

BBG-SDU-GDMS1

Synchro Distribution Unit



Description

The BBG-SDU-GDMS1 is a stand-alone system, which provides data format conversion of serial data into synchro signals and data distribution of serial data.

The SDU is factory configurable to customer requirements for easy field installation.

Applications

- ✦ Radar Systems (antenna azimuth)
- ✦ Navigation Systems (Gyrocompass, speed log, course, pitch, and roll)
- ✦ Industrial Processes (position, velocity)
- ✦ Meteorology Instruments (wind speed and direction)
- ✦ Many Others

Features

- ✦ NMEA-0183 Compatible
- ✦ Two Channel Serial Outputs
- ✦ Four Channels, 25VA, 8 Synchro Outputs
- ✦ RS-232, RS-422, RS-423, RS-485, MIL-STD-188C Protocols
- ✦ Custom Serial Data Formats and Frequencies are available upon request.

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BBG-SDU-GDMS1 Product Specifications



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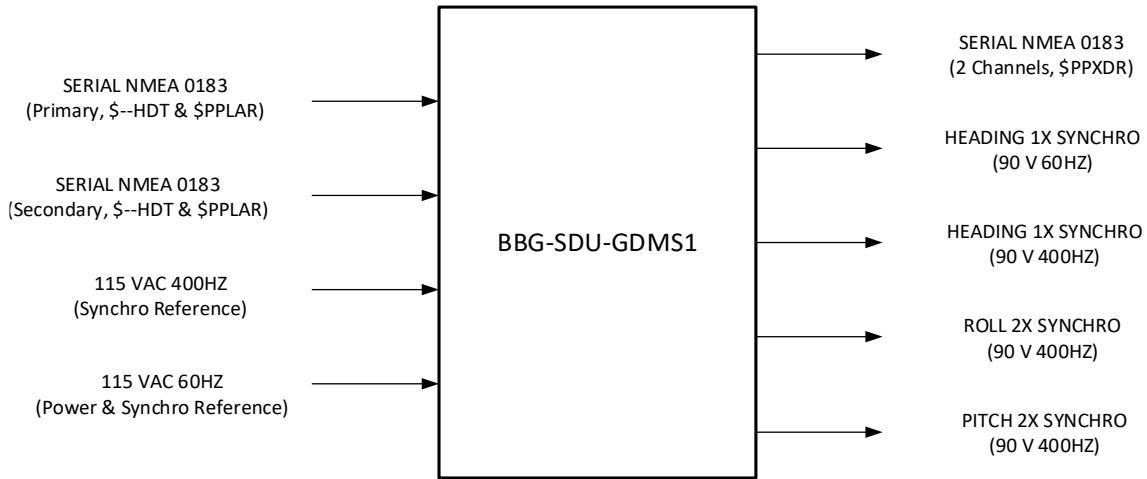
Revision History

Revision Number	Date	Page	Changes
1	4/18/2024	1 & 11-13	Added spare synchro outputs

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Block Diagram



The BBG-SDU-GDMS1 operates on 115 VAC 60 Hz power and 115 VAC 60 & 400 Hz reference inputs and is capable of interfacing two serial input channels to four synchro output channels and two serial output channels.

Technical Specifications

Parameter	Value	Units
Inputs		
Power & Synchro Reference (60Hz)	115	VAC
	60	Hz
	3.15	Amp(s)
Synchro Reference (400Hz)	115	VAC
	400	Hz
	3.15	Amp(s)
Serial (\$--HDT)	38400 BAUD	NMEA-0183
Serial (\$PPLAR)	38400 BAUD	NMEA-0183
Outputs		
Serial (\$PPXDR)	19200 BAUD	NMEA-0183
Synchro (Channel 1)	90	Volts
	60	Hertz
	25	VA
Synchro (Channels 2-4)	90	Volts
	400	Hertz
	25	VA
Accuracy	+/-4	arc minutes

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Temperature Range		
Operating	0 to +50	C°
Storage	-65 to +150	C°
Mechanical		
Weight	100	Lbs
Dimensions	37 x 25 x 9	In
	94 x 63.5 x 22.9	Cm

Overview

The BBG-SDU-GDMS1 is a stand-alone system, which receives two separate NMEA serial data streams and provides format translation of the serial data. Outputs are supplied via four medium power synchro signals and two isolated NMEA serial data outputs. Synchro outputs are available on DIN rail terminal blocks and listed in the connector list. The synchro scaling is determined from the configuration of the Serial to Synchro converter module switch (S1) at power up or reset. The four synchro output channels are factory configured as follows:

PCB	Channel	Configuration*
1	1	1X Heading
2	2	1X Heading
3	3	2X Roll
4	4	2X Pitch

Primary or secondary serial input is selectable via the *Input Select* switch on the front panel. *Primary* and *Secondary* indicator LEDs on the front panel indicate when serial data is being received from each serial input channel. Output serial is provided by two fully redundant channels. Input and output serial message format is factory configured. The four serial isolators are configured as follows:

PCB	Baud Rate (Input)	Baud Rate (Output)	Mode
5	38400 BAUD	38400 BAUD	Passthrough
6	38400 BAUD	38400 BAUD	Passthrough
7	38400 BAUD	19200 BAUD	Translate
8	38400 BAUD	19200 BAUD	Translate

