	1414	R

Receptacle #14 Status	byte	0 to 4	See above	1415	R
Receptacle #15 Status	byte	0 to 4	See above	1416	R
Receptacle #16 Status	byte	0 to 4	See above	1417	R

2.15 Receptacle Status Group B Group ID (GID) 15 NO

This group contains the time remaining until receptacle on/off for the receptacle management unit.

Time to Go #1	long	0 to 999999	In Seconds	1501	R
Time to Go #2	long	0 to 999999	In Seconds	1502	R
Time to Go #3	long	0 to 999999	In Seconds	1503	R
Time to Go #4	long	0 to 999999	In Seconds	1504	R
Time to Go #5	long	0 to 999999	In Seconds	1505	R
Time to Go #6	long	0 to 999999	In Seconds	1506	R
Time to Go #7	long	0 to 999999	In Seconds	1507	R
Time to Go #8	long	0 to 999999	In Seconds	1508	R
Time to Go #9	long	0 to 999999	In Seconds	1509	R
Time to Go #10	long	0 to 999999	In Seconds	1510	R
Time to Go #11	long	0 to 999999	In Seconds	1511	R
Time to Go #12	long	0 to 999999	In Seconds	1512	R
Time to Go #13	long	0 to 999999	In Seconds	1513	R
Time to Go #14	long	0 to 999999	In Seconds	1514	R
Time to Go #15	long	0 to 999999	In Seconds	1515	R
Time to Go #16	long	0 to 999999	In Seconds	1516	R

2.16 Environmental Input Group Group ID (GID) 16 NO

This group contains environmental input status.

Parameter Name	Type	Range	Description	XID	R/W
Utility Voltage	short	0 to 2500	Input Voltage in .1 V	1601	R
Relative Humidity	short	0 to 100	RH in Percent	1602	R
Temperature	short	-40 to 200	Degrees Fahrenheit	1603	R
Contact Input State #1	byte	0 or 1	0 = Open 1 = Closed	1604	R
Contact Input State #2	byte	0 or 1	0 = Open 1 = Closed	1605	R
Contact Input State #3	byte	0 or 1	0 = Open 1 = Closed	1606	R
Contact Input State #4	byte	0 or 1	0 = Open 1 = Closed	1607	R
Contact Input State #5	byte	0 or 1	0 = Open 1 = Closed	1608	R
Contact Input State #6	byte	0 or 1	0 = Open 1 = Closed	1609	R
Contact Input State #7	byte	0 or 1	0 = Open 1 = Closed	1610	R
Contact Input State #8	byte	0 or 1	0 = Open 1 = Closed	1611	R
Contact Input State #9	byte	0 or 1	0 = Open 1 = Closed	1612	R
Contact Input State #10	byte	0 or 1	0 = Open 1 = Closed	1613	R
Contact Input State #11	byte	0 or 1	0 = Open 1 = Closed	1614	R
Contact Input State #12	byte	0 or 1	0 = Open 1 = Closed	1615	R
Contact Input State #13	byte	0 or 1	0 = Open 1 = Closed	1616	R
Contact Input State #14	byte	0 or 1	0 = Open 1 = Closed	1617	R
Contact Input State #15	byte	0 or 1	0 = Open 1 = Closed	1618	R
Contact Input State #16	byte	0 or 1	0 = Open 1 = Closed	1619	R
Analog Input State #1	short	0 to 1000	.1 percent of full scale	1620	R
Analog Input State #2	short	0 to 1000	.1 percent of full scale	1621	R
Analog Input State #3	short	0 to 1000	.1 percent of full scale	1622	R
Analog Input State #4	short	0 to 1000	.1 percent of full scale	1623	R
Analog Input State #5	short	0 to 1000	.1 percent of full scale	1624	R
Analog Input State #6	short	0 to 1000	.1 percent of full scale	1625	R
Analog Input State #7	short	0 to 1000	.1 percent of full scale	1626	R
Analog Input State #8	short	0 to 1000	.1 percent of full scale	1627	R

2.17 Receptacle Output Group Group ID (GID) 17 NO

This group contains current feedback data from the receptacle management unit.

Parameter Name	Type	Range	Description	XID	R/W
Aggregate Unit Output	short	0 to 9999	Aggregate output of unit .1 A	1701	r
Receptacle #1 Output Current	short	0 to 9999	Receptacle Load in .1 A	1702	r
Receptacle #2 Output Current	short	0 to 9999	Receptacle Load in .1 A	1703	r
Receptacle #3 Output Current	short	0 to 9999	Receptacle Load in .1 A	1704	r
Receptacle #4 Output Current	short	0 to 9999	Receptacle Load in .1 A	1705	r
Receptacle #5 Output Current	short	0 to 9999	Receptacle Load in .1 A	1706	r
Receptacle #6 Output Current	short	0 to 9999	Receptacle Load in .1 A	1707	r
Receptacle #7 Output Current	short	0 to 9999	Receptacle Load in .1 A	1708	r
Receptacle #8 Output Current	short	0 to 9999	Receptacle Load in .1 A	1709	r
Receptacle #9 Output Current	short	0 to 9999	Receptacle Load in .1 A	1710	r
Receptacle #10 Output Current	short	0 to 9999	Receptacle Load in .1 A	1711	r
Receptacle #11 Output Current	short	0 to 9999	Receptacle Load in .1 A	1712	r
Receptacle #12 Output Current	short	0 to 9999	Receptacle Load in .1 A	1713	r
Receptacle #13 Output Current	short	0 to 9999	Receptacle Load in .1 A	1714	r
Receptacle #14 Output Current	short	0 to 9999	Receptacle Load in .1 A	1715	r
Receptacle #15 Output Current	short	0 to 9999	Receptacle Load in .1 A	1716	r
Receptacle #16 Output Current	short	0 to 9999	Receptacle Load in .1 A	1717	r

