

9E 2080K ShutHid Document

UPS HID and COPI Communication Software Requirements.

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Ind	date	Modification	Nom Name	Visa	Nom Name	Visa
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Revision History

Revision	Issue date	Comments
AA	2010/01/25	First issue.
AB	2010/10/06	<p>Section 3.1 :</p> <ul style="list-style-type: none"> - Suppress the HID below because informations not available : UPS.BatterySystem.Battery.Temperature UPS.PowerConverter.Output.Phase[x].PeakFactor UPS.PowerSummary.AudibleAlarmControl UPS.PowerConverter.Rectifier.PresentStatus.HighNegativeDCBusVoltage UPS.PowerConverter.Rectifier.PresentStatus.LowNegativeDCBusVoltage UPS.PowerConverter.Input[3].EnergySaving UPS.PowerConverter.Output.ForcedReboot - Suppress the HID below because UPS cannot be remote controlled UPS.PowerSummary.Schedule UPS.PowerSummary.DelayBeforeShutdown UPS.PowerSummary.DelayBeforeStartup - Modify the HID below because UPS cannot be remote controlled UPS.PowerSummary.PresentStatus.Switchable RO fixed to 0 <p>Add the HID UPS.OutletSystem.Outlet[1] collection UPS.PowerConverter.Output.PresentStatus.VoltageHigh UPS.PowerConverter.Output.PresentStatus.VoltageLow UPS.PowerConverter.Input[2].PresentStatus.VoltageTooHigh UPS.PowerConverter.Input[2].PresentStatus.VoltageTooLow UPS.PowerConverter.Output.PresentStatus.FrequencyOutOfRange UPS.PowerSupply.PresentStatus.InternalFailure UPS.PowerConverter.Input[1].PresentStatus.WiringFault UPS.PowerConverter.Input[2].PresentStatus.WiringFault UPS.PowerSummary.PresentStatus.ShutdownRequested UPS.PowerSummary.PresentStatus.CompatibilityFailure UPS.PowerConverter.Rectifier.PresentStatus.Used</p>
AC	2012/12/26	<p>All members are sorted by Report ID</p> <p>Add comments that show some members are unused</p> <p>Change some unit Modify document description</p>
AD	2013/01/11	Add example
AE	2013/01/11	Modify the format of document

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1. INTRODUCTION

This document describes how to communicate with 9E 20-80K UPS by SHUT protocol, and detailly describes the HID databases in 9E 20-80K UPS including all the HID objects and how to manage them.

SHUT protocol describe in<SHUT Protocol Generic Specification.pdf>. If the HID databases describe in <SHUT Protocol Generic Specification.pdf> is conflict with this document, please follow this document.

1.1 SHUT-HID implementation

SHUT-HID implementation allows the UPS to communicate with CSB via service port(DB9) or the MINISLOT card.

1.1.1 DB9 port:

Connection :

- Connect to the UPS protection software running on PC
- Set operation through the Config software running on PC
- Connect with the Microsoft Power Management
- Microsoft Plug & Play (WHQL requirements)

Default setting for DB9 port in CSB are:

- Baud rate: 57600
- 8 data bits
- No parity
- 1 stop bit
- Flow control: none

1.1.2 Minislot:

Connection:

- EATON Network Management Card (66102 and 66103)

Default setting for of UPS SHUT Minislot port in CSB are:

- Baud rate: 2400
- 8 data bits
- No parity
- 1 stop bit
- Flow control: none

1.2 GLOSSARY

USB :	Universal Serial Bus
HID :	Human Interface Device
COPI :	Core Object Protocol Interface
SHUT :	Serial Hid Ups Transfer
PNP :	Plug And Play protocol for Microsoft OS
DEVICE :	Terminology used to name the HID databases server (Ex of device : GDEV card)
HOST :	Terminology used to name the HID databases client (Ex of host : NMC card)
MOSAIC :	Project name for new communication solutions.

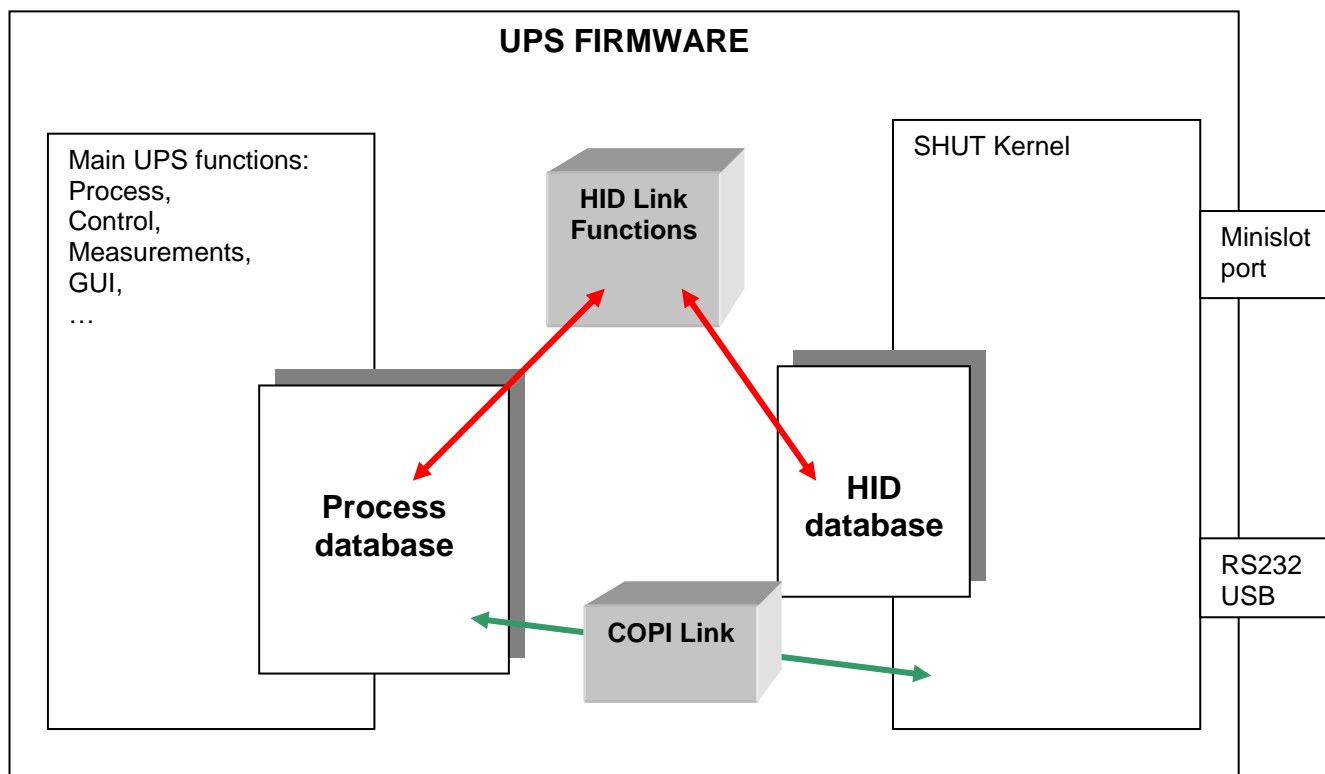
1.3 REFERENCE DOCUMENTS

SHUT : Serial HID UPS transfer. General specification.
SHUT Kernel Communication. Software Requirements.
SHUT Kernel Source code.

Reference
51029196ZA
34003831ZA
34003831ZC

2. ARCHITECTURE

The architecture is as follows :



HID Link Functions make Read/Write access to data with translation as follows :

- Reverse status (i.e. alarm when value equal to 0 or 1)
- Unit scale operation (i.e.: VA or kVA, ...)
- Data Range (i.e. : 'divide by 100' or 'multiple by 10', ...)
- Downcount of Delay or Timer
- Parameter the UPS process

COPI Link makes direct exchange of variables of the Process database.

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3. HID/COPI DATABASE

3.1 HID/COPI DATA TABLE

ReportId is the number of the report where the value of the HID data is stored.

