Toshiba UPS

Description

The serial TIC UPS driver allows the ProtoNode to transfer data to and from devices over RS-232 using TIC UPS protocol. The ProtoNode can emulate a Client.

This driver is intended for use with Toshiba models UPS and is implemented to:

- Read information from the UPS such as battery life, voltages etc. This will be done in user mode on the UPS.

- Write information and commands such as shutdown commands to the UPS.

- Advanced options such as reading/writing EEPROM is not supported. No date/time reads or writes are supported. No string type commands are supported.

While the driver has both Server and Client implementations, the Server is intended for emulation and test purposes by FieldServer only.

Connection Facts

FieldServer Mode	Nodes	Comments
Client	1	As the Toshiba protocol only allows for 1:1 communication, only 1 Client is allowed per RS 232 port.
Server	1	The Server is implemented for emulation purposes only. It has a static address as per the Toshiba spec.

Formal Driver Type

Serial, Client only

Compatibility

FieldServer Model	Compatible		FieldServer Model	Compatible
ProtoCessor	Yes		QuickServer FS-QS-10xx	No
ProtoCarrier	Yes		QuickServer FS-QS-12xx	Yes
ProtoNode	Yes		QuickServer FS-QS-20xx	Yes
ProtoAir	Yes		QuickServer FS-QS-22xx	Yes
			QuickServer FS-QS-3x10-F	Yes

Connection Information

Connection Type: RS-232

Baud Rates: 1200; 2400; 4800; 9600

Data Bits: 7

Stop Bits: 1

Parity: Even

Multidrop Capability: No

Devices Tested

Device	Tested (Factory, Site)
TIC UPS model 1600	Factory
TIC UPS model G900	Factory
TIC UPS model G8000MM	Site

Communication Functions

Read Operations Supported

ProtoNode as a Client	ProtoNode as a Server	Description
ALARM	ALARM	Alarm data
BC	BC	Battery current
BECR	BECR	Battery estimated charge remaining
BEMR	BEMR	Battery estimated minutes remaining
BLR	BLR	Battery life remaining
BPV1	BPV1	Bypass voltage phase 1
BPV2	BPV2	Bypass voltage phase 2
BPV3	BPV3	Bypass voltage phase 3
BPC	BPC	Bypass current
BPFREQ	BPFREQ	Bypass frequency
BRHT	BRHT	Battery rated holding time
BT	BT	Battery temperature
BVP	BVP	Battery voltage percentage
DCBV	DCBV	DC bus voltage
FAULT	FAULT	Fault data
IC1	IC1	Input current phase 1
IC2	IC2	Input current phase 2
IC3	IC3	Input current phase 3
IFRQ	IFRQ	Input frequency
IV1	IV1	Input voltage phase 1
IV2	IV2	Input voltage phase 2
IV3	IV3	Input voltage phase 3
OC1	OC1	Output current phase 1
OC2	OC2	Output current phase 2
OC3	OC3	Output current phase 3
OFRQ	OFRQ	Output frequency
OLP1	OLP1	Output load percent phase 1
OLP2	OLP2	Output load percent phase 2
OLP3	OLP3	Output load percent phase 3
OV1	OV1	Output voltage phase 1
OV2	OV2	Output voltage phase 2
OV3	OV3	Output voltage phase 3
SOB	SOB	Seconds on battery
SAD	SAD	Shutdown after delay
OV12	OV12	Output voltage between phase 1 & 2
OV23	OV23	Output voltage between phase 2 & 3
OV31	OV31	Output voltage between phase 3 & 1

Bit #	FAULT COMMAND Function	ALARM COMMAND Function	STATUS COMMAND Function
Bit 23	Not used	Not used	
Bit 22	1	1	
Bit 21	Input over current	Low battery voltage	
Bit 20	DC over current	Battery replacement alarm	
Bit 19	DC bus over voltage	Parallel running mode	
Bit 18	DC bus under voltage	0	
Bit 17	Phase rotation error	0	
Bit 16	DC Bus imbalance	UPS lifetime alarm	
Bit 15	Not used	Not used	
Bit 14	1	1	
Bit 13	EEPROM error	Asynchronous operation	
Bit 12	Battery or charger circuit fault	Ambient overheat	
Bit 11	Battery overheat	Overload accumulation started	
Bit 10	UPS overheat	0	
Bit 9	0	0	
Bit 8	Fuse has opened	0	
Bit 7	Not used	Not used	Not used
Bit 6	1	1	1
Bit 5	Inverter over current	Countdown started for shutdown	UPS fault detected
Bit 4	UPS overload	0	Input voltage out of spec
Bit 3	Inverter overload	0	Low battery voltage detected
Bit 2	Inverter under voltage	0	UPS output from bypass
Bit 1	Overload 110% load	0	UPS output from inverter
Bit 0	Inverter over voltage	0	UPS input and output voltage sync

Protocol Driver Sheet – Toshiba UPS

Commands Supported by Different Models

COMMAND	1600	1800	4200	G8000 & G8000MM	G9000
ALARM	x	x			
BC	x	x	x	x	x
BECR		x		x	x
BEMR	x	x			
BLR	x	x			
BPV1	x	x	x	x	
BPV2			x		x
BPV3			x	x	
BPC	x	x	x	x	x
BPFREQ	x	x	x	x	x
BRHT	x	x	x	x	x
BT	x	x			
BVP	x	x	x	x	x
DCBV		x	x	x	x
FAULT	x	x	x	x	x
IC1	x	x	x	x	x
IC2			x	x	x
IC3			x	x	x
IFRQ	x	x	x	x	x
IV1	x	x	x	x	x
IV2			x	x	x
IV3			x	x	x
OC1	x	x	x	x	x
OC2			x	x	x
OC3			x	x	x
OFRQ	x	x	x	x	x
OLP1	x	x	x	x	x
OLP2			x	x	x
OLP3			x	x	x
OV1	x	x	x	x	x
OV2			x	x	x
OV3			x	x	x
OV12					x
OV23					x
OV31					x
SOB		x			
SAD	x	x	x		
STATUS	x	x	x	x	x

Write (Control) Operations Supported

ProtoNode as a Client	ProtoNode as a Server	Description
SAD	SAD	Shutdown after delay
BTEST		Battery Test

NOTE: Due to battery health, this point can only be tested as specified by TIC.

ProtoNode as a Client	ProtoNode as a Server
The following models support the listed commands:	
1600; 1800; 4200	1600; 1800; 4200
SAD; BTEST	SAD

Unsupported Functions and Data Types

Function	Reason
Programming messages	ProtoNode is a data transfer device, and as such, programming messages are not required.
Date and time functions	Not supported by other protocols.
All string commands: Type form Serial number Manufacturer Software version	Not supported by other protocols.
E & F commands	Not supported by other protocols.
Write Commands	A limited set is supported only – refer to the Write Operations Section.

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