2.18 Auxiliary Output Group Group ID (GID) 18 NO

This group contains the actual output value for the auxiliary unit's outputs. May vary from the setpoints if feedback is provided, i.e., actual versus commanded may vary.

Parameter Name	Type	Range	Description	XID	R/W
Contact Output #1	byte	0 or 1	0 = Open 1 = Closed	1801	r
Contact Output #2	byte	0 or 1	0 = Open 1 = Closed	1802	r
Contact Output #3	byte	0 or 1	0 = Open 1 = Closed	1803	r
Contact Output #4	byte	0 or 1	0 = Open 1 = Closed	1804	r
Contact Output #5	byte	0 or 1	0 = Open 1 = Closed	1805	r
Contact Output #6	byte	0 or 1	0 = Open 1 = Closed	1806	r
Contact Output #7	byte	0 or 1	0 = Open 1 = Closed	1807	r
Contact Output #8	byte	0 or 1	0 = Open 1 = Closed	1808	r
Analog Output Voltage #1	short	0 to 1000	.1 percent of full scale	1809	r
Analog Output Voltage #2	short	0 to 1000	.1 percent of full scale	1810	r
Analog Output Voltage #3	short	0 to 1000	.1 percent of full scale	1811	r
Analog Output Voltage #4	short	0 to 1000	.1 percent of full scale	1812	r
Analog Output Voltage #5	short	0 to 1000	.1 percent of full scale	1813	r
Analog Output Voltage #6	short	0 to 1000	.1 percent of full scale	1814	r
Analog Output Voltage #7	short	0 to 1000	.1 percent of full scale	1815	r
Analog Output Voltage #8	short	0 to 1000	.1 percent of full scale	1816	r

2.19 Receptacle Alarm Group Group ID (GID) 19 NO

This group contains receptacle status alarm indications.

Parameter Name	Type	Range	Description	XID	R/W
Alarm Receptacle #1	byte	0 to 2	0 = No Alarm 1 = Receptacle Over Current 2 = Receptacle Under Current	1901	R
Alarm Receptacle #2	byte	see above	See above	1902	R
Alarm Receptacle #3	byte	see above	See above	1903	R
Alarm Receptacle #4	byte	see above	See above	1904	R
Alarm Receptacle #5	byte	see above	See above	1905	R
Alarm Receptacle #6	byte	see above	See above	1906	R
Alarm Receptacle #7	byte	see above	See above	1907	R
Alarm Receptacle #8	byte	see above	See above	1908	R
Alarm Receptacle #9	byte	see above	See above	1909	R
Alarm Receptacle #10	byte	see above	See above	1910	R
Alarm Receptacle #11	byte	see above	See above	1911	R
Alarm Receptacle #12	byte	see above	See above	1912	R
Alarm Receptacle #13	byte	see above	See above	1913	R
Alarm Receptacle #14	byte	see above	See above	1914	R
Alarm Receptacle #15	byte	see above	See above	1915	R
Alarm Receptacle #16	byte	see above	See above	1916	R

2.20 Environmental Alarm Group Group ID (GID) 20 NO

This group contains environmental input alarm indications.

Parameter Name	Type	Range	Description	XID	R/W
Alarm Humidity	byte	0, 1, or 2	0 = Humidity OK 1 = Over Humidity 2 = Under Humidity	2001	r
Alarm Temperature	byte	0, 1, or 2	0 = Temperature OK 1 = Over Temperature 2 = Under Temperature	2002	r
Alarm Contact 1	byte	0 or 1	0 = No Alarm 1 = Alarm	2003	r

