

# Communication Protocol v1.4 For Tripplite 3024

All technical information contained in this document is the exclusive property of Tripplite and may neither be used nor disclosed without its prior written consent.

Legend:

1. Items in black are supported.
2. Items in red are not supported.

## Report Descriptor Skeleton

Power Summary Collection

*Battery System Collection*

AC Flow Collection

*Power Converter Collection*

*Outlet System Collection*

*Miscellaneous Collection*

## 1. USB Report Descriptor Protocol

This protocol attended to describe the protocol layer between UPS USB Report Descriptor and Application Software. Instead of the formal way creating an UPS Report Descriptor, the point of view of Power Device structure will be used to create a Report Descriptor of USB based UPS.

A UPS Report Descriptor include six items, Each Item share with one corresponds Report ID, and each Report ID field is pre-defined (Order, Byte #, Unit in each Report ID).

## 2. Information

- VID : 0x09AE
- PID : 0x 3024
- iManufacture : "TRIPP LITE UPS"
- iProduct : "TRIPP LITE UPS"
- iOEMInformation : "TRIPP LITE"
- iDeviceChemistry : "PbAc"
- iModelString : "TRIPP LITE UPS"

## 3. Transmit format

- Get\_Report : Send data to PC . (USB→PC)

- Set\_Report : Get data from PC (PC→USB)
- Data format : Report ID + Data (at most 4 bytes)

#### 4. Communication Protocol (for USB Report Descriptor)

Power Summary Collection						
Report ID #	Usage (usage page : usage ID)	Byte #	Unit	Type	R/W	Supported?
40	➤ iProduct (0x84:0xfe)	1		Feature	R	Y
41	➤ iSerialNumber (0x84:0xff)	1		Feature	R	
43	➤ iManufacture (0x84:0xfd)	1		Feature	R	Y
48	➤ ConfigVoltage(Input Line) (0x84:0x40)	1	1V	Feature	R	Y/ok
49	➤ Voltage(Input Line) (0x84:0x30)	2	0.1V	Feature	R	Y/ok
17	➤ AudibleAlarmControl (0x84:0x5a)	1		Feature	R/W	Y


- iProduct: Index of a string descriptor describing product.
- iSerialNumber: Index of a string descriptor describing the device's serial number.  
For example, for usb Comm..., the device will respond an index of string, like 1,2,...; for sci Comm..., the device will respond with string
- iManufacture: Index of a string descriptor describing manufacture.
- ConfigVoltage: Nominal value of the input voltage.
- Voltage: Actual value of the input voltage.
- AudibleAlarmControl: 1: Disable, 2: Enable, 3: Temporary Mute (Temporarily)



54	➤ DesignCapacity (0x85:0x83)	1		Feature	R	Y
56	➤ WarningCapacityLimit (0x85:0x8c)	1		Feature	R	Y
44	➤ Rechargeable (0x85:0x8b)	1		Feature	R	Y
53	➤ RunTimeToEmpty (0x85:0x68)	2	Sec	Feature & Input	R	Y

- iDeviceChemistry: Index of a string descriptor containing the battery's chemistry.
- iOENInformation: Index of a string descriptor defining OEM specific information for the battery.
- CapacityMode: 0 = mAh, 1 = mWh, 2 = %, 3 = Boolean support only(OK, failed). Normally, the UPS returns value 2, the percentage capacity mode.
- RemainingCapacity: The predicted remaining capacity.
- RemainingCapacityLimit: Whenever the battery's remaining capacity falls below the value in the Remaining Capacity Alarm register, the battery periodically issues a Remaining Capacity alarm.
- FullChargeCapacity: The predicted pack capacity when it is fully charged.
- DesignCapacity: The theoretical capacity of a new pack.
- WarningCapacityLimit: OEM-designed battery granularity between low and warning and should read "OEM designed battery warning capacity.
- Rechargeable: Rechargeable Battery(1) / Not Rechargeable Battery(0).
- RunTimeToEmpty: The predicted remaining battery life at the present rate of discharge.



