

Murata Power Solutions

PMBus™ Commands

This application note is applicable to the following products.

- D1U3CS-D-850-12-HC4C
- D1U3CS-W-850-12-HC4C
- D1U3CS-W-1200-12-HA4EC
- D1U3CS-W-1200-12-HC4C
- D1U3CS-W-1200-12-HA4C
- D1U3CS-W-1200-12-HC3C
- D1U3CS-W-1200-12-HA3C

Standard PMBus™ Commands

All data passed over the PMBus™ interface uses PEC per the PMBus™ specification v 1.1 definition. Linear data formatting is used for all passed parameters. It is strongly recommended to make full use of the PEC byte to validate all transactions and repeat if not validated. Block reads (whereby the loose byte received denotes the remaining bytes to be clocked out) are not supported on these 850W to 1200W D1U3CS-x power supplies. A minimum 100 µsec delay between transactions (between START and STOP bits) is recommended for robust PMBus™ communications.

Note: 100kHz I²C communication is supported on the PMBus™ interface. These products do not support 400kHz I²C communication on the PMBus™ interface.

D1U3CS-W-1200-12-HA4EC

Power Supply Main Controller			
Vendor	MFG Part Number	Package	Description
Cypress Semiconductor Inc.	CY8C2763-24LTXIT	48-pin QFN	8-bit PSoc, 16K flash, 256b RAM, -40C to 85C
Power Supply External EEPROM			
Vendor	MFG Part Number	Package	Description
Microchip Technology Inc.	24AA024T-I/MS	8-pin MSOP	2Kbit, 2.5-5.5V 400kHz, 1.8-2.5V 100kHz, 85C serial EEPROM
A1 (Serial Address BIT 1)	A0 (Serial Address BIT 0)	Power Supply Main Controller (Serial Comm Slave Address)	Power Supply External EEPROM (Serial Comm Slave Address)
LOW	LOW	0x5C+ (R/W)	0x54+ (R/W)
LOW	HIGH	0x5D+ (R/W)	0x55+ (R/W)
HIGH	LOW	0x5E+ (R/W)	0x56+ (R/W)
HIGH	HIGH	0x5F+ (R/W)	0x57+ (R/W)

Command Code	Command Name	Read / Write	Byte Name	Bit Number	Bit Name	Definition	Supported
1	OPERATION	R/W		7		Turn the unit on/off in conjunction with digital input from PSON_H	YES
						Set output margin high/low voltages	NO
3	CLEAR_FAULTS	W				Write only command clears all faults that have been set in all the STATUS_XXXX registers simultaneously	YES
20	VOLTAGE_MODE	R				Single data byte sets the READ_VOUT sensor to linear mode data format and supplies N = -6 exponent for translation to volts PMBus™ Spec - Part II - Revision 1.1 - Sections 8.1-8.3	YES
3A	FAN_CONFIG_1_2	R		7	FAN_1_INSTALLATION	Asserted when fan is installed in position 1	YES
				6*	FAN_1_SETTING_MODE	Asserted when fan is commanded in RPM (Clear when fan is commanded in Duty Cycle)	YES
				5	FAN_1_TACH_PULSES	Fan 1 Tachometer pulses per revolution (upper bit)	YES
				4	FAN_1_TACH_PULSES	Fan 1 Tachometer pulses per revolution (lower bit)	YES
				3	FAN_2_INSTALLATION	Asserted when fan is installed in position 2	NO
				2	FAN_2_SETTING_MODE	Asserted when fan is commanded in RPM (Clear when fan is commanded in Duty Cycle)	NO
				1	FAN_2_TACH_PULSES	Fan 2 Tachometer pulses per revolution (upper bit)	NO
0	FAN_2_TACH_PULSES	Fan 2 Tachometer pulses per revolution (lower bit)	NO				
3B	FAN_COMMAND_1	R/W				Two-byte manual fan override command fan speed value in RPM Command speed formatted in linear data format as per command 0x90 - READ_FAN_SPEED_1	YES