Alarm Contact 2	byte	0 or 1	0 = No Alarm 1 = Alarm	2004	r
Alarm Contact 3	byte	0 or 1	0 = No Alarm 1 = Alarm	2005	r
Alarm Contact 4	byte	0 or 1	0 = No Alarm 1 = Alarm	2006	r
Alarm Contact 5	byte	0 or 1	0 = No Alarm 1 = Alarm	2007	r
Alarm Contact 6	byte	0 or 1	0 = No Alarm 1 = Alarm	2008	r
Alarm Contact 7	byte	0 or 1	0 = No Alarm 1 = Alarm	2009	r
Alarm Contact 8	byte	0 or 1	0 = No Alarm 1 = Alarm	2010	r
Alarm Contact 9	byte	0 or 1	0 = No Alarm 1 = Alarm	2011	r
Alarm Contact 10	byte	0 or 1	0 = No Alarm 1 = Alarm	2012	r
Alarm Contact 11	byte	0 or 1	0 = No Alarm 1 = Alarm	2013	r
Alarm Contact 12	byte	0 or 1	0 = No Alarm 1 = Alarm	2014	r
Alarm Contact 13	byte	0 or 1	0 = No Alarm 1 = Alarm	2015	r
Alarm Contact 14	byte	0 or 1	0 = No Alarm 1 = Alarm	2016	r
Alarm Contact 15	byte	0 or 1	0 = No Alarm 1 = Alarm	2017	r
Alarm Contact 16	byte	0 or 1	0 = No Alarm 1 = Alarm	2018	r

2.21 Auxiliary Test Group — Group ID (GID) 21 NO

This group contains auxiliary device self test status and command variables.

Parameter Name	Type	Range	Description	XID	R/W
Auxiliary Self Test	byte	0 to 100	0 = OK, else error code	2101	r
Initiate Self Test	byte	0 to 1	0 = Cancel Self Test 1 = Initiate Self Test	2102	w

2.22 Auxiliary Control Group — Group ID (GID) 22 NO

This group contains the *commanded* output for the unit. May vary from the *actual* value if feedback is provided (see Group 18).

Parameter Name	Type	Range	Description	XID	R/W
Contact Output #1 State	byte	0 or 1	0 = Open 1 = Close	2201	r+w
Contact Output #2 State	byte	0 or 1	0 = Open 1 = Close	2202	r+w
Contact Output #3 State	byte	0 or 1	0 = Open 1 = Close	2203	r+w
Contact Output #4 State	byte	0 or 1	0 = Open 1 = Close	2204	r+w
Contact Output #5 State	byte	0 or 1	0 = Open 1 = Close	2205	r+w
Contact Output #6 State	byte	0 or 1	0 = Open 1 = Close	2206	r+w
Contact Output #7 State	byte	0 or 1	0 = Open 1 = Close	2207	r+w
Contact Output #8 State	byte	0 or 1	0 = Open 1 = Close	2208	r+w
Analog Output #1 Setpoint	short	0 to 1000	.1 percent of rated output	2209	r+w
Analog Output #1 Setpoint	short	0 to 1000	.1 percent of rated output	2210	r+w
Analog Output #1 Setpoint	short	0 to 1000	.1 percent of rated output	2211	r+w
Analog Output #1 Setpoint	short	0 to 1000	.1 percent of rated output	2212	r+w
Analog Output #1 Setpoint	short	0 to 1000	.1 percent of rated output	2213	r+w
Analog Output #1 Setpoint	short	0 to 1000	.1 percent of rated output	2214	r+w
Analog Output #1 Setpoint	short	0 to 1000	.1 percent of rated output	2215	r+w
Analog Output #1 Setpoint	short	0 to 1000	.1 percent of rated output	2216	r+w

2.23 Receptacle Control Group — Group ID (GID) 23 NO

This group contains control variables for the receptacle management unit.

Parameter Name	Type	Range	Description	XID	R/W
All Receptacles Action	byte	0 to 7	0 = Cancel 1 = On Immed 2 = On with times in GID 27 3 = On using default times in GID 25	2301	r+w

			4 = Off with times in GID 27 5 = Off using default times in GID 26 6 = On and Off using default times in GIDs 25 and 26 7 = Cycle immediately		
Receptacle #1 Action	byte	0 to 7	see above for add'l values	2302	r+w
Receptacle #2 Action	byte	0 to 7	see above	2303	r+w
Receptacle #3 Action	byte	0 to 7	see above	2304	r+w
Receptacle #4 Action	byte	0 to 7	see above	2305	r+w
Receptacle #5 Action	byte	0 to 7	see above	2306	r+w
Receptacle #6 Action	byte	0 to 7	see above	2307	r+w
Receptacle #7 Action	byte	0 to 7	see above	2308	r+w
Receptacle #8 Action	byte	0 to 7	see above	2309	r+w
Receptacle #9 Action	byte	0 to 7	see above	2310	r+w
Receptacle #10 Action	byte	0 to 7	see above	2311	r+w
Receptacle #11 Action	byte	0 to 7	see above	2312	r+w
Receptacle #12 Action	byte	0 to 7	see above	2313	r+w
Receptacle #13 Action	byte	0 to 7	see above	2314	r+w
Receptacle #14 Action	byte	0 to 7	see above	2315	r+w
Receptacle #15 Action	byte	0 to 7	see above	2316	r+w
Receptacle #16 Action	byte	0 to 7	see above	2317	r+w

2.24 Auxiliary Configuration Group Group ID (GID) 24 NO

This group contains configuration variables for the auxiliary unit.