AC Flow Collection						
Report ID #	Usage (usage page : usage ID)	Byte #	Unit	Type	R/W	Supported?
1	➤ ConfigVoltage (0x84:0x40)	1	V	Feature	R	
2	➤ ConfigFrequency (0x84:0x42)	1	Hz	Feature	R	Y
3	➤ ConfigApparentPower (0x84:0x43)	2	VA	Feature	R	Y
85	➤ SiteWiringFault (0xffff:0x93)	1		Feature	R	Y

- ConfigVoltage: Nominal value of the voltage.
- ConfigFrequency: Nominal value of the frequency.
- ConfigApparentPower: Nominal value of the apparent power.
- SiteWiringFault: Wiring OK (0) / Wiring Fault (1)/Not Support (2)



OutletSystem Collection						
Report ID #	Usage (usage page : usage ID)	Byte #	Unit	Type	R/W	Supported?
21	➤ DelayBeforeShutdown (0x84:0x57)	2	Sec	Feature	R/W	Y
22	➤ DelayBeforeStartup (0xffff:0x56)	2	Min	Feature	R/W	Y
23	➤ DelayBeforeReboot (0x84:0x55)	2	Sec	Feature	R/W	Y
97	➤ DelayBeforeStartup (0x84:0x56)	2	Sec	Feature	R/W	Y
30	➤ PercentLoad (0x84:0x35)	1		Feature	R	Y
65	➤ PowerOnDelay (0xffff:0x81)	1	Sec	Feature	R/W	Y
81	➤ OutputSource (0xffff:0x91)	1		Feature	R	Y
82	➤ Watchdog (0xffff:0x92) (Tripp Lite models only)	1		Feature	R/W	

- DelayBeforeShutdown: Writing this value shuts down either the output after the indicated number of seconds, or sooner if the batteries become depleted.  
The maximum value is 32767. Setting this object to 0 causes the shutdown to occur immediately. Setting this object to -1 aborts the countdown. When read, "Delay Before Shutdown" will return the number of seconds remaining until shutdown, or -1 if no shutdown countdown is in effect.
- DelayBeforeStartup: A program should use either the Report ID 22 or the Report ID 97 to set the value of "Delay Before Startup". Writing this value starts the output after the indicated number of seconds in "Delay before Startup".  
The maximum value is 32767. Sending this command with -1 aborts the countdown. If the countdown expires during a utility failure, the startup shall not occur until the utility power is restored.
- DelayBeforeReboot: The maximum value is 32767. Writing this value immediately shuts down the output for a period equal to the indicated number of seconds in DelayBewforeReboot. When read, DelayBeforeReboot returns the number of seconds remaining in the countdown, or -1 if no countdown is in progress.
- PercentLoad: The actual value of the percentage of the power capacity.
- PowerOnDelay: Delay the UPS startup after power restores. The power quality may not stable when power restores, this feature let the UPS wait a period of time to startup the system.
- OutputSource: 0 = Normal(0) / Battery (1) / Bypass (2) / Reducing (3) / Boosting (4) / Manual Bypass (5) / None (6).
- Watchdog: 0 = Cancel watchdog / 1-255 = Enter watchdog mode (seconds).  
The unit can only enter watch dog mode when:
  - The software sends WDGww (ww is not 0).
The unit will get out of watch dog mode when:



- The unit goes through a power up reset.
- The unit enters idle mode.
- The unit executes a reboot after the watchdog times out.
- WDG0 is processed by the unit.
- The unit enters standby mode.

Miscellaneous Collection						
Report ID #	Usage (usage page : usage ID)	Byte #	Unit	Type	R/W	Supported?
13	> iModelString (0xffff:0x75)	1		Feature	R	Y
14	> iModelStringOffset (0xffff:0x76)	1		Feature	R	Y
15	> UpsType (0xffff:0x7c)	1		Feature	R	Y
93	> Number of Internal Battery (0xffff:0x62)	1		Feature	R	Y
67	> AC Fail & Restore Auto-Reboot Enable/Disable (0xffff:0x9c)	1		Feature	R/W	Y
108	> CommProtocol (0xffff:7d)	2		Feature	R	Y
87	> Output Abnormal (0xffff:a0)	1		Feature	R	Y
88	> Output off (0xffff:a1)	1		Feature	R	Y
194	> Get Firmware PartNumber (0xffff:0xD6)	4		Feature	R	Y
195	> Protocol Compatibility (0xffff:D7) > Byte3 = Reserved (read as 0) > Byte2 = Reserved (read as 0) > Byte1 = Family Index > Byte0 = Group Index	4		Feature	R	Y

- iModelString: Index of a string descriptor describing model names string.
- iModelStringOffset: Offset of the UPS model name in the model names string.
- UPSType:
 

Low 4 bits	Result
	0: On-Line
	1: Off-Line
	2: Line-Interactive
	3: Simple On-Line
	4: Simple Off-Line
	5: Simple Line-Interactive
High 4 bits	
	Indicates the firmware version

- AC Fail & Restore Auto-Boot Enable/Disable: Disable(0)/Enable(1)
- Output Abnormal: Abnormal(1) Output voltage high/ Output voltage low  
Normal(0) Output voltage normal
- Output Off: Output voltage On(0)/Off(1)
- CommProtocol: needs to report 0x3024