* Implementation Status: Supports RPM Mode only

Command Code	Command Name	Read / Write	Byte Name	Bit Number	Bit Name	Definition	Supported
79	STATUS_WORD	R	STATUS_WORD (Upper byte of STATUS_WORD)	7	VOUT_F_W	Asserted when an output voltage fault or warning has occurred	YES
				6	IOUT_POUT_F_W	Asserted when a main output current / output power fault or warning has occurred	YES
				5	INPUT_F_W	Asserted when an Input voltage/current/power fault or warning has occurred	YES
				4	MFG_SPECIFIC_F_W	Manufacturer specific fault or warning has occurred	YES
				3	POWER_GOOD_L	Asserted when the POWER_GOOD signal is negated	YES
				2	FANS_F_W	Asserted when a fan fault or warning has occurred	YES
				1	STATUS_OTHER_F_W	Asserted when a bit in command STATUS_OTHER set	NO
				0	UNKNOWN_F_W	Asserted when a fault not listed in [15:1] has occurred	NO
			STATUS_BYTE (Lower byte of STATUS_WORD)	7	BUSY_F	Asserted when device busy and unable to respond fault	NO
				6	UNIT_OFF	Asserted when unit not providing power to the output	YES
				5	OUTPUT_OV_F	Asserted when an output overvoltage fault has occurred	YES
				4	OUTPUT_OC_F	Asserted when an output overcurrent fault has occurred	YES
				3	INPUT_UV_F	Asserted when an input undervoltage fault has occurred	YES
				2	TEMPERATURE_F_W	Asserted when an overtemperature fault or warning has occurred	YES
				1	CML_F	Asserted when a communications, memory, or logic fault has occurred	YES
7A	STATUS_VOUT	R		0	NONE_F_W	Asserted when a fault not listed in [7:1] occurred	NO
				7	VOUT_OV_F	Asserted when a main output overvoltage fault has occurred	YES
				6	VOUT_OV_W	Asserted when a main output overvoltage warning has occurred	YES
				5	VOUT_UV_W	Asserted when a main output undervoltage warning has occurred	YES
				4	VOUT_UV_F	Asserted when the main output is < 12% for more than 20mS; Toggle enable after 3Sec (Customer spec 3.3.7)	NO
				3	VOUT_MAX_F	"Asserted when the main output is set higher than the commanded VOUT_MAX limit"	NO
				2	TON_MAX_F	"Asserted when the main output turn-on timing has exceeded the TON_MAX fault timing"	NO
				1	TON_MAX_W	"Asserted when the main output turn-on timing has exceeded the TON_MAX warning timing"	NO
7B	STATUS_IOUT	R		0	VOUT_TRACKING_E	Asserted when an error in the output voltage during power-up/down has occurred	NO
				7	IOUT_OC_F	Asserted when a main output overcurrent fault has occurred	YES
				6	IOUT_OC_SHUTDOWN	Asserted when a main output overcurrent and low voltage shutdown fault has occurred	YES
				5	IOUT_OC_W	Asserted when a main output overcurrent warning has occurred	YES
				4	IOUT_UC_W	Asserted when a main output undercurrent fault has occurred	NO
				3	CURRENT_SHARE_F	Asserted when a output current share fault has occurred	NO
				2	POWER_LIMIT_MODE	Asserted when the unit has entered output power limiting mode	NO
				1	POUT_OP_F	Asserted when an output overpower fault has occurred	NO
7C	STATUS_INPUT	R		0	POUT_OP_W	Asserted when an output overpower warning has occurred	YES
				7	VIN_OV_F	Asserted when an input overvoltage fault has occurred	NO
				6	VIN_OV_W	Asserted when an input overvoltage warning has occurred	YES
				5	VIN_UV_W	Asserted when an input undervoltage warning has occurred	YES
				4	VIN_UV_F	Asserted when an input undervoltage fault has occurred	YES
				3	VIN_UV_OFF	Asserted when the Unit is OFF for insufficient input voltage	YES
				2	IIN_OC_F	Asserted when an input overcurrent fault has occurred	NO
				1	IIN_OC_W	Asserted when an input overcurrent warning has occurred	YES
7D	STATUS_TEMPERATURE	R		0	PIN_OP_W	Asserted when an input overpower warning has occurred	YES
				7	TEMPERATURE_OT_F	Asserted when an overtemperature fault has occurred	YES
				6	TEMPERATURE_OT_W	Asserted when an overtemperature warning has occurred	YES
				5	TEMPERATURE_UT_W	Asserted when an undertemperature warning has occurred	NO
				4	TEMPERATURE_UT_F	Asserted when an undertemperature fault has occurred	NO
				3	RESERVED	Reserved	NO
				2	RESERVED	Reserved	NO
				1	RESERVED	Reserved	NO
0	RESERVED	Reserved	NO				