HidPath is the identifier of the HID data.

IdCOPI is the identifier of the data with COPI.

DataType is the type of the HID data :

Nota : For HID data typed as **Parameter**, the value must be **saved in FLASH or EEPROM** to be recovered after an power cut.

Description is the description of HID data and its possible values.

ReportType have two values :

- *Feature* for reports which can be read only by GET_REPORT requests.
- *Feature/Input* for reports which can be read by GET_REPORT and also can be notified.

RWRO have two values :

- *RO* for Read only values
- *RW* for that can be changed through the communication channel.

CstVar have two values :

- *Cst* for constant values
- *Var* for values which can change.

Unit is the unit used by the HID data.

Size is the length coded in bits taken by the value of the HID data into the report.

Default is the default value of the HID Data, it is also the value for a constant HID data.

Comment is an example, some variables mark as unused, its value means nothing, don't use these variables

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Report ID	HidPath	IdCOPI	Data Type	Description	Report Type	RW RO	Cst Var	Unit	Size	Default	Default String	Comment
1	UPS.PowerSummary.PresentStatus.ACPresent		Status	0: Main AC is not OK 1: Main AC is OK	Feature /Input	RO	Var	-	8	0		
	UPS.PowerSummary.PresentStatus.BelowRemainingCapacityLimit		Alarm	0: Battery level is above RCL threshold. 1: Battery level is below RemainingCapacityLimit threshold or RunTimeToEmpty is below RemainingTimeLimit threshold. It is always 0 when the UPS is not on Battery.	Feature /Input	RO	Var	-	8	0		
	UPS.PowerSummary.PresentStatus.Charging		Status	0: Battery is not charging 1: Battery is charging Can be redundant with UPS.PowerSummary.PresentStatus.DischargingThis object is used by Microsoft Power Management.	Feature /Input	RO	Var	-	8	0		
	UPS.PowerSummary.PresentStatus.Discharging		Alarm	0: Battery is not discharging 1: Battery is discharging	Feature /Input	RO	Var	-	8	0		
	UPS.PowerSummary.PresentStatus.Good		Status	0: Output is not powered. 1: Output is powered.	Feature /Input	RO	Var	-	8	0		

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2	UPS.PowerSummary.PresentStatus.InternalFailure		Alarm	Sum of all hardware UPS internal fault that cause UPS malfunction, excluding the environment fault. 0: No fault 1: Fault	Feature /Input	RO	Var	-	8	0		
	UPS.PowerSummary.PresentStatus.NeedReplacement		Alarm	This status comes from the battery test or the autometer. 0: Battery is OK 1: Battery need replacement OR is faulty	Feature /Input	RO	Var	-	8	0		
	UPS.PowerSummary.PresentStatus.OverLoad		Alarm	0: No output overload 1: Output overload	Feature /Input	RO	Var	-	8	0		
	UPS.PowerSummary.PresentStatus.ShutdownImminent		Alarm	The output will be unpowered soon for UPS internal reason (fault, battery low voltage, ...) 0: Not in progress 1: In progress	Feature /Input	RO	Var	-	8	0		



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3	UPS.PowerSummary.PresentStatus.CompatibilityFailure		Alarm	0: Software incompatibility is false 1: Software incompatibility is true	Feature /Input	RO	Var	-	8	0		
	UPS.PowerSummary.PresentStatus.ConfigurationFailure		Alarm	0: Configuration error is false 1: Configuration error is true	Feature /Input	RO	Var	-	8	0		
	UPS.PowerSummary.PresentStatus.EmergencyStop		Alarm	0: No emergency stop 1: emergency stop was proceed	Feature /Input	RO	Var	-	8	0		
	UPS.PowerSummary.PresentStatus.FanFailure		Alarm	0: no fault 1: Ventilator fault	Feature /Input	RO	Var	-	8	0		
	UPS.PowerSummary.PresentStatus.OverTemperature		Alarm	Internal UPS temperature status. 0: UPS temperature is OK 1: UPS temperature is high	Feature /Input	RO	Var	-	8	0		
	UPS.PowerSummary.PresentStatus.ShutdownRequested		Alarm	0: no shutdwon requested 1: shutdown requested	Feature /Input	RO	Var	-	8	0		unused
	UPS.PowerSupply.PresentStatus.InternalFailure		Alarm	0: internal failure is false 1:internal failure is true	Feature /Input	RO	Var	-	8	0		unused

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4	UPS.PowerSummary.PresentStatus.Switchable		Parameter	<p>Parameter to enable or not remote UPS commands coming from all communication ports.</p> <p>0: Depending of UPS :</p> <p>Eaton UPS : Commands to shutoff or start the UPS cannot be written.</p> <p>Dell UPS : All HID datas cannot be written.</p> <p>1: All HID datas can be written.</p>	Feature /Input	RO	Var	-	8	0		unused
6	UPS.PowerSummary.RemainingCapacity		Measure	Remaining battery level calculated by the autometer.	Feature /Input	RO	Var	%	8	0		
	UPS.PowerSummary.RunTimeToEmpty		Measure	Battery remaining time calculated by the autometer.	Feature /Input	RO	Var	s	32	0		



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7	UPS.PowerSummary.Current		Measure	Actual value of measured battery current.	Feature	RO	Var	0.1A	16	0		100 = 10A
	UPS.PowerSummary.PercentLoad		Measure	Output percent load	Feature	RO	Var	%	8	0		
	UPS.PowerSummary.Temperature		Measure	Actual value of measured UPS internal temperature.	Feature	RO	Var	°K	16	0		always be 298
	UPS.PowerSummary.Voltage		Measure	Actual value of measured battery voltage	Feature	RO	Var	0.1V	16	0		2200 = 220V
8	UPS.PowerSummary.RemainingCapacityLimit		Parameter	Low battery level threshold (Cf Below Remaining Capacity Limit)	Feature	RO	Var	%	8	20		
11	UPS.Flow[1].FlowID		Constant	Specific, always 1	Feature	RO	Cst	-	8	1		always be 1
	UPS.Flow[2].FlowID		Constant	Specific, always 2	Feature	RO	Cst	-	8	2		always be 2
	UPS.Flow[4].FlowID		Constant	Specific, always 4	Feature	RO	Cst	-	8	4		always be 4
	UPS.PowerSummary.Country		Parameter	0 = Europe 1 = US 2 = Europe_208 3 = Worldwide (the UPS can operate on all frequency, voltage in the world) 4 = Australia	Feature	RO	Cst	-	8	1		always be 1
	UPS.PowerSummary.FlowID		Constant	Specific, Always 4	Feature	RO	Cst	-	8	4		always be 4
	UPS.PowerSummary.PowerSummaryID		Constant	Only one power summary, always 1	Feature	RO	Cst	-	8	1		always be 1

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12	UPS.PowerSummary.CapacityGranularity1		Constant	Generally 1 (for 1% of capacity)	Feature	RO	Cst	-	8	1		always be 1
	UPS.PowerSummary.CapacityMode		Constant	Always 2	Feature	RO	Cst	-	8	2		always be 2
	UPS.PowerSummary.DesignCapacity		Constant	100 for 100%	Feature	RO	Cst	%	8	100		always be 100
	UPS.PowerSummary.FullChargeCapacity		Constant	Generally a static value of 100, but if there is precise way to calculate y=the battery charge at the end of the charge, It could be different. A low value denotes battery end of life.	Feature	RO	Cst	%	8	100		always be 100
13	UPS.PowerSummary.ConfigVoltage		Measure	Nominal Battery voltage. Value = 12V * BatteryCount (See Report 33)	Feature	RO	Cst	V	16	0		
14	UPS.PowerSummary.ConfigurationReset		Command	Command to reset configuration : 0 : no reset 1 : Set to default values all parameters (excluding Serial number, Product name, Model Name or calibration values.	Feature	RO	Var	-	8	0		
15	UPS.PowerSummary.PresentStatus.CommunicationLost		Alarm	0: Communication is OK with core 1: Communication is lost with core, The HID databasis is not updated, then could be false.	Feature /Input	RO	Var	-	8	0		