Parameter Name	Type	Range	Description	XID	R/W
Lower Humidity Threshold	byte	0 to 100	Humidity in Percent	2401	r+w
Upper Humidity Threshold	byte	0 to 100	Humidity in Percent	2402	r+w
Lower Temperature Threshold	short	-40 to 200	Degrees Fahrenheit	2403	r+w
Upper Temperature Threshold	short	-40 to 200	Degrees Fahrenheit	2404	r+w
Contact Input #1 Normal State	byte	0 or 1	0 = N/O 1 = N/C	2405	r+w
Contact Input #2 Normal State	byte	0 or 1	0 = N/O 1 = N/C	2406	r+w
Contact Input #3 Normal State	byte	0 or 1	0 = N/O 1 = N/C	2407	r+w
Contact Input #4 Normal State	byte	0 or 1	0 = N/O 1 = N/C	2408	r+w
Contact Input #5 Normal State	byte	0 or 1	0 = N/O 1 = N/C	2409	r+w
Contact Input #6 Normal State	byte	0 or 1	0 = N/O 1 = N/C	2410	r+w
Contact Input #7 Normal State	byte	0 or 1	0 = N/O 1 = N/C	2411	r+w
Contact Input #8 Normal State	byte	0 or 1	0 = N/O 1 = N/C	2412	r+w

2.25 Receptacle Configuration Group A Group ID (GID) 25 NO

This group contains startup timers for the receptacle management unit. These are time delays that are honored when the unit powers up.

Parameter Name	Type	Range	Description	XID	R/W
Receptacle #1 Up Timer	long	0 to 999999	< 0 = Stay Off 0 = Immediate > 0 = Time in seconds	2501	r+w
Receptacle #2 Up Timer	long	0 to 999999	See above	2502	r+w
Receptacle #3 Up Timer	long	0 to 999999	See above	2503	r+w
Receptacle #4 Up Timer	long	0 to 999999	See above	2504	r+w
Receptacle #5 Up Timer	long	0 to 999999	See above	2505	r+w
Receptacle #6 Up Timer	long	0 to 999999	See above	2506	r+w
Receptacle #7 Up Timer	long	0 to 999999	See above	2507	r+w
Receptacle #8 Up Timer	long	0 to 999999	See above	2508	r+w
Receptacle #9 Up Timer	long	0 to 999999	See above	2509	r+w
Receptacle #10 Up Timer	long	0 to 999999	See above	2510	r+w
Receptacle #11 Up Timer	long	0 to 999999	See above	2511	r+w
Receptacle #12 Up Timer	long	0 to 999999	See above	2512	r+w
Receptacle #13 Up Timer	long	0 to 999999	See above	2513	r+w

Receptacle #14 Up Timer	long	0 to 999999	See above	2514	r+w
Receptacle #15 Up Timer	long	0 to 999999	See above	2515	r+w
Receptacle #16 Up Timer	long	0 to 999999	See above	2516	r+w

2.26 Receptacle Configuration Group B Group ID (GID) 26 NO

This group contains shutdown timers for the receptacle management unit. See Group 23 for how to activate a timed shutdown for a receptacle.

Parameter Name	Type	Range	Description	XID	R/W
Receptacle #1 Down Timer	long	0 to 999999	< 0 = Stay On 0 = Immediate > 0 = Time in seconds	2601	r+w
Receptacle #2 Down Timer	long	0 to 999999	See above	2602	r+w
Receptacle #3 Down Timer	long	0 to 999999	See above	2603	r+w
Receptacle #4 Down Timer	long	0 to 999999	See above	2604	r+w
Receptacle #5 Down Timer	long	0 to 999999	See above	2605	r+w
Receptacle #6 Down Timer	long	0 to 999999	See above	2606	r+w
Receptacle #7 Down Timer	long	0 to 999999	See above	2607	r+w
Receptacle #8 Down Timer	long	0 to 999999	See above	2608	r+w
Receptacle #9 Down Timer	long	0 to 999999	See above	2609	r+w
Receptacle #10 Down Timer	long	0 to 999999	See above	2610	r+w
Receptacle #11 Down Timer	long	0 to 999999	See above	2611	r+w
Receptacle #12 Down Timer	long	0 to 999999	See above	2612	r+w
Receptacle #13 Down Timer	long	0 to 999999	See above	2613	r+w
Receptacle #14 Down Timer	long	0 to 999999	See above	2614	r+w
Receptacle #15 Down Timer	long	0 to 999999	See above	2615	r+w
Receptacle #16 Down Timer	long	0 to 999999	See above	2616	r+w

2.27 Receptacle Configuration Group C Group ID (GID) 27 NO

This group contains a user-modifiable shutdown time that does not change the power-up defaults contained in GIDs 25 and 26.