Command Code	Command Name	Read / Write	Byte Name	Bit Number	Bit Name	Definition	Supported
7E	STATUS_CML	R		7	CML_COMMAND_E	Asserted when an invalid or unsupported command is received	YES
				6	CML_DATA_E	Asserted when invalid or unsupported data is received	YES
				5	CML_PEC_E	Asserted when a packet error checking (PEC) failed has occurred	YES
				4	CML_MEMORY_F	Asserted when a memory fault is detected	NO
				3	CML_PROCESSOR_F	Asserted when a processor fault is detected	NO
				2	RESERVED	Reserved	NO
				1	CML_NONE_F	Asserted when a communication fault not listed in [7:3] has occurred	NO
				0	CML_OTHER_F	Asserted when another memory or logic fault has occurred	NO
80	STATUS_MFG_SPECIFIC	R		7	PS_KILL	"Asserted when the PS_KILL pin is shorted and the unit is properly seated in the chassis"	YES
				6	AC_OK	Asserted when the input voltage is within operating specification	YES
				5	PS_ON	Asserted when the PS_ON_H is high	YES
				4	VSTBY_OV_W	Asserted when a standby output overvoltage warning has occurred	YES
				3	VSTBY_UV_W	Asserted when a standby output undervoltage warning has occurred	YES
				2	VSTBY_OV_F	Asserted when a standby output overvoltage warning has occurred	YES
				1	ISTBY_OC_W	Asserted when a standby output overcurrent warning has occurred	YES
				0	ISTBY_OC_F	Asserted when a standby output overcurrent fault has occurred	YES
81	STATUS_FANS_1_2	R		7	FAN_1_F	Fan 1 fault	YES
				6	FAN_2_F	Fan 2 fault	NO
				5	FAN_1_W	Fan 1 warning	YES
				4	FAN_2_W	Fan 2 warning	NO
				3	FAN_1_OVERRIDE	Fan 1 speed overridden	YES
				2	FAN_2_OVERRIDE	Fan 2 speed overridden	NO
				1	FAN_AIRFLOW_F	Airflow fault	NO
				0	FAN_AIRFLOW_W	Airflow warning	NO
88	READ_VIN	R			Two-byte Input Voltage Sensor Reading in Vrms PMBus™ Data Format: Linear Data Format (N = -1) PMBus™ Sensor Resolution: 0.5Vrms (linear format) Raw sensor full-scale: 300Vrms Accuracy: ±5% of raw sensor full-scale	YES	
89	READ_IIN	R			Two-byte Input Current Sensor Reading in Arms PMBus™ Data Format: Linear Data Format (N = -5) PMBus™ Sensor Resolution: 0.03125Arms (linear format) Raw sensor full-scale: 31.96875Arms Accuracy: ±5% of raw sensor full-scale	YES	
8B	READ_VOUT	R			Two-byte Output Voltage Sensor Reading in Vdc PMBus™ Data Format: Linear Data Format (N = -6) supplied by command 0x20 VOUT_MODE PMBus™ Sensor Resolution: 0.015625Vdc (linear format) Raw sensor full-scale: 15.984 Vdc Accuracy: ±2% of raw sensor full-scale	YES	
8C	READ_IOUT	R			Two-byte Output Current Sensor Reading in Adc PMBus™ Data Format: Linear Data Format (N = -3) PMBus™ Sensor Resolution: 0.125 Adc (linear format) Raw sensor full-scale: 127.8 Adc Accuracy: ±2% of raw sensor full-scale	YES	
8D	READ_TEMPERATURE_1	R			Two-byte Inlet Temperature Sensor reading in °C PMBus™ Data Format: Linear Data Format (N = 0) PMBus™ Sensor Resolution: 1 °C (linear format) Raw sensor full-scale: -7C to 150C Accuracy: ±3 C	YES	
8E	READ_TEMPERATURE_2	R			Two-byte Outlet Temperature Sensor reading in °C PMBus™ Data Format: Linear Data Format (N = 0) PMBus™ Sensor Resolution: 1 °C (linear format) Raw sensor full-scale: -10C to 150C Accuracy: ±3 C	YES	
8F	READ_TEMPERATURE_3	R			Two-byte Secondary Hotspot Temperature Sensor reading in °C PMBus™ Data Format: Linear Data Format (N = 0) PMBus™ Sensor Resolution: 1 °C (linear format) Raw sensor full-scale: 27C to 150C Accuracy: ±3 C	YES	