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16	UPS.PowerSummary.iDeviceChemistry		String	Battery chemistry. Example "PbAc" for lead acid battery.	Feature	RO	Cst	-	8	5	PbAc	PbAc
	UPS.PowerSummary.iManufacturer	0xF806	String	Manufacturer name, Examples : "MGE OFFICE PROTECTION SYSTEMS" "EATON POWERWARE" "EATON" "DELL"	Feature	RO	Cst	-	8	1	EATON	EATON
	UPS.PowerSummary.iModel	0xF807	String	Model name, basically the string which is containing the commercial power, Examples : "RT 1500" "650" ...	Feature	RO	Cst	-	8	3	20000	
	UPS.PowerSummary.iPartNumber	0xF829	String	Part number	Feature	RO	Cst	-	8	9	30000	9E303LL10000000
	UPS.PowerSummary.iProduct	0xF809	String	Product name, Examples : "Evolution" "Protection Station" ...	Feature	RO	Cst	-	8	2	9E	9E
	UPS.PowerSummary.iReferenceNumber	0xF82A	String	Technical Reference of firmware	Feature	RO	Cst	-	8	10		590
	UPS.PowerSummary.iSerialNumber	0xF80A	String	Serial number, it can be changed with COPI protocol : Example : "AN2E49008".	Feature	RO	Cst	-	8	4		4
	UPS.PowerSummary.iVersion		String	Indus release : Examples "AA" or "1.05" "00.01.0005"	Feature	RO	Cst	-	8	6	00.00.0001	

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18	UPS.PowerSummary.RemainingCapacityLimitSetting		Parameter	Low battery level threshold (can be tuned and copied into RemainingCapacityLimit)	Feature	RO	Var	%	8	20		UPM EEPROM Address: 5315/5316 Battery test threshold low Should be same as report 8: UPS.PowerSummary.RemainingCapacityLimit
20	UPS.Flow[1].ConfigFrequency		Measure	Nominal frequency of Main AC. Generally made by automatic detection. If the frequency measured is out of limits, it takes the value of the Config Output Frequency.	Feature	RO	Var	Hz	8	0		
	UPS.Flow[2].ConfigFrequency		Measure	Nominal frequency of Bypass AC. Generally made by automatic detection.	Feature	RO	Var	Hz	8	0		
21	UPS.Flow[1].ConfigVoltage		Measure	Nominal voltage of Main AC.	Feature	RO	Var	0.1V	16	0		
	UPS.Flow[2].ConfigVoltage		Measure	Nominal voltage of Bypass AC	Feature	RO	Var	0.1V	16	0		



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22	UPS.Flow[4].ConfigPercentLoad		Parameter	Output percent load threshold triggering the PowerSummary.PresentStatus.Overload alarm	Feature	RO	Var	%	8	100		unused
25	UPS.Flow[4].ConfigFrequency		Parameter	Nominal value of frequency	Feature	RW	Var	Hz	8	50		
32	UPS.BatterySystem.Battery.BatteryID		Constant	All battery block are seen as one battery, always 1	Feature	RO	Cst	-	8	1		always be 1
	UPS.BatterySystem.BatterySystemID		Constant	Only one battery system, always 1	Feature	RO	Cst	-	8	1		always be 1
	UPS.BatterySystem.Charger.ChargerID		Constant	ID of stander charger	Feature	RO	Cst	-	8	1		always be 1
33	UPS.BatterySystem.Battery.Count		Measure	Battery module (blocks) count (in user point of view).	Feature	RO	Var	-	8	0		
35	UPS.BatterySystem.Battery.DesignCapacity		Parameter	Industry uses mAh, 1 mAh is 3,6 As. By default it is set by the UPS with the internal battery capacity. When the customer adds an external battery, then he will use a Config tool to set DesignCapacity with : - Capacity internal batt + external batt	Feature	RO	Var	As	32	0		
	UPS.BatterySystem.Charger.Mode		Status	1 (Charging) - Battery is charging 2 (Discharging) - Battery is discharging 3 (Equalizing) - Battery is equalizing(or floating) 4 (Resting) - Battery is resting 5 (Off) – Battery is off	Feature	RO	Var	-	8	0		

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36	UPS.BatterySystem.Battery.Test		Command	Read result value. 1: Done and Passed 3: Done and Error 5: In progress	Feature	RO	Var	-	8	0		
37	UPS.BatterySystem.Battery.TestPeriod		Parameter	0 = No Test 1~n = The battery test period in seconds	Feature	RO	Var	s	32	0x803A0900		unused
38	UPS.BatterySystem.Charger.ChargerType		Parameter	Charger type 0 - None 1 - Extended (CLA) 2 - Large extension 3 - Extra large extension (XL) 4 - ABM	Feature	RO	Var	-	8	0		always be 4



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39	UPS.BatterySystem.Battery.PresentStatus.FuseFault		Alarm	In case of fuse in battery circuit 0: No fuse or Fuse is OK 1: Fuse is open	Feature /Input	RO	Var	-	8	0		unused
	UPS.BatterySystem.Battery.PresentStatus.OverTemperature		Alarm	Defined by comparaisn an internal threshold of by using a contact status	Feature /Input	RO	Var	-	8	0		unused
	UPS.BatterySystem.Battery.PresentStatus.Present		Alarm	0: Battery not present (or some elements of the battery are disconnected) 1: Battery present	Feature /Input	RO	Var	-	8	0		unused
	UPS.BatterySystem.Battery.PresentStatus.VoltageTooHigh		Alarm	0: Batter DC voltage is good 1: Battery DC voltage is high	Feature /Input	RO	Var	-	8	0		
	UPS.BatterySystem.Charger.PresentStatus.Floating		Status	0:ABM on Float Mode is false 1: ABM on Float Mode is true	Feature /Input	RO	Var	-	8	0		unused
	UPS.BatterySystem.Charger.PresentStatus.InternalFailure		Alarm	0: No fault 1: Any hardware fault that cause charger malfunction	Feature /Input	RO	Var	-	8	0		
	UPS.BatterySystem.Charger.PresentStatus.Used		Status	0:Charger On is false 1:Charger On is true	Feature /Input	RO	Var	-	8	0		
	UPS.BatterySystem.Charger.PresentStatus.VoltageTooHigh		Alarm	0: Recharge battery voltage is not too high 1: Recharge battery voltage is too high	Feature /Input	RO	Var	-	8	0		

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41	UPS.PowerSummary.Time		Measure	<p>Actual value of time : represent the number of seconds elapsed since 1st of January 1970 at 00:00:00 GMT (cf timestamp Unix).</p> <p>Read : returns the current time of UPS.</p> <p>Written : allows to set the UPS time.</p>	Feature	RO	Var	s	32	0		
43	UPS.PowerConverter.Input[1].WiringFaultDetection		Parameter	<p>Wiring Fault Detection.</p> <p>0: Disabled 1: Enabled</p>	Feature	RO	Var	-	8	0		always be 1
45	UPS.PowerConverter.Input[2].SwitchOffControl		Command	<p>Command to switch on inverter</p> <p>0:not used, 1:switch off automatic bypass</p>	Feature	RO	Var	-	8	0		unused