Parameter Name	Type	Range	Description	XID	R/W
Receptacle #1 Action Time	long	0 to 999999	0 = Immediate > 0 = Time in seconds	2701	r+w
Receptacle #2 Action Time	long	See above	See above	2702	r+w
Receptacle #3 Action Time	long	See above	See above	2703	r+w
Receptacle #4 Action Time	long	See above	See above	2704	r+w
Receptacle #5 Action Time	long	See above	See above	2705	r+w
Receptacle #6 Action Time	long	See above	See above	2706	r+w
Receptacle #7 Action Time	long	See above	See above	2707	r+w
Receptacle #8 Action Time	long	See above	See above	2708	r+w
Receptacle #9 Action Time	long	See above	See above	2709	r+w
Receptacle #10 Action Time	long	See above	See above	2710	r+w
Receptacle #11 Action Time	long	See above	See above	2711	r+w
Receptacle #12 Action Time	long	See above	See above	2712	r+w
Receptacle #13 Action Time	long	See above	See above	2713	r+w
Receptacle #14 Action Time	long	See above	See above	2714	r+w
Receptacle #15 Action Time	long	See above	See above	2715	r+w
Receptacle #16 Action Time	long	See above	See above	2716	r+w

2.28 Receptacle Configuration Group D Group ID (GID) 28 NO

This group contains lower current alarm thresholds for the receptacle unit.

Parameter Name	Type	Range	Description	XID	R/W
Lower Aggregate Output Threshold	short	0 to 9999	.1 Amperes	2801	r+w
Receptacle #1 Lower Threshold	short	0 to 9999	.1 Amperes	2802	r+w
Receptacle #2 Lower Threshold	short	0 to 9999	.1 Amperes	2803	r+w
Receptacle #3 Lower Threshold	short	0 to 9999	.1 Amperes	2804	r+w
Receptacle #4 Lower Threshold	short	0 to 9999	.1 Amperes	2805	r+w
Receptacle #5 Lower Threshold	short	0 to 9999	.1 Amperes	2806	r+w
Receptacle #6 Lower Threshold	short	0 to 9999	.1 Amperes	2807	r+w
Receptacle #7 Lower Threshold	short	0 to 9999	.1 Amperes	2808	r+w
Receptacle #8 Lower Threshold	short	0 to 9999	.1 Amperes	2809	r+w
Receptacle #9 Lower Threshold	short	0 to 9999	.1 Amperes	2810	r+w
Receptacle #10 Lower Threshold	short	0 to 9999	.1 Amperes	2811	r+w
Receptacle #11 Lower Threshold	short	0 to 9999	.1 Amperes	2812	r+w
Receptacle #12 Lower Threshold	short	0 to 9999	.1 Amperes	2813	r+w
Receptacle #13 Lower Threshold	short	0 to 9999	.1 Amperes	2814	r+w
Receptacle #14 Lower Threshold	short	0 to 9999	.1 Amperes	2815	r+w
Receptacle #15 Lower Threshold	short	0 to 9999	.1 Amperes	2816	r+w
Receptacle #16 Lower Threshold	short	0 to 9999	.1 Amperes	2817	r+w

2.29 Receptacle Configuration Group E Group ID (GID) 29 NO

This group contains upper current alarm thresholds for the receptacle unit.

Parameter Name	Type	Range	Description	XID	R/W
Upper Aggregate Output Threshold	short	0 to 9999	.1 Amperes	2901	r+w
Receptacle #1 Upper Threshold	short	0 to 9999	.1 Amperes	2902	r+w
Receptacle #2 Upper Threshold	short	0 to 9999	.1 Amperes	2903	r+w
Receptacle #3 Upper Threshold	short	0 to 9999	.1 Amperes	2904	r+w
Receptacle #4 Upper Threshold	short	0 to 9999	.1 Amperes	2905	r+w
Receptacle #5 Upper Threshold	short	0 to 9999	.1 Amperes	2906	r+w
Receptacle #6 Upper Threshold	short	0 to 9999	.1 Amperes	2907	r+w

Receptacle #7 Upper Threshold	short	0 to 9999	.1 Amperes	2908	r+w
Receptacle #8 Upper Threshold	short	0 to 9999	.1 Amperes	2909	r+w
Receptacle #9 Upper Threshold	short	0 to 9999	.1 Amperes	2910	r+w
Receptacle #10 Upper Threshold	short	0 to 9999	.1 Amperes	2911	r+w
Receptacle #11 Upper Threshold	short	0 to 9999	.1 Amperes	2912	r+w
Receptacle #12 Upper Threshold	short	0 to 9999	.1 Amperes	2913	r+w
Receptacle #13 Upper Threshold	short	0 to 9999	.1 Amperes	2914	r+w
Receptacle #14 Upper Threshold	short	0 to 9999	.1 Amperes	2915	r+w
Receptacle #15 Upper Threshold	short	0 to 9999	.1 Amperes	2916	r+w
Receptacle #16 Upper Threshold	short	0 to 9999	.1 Amperes	2917	r+w

2.30 Miscellaneous Group ID (GID) 30

This group contains miscellaneous parameters provided by the UPS or Auxiliary device.