Command Code	Command Name	Read / Write	Byte Name	Bit Number	Bit Name	Definition	Supported
90	READ_FAN_SPEED_1	R				Two-byte Fan Speed Sensor reading in RPM	YES
						PMBus™ Data Format: Linear Data Format (N = 5)	
						PMBus™ Sensor Resolution: 32 RPM	
						Raw sensor full-scale: 32736 rpm	
						Accuracy: ±5% of full-speed	
96	READ_POUT	R				Two-byte Output Power Sensor reading in watts	YES
						PMBus™ Data Format: Linear Data Format (N = 1)	
						PMBus™ Sensor Resolution: 2 Watts	
						Sensor full-scale: 2,046 Watts	
						Accuracy: ±5% of full-scale	
97	READ_PIN	R				Two-byte Input Power Sensor reading in watts	YES
						PMBus™ Data Format: Linear Data Format (N = 1)	
						PMBus™ Sensor Resolution: 2 Watts	
						Sensor full-scale: 2,046 Watts	
						Accuracy: ±5% of full-scale	
98	PMBUS_REVISION	R				"Single data byte reading of the PMBus™ revision to which the power supply is compliant"	YES
						PMBus™ Spec - Part II - Revision 1.1 - Section 22.1	
9B	MFG_REVISION	R	PRI_MAJOR_FW_REV			Primary Side Major Firmware Revision	YES
			PRI_MINOR_FW_REV			Primary Side Minor Firmware Revision	
			SEC_MAJOR_FW_REV			Secondary Side Major Firmware Revision	
			SEC_MINOR_FW_REV			Secondary Side Minor Firmware Revision	
E1	EEPROM_WP (MFG_SPECIFIC_17)	R/W				Single data byte write to enable (write 0x9A) or disable (write 0x56) writes to the external EEPROM	YES
E3	READ_HOURS_USED	R				Three byte accumulated fault-free power-on hours of the main output in hours	YES
						PMBus™ Data Format: Linear Data Format (N = 0)	
						PMBus™ Sensor Resolution: 1 hour	
						Sensor full-scale: ~ 120 Years	
						Accuracy: ±3%	
E5	READ_VSTBY	R				Two-byte Standby Voltage Sensor Reading in Vdc	YES
						PMBus™ Data Format: Linear Data Format (N = -7)	
						PMBus™ Sensor Resolution: 0.0078125Vdc (linear format)	
						Raw sensor full-scale: 8Vdc	
						Accuracy: ±2% of raw sensor full-scale	
E6	READ_ISTBY	R				Two-byte Standby Current Sensor Reading in Adc	YES
						PMBus™ Data Format: Linear Data Format (N = -7)	
						PMBus™ Sensor Resolution: 0.0078125Adc (linear format)	
						Raw sensor full-scale: 8Adc	
						Accuracy: ±2% of raw sensor full-scale	