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46	UPS.PowerConverter.Chopper.ChopperID		Constant	Only one chopper, always 1	Feature	RO	Cst	-	8	1		always be 1
	UPS.PowerConverter.Input[1].FlowID		Constant	It is the Main AC flow, always 1	Feature	RO	Cst	-	8	1		always be 1
	UPS.PowerConverter.Input[1].InputID		Constant	Specific, always 1	Feature	RO	Cst	-	8	1		always be 1
	UPS.PowerConverter.Input[2].FlowID		Constant	1 : Main AC flow (because R1 and R2 are common) 2 : Bypass flow (because R1 and R2 are separated)	Feature	RO	Cst	-	8	2		always be 2
	UPS.PowerConverter.Input[2].InputID		Constant	Specific, always 2	Feature	RO	Cst	-	8	2		always be 2
	UPS.PowerConverter.Input[3].FlowID		Constant	It is the Main AC flow, always 3, this flow is not defined in the present report descriptor	Feature	RO	Cst	-	8	3		always be 3
	UPS.PowerConverter.Input[3].InputID		Constant	Specific, always 3	Feature	RO	Cst	-	8	3		always be 3
	UPS.PowerConverter.Input[4].FlowID		Constant	1 : Main AC flow (because R1 and R2 are common) 2 : Bypass flow (because R1 and R2 are separated)	Feature	RO	Cst	-	8	2		always be 2
	UPS.PowerConverter.Input[4].InputID		Constant	Specific, always 4	Feature	RO	Cst	-	8	4		always be 4
	UPS.PowerConverter.Input[5].FlowID		Constant	1 : Main AC flow (because R1 and R2 are common) 2 : Bypass flow (because R1 and R2 are separated)	Feature	RO	Cst	-	8	2		always be 2
	UPS.PowerConverter.Input[5].InputID		Constant	Specific, always 5	Feature	RO	Cst	-	8	5		always be 5
	UPS.PowerConverter.Inverter.InverterID		Constant	Only one inverter, always 1	Feature	RO	Cst	-	8	1		always be 1
	UPS.PowerConverter.Output.FlowID		Constant	Specific, always 4	Feature	RO	Cst	-	8	4		always be 4
	UPS.PowerConverter.Output.OutputID		Constant	only one output, always 1	Feature	RO	Cst	-	8	1		always be 1
UPS.PowerConverter.PowerConverterID		Constant	Only one power converter, always 1	Feature	RO	Cst	-	8	1		always be 1	

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47	UPS.PowerConverter.Input[1].Phase[1].PhaseID		Constant	ID of phase 1 of Main AC	Feature	RO	Cst	-	8	0x01		always be 0x01
	UPS.PowerConverter.Input[1].Phase[12].PhaseID		Constant	ID of phase 12 of Main AC	Feature	RO	Cst	-	8	0x0C		always be 0x0c
	UPS.PowerConverter.Input[1].Phase[2].PhaseID		Constant	ID of phase 2 of Main AC	Feature	RO	Cst	-	8	0x02		always be 0x02
	UPS.PowerConverter.Input[1].Phase[23].PhaseID		Constant	ID of phase 23 of Main AC	Feature	RO	Cst	-	8	0x17		always be 0x17
	UPS.PowerConverter.Input[1].Phase[3].PhaseID		Constant	ID of phase 3 of Main AC	Feature	RO	Cst	-	8	0x03		always be 0x03
	UPS.PowerConverter.Input[1].Phase[31].PhaseID		Constant	ID of phase 31 of Main AC	Feature	RO	Cst	-	8	0x1F		always be 0x1f
	UPS.PowerConverter.Input[2].Phase[1].PhaseID		Constant	ID of phase 1 of Bypass AC	Feature	RO	Cst	-	8	0x01		always be 0x01
	UPS.PowerConverter.Input[2].Phase[12].PhaseID		Constant	ID of phase 12 of Bypass AC	Feature	RO	Cst	-	8	0x0C		always be 0x0c
	UPS.PowerConverter.Input[2].Phase[2].PhaseID		Constant	ID of phase 2 of Bypass AC	Feature	RO	Cst	-	8	0x02		always be 0x02
	UPS.PowerConverter.Input[2].Phase[23].PhaseID		Constant	ID of phase 23 of Bypass AC	Feature	RO	Cst	-	8	0x17		always be 0x17
	UPS.PowerConverter.Input[2].Phase[3].PhaseID		Constant	ID of phase 3 of Bypass AC	Feature	RO	Cst	-	8	0x03		always be 0x03
	UPS.PowerConverter.Input[2].Phase[31].PhaseID		Constant	ID of phase 31 of Bypass AC	Feature	RO	Cst	-	8	0x1F		always be 0x1f

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48	UPS.PowerConverter.Input[1].ActivePower		Measure	Total active power of Main AC	Feature	RO	Var	W	32	0		
	UPS.PowerConverter.Input[1].ApparentPower		Measure	Total apparent power of Main AC	Feature	RO	Var	VA	32	0		
	UPS.PowerConverter.Input[1].Current		Measure	Total current taken on Main AC for 3 phase Input	Feature	RO	Var	0.1A	16	0		
	UPS.PowerConverter.Input[1].Frequency		Measure	Actual value of Main AC frequency	Feature	RO	Var	0.1Hz	16	0		
	UPS.PowerConverter.Input[1].PowerFactor		Measure	Actual value of Main AC Power Factor	Feature	RO	Var	-	8	0		
	UPS.PowerConverter.Input[1].Voltage		Measure	Main AC phase 1 voltage	Feature	RO	Var	0.1V	16	0		
49	UPS.PowerConverter.Input[1].Phase[1].Current		Measure	Actual value of Main AC current phase x	Feature	RO	Var	0.1A	16	0		
	UPS.PowerConverter.Input[1].Phase[1].Voltage		Measure	Actual value of Main AC voltage phase x	Feature	RO	Var	0.1V	16	0		
	UPS.PowerConverter.Input[1].Phase[12].Voltage		Measure	Actual value of Main AC voltage phase x	Feature	RO	Var	0.1V	16	0		
	UPS.PowerConverter.Input[1].Phase[2].Current		Measure	Actual value of Main AC current phase x	Feature	RO	Var	0.1A	16	0		
	UPS.PowerConverter.Input[1].Phase[2].Voltage		Measure	Actual value of Main AC voltage phase x	Feature	RO	Var	0.1V	16	0		
	UPS.PowerConverter.Input[1].Phase[23].Voltage		Measure	Actual value of Main AC voltage phase x	Feature	RO	Var	0.1V	16	0		
	UPS.PowerConverter.Input[1].Phase[3].Current		Measure	Actual value of Main AC current phase x	Feature	RO	Var	0.1A	16	0		
	UPS.PowerConverter.Input[1].Phase[3].Voltage		Measure	Actual value of Main AC voltage phase x	Feature	RO	Var	0.1V	16	0		
	UPS.PowerConverter.Input[1].Phase[31].Voltage		Measure	Actual value of Main AC voltage phase x	Feature	RO	Var	0.1V	16	0		



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50	UPS.PowerConverter.Input[1].PresentStatus.CircuitBreaker	Status	Q1 status 0:Off (open) 1:On (close)	Feature /Input	RO	Var	-	8	0		always be 1
	UPS.PowerConverter.Input[1].PresentStatus.FrequencyOutOfRange	Alarm	0: Frequency in range 1: Frequency out of range	Feature /Input	RO	Var	-	8	0		
	UPS.PowerConverter.Input[1].PresentStatus.FuseFault	Alarm	0: No fuse or fuse closed 1: Fuse open	Feature /Input	RO	Var	-	8	0		
	UPS.PowerConverter.Input[1].PresentStatus.InternalFailure	Alarm	0: No fault 1: hardware fault in the R1 input module.	Feature /Input	RO	Var	-	8	0		
	UPS.PowerConverter.Input[1].PresentStatus.Used	Status	0: Not used as source of power converter 1: Main AC Input (R1) Used as source of power converter (not including the High efficiency mode).	Feature /Input	RO	Var	-	8	0		
	UPS.PowerConverter.Input[1].PresentStatus.VoltageOutOfRange	Alarm	0: Voltage in range 1: Voltage out of range(too high or too low)	Feature /Input	RO	Var	-	8	0		
	UPS.PowerConverter.Input[1].PresentStatus.VoltageTooHigh	Alarm	0: Main AC voltage too high is false 1: Main AC voltage too high is true	Feature /Input	RO	Var	-	8	0		
	UPS.PowerConverter.Input[1].PresentStatus.VoltageTooLow	Alarm	0: Voltage too low is false 1: Voltage too low is true	Feature /Input	RO	Var	-	8	0		
	UPS.PowerConverter.Input[1].PresentStatus.WiringFault	Alarm	0: no fault 1: Site wiring fault	Feature /Input	RO	Var	-	8	0		
	UPS.PowerConverter.Input[2].PresentStatus.VoltageTooHigh	Alarm	0: Bypass AC voltage too high is false 1: Bypass AC voltage too high is true	Feature /Input	RO	Var	-	8	0		
	UPS.PowerConverter.Input[2].PresentStatus.VoltageTooLow	Alarm	0: Bypass AC voltage too low is false 1: Bypass AC voltage too low is true	Feature /Input	RO	Var	-	8	0		
UPS.PowerConverter.Input[2].PresentStatus.WiringFault	Alarm	0: no fault 1: Site wiring fault	Feature /Input	RO	Var	-	8	0			