Parameter Name	Type	Length/Range	Description	XID	R/W	
Date	string	8	yyyymmdd	3001	r+w	yes
Time	string	6	hhmmss	3002	r+w	yes
Baud	byte	1 to 7	1 = 300 baud 2 = 1200 baud 3 = 2400 baud (default) 4 = 4800 baud 5 = 9600 baud 6 = 19200 baud 7 = 38400 baud (may not be settable)	3003	r+w	no
Timeout	short	10 to 9999	Worst-case response time in mS for device.	3004	r	no
Reserved	-	-	reserved for future use	3005		no
Reserved	-	-	reserved for future use	3006		no
Misc String #1	string	16	Defined by Mfr	3007	r+w	no
Misc String #2	string	16	Defined by Mfr	3008	r+w	no
Generator Status	byte	0 to 1	Generator (Diesel Engine) status: 0 = OFF 1 = ON (reflects X2 input on Newave UPS) (Defined by Newave)	3009	r	yes
Misc Byte #2	byte	0 to 99	Defined by Mfr	3010	r+w	No
Misc Byte #3	byte	0 to 99	Defined by Mfr	3011	r+w	no
Misc Byte #4	byte	0 to 99	Defined by Mfr	3012	r+w	no
Misc Short #1	short	0 to 9999	Defined by Mfr	3013	r+w	no
Misc Short #2	short	0 to 9999	Defined by Mfr	3014	r+w	no
Misc Short #3	short	0 to 9999	Defined by Mfr	3015	r+w	no
Misc Short #4	short	0 to 9999	Defined by Mfr	3016	r+w	no
Misc Long #1	long	0 to 999999	Defined by Mfr	3017	r+w	no
Misc Long #2	long	0 to 999999	Defined by Mfr	3018	r+w	no
Misc Long #3	long	0 to 999999	Defined by Mfr	3019	r+w	no
Misc Long #4	long	0 to 999999	Defined by Mfr	3020	r+w	no

2.31 UPS Alarm and Message log refresh comand Group ID (GID)31

Parameter Name	Type	Range	Description	XID	R/W	
General Alarm #1[4]	byte	0 or 1	Aggiornamento fifo clinte. Il f del cliente è una copia di quel residente nel `UPS. Viene manda un messaggio alla volta .	C3101	r	Yes

[4] *General Alarms are defined by the equipment manufacturer*

3. Communications

3.1 Chained and Multi-drop Operation

For operations using multiple devices in a single chain or multi-drop scheme, the following rules apply:

3.1.1 Maximum Number of Units

Up to 99 units are supported on a single communication link. Physical characteristics of the physical bus interface may reduce this number. For example, RS-485 supports a maximum of 32 nodes on any one trunk unless repeaters are used.

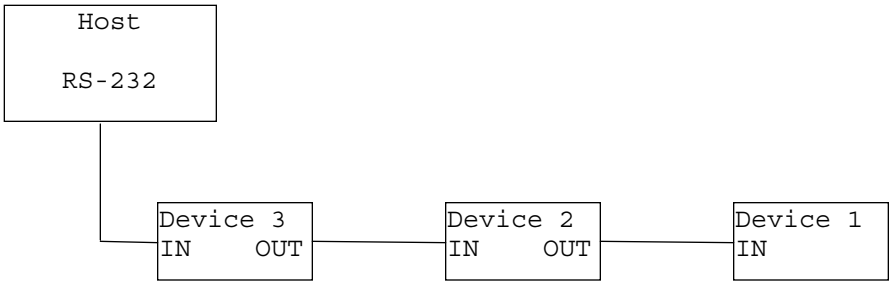
3.1.2 Chained Operation

For daisy-chain operations, higher baud rates are recommended to avoid lag-time problems. Limiting the number of units in the chain to less than eight is also recommended. Unit numbers in a chain must be continuous from 1.

As chained operation fails if addressing is incorrect, it is recommended that Unit #'s be DIP-switch selectable to avoid confusion.

In a chained environment, the highest-order unit shall be closest to the computer, with the next-highest-order unit next, and so forth. Unit #1 shall be the last unit in the chain (unless a non-protocol-compliant device is to be connected, in which case it is last).

This topology is shown below (Note that in this example, Device 2 and Device 3 have two RS-232 ports each):



The last unit need not support the Revision 3.0 for chained operation.

Devices need not be selected via the *Query* command, as each message contains the *unit id* of the target device.

A device receiving a message addressed to it will interpret the message and respond appropriately to host. The message will not be forwarded down the chain.

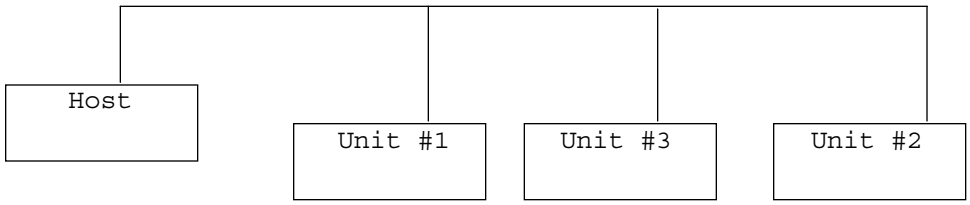
A unit receiving a message for a different Unit Id will forward the command down the chain, with the exception of Unit #1, which only forwards any non-protocol-compliant data down the chain. If Unit #1 receives an extended command that is addressed to another unit, the unit is unavailable or offline and no response is sent.

All responses received from a downstream device are forwarded up the chain by all units.