D1U3CS-W-1200-12-HxxC / D1U3CS-W-850-12-HxxC

Power Supply Main Controller			
Vendor	MFG Part Number	Package	Description
Cypress Semiconductor Inc.	CY8C2763-24LTXIT	48-pin QFN	8-bit PSoC, 16K flash, 256b RAM, -40C to 85C
Power Supply External EEPROM			
Vendor	MFG Part Number	Package	Description
Microchip Technology Inc.	24AA024T-I/MS	8-pin MSOP	2Kbit, 2.5-5.5V 400kHz, 1.8-2.5V 100kHz, 85C serial EEPROM
A1 (Serial Address BIT 1)	A0 (Serial Address BIT 0)	Power Supply Main Controller (Serial Comm Slave Address)	Power Supply External EEPROM (Serial Comm Slave Address)
LOW	LOW	0x58+ (R/W)	0x50+ (R/W)
LOW	HIGH	0x59+ (R/W)	0x51+ (R/W)
HIGH	LOW	0x5A+ (R/W)	0x52+ (R/W)
HIGH	HIGH	0x5B+ (R/W)	0x53+ (R/W)

Command Code	Command Name	Read / Write	Byte Name	Bit Number	Bit Name	Definition	Supported	
1	OPERATION	R/W		7		Turn the unit on/off in conjunction with digital input from PSON_H	YES	
						Set output margin high/low voltages	NO	
3	CLEAR_FAULTS	W				Write only command clears all faults that have been set in all the STATUS_XXXX registers simultaneously	YES	
20	VOLTAGE_MODE	R				Single data byte sets the READ_VOUT sensor to linear mode data format and supplies N = -6 exponent for translation to volts PMBus™ Spec - Part II - Revision 1.1 - Sections 8.1-8.3	YES	
3A	FAN_CONFIG_1_2	R		7	FAN_1_INSTALLATION	Asserted when fan is installed in position 1	YES	
				6*	FAN_1_SETTING_MODE	Asserted when fan is commanded in RPM (Clear when fan is commanded in Duty Cycle)	YES	
				5	FAN_1_TACH_PULSES	Fan 1 Tachometer pulses per revolution (upper bit)	YES	
				4	FAN_1_TACH_PULSES	Fan 1 Tachometer pulses per revolution (lower bit)	YES	
				3	FAN_2_INSTALLATION	Asserted when fan is installed in position 2	NO	
				2	FAN_2_SETTING_MODE	Asserted when fan is commanded in RPM (Clear when fan is commanded in Duty Cycle)	NO	
				1	FAN_2_TACH_PULSES	Fan 2 Tachometer pulses per revolution (upper bit)	NO	
				0	FAN_2_TACH_PULSES	Fan 2 Tachometer pulses per revolution (lower bit)	NO	
3B	FAN_COMMAND_1	R/W				Two-byte manual fan override command fan speed value in RPM Command speed formatted in linear data format as per command 0x90 - READ_FAN_SPEED_1	YES	
79	STATUS_WORD	R	STATUS_WORD (Upper byte of STATUS_WORD)	7	VOUT_F_W	Asserted when an output voltage fault or warning has occurred	YES	
				6	IOUT_POUT_F_W	Asserted when a main output current / output power fault or warning has occurred	YES	
				5	INPUT_F_W	Asserted when an Input voltage/current/power fault or warning has occurred	YES	
				4	MFG_SPECIFIC_F_W	Manufacturer specific fault or warning has occurred	YES	
				3	POWER_GOOD_L	Asserted when the POWER_GOOD signal is negated	YES	
				2	FANS_F_W	Asserted when a fan fault or warning has occurred	YES	
				1	STATUS_OTHER_F_W	Asserted when a bit in command STATUS_OTHER set	NO	
				0	UNKNOWN_F_W	Asserted when a fault not listed in [15:1] has occurred	NO	
				STATUS_BYTE (Lower byte of STATUS_WORD)	7	BUSY_F	Asserted when device busy and unable to respond fault	NO
					6	UNIT_OFF	Asserted when unit not providing power to the output	YES
					5	OUTPUT_OV_F	Asserted when an output overvoltage fault has occurred	YES
					4	OUTPUT_OC_F	Asserted when an output overcurrent fault has occurred	YES
					3	INPUT_UV_F	Asserted when an input undervoltage fault has occurred	YES
					2	TEMPERATURE_F_W	Asserted when an overtemperature fault or warning has occurred	YES
					1	CML_F	Asserted when a communications, memory, or logic fault has occurred	YES
0	NONE_F_W	Asserted when a fault not listed in [7:1] occurred	NO					