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51	UPS.PowerConverter.Input[2].OutOfToleranceTransferEnable	Parameter	<p>0 - The transfer on bypass is not allowed when AC Bypass is out of tolerance. (No break allowed)</p> <p>1 - The transfer on bypass is allowed even AC Bypass is out of tolerance. (A power break is possible.)</p>	Feature	RO	Var	-	8	0		unused
52	UPS.PowerConverter.Input[2].Switchable	Parameter	<p>Definition is :</p> <p>0: The transfer on bypass by manual command is not allowed</p> <p>1: The transfer on bypass by manual command is allowed.</p>	Feature	RO	Var	-	8	0		unused
53	UPS.PowerConverter.Input[2].ForcedTransferEnable	Parameter	<p>0: The transfer on bypass by manual command is not allowed</p> <p>1: The transfer on bypass by manual command is allowed</p> <p>Nota : The manual command is activated by the HID data UPS.PowerConverter.Input[2].SwitchOnControl</p>	Feature	RO	Var	-	8	1		
54	UPS.PowerConverter.Input[2].SwitchOnControl	Command	<p>Command to switch manually on bypass :</p> <p>0: not used,</p> <p>1: switch on automatic bypass</p>	Feature	RO	Var	-	8	0		unused

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55	UPS.PowerConverter.Input[2].Phase[1].Current		Measure	If three phases UPS, Actual value of Bypass AC current phase x	Feature	RO	Var	0.1A	16	0		
	UPS.PowerConverter.Input[2].Phase[1].Voltage		Measure	If three phases UPS, Actual value of Bypass AC voltage phase x	Feature	RO	Var	0.1V	16	0		
	UPS.PowerConverter.Input[2].Phase[12].Voltage		Measure	If three phases UPS, Actual value of Bypass AC voltage phase x	Feature	RO	Var	0.1V	16	12		
	UPS.PowerConverter.Input[2].Phase[2].Current		Measure	If three phases UPS, Actual value of Bypass AC current phase x	Feature	RO	Var	0.1A	16	0		
	UPS.PowerConverter.Input[2].Phase[2].Voltage		Measure	If three phases UPS, Actual value of Bypass AC voltage phase x	Feature	RO	Var	0.1V	16	0		
	UPS.PowerConverter.Input[2].Phase[23].Voltage		Measure	If three phases UPS, Actual value of Bypass AC voltage phase x	Feature	RO	Var	0.1V	16	23		
	UPS.PowerConverter.Input[2].Phase[3].Current		Measure	If three phases UPS, Actual value of Bypass AC current phase x	Feature	RO	Var	0.1A	16	0		
	UPS.PowerConverter.Input[2].Phase[3].Voltage		Measure	If three phases UPS, Actual value of Bypass AC voltage phase x	Feature	RO	Var	0.1V	16	0		
	UPS.PowerConverter.Input[2].Phase[31].Voltage		Measure	If three phases UPS, Actual value of Bypass AC voltage phase x	Feature	RO	Var	0.1V	16	31		
	UPS.PowerConverter.Input[2].PowerFactor		Measure	Power Factor of Bypass AC	Feature	RO	Var	-	8	0		

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56	UPS.PowerConverter.Input[2].PresentStatus.CircuitBreaker	Status	Q4S position 0:Off (open) 1:On (close)	Feature /Input	RO	Var	-	8	0		
	UPS.PowerConverter.Input[2].PresentStatus.FrequencyOutOfRange	Alarm	0: Frequency in range 1: Frequency out of range	Feature /Input	RO	Var	-	8	0		
	UPS.PowerConverter.Input[2].PresentStatus.Good	Alarm	0: In fault 1: All correct, the CS has no failure and the bypass input voltage/frequency is in tolerance.	Feature /Input	RO	Var	-	8	0		
	UPS.PowerConverter.Input[2].PresentStatus.InternalFailure	Alarm	0:no fault 1:bypass internal fault (fuse, relay, ...)	Feature /Input	RO	Var	-	8	0		unused
	UPS.PowerConverter.Input[2].PresentStatus.Overload	Alarm	0: No Overload 1: Overload	Feature /Input	RO	Var	-	8	0		unused
	UPS.PowerConverter.Input[2].PresentStatus.PhaseOutOfRange	Alarm	Phase displacement between AC bypass voltage and output. 0: In phase 1: Phase out of range (bypass input and inverter output cannot phase lock)	Feature /Input	RO	Var	-	8	0		
	UPS.PowerConverter.Input[2].PresentStatus.ThermalOverload	Alarm	0: No thermal overload 1: Thermal overload	Feature /Input	RO	Var	-	8	0		unused
	UPS.PowerConverter.Input[2].PresentStatus.Used	Alarm	0: Not used as source of power converter 1: Bypass AC Input (R2) Used as source of power converter	Feature /Input	RO	Var	-	8	0		
	UPS.PowerConverter.Input[2].PresentStatus.VoltageOutOfRange	Alarm	0: Voltage in range 1: Voltage out of range	Feature /Input	RO	Var	-	8	0		

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58	UPS.PowerConverter.Input[2].ActivePower		Measure	Total active power of bypass AC	Feature	RO	Var	W	32	0		
	UPS.PowerConverter.Input[2].ApparentPower		Measure	Total apparent power of bypass AC	Feature	RO	Var	VA	32	0		
	UPS.PowerConverter.Input[2].Current		Measure	Total current taken on bypass for 3 phase Input	Feature	RO	Var	0.1A	16	0		
	UPS.PowerConverter.Input[2].Frequency		Measure	Actual value of Bypass AC frequency	Feature	RO	Var	0.1H z	16	0		
	UPS.PowerConverter.Input[2].Voltage		Measure	Bypass phase 1 voltage	Feature	RO	Var	0.1V	16	0		
59	UPS.PowerConverter.Input[3].PresentStatus.CircuitBreaker		Status	QF1 Status 0: Off (open) 1: On (close) (for battery)	Feature /Input	RO	Var	-	8	0		
	UPS.PowerConverter.Input[3].PresentStatus.Used		Status	0: Not used as source of power converter 1: Used as source of power converter redundant with UPS.PowerSummary.PresentStatus.Discharging This object is used by UPS Control.	Feature /Input	RO	Var	-	8	0		

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60	UPS.PowerConverter.Input[4].PresentStatus.CircuitBreaker	Status	Q3BP status (combiner avec Q4S a voir sur PROXIMA) 0:Off (open) 1:On (close) (for manual bypass)	Feature /Input	RO	Var	-	8	0		
	UPS.PowerConverter.Input[4].PresentStatus.Used	Status	0: Not used as source of power converter 1: Used as source of power converter (Maintenance position)	Feature /Input	RO	Var	-	8	0		
	UPS.PowerConverter.Input[5].PresentStatus.Used	Status	0: Not used as source of power converter 1: Used as source of power converter (ECO mode) ECO mode is equivalent to High Efficiency mode.	Feature /Input	RO	Var	-	8	0		
63	UPS.PowerConverter.Input[5].Switchable	Parameter	ECO mode 0: Not enabled 1: Enabled	Feature	RO	Var	-	8	0		