3.1.3 Multi-drop Operation

For multi-drop operation, no pass-through is required, as this is a bus-type topology. Thus, no echoing of commands received is performed by the units in this environment. All devices must conform to the this protocol in a multi-drop environment.

A simple multi-drop topology is shown here:



The hardware standard RS-485 is an example of a multi-drop interface.

3.2 Operating Parameters

Baud Rate - 2400 (default - can be modified by changing XID 3003)
Data Bits - 8
Stop Bits - 1
Parity - None

It is recommended that startup baud rate be DIP-switch selectable to avoid confusion caused by different baud rates, especially when more than one Unit is in use.

3.3 Message Format

Messages take the following format (note that *Abbreviated Messages [see below]* do not contain the *length*, *data* or *checksum* fields):

header (1 byte)	*unit id* *(2 bytes)*	*message type* (1 byte)	*length* *(3 bytes)*	*data* (117 bytes max)	*checksum* *(4 bytes)*

3.3.1 Header

The message *header* is a single byte of data. The *header* will be '>' (right arrow).

3.3.2 Unit Id

The *Unit Id* is a two-byte ASCII representation of the unit number, from 1 to 99. A *Unit Id* of '00' indicates a broadcast message to all devices.

3.3.3 Message Type

The *message type* is a single byte of data. The *message type* will be either a *Standard* or *Abbreviated* message type.

3.3.3.1 Standard Message Types

Standard messages are commands from the host and data from the device:

Msg Type	Command	Description
Q	Query Device	Determine if device is online
G	Get Data	Request Data from Device
X	Set Data	Set Data in Device

A	Data	Data from Device

3.3.3.2 Abbreviated Message Types

Abbreviated messages are responses from the device to the host indicating status. These messages consist only of the header character ('>'), two-digit unit number, and the message type ('0', '1', '2'). Length, data and checksum are omitted.

Msg Type	Message	Description
0	NAK	Command Rejected or Not Supported
1	ACK	Command Accepted
2	Checksum Error	Invalid Checksum in Command Message

3.3.4 Length

The *length* is the combined length of *data* and *checksum.*

3.3.5 Data

All data is positional and comma delimited. If a variable value is not currently available, a comma with no data is placed in the variable location. It is not necessary to provide commas beyond the last data value. For example, the Miscellaneous group can return up to 32 data values. If, on Unit #3, only the 2nd, 11th, and 12th variables have valid data, the UPS response will have the following format:

>03A042,1,,,,,,,,,"Misc String","Hello World"0C54

Note that it is not necessary to provide the final commas since there is no valid data for the final 20 variables. Total length of the *data* field is shall not exceed 117. (The last four bytes [0C54] are the ASCII representation of the hexadecimal checksum [see below]).

3.3.6 Checksum

The *checksum* is the last four bytes of the message packet and is the ASCII hexadecimal representation of the sum of all characters (including header) up to the last byte in *data.* A *checksum* of "0000" shall always be interpreted as valid (i.e., no checksum verification is performed).

3.4 Messages from Host to Device

3.4.1 Query Device Message

The *Query Device* message has the following format:

>	*unit id* (2 bytes)	**Q**	*length* (3 bytes)	*checksum* (4 bytes)

The *Query Device* message is to determine the presence or lack of a unit as identified in the *unit id.* If the unit is offline or not available, no response is received.

Note that broadcast mode (i.e., *Unit Id "00")* is not supported for *Query Device* messages.

3.4.1.1 Response

Response from queried unit is an *ACK* message or *Checksum Error* message.

3.4.2 Get Message

The *Get* message has the following format:

>	*unit id* (2 bytes)	**G**	*length* (3 bytes)	*data*	*checksum* (4 bytes)

The *Get* message is to request a specific XID or GID.

Note that broadcast mode (i.e., *Unit Id "00")* is not supported for *Get* messages.

Valid *data* includes the following commands:

Command	Description	Parameters Requested
GR<id>	Get Group <id> where *<id> is the zero-padded GID of length 2.*	Generic Group Get Command for any GID. Not supported for GIDs 1, 10, 11, 12, 13. Returns group in comma delimited format. Unsupported variables represented by a comma. Null strings represented by "".
XG??	Query Available Groups	Returns comma delimited list of GIDs supported by this device.
XA<gr>	Query Available Parameters where <gr> is the zero-padded GID of length 2.	Query available parameters for specified group. Positional comma-delimited data returns 1 indicating that the corresponding parameter is supported, 0 if not. Trailing 0s are insignificant.
<xid>	Get Arbitrary XID object where *<xid>* is the zero-padded object XID of length 4.	Get specified object whose XID is specified.

3.4.2.1 Response

Response from Device is a *Data* message or a *NAK* message if the specified GID or XID is unsupported, or *Checksum Error* message.

Note that string values will be enclosed in double quotes.

3.4.3 Set Message

The *Set* message has the following format:

>	*unit id* (2 bytes)	**X**	*length* (3 bytes)	*data*	*checksum* (4 bytes)

The *Set* command is used to set an XID or Group's data values.

Specifying a *Unit Id* of *"00"* indicates that all devices should set the corresponding data values (if supported).