* Implementation Status: Supports RPM Mode only

Command Code	Command Name	Read / Write	Byte Name	Bit Number	Bit Name	Definition	Supported
7A	STATUS_VOUT	R		7	VOUT_OV_F	Asserted when a main output overvoltage fault has occurred	YES
				6	VOUT_OV_W	Asserted when a main output overvoltage warning has occurred	YES
				5	VOUT_UV_W	Asserted when a main output undervoltage warning has occurred	YES
				4	VOUT_UV_F	Asserted when the main output is < 12% for more than 20mS; Toggle enable after 3Sec (Customer spec 3.3.7)	NO
				3	VOUT_MAX_F	Asserted when the main output is set higher than the commanded VOUT_MAX limit	NO
				2	TON_MAX_F	Asserted when the main output turn-on timing has exceeded the TON_MAX fault timing	NO
				1	TON_MAX_W	Asserted when the main output turn-on timing has exceeded the TON_MAX warning timing	NO
				0	VOUT_TRACKING_E	Asserted when an error in the output voltage during power-up/down has occurred	NO
7B	STATUS_IOUT	R		7	IOUT_OC_F	Asserted when a main output overcurrent fault has occurred	YES
				6	IOUT_OC_SHUTDOWN	Asserted when a main output overcurrent and low voltage shutdown fault has occurred	YES
				5	IOUT_OC_W	Asserted when a main output overcurrent warning has occurred	YES
				4	IOUT_UC_W	Asserted when a main output undercurrent fault has occurred	NO
				3	CURRENT_SHARE_F	Asserted when a output current share fault has occurred	NO
				2	POWER_LIMIT_MODE	Asserted when the unit has entered output power limiting mode	NO
				1	POUT_OP_F	Asserted when an output overpower fault has occurred	NO
				0	POUT_OP_W	Asserted when an output overpower warning has occurred	YES
7C	STATUS_INPUT	R		7	VIN_OV_F	Asserted when an input overvoltage fault has occurred	NO
				6	VIN_OV_W	Asserted when an input overvoltage warning has occurred	YES
				5	VIN_UV_W	Asserted when an input undervoltage warning has occurred	YES
				4	VIN_UV_F	Asserted when an input undervoltage fault has occurred	YES
				3	VIN_UV_OFF	Asserted when the Unit is OFF for insufficient input voltage	YES
				2	IIN_OC_F	Asserted when an input overcurrent fault has occurred	NO
				1	IIN_OC_W	Asserted when an input overcurrent warning has occurred	YES
				0	PIN_OP_W	Asserted when an input overpower warning has occurred	YES
7D	STATUS_TEMPERATURE	R		7	TEMPERATURE_OT_F	Asserted when an overtemperature fault has occurred	YES
				6	TEMPERATURE_OT_W	Asserted when an overtemperature warning has occurred	YES
				5	TEMPERATURE_UT_W	Asserted when an undertemperature warning has occurred	NO
				4	TEMPERATURE_UT_F	Asserted when an undertemperature fault has occurred	NO
				3	RESERVED	Reserved	NO
				2	RESERVED	Reserved	NO
				1	RESERVED	Reserved	NO
				0	RESERVED	Reserved	NO
7E	STATUS_CML	R		7	CML_COMMAND_E	Asserted when an invalid or unsupported command is received	YES
				6	CML_DATA_E	Asserted when invalid or unsupported data is received	YES
				5	CML_PEC_E	Asserted when a packet error checking (PEC) failed has occurred	YES
				4	CML_MEMORY_F	Asserted when a memory fault is detected	NO
				3	CML_PROCESSOR_F	Asserted when a processor fault is detected	NO
				2	RESERVED	Reserved	NO
				1	CML_NONE_F	Asserted when a communication fault not listed in [7:3] has occurred	NO
				0	CML_OTHER_F	Asserted when another memory or logic fault has occurred	NO
80	STATUS_MFG_SPECIFIC	R		7	PS_KILL	Asserted when the PS_KILL pin is shorted and the unit is properly seated in the chassis	YES
				6	AC_OK	Asserted when the input voltage is within operating specification	YES
				5	PS_ON	Asserted when the PS_ON_H is high	YES
				4	VSTBY_OV_W	Asserted when a standby output overvoltage warning has occurred	YES
				3	VSTBY_UV_W	Asserted when a standby output undervoltage warning has occurred	YES
				2	VSTBY_UV_F	Asserted when a standby output overvoltage warning has occurred	YES
				1	ISTBY_OC_W	Asserted when a standby output overcurrent warning has occurred	YES
				0	ISTBY_OC_F	Asserted when a standby output overcurrent fault has occurred	YES