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64	UPS.PowerConverter.Rectifier.PresentStatus.DCBusUnbalanced		Alarm	0: DC Bus is balanced 1: DC Bus is unbalanced	Feature /Input	RO	Var	-	8	0		unused
	UPS.PowerConverter.Rectifier.PresentStatus.HighPositiveDCBusVoltage		Alarm	Rectifier DC Bus + voltage is too high	Feature /Input	RO	Var	-	8	0		
	UPS.PowerConverter.Rectifier.PresentStatus.InternalFailure		Alarm	0: no fault 1: Rectifier fault	Feature /Input	RO	Var	-	8	0		
	UPS.PowerConverter.Rectifier.PresentStatus.LowPositiveDCBusVoltage		Alarm	Rectifier DC Bus + voltage is too low	Feature /Input	RO	Var	-	8	0		
	UPS.PowerConverter.Rectifier.PresentStatus.OverLoad		Alarm	0: No fault 1: Rectifier overload	Feature /Input	RO	Var	-	8	0		
	UPS.PowerConverter.Rectifier.PresentStatus.Used		Status	0: Rectifier Off 1: Rectifier On	Feature /Input	RO	Var	-	8	0		



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65	UPS.PowerConverter.Inverter.PresentStatus.CurrentLimitation	Alarm	0: No current limitation 1: Current limitation	Feature /Input	RO	Var	-	8	0		unused
	UPS.PowerConverter.Inverter.PresentStatus.FuseFault	Alarm	0: No fuse or fuse closed 1: Fuse open	Feature /Input	RO	Var	-	8	0		unused
	UPS.PowerConverter.Inverter.PresentStatus.InternalFailure	Alarm	0: No fault 1: Any fault that cause inverter malfunction	Feature /Input	RO	Var	-	8	0		
	UPS.PowerConverter.Inverter.PresentStatus.Overload	Alarm	Inverter module 0: No overload 1: Overload	Feature /Input	RO	Var	-	8	0		
	UPS.PowerConverter.Inverter.PresentStatus.ThermalOverload	Alarm	0: No overload Temperature 1: Overload Temperature	Feature /Input	RO	Var	-	8	0		
	UPS.PowerConverter.Inverter.PresentStatus.Used	Status	0: Inverter is not used 1: Inverter is used	Feature /Input	RO	Var	-	8	0		
	UPS.PowerConverter.Inverter.PresentStatus.VoltageTooHigh	Alarm	0: Inverter output voltage too high is false 1: Inverter output voltage too high is true	Feature /Input	RO	Var	-	8	0		unused
	UPS.PowerConverter.Inverter.PresentStatus.VoltageTooLow	Alarm	0: Inverter output voltage too low is false 1: Inverter output voltage too low is true	Feature /Input	RO	Var	-	8	0		unused



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66	UPS.PowerConverter.Output.ActivePower		Measure	Actual value of active power	Feature	RO	Var	W	32	0		
	UPS.PowerConverter.Output.ApparentPower		Measure	Actual value of apparent power	Feature	RO	Var	VA	32	0		
	UPS.PowerConverter.Output.Current		Measure	Total current taken on output for 3 phase Output	Feature	RO	Var	0.1A	16	0		
	UPS.PowerConverter.Output.Frequency		Measure	Actual value of frequency	Feature	RO	Var	Hz	16	0		
	UPS.PowerConverter.Output.PeakFactor		Measure	0.00-4.00 (use of exponent)	Feature	RO	Var	c-	16	0		Always be 14100 =1.41
	UPS.PowerConverter.Output.PowerFactor		Measure	Cos PHI 0.00-1.00 (use of exponent) (1 = 100)	Feature	RO	Var	-	8	0		
	UPS.PowerConverter.Output.Voltage		Measure	Output phase 1 voltage	Feature	RO	Var	0.1V	16	0		
	UPS.PowerConverter.Rectifier.Phase[1].Voltage		Measure	These 2 data show the DC Bus positive voltage to ground	Feature	RO	Var	0.1V	16	0		UPM Variable Address: 5201
	UPS.PowerConverter.Rectifier.Phase[2].Voltage		Measure	These 2 data show the DC Bus positive voltage to ground	Feature	RO	Var	0.1V	16	0		UPM Variable Address: Variable 5202
68	UPS.PowerConverter.Output.FrequencyRangeBypassTransfer		Parameter	Tolerance on bypass AC frequency to switch on bypass. The frequency could be in range of -X% to +X% around the nominal value.	Feature	RO	Var	%	8	0		unused

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69	UPS.PowerConverter.Output.LowVoltageBypassTransfer		Parameter	Low threshold on bypass AC voltage to switch on bypass.	Feature	RO	Var	0.1V	16	187		Bypass voltage min limit
70	UPS.PowerConverter.Output.HighVoltageBypassTransfer		Parameter	High threshold on bypass AC voltage to switch on bypass.	Feature	RO	Var	0.1V	16	265		Bypass voltage max limit
73	UPS.PowerConverter.Output.Overload[1].PresentStatus.OverThreshold		Alarm	0: output overload level 1 is false 1: output overload level 1 is true	Feature /Input	RO	Var	-	8	0		
	UPS.PowerConverter.Output.Overload[2].PresentStatus.OverThreshold		Alarm	0: output overload level 2 is false 1: output overload level 2 is true	Feature /Input	RO	Var	-	8	0		
	UPS.PowerConverter.Output.Overload[3].PresentStatus.OverThreshold		Alarm	0: output overload level 3 is false 1: output overload level 3 is true	Feature /Input	RO	Var	-	8	0		always be 0
	UPS.PowerConverter.Output.PresentStatus.CircuitBreaker		Status	Q5N status : 0: Off (open) 1: On (close) (for powerconver output)	Feature /Input	RO	Var	-	8	0		always be 1
	UPS.PowerConverter.Output.PresentStatus.FrequencyOutOfRange		Alarm	0: Frequency Not Out Of Range 1: Frequency Out Of Range	Feature /Input	RO	Var	-	8	0		unused
	UPS.PowerConverter.Output.PresentStatus.ShortCircuit		Alarm	0: no short circuit 1: short circuit on output	Feature /Input	RO	Var	-	8	0		
	UPS.PowerConverter.Output.PresentStatus.VoltageTooHigh		Alarm	0: Voltage Too High is false 1: Voltage Too High is true	Feature /Input	RO	Var	-	8	0		
	UPS.PowerConverter.Output.PresentStatus.VoltageTooLow		Alarm	0: Voltage Too Low is false 1: Voltage Too Low is true	Feature /Input	RO	Var	-	8	0		unused

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74	UPS.PowerConverter.ConverterType		Parameter	1: Off Line / Line interactive 2: On Line 3: On Line - Unitary/Parallel 4: On Line - Parallel with NS 5: On Line - Hot Standby Redundancy (set on redundant UPS)	Feature	RO	Cst	-	8	2		always be 2
75	UPS.PowerConverter.FrequencyConverterModeSetting		Parameter	0: AutoRanging, The converter follows the input frequency while it is in the allowed range. It sets output frequency to the nearest frequency (50 Hz or 60 Hz) of the input frequency when it is out of the allowed range. 1:Frequency Converter	Feature	RO	Var	-	8	0		unused
76	UPS.PowerConverter.FrequencyConverterMode		Status	1 : Currently works on AutoRanging 2 : Currently works on Frequency converter	Feature	RO	Var	-	8	0		unused
77	UPS.PowerConverter.Chopper.PresentStatus.InternalFailure		Alarm	0: No fault 1: Any hardware fault that cause chopper malfunction	Feature /Input	RO	Var	-	8	0		unused



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83	UPS.PowerConverter.Output.Overload[1].Threshold		Parameter	Threshold of level 1 output overload, 110 = 110%	Feature	RO	Var	-	8	102		always be 110
84	UPS.PowerConverter.Output.Overload[2].Threshold		Parameter	Threshold of level 2 output overload, 125 = 125%	Feature	RO	Var	-	8	111		always be 125
85	UPS.PowerConverter.Output.Overload[3].Threshold		Parameter	Threshold of level 3 output overload, 150 = 150%	Feature	RO	Var	-	8	126		always be 150
102	UPS.PowerConverter.Inverter.SynchroSource		Parameter	0 : Unknown 1 : Mains 1 2 : Internal 3 : External 4 : Mains 2	Feature	RO	Var	-	8	0		unused
103	UPS.PowerConverter.Output.FrequencyRangeEcoTransfer		Parameter	Tolerance on AC frequency to switch on ECO mode. The frequency could be in range of -X% to +X% around the nominal value.	Feature	RO	Var	%	8	0		unused
104	UPS.PowerConverter.Output.HighVoltageEcoTransfer		Parameter	High threshold on AC voltage to switch on ECO mode.	Feature	RO	Var	0.1V	16	253		OUTPUT_VOLTAGE_RATING*(100+PARAM_BypAC_OVLevel)/1000