Where *data* is a string of up to 117 characters, beginning with a four-byte *Command* (without trailing comma) followed immediately by *parameter(s)* to be set. Strings should be enclosed in double quotes.

Command	**Description**	***Parameter(s)***
GR<id>	Set Group <id> where *<id> is the two-byte GID*	Generic Group Set Command for any GID. **Not supported for GIDs 1, 10, 11, 12, 13 (use <xid> command)**
<xid>	Set Arbitrary XID object where *<xid>* is the object XID and has length 4.	Set specified object whose XID is specified.

3.4.3.1 Response

If *Unit Id* is "00", no response is generated. Otherwise, response from Device is an *ACK* message to indicate the parameters were successfully set or a *NAK* message to indicate one or more parameters were not set, or a *Checksum Error* message.

3.5 Messages from Device to Host

3.5.1 Data Message

The *Data* message has the following format:

>	*unit id* (2 bytes)	**A**	*length* (3 bytes)	*data*	*checksum* (4 bytes)

Where *data* is a string of up to 117 characters containing data to be returned to the host.

3.6 Communication examples

Following are examples of commands that may be sent to a UPS, and responses to those commands from the UPS.

3.6.1 Query commands examples

Host checks for Auxiliary Device #3

>03Q0040186

```
>    - Header character
03   - Unit Number
Q    - Record type (Query)
004  - Number of bytes to follow
0186 - Hex Checksum
```

If an auxiliary device unit #3 is connected, it responds:

>031

```
>   -  Header character
03  - Unit number
1   - Record type (command accepted)
```

3.6.2 Get commands examples

Host asks for the value of Contact Output #8 from Unit #3

```
>03G00818080251

>    - Header character
03   - Unit Number
G    - Record type (Get)
008  - Number of bytes to follow
1808 - XID for Contact Output #8
0251 - Hex Checksum
```

Auxiliary Unit #3 responds:

```
>03A005101A8

>    - Header character
03   - Unit Number
A    - Record type (Data)
005  - Number of bytes to follow
1    - Contact status
01A8 - Hex Checksum
```

Host attempts to get Receptacle Status Group from Unit #5

```
>05G008GR140280

>    - Header character
05   - Unit number
G    - Record type (Get)
008  - Number of bytes to follow
GR14 - GID 14
0280 - Hex Checksum
```

Auxiliary Unit #5 Responds:

```
>05A0331,1,1,2,3,,,,,,,,,,,,0,0,5,506AC

>   - Header character
A    - Record type (Data)
05   - Unit number
033  - Number of bytes to follow
1    - Some Outputs are On
1    - Receptacle #1 is On
1    - Receptacle #2 is On
2    - Receptacle #3 is Off, transitioning On
3    - Receptacle #4 is On, transitioning Off
            (receptacles 5 to 16 are not supported)
0    - Time to Go is 0 seconds for receptacle #1
0    - Time to Go is 0 seconds for receptacle #2
5    - Time to Go is 5 seconds for receptacle #3
3    - Time to Go is 3 seconds for receptacle #4
06AC - Hex Checksum
```

3.6.3 Set commands examples

Host attempts to set Auxiliary Configuration Group for Unit #1

```
>01X028GR2410,90,-5,105,1,1,0,00648

>    - Header character
01   - Unit number
X    - Record type (Set)
028  - Number of bytes to follow
GR24 - Group ID (Auxiliary Configuration Group A)
10   - Lower Humidity Threshold
90   - Upper Humidity Threshold
-5   - Lower Temperature Threshold
105  - Upper Temperature Threshold
1    - N/C Contact #1
1    - N/C Contact #2
0    - N/O Contact #3
0    - N/O Contact #4 (Contacts 5,6,7, and 8 unchanged)
0648 - Hex checksum
```

Auxiliary Unit responds:

```
>011

>   - Header character
01  - Unit Number
1   - Record type (Command Accepted)
```

Host attempts to Turn On Receptacle #3 Immediately in Unit #1

```
>01X009120410288

>    - Header character
01   - Unit number
X    - Record type (Set)
009  - Number of bytes to follow
1204 - XID for Receptacle #3
1    - Turn it ON!
0288 - Hex Checksum
```

Auxiliary Unit responds:

```
>011

>   - Header character
01  - Unit Number
1   - Record type (Command Accepted)
```

Revision History

Revision	Date	Comments
3.0	01/19/96 03/20/96 03/21/96 05/03/96 5/07/96 5/15/96 5/28/96 6/06/96 6/12/96	Added Auxiliary Device Extensions - JMM Added Support for Checksums - JMM Added Enhanced 3 Phase Support - JMM Added Phase to Neutral Voltages and Add'l Comments - JMM Unit #1 deselected at power-up for multi-drop - JMM Modified Set/Get/Query Format - JMM Improved readability, changed packet format - JMM Minor corrections - JMM Released.
	2003	Extensions for Newave
3.0.1	3.3.2004	Included XIDs 512, 513, 514 - mn
		XID 634 not supported - mn
		some notes added – mn
3.0.2	1.6.2004	description for XIDs 913 and 914