Command Code	Command Name	Read / Write	Byte Name	Bit Number	Bit Name	Definition	Supported
81	STATUS_FANS_1_2	R		7	FAN_1_F	Fan 1 fault	YES
				6	FAN_2_F	Fan 2 fault	NO
				5	FAN_1_W	Fan 1 warning	YES
				4	FAN_2_W	Fan 2 warning	NO
				3	FAN_1_OVERRIDE	Fan 1 speed overridden	YES
				2	FAN_2_OVERRIDE	Fan 2 speed overridden	NO
				1	FAN_AIRFLOW_F	Airflow fault	NO
				0	FAN_AIRFLOW_W	Airflow warning	NO
88	READ_VIN	R			Two-byte Input Voltage Sensor Reading in Vrms PMBus™ Data Format: Linear Data Format (N = -1) PMBus™ Sensor Resolution: 0.5Vrms (linear format) Raw sensor full-scale: 300Vrms Accuracy: ±5% of raw sensor full-scale	YES	
89	READ_IIN	R			Two-byte Input Current Sensor Reading in Arms PMBus™ Data Format: Linear Data Format (N = -5) PMBus™ Sensor Resolution: 0.03125Arms (linear format) Raw sensor full-scale: 31.96875Arms Accuracy: ±5% of raw sensor full-scale	YES	
8B	READ_VOUT	R			Two-byte Output Voltage Sensor Reading in Vdc PMBus™ Data Format: Linear Data Format (N = -6) supplied by command 0x20 VOUT_MODE PMBus™ Sensor Resolution: 0.015625Vdc (linear format) Raw sensor full-scale: 15.984 Vdc Accuracy: ±2% of raw sensor full-scale	YES	
8C	READ_IOUT	R			Two-byte Output Current Sensor Reading in Adc PMBus™ Data Format: Linear Data Format (N = -3) PMBus™ Sensor Resolution: 0.125 Adc (linear format) Raw sensor full-scale: 127.8 Adc Accuracy: ±2% of raw sensor full-scale	YES	
8D	READ_TEMPERATURE_1	R			Two-byte Inlet Temperature Sensor reading in °C PMBus™ Data Format: Linear Data Format (N = 0) PMBus™ Sensor Resolution: 1 °C (linear format) Raw sensor full-scale: -7C to 150C Accuracy: ±3 C	YES	
8E	READ_TEMPERATURE_2	R			Two-byte Outlet Temperature Sensor reading in °C PMBus™ Data Format: Linear Data Format (N = 0) PMBus™ Sensor Resolution: 1 °C (linear format) Raw sensor full-scale: -10C to 150C Accuracy: ±3 C	YES	
8F	READ_TEMPERATURE_3	R			Two-byte Secondary Hotspot Temperature Sensor reading in °C PMBus™ Data Format: Linear Data Format (N = 0) PMBus™ Sensor Resolution: 1 °C (linear format) Raw sensor full-scale: 27C to 150C Accuracy: ±3 C	YES	
90	READ_FAN_SPEED_1	R			Two-byte Fan Speed Sensor reading in RPM PMBus™ Data Format: Linear Data Format (N = 5) PMBus™ Sensor Resolution: 32 RPM Raw sensor full-scale: 32736 rpm Accuracy: ±5% of full-speed	YES	
96	READ_POUT	R			Two-byte Output Power Sensor reading in watts PMBus™ Data Format: Linear Data Format (N = 1) PMBus™ Sensor Resolution: 2 Watts Sensor full-scale: 2,046 Watts Accuracy: ±5% of full-scale	YES	
97	READ_PIN	R			Two-byte Input Power Sensor reading in watts PMBus™ Data Format: Linear Data Format (N = 1) PMBus™ Sensor Resolution: 2 Watts Sensor full-scale: 2,046 Watts Accuracy: ±5% of full-scale	YES	
98	PMBUS™_REVISION	R			Single data byte reading of the PMBus™ revision to which the power supply is compliant PMBus™ Spec - Part II - Revision 1.1 - Section 22.1	YES	

