

# SYNQNET™ DIGITAL PWM BRUSHLESS SERVO AMPLIFIERS SPECIFICATIONS



## Electrical

Bus Voltage	24-370 VDC for Amplifier modules. All stand-alone and multi-axis versions can be ordered for operation from either 110-130 VAC or 208-240 VAC (single or 3-phase, 50/60 Hz).
Continuous Output Current	Low Power: 10 amps, standard power: 15 amps, high power: 20 amps.
Peak Output Current	SMA9915 Low Power: 20 amps, SMA9915 Standard Power: 30 amps, SMA9915 High Power: 40 amps, SMA9930: 60 amps for 2 seconds.
Switching Frequency	24 kHz PWM standard.
Bandwidth	Current loop bandwidths up to 3 kHz.
Commutation	Sinusoidal from a quadrature encoder or linear scale.
Input Command Signal	SynqNet Bus, Current(torque) or Velocity mode
Software Configurable	Glentek's Windows™ based MotionMaestro™ software provides ease of set-up and tuning. This software is Windows™ 95/98/2000 and NT compatible.

## Divide-by-N (DBN) Option

Pulse Output Width	0.0133 to 873.8 $\mu$ sec. (1 count $\div$ 75 $\mu$ sec.) Programmable to 1/75 $\mu$ sec. intervals
Pulse Output Interval	Up to 4,294,967,296 encoder counts (32 bit) Min. time interval = 2 $\mu$ sec.
Pulse Latency From Sine / Cosine Sampling	1.4 $\mu$ sec.
Number of DBN Frames	Up to 128 Start/Stop frames

## Sine Encoder Interpolation Option

Sine/ Cosine Input	Max frequency: 500KHz/channel Gain and offset can be adjusted by software
Sampling Rate	500KHz (2 $\mu$ sec.)
Interpolation	Selectable, up to 4096 (12 bit)



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## Controller I/O

Optically Isolated Inputs: Dedicated (4): Pos Limit, Neg Limit, Node Disable, HomeGeneral Purpose (2):	Optically Isolated Inputs: Dedicated (4): Pos Limit, Neg Limit, Node Disable, HomeGeneral Purpose (2):
Optically Isolated Outputs: Dedicated (2): Node Alarm, Brake (-C/E) General Purpose (2): Out0, Out1 (-C/E)	The collector and emitter terminals of each optical output are available at the I/O connector allowing the ability to configure each output as sourcing or sinking. All outputs are controlled by the SynqNetô controller. VCE(max) = 35V Iout(max) = 30mA
High Speed Differential Line receiver InputsDedicated (3): Aux Encoder A,B,I +/- General Purpose (2): Rx0, Rx1 +/-	Uses industry standard 26LV32 or equivalent RS422 line receiver. All signals directly connected to SynqNetô Node controller. Includes Broken wire detection on Aux Encoder A & B channels.
High Speed Differential Line Driver OutputsDedicated (0): General Purpose (2): Tx0, Tx1 +/-	Uses industry standard 26LV31 or equivalent RS422 line drivers. All outputs are controlled by the SynqNetô controller. Iout(max) = 20mA
Analog Out	0-5V Analog output referenced to Common for monitoring DSP signals, output source selectable using MotionMaestroô setup software.
Power (+5V) ≠ Do Not use at this time, reserved for future Auxiliary 5V supply.	Currently connected to the on board 5V power supply, future amplifiers will use this as optional auxiliary 5V supply input to keep the controller logic section alive when the main DC bus is removed.

## Motor Feedback, encoder, commutation, and motor temp switch

+5V	5VDC +/-10%, 200 mA max Encoder/Hall supply voltage (output)
Common	5V supply return and return for Motor Temp switch
Encoder A, B, Z +/-:	26LV32 or equivalent RS422 line receiver inputs with 150 ohm differential line termination. Supports incremental, differential, TTL encoders.Broken wire detection on A & B channels.
Hall 1, 2, 3 +/-	26LV32 or equivalent RS422 line receiver inputs. Compatible with differential or single-ended commutation tracks or Hall sensors.Single-ended connections should be made to the "+" input while leaving the "≠" input unconnected. Power-on phase-finding routines available for operation without commutation tracks or Hall sensors.
Mtr Temp	Motor thermal switch input referenced to Common, amplifier can be configured to fault on normally open or normally closed switch (active high/low)

## Other Supported Encoders

Yaskawa reduced wire incremental encoder	Commutation information and Index multiplexed on encoder C channel. Connect Encoder A, B, C to amplifier A, B, Z inputs. No connection to Hall inputs.
Sanyo Denki & Tamagawa reduced wire incremental encoder	Commutation data multiplexed with Encoder A, B, Z channels. Connect Encoder A, B, C to amplifier A, B, Z inputs. No connection to Hall inputs.



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## Other Supported Encoders

Display	Name	Description
1	EEPROM Fault*	Parameter EEPROM checksum fault
2	RAM Fault*	Power up RAM read/write test failed
3	CPLD Fault*	CPLD communication timeout
4	Interpolator Fault* (Sine interpolator option only)	Interpolator processor not responding
8	Reset (Flashing)	N/A
b	Bus Over Voltage	DC bus exceeded 450VDC nominal (for 320VDC input) DC bus exceeded
c	Clamp (Disabled)	Output stage disabled
E	Encoder Fault	Encoder fault detected
F	Foldback	Foldback condition active
H	Heatsink Over Temperature	Heatsink thermal switch tripped (65°C typical)
h	Motor Over Temperature	Motor thermal switch / thermister tripped
L	LS/ECB	Motor RMS over current
0	Normal Operation	Amp enabled (no Hall only)
S	HS/ECB	Output short circuit detected (50A for standard power)
U	Bus Under Voltage	DC bus below 150VDC nominal (for 320VDC input) DC bus below 80VDC nominal (for 160VDC input)
----	Hall Fault	Invalid hall state (000 or 111)
-----	Commutation Fault	Hall angle does not match encoder counter angle No Halls: Phase finding routine failed
.	Decimal Point Only	Drive processor is in reset Logic power indicator
Single outer segment	Amp Enabled, Hall	Amp enabled Segment indicates one of six hall states

## SynqNet™ Ports

Connectors	Shielded Cat-5 RJ-45
In/Out Port LED Indicators	The In and Out port each have two LED indicators as follows:
Link LED:	
On	Physical Link is Active
Off	Physical Link is Inactive
Network Activity LED:	
On	Tx and Rx Active, Cyclic mode
Blink	Tx only Active, Discovery mode
Off	Idle, Shutdown mode

## Environmental

Operating Temperature	0°C to +60°C
Storage Temperature	-40°C to +80°C
Humidity	5% to 95% non-condensing



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