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105	UPS.PowerConverter.Output.LowVoltageEcoTransfer		Parameter	Low threshold on AC voltage to switch on ECO mode.	Feature	RO	Var	0.1V	16	207		OUTPUT_VOLTAGE_RATING*(100-PARAM_BypACUVLevel)/1000
114	UPS.Flow[4].ConfigVoltage		Parameter	Nominal output voltage.	Feature	RO	Var	0.1V	16	230		
115	UPS.PowerConverter.Input[1].AutomaticRestart		Parameter	0: Automatic restart not enabled 1: Automatic restart enabled	Feature	RO	Var	-	8	1		
116	UPS.Flow[4].ConfigActivePower		Parameter	Nominal value of active power	Feature	RO	Var	W	32	0		
117	UPS.Flow[4].ConfigApparentPower		Parameter	Nominal value of apparent power	Feature	RO	Var	VA	32	0		
119	UPS.PowerConverter.Output.Phase[1].ActivePower		Measure	Actual value of active power	Feature	RO	Var	W	32	0		
	UPS.PowerConverter.Output.Phase[1].ApparentPower		Measure	Actual value of apparent power	Feature	RO	Var	VA	32	0		
	UPS.PowerConverter.Output.Phase[2].ActivePower		Measure	Actual value of active power	Feature	RO	Var	W	32	0		
	UPS.PowerConverter.Output.Phase[2].ApparentPower		Measure	Actual value of apparent power	Feature	RO	Var	VA	32	0		
	UPS.PowerConverter.Output.Phase[3].ActivePower		Measure	Actual value of active power	Feature	RO	Var	W	32	0		
	UPS.PowerConverter.Output.Phase[3].ApparentPower		Measure	Actual value of apparent power	Feature	RO	Var	VA	32	0		



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120	UPS.PowerConverter.Output.Phase[1].Current		Measure	Actual value of phase 1 current of output (Line1_Neutral)	Feature	RO	Var	0.1A	16	0		
	UPS.PowerConverter.Output.Phase[1].PercentLoad		Measure	Actual value of phase 1 load percent of output	Feature	RO	Var	%	8	0		
	UPS.PowerConverter.Output.Phase[1].Voltage		Measure	Actual value of phase 1 voltage of output	Feature	RO	Var	0.1V	16	0		
	UPS.PowerConverter.Output.Phase[12].Voltage		Measure	Actual value of phase 12 voltage of output (Line1_Line2)	Feature	RO	Var	0.1V	16	12		
	UPS.PowerConverter.Output.Phase[2].Current		Measure	Actual value of phase 2 current of output	Feature	RO	Var	0.1A	16	0		
	UPS.PowerConverter.Output.Phase[2].PercentLoad		Measure	Actual value of phase 2 load percent of output	Feature	RO	Var	%	8	0		
	UPS.PowerConverter.Output.Phase[2].Voltage		Measure	Actual value of phase 2 voltage of output	Feature	RO	Var	0.1V	16	0		
	UPS.PowerConverter.Output.Phase[23].Voltage		Measure	Actual value of phase 23 voltage of output	Feature	RO	Var	0.1V	16	23		
	UPS.PowerConverter.Output.Phase[3].Current		Measure	Actual value of phase 3 current of output	Feature	RO	Var	0.1A	16	0		
	UPS.PowerConverter.Output.Phase[3].PercentLoad		Measure	Actual value of phase 3 load percent of output	Feature	RO	Var	%	8	0		
	UPS.PowerConverter.Output.Phase[3].Voltage		Measure	Actual value of phase 3 voltage of output	Feature	RO	Var	0.1V	16	0		
	UPS.PowerConverter.Output.Phase[31].Voltage		Measure	Actual value of phase 31 voltage of output	Feature	RO	Var	0.1V	16	31		

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121	UPS.PowerConverter.Output.Phase[1].PhaseID		Constant	ID of phase 1 of output	Feature	RO	Cst	-	8	0x01		
	UPS.PowerConverter.Output.Phase[12].PhaseID		Constant	ID of phase 12 of output	Feature	RO	Cst	-	8	0x0C		
	UPS.PowerConverter.Output.Phase[2].PhaseID		Constant	ID of phase 2 of output	Feature	RO	Cst	-	8	0x02		
	UPS.PowerConverter.Output.Phase[23].PhaseID		Constant	ID of phase 23 of output	Feature	RO	Cst	-	8	0x17		
	UPS.PowerConverter.Output.Phase[3].PhaseID		Constant	ID of phase 3 of output	Feature	RO	Cst	-	8	0x03		
	UPS.PowerConverter.Output.Phase[31].PhaseID		Constant	ID of phase 31 of output	Feature	RO	Cst	-	8	0x1F		
128	UPS.OutletSystem.Outlet[1].FlowID		Constant	Specific	Feature	RO	Cst	-	8	0x04		
	UPS.OutletSystem.Outlet[1].OutletID		Constant	Specific	Feature	RO	Cst	-	8	0x01		
129	UPS.OutletSystem.Outlet[1].PresentStatus.Switchable		Status	Specific	Feature	RO	Cst	-	8	0		unused



3.2 COPI DATA TABLE

3.2.1 COPI datas for Configuration

The table above describes also all the datas which must be available through the COPI protocol for configuration, see the column **idCOPI**.

3.2.2 COPI datas for Debug

These COPI IDs can be considered as optional because they are not required for any applications but only for Debug at the development stage of the UPS. Also they are kept into the firmware at mass production because they could help to investigate on some issues at maintenance stage.

The following group allow to read/write memory either in Flash or in Ram. Depending of platform, Write in Flash can be cancelled.

- COPI_ID_ADDRESS_MEMORY : 0x0410 (R/W, size of the data must match with the address bus width : 2 or 4 bytes)
- COPI_ID_LENGTH_MEMORY : 0x0411 (R/W, 2 bytes)
- COPI_ID_DATA_MEMORY : 0x0412 (R/W, binary block)

The following group allow to read/write Eeprom. Depending of platform, Write in Eeprom can be cancelled.

- COPI_ID_ADDRESS_EEPROM : 0x0420 (R/W, size of the data must match with the address eeprom width : 2 or 4 bytes)
- COPI_ID_LENGTH_EEPROM : 0x0421 (R/W, 2 bytes)
- COPI_ID_DATA_EEPROM : 0x0422 (R/W, binary block)

The following group allow to read/clear the internal 50 Event UPS history.

- COPI_ID_READ_HISTORY : 0x0430 (RO, binary block containing an array of 50 structures)

The structure is made of :

unsigned long time ; // Unix timestamp of the event

unsigned short event ; // 16 bit event number

Index 0 is the most recent, index 49 is the most ancient event.

- COPI_ID_CLEAR_HISTORY : 0x0431 (R/W, 1 byte)

3.2.3 COPI datas for Network card

The COPI Id 0xE049 is a string 16 bytes max where the Network card firmware can write its firmware release.

The COPI Id 0xE350 is an integer 32 bits where the Network card firmware can write its IP address.

From the msb to the lsb, the value contains the IP address : uuu.vvv.xxx.yyy

Both data can also be read by the Network card.

At UPS initialisation time, the UPS empties these data.

At Network card initialisation time, the card writes these data with its own firmware release and IP address.

The UPS firmware will report this firmware release and IP address to the LCD.

To cover the case where the card is removed, a watchdog mechanism into the UPS firmware erases the release number and the IP address if the Network card does not poll regularly the UPS.