Command Code	Command Name	Read / Write	Byte Name	Bit Number	Bit Name	Definition	Supported
9B	MFG_REVISION	R	PRI_MAJOR_FW_REV			Primary Side Major Firmware Revision	YES
			PRI_MINOR_FW_REV			Primary Side Minor Firmware Revision	
			SEC_MAJOR_FW_REV			Secondary Side Major Firmware Revision	
			SEC_MAJOR_FW_REV			Secondary Side Minor Firmware Revision	
E1	EEPROM_WP (MFG_SPECIFIC_17)	R/W				Single data byte write to enable (write 0x9A) or disable (write 0x56) writes to the external EEPROM	YES
E3	READ_HOURS_USED	R				Three byte accumulated fault-free power-on hours of the main output in hours	YES
						PMBus™ Data Format: Linear Data Format (N = 0)	
						PMBus™ Sensor Resolution: 1 hour	
						Sensor full-scale: ~ 120 Years Accuracy: ±3%	
E5	READ_VSTBY	R				Two-byte Standby Voltage Sensor Reading in Vdc	YES
						PMBus™ Data Format: Linear Data Format (N = -7)	
						PMBus™ Sensor Resolution: 0.0078125Vdc (linear format)	
						Raw sensor full-scale: 8Vdc Accuracy: ±2% of raw sensor full-scale	
E6	READ_ISTBY	R				Two-byte Standby Current Sensor Reading in Adc	YES
						PMBus™ Data Format: Linear Data Format (N = -7)	
						PMBus™ Sensor Resolution: 0.0078125Adc (linear format)	
						Raw sensor full-scale: 8Adc Accuracy: ±2% of raw sensor full-scale	

Data Format

The Data Format section is entirely redundant. The products use the Linear data format.

Formula: $X = Y * 2^N$

X = the calculated value

Y = the two-byte value read from PMBus

N = the sensor-specific exponent

Command Name	N	Resolution per Bit	Minimum Reading	Maximum Reading	Units
READ_VIN	-1	0.5	0	300	Vrms
READ_IIN	-5	0.03125	0	31.96875	Arms
READ_VOUT	-6	0.015625	0	15.984375	Vdc
READ_IOUT	-3	0.125	0	127.875	Adc
READ_TEMPERATURE_1	0	1	-7	150	C
READ_TEMPERATURE_2	0	1	-10	150	C
READ_TEMPERATURE_3	0	1	27	150	C
READ_FAN_SPEED_1	5	32	0	32736	RPM
READ_POUT	1	2	0	2046	W
READ_PIN	1	2	0	2046	W
READ_VSTBY	-7	0.0078125	0	7.9921875	Vdc
READ_ISTBY	-7	0.0078125	0	7.9921875	Adc

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