The polling cycle of the Network card is 10 seconds periodic generally, but it happens that the card interrupts the polling during at most 10 seconds, during a 'factory reset' action for example.

In consequence, the watchdog mechanism should not be too aggressive, the watchdog time should be in between 20 and 30 seconds.

3.3 HID STRINGS

HID protocol codes some string that allows to identify the device.

3.3.1 Manufacturer

- Following strings are constant :
iManufacturer = "EATON"

3.3.2 Battery Chemistery

- Following string is the acronym depending on the battery
iDeviceChemistery = "PbAc" for Lead-Acid battery, "NiCd" for Nickel-Cadmium battery, or else ...

3.3.3 Firmware Release

- Following string is the version according to the policy of versioning on 9E 20-80K project
iVersion = "MM.mm.bbbb"
MM = major version number
mm = minor version number
bbbb = build number

3.3.4 Serial Number

- The serial number is entered by the tester tool at production time.
iSerialNumber

3.3.5 Reference Number

This reference number is derived from the Machine ID historically used by Eaton to identify their Firmware system.
Default reference on 9E 20-80K is 590

3.3.6 UPS naming

The table at next page shows the datas that will be coded according to the UPS Name.

UPS Name coded into iProduct	iPart Number	iModel
Eaton 9E Series UPS	9EH02CC50102000	20000
Eaton 9E Series UPS	9EH03CC50102000	30000
Eaton 9E Series UPS	9EH04CC50102000	40000
Eaton 9E Series UPS	9EH06CC50101000	60000
Eaton 9E Series UPS	9EH08CC50101000	80000

4. Test Example

4.1 Test Description

- Serial Port Settings:
 - Baud rate: 57600 (See Section1.1)
 - 8 data bits
 - No parity
 - 1 stop bit
 - Flow control : none

- For test command, data packet format and communication processing description, please refer **SHUT Protocol Generic Specification.pdf**.

- For data analysis, please refer to section 3.

UPS HID and COPI Communication Software Requirements.

reference n : 34008958 ZA

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4.2 Get Report Command

This example is:

Host reads object data(Report ID is 0x30) from UPS , the steps shown as following:

4.2.1 Shut data packets

Following is Shut data packet format:

(Please refer Section 2.3 in SHUT Protocol Generic Specification .pdf)

Packet type	Data length	Data bytes D0..Dn	Checksum-8
1 byte	1 byte	1-8 bytes	1 byte

4.2.2 UPS Get Report Command

Get Report Command format shown as follow table, it's "**Data bytes D0...Dn**" part in Shut data packets:

(Please refer 2.5 section in SHUT Protocol Generic Specification .pdf)

Field	Request Type 1	Request Type 2	Report ID	Report Type	Interface LSB	Interface MSB	Length LSB	Length MSB
Data	0xA1	0x01	(variable)	0x03	0x00	0x00	0x00	0x00

4.2.3 Host reads data from UPS

All data is in hex . The underline word is "**Data bytesD0...Dn**" in shut data packets

Step	Host/UPS	Command/Reply (Hex)	Comment
1	Host	16	Host sends sync data 0x16 to UPS firstly to create communication
2	UPS	16	UPS replys data 0x16 to indicate that communication is created successfully
3	Host	81 88 <u>A1 01 30 03 00 00 20 00</u> B3	<ul style="list-style-type: none"> Then host sends Get Report command, format shown as below: Shut data packets: <ul style="list-style-type: none"> 81: Packet type (add 0x80 means last Cmd) 88: Data length (8 bytes, it's max in a packet) A1...20 00: Data bytes B3: Checksum(XOR 8 data bytes) Data bytes: <ul style="list-style-type: none"> A1: Request Type 1 01: Request Type 2 30: Report ID 03: Report Type 00: Interface LSB 00: Interface MSB 20: Length LSB 00: Length MSB <p>The data byte length that we require to read is determined by Length MSB and Length LSB, in this example, required data byte length is 32(Length MSB: LSB, 0x0020). If required data byte length is larger than total data bytes in a Report Object(15 bytes in Report 48), UPS responses all data bytes in this Report Object, else just 32 data bytes will be responded.</p>

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4	UPS	06 04 88 <u>30 68 29 00 00 84 35 00</u> C0	<ul style="list-style-type: none"> ▪ UPS response data: firstly ACK then data packet. 06 : ACK, UPS receives data packets successfully For more details, see 2.4 Error handling in SHUT Protocol Generic Specification.pdf ▪ Shut data packets: 04: Packet type (no add 0x80, means not finish) 88: Data length 30...35 00: Data bytes C0: Checksum ▪ Reply Data Bytes Format: Byte 0: Report ID (30) Byte 1...n : Data (68 29 00 00 84 35 00)
5	Host	06	<ul style="list-style-type: none"> ▪ Host answers to UPS 06 : ACK, Host receives data packets successfully
6	UPS	84 88 <u>00 3A 02 F4 01 46 10 09</u> 92	<ul style="list-style-type: none"> ▪ Report object data has not completely been sent yet, so UPS continues to send the residual data after getting ACK from Host ▪ Shut data packets: 84: Packet type (add 0x80, means last one) 88: Data length 00...10 09: Data bytes 92: Checksum ▪ Reply Data bytes without ACK byte and Report ID byte this time : Byte 0...n : Data (00 3A 02 F4 01 46 10 09)

UPS HID and COPI Communication Software Requirements.

reference n : 34008958 ZA

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4.2.4 Data Analysis

1) Reference

- See the UPS response Data bytes (Section 4.2.3 Step4 and Step6 description).
- Please refer to Section 3 Report 48.

2) Report 48(0x30) brief description:

48	UPS.PowerConverter.Input[1].ActivePower	W	32
	UPS.PowerConverter.Input[1].ApparentPower	VA	32
	UPS.PowerConverter.Input[1].Current	0.1A	16
	UPS.PowerConverter.Input[1].Frequency	0.1Hz	16
	UPS.PowerConverter.Input[1].PowerFactor	-	8
	UPS.PowerConverter.Input[1].Voltage	0.1V	16

3) The data from UPS:

- 06 04 88 **30 68 29 00 00 84 35 00** C0 (in Step 4)
84 88 **00 3A 02 F4 01 46 10 09** 92 (in Step 6)
- The data is Big Endian Format
- The first data in Step 4 "0x30" is Report ID 48

4) Analysis data based on description of Report 48

Members in Report 48	Data length	Data	Actual Value (Multiply Data by unit)
UPS.PowerConverter.Input[1].ActivePower	32bits(4 bytes)	<u>68 29 00 00</u>	0x00002968 = 10600 * W = 10600 W
UPS.PowerConverter.Input[1].ApparentPower	32 bits(4 bytes)	<u>84 35 00 00</u>	0x00003584 = 13700 * W = 13700 W
UPS.PowerConverter.Input[1].Current	16 bits(2 bytes)	<u>3A 02</u>	0x023A = 570 * 0.1A = 57A
UPS.PowerConverter.Input[1].Frequency	16 bits(2 bytes)	<u>F4 01</u>	0x01F4 = 500 * 0.1Hz = 50Hz
UPS.PowerConverter.Input[1].PowerFactor	8 bits(1 byte)	<u>46</u>	0x46 = 70
UPS.PowerConverter.Input[1].Voltage	16 bits(2 bytes)	<u>10 09</u>	0x0910 = 2320 * 0.1V = 232V

4.3 Set Report Command

Only Report 25 is defined as RW , the Set Report Command should divide into 2 part, because its data length is beyond 8 bytes, see below:

4.3.1 Set frequency as 0x3C = 60HZ

```
01 88 21 09 19 03 00 00 02 00 30
81 22 19 3C 25
```

4.3.2 Set frequency as 0x32 = 50HZ

```
01 88 21 09 19 03 00 00 02 00 30
81 22 19 32 2B
```

4.4 GET Descriptor command

This command is typically used only in circumstances where the host wants to perform full USB/HID style processing. The format of each of these descriptors is beyond the scope of this document; refer to the official SHUT specification.