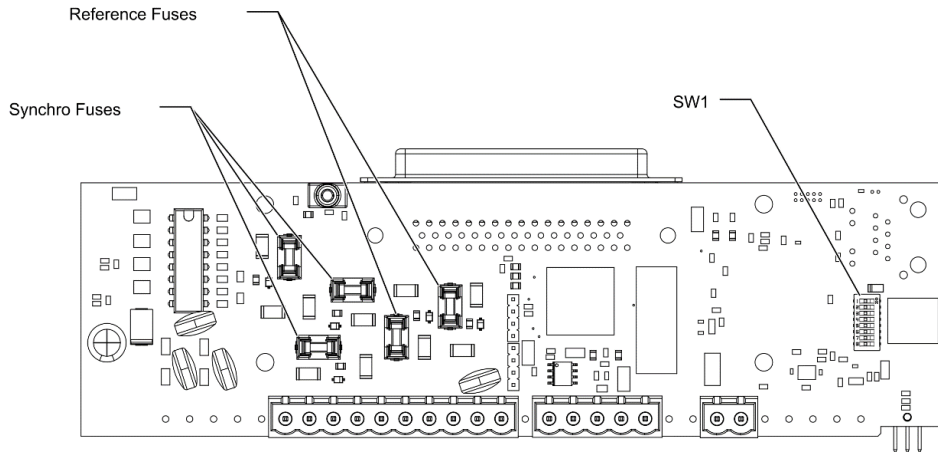
*Baud rate and modes can be configured via dip switch S1 and jumper P5.

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Serial to Synchro Converters (PCB1-4)

Each Serial and Synchro to Parallel PCB can receive one synchro input and/or one serial input to produce a digital angle for output to a Synchro Booster Amplifier. Functionality is determined by the jumpers and configuration switch at power-on or reset. During power-on or reset, an onboard microcontroller reads the configuration switch, configures the interface card, and provides all signals and control necessary to read the desired interface, process the data, and output the converted information.



PW-6623 Serial to Synchro Module

Each synchro output channel of the SDU is fault protected against overcurrent and over temperature faults. In addition, the SDU provides internal kick circuitry for added control and protection. Synchro data formats, power outputs, synchro voltages and frequencies are factory configured to user requirements. The table below defines the switch position for the available baud rates and output scaling for the serial to synchro converters.

SERIAL TO SYNCHRO CONVERTER BAUD RATE AND MODE SELECTION								
	Configuration Switch S1							
	8	7	6	5	4	3	2	1
BAUD 4800	X	X	X	X	X	X	OFF	OFF
BAUD 19200	X	X	X	X	X	X	OFF	ON
BAUD 38400	X	X	X	X	X	X	ON	OFF
BAUD 57600	X	X	X	X	X	X	ON	ON
Reference Normal	X	X	X	X	X	OFF	X	X
Reference Inverted	X	X	X	X	X	ON	X	X
Direction Normal	X	X	X	X	OFF	X	X	X

BBG-SDU-GDMS1 Product Specifications

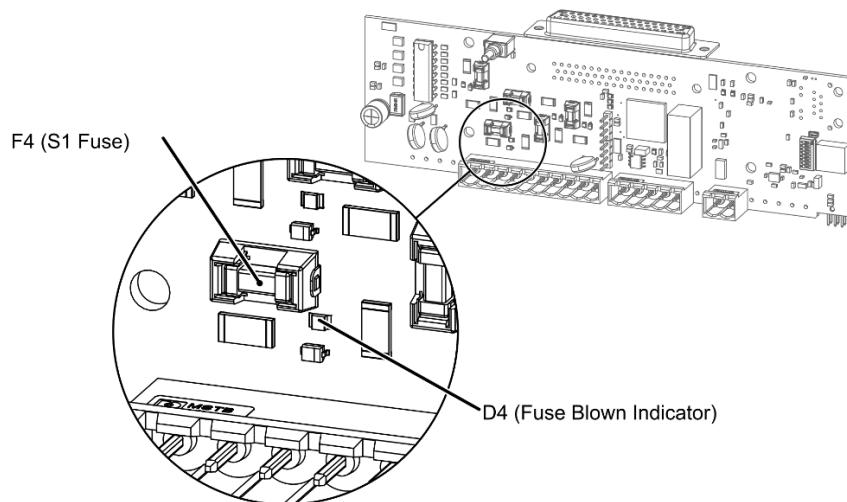


Direction Inverted	X	X	X	X	ON	X	X	X
Checksum Required	X	X	X	OFF	X	X	X	X
Checksum Optional	X	X	X	ON	X	X	X	X
HEADING Mode	X	OFF	OFF	X	X	X	X	X
ROLL Mode	X	OFF	ON	X	X	X	X	X
PITCH Mode	X	ON	OFF	X	X	X	X	X

Fuses:

Five cartridge style fuses are located on each serial to synchro PCB and provide over voltage and short circuit protection. LED indicators D5, D4, D16, D17, and D12 located within proximity of each corresponding fuse provide a visual indication of when a fuse is open. The intensity of the indicator's illumination is dependent upon the "S" lead output at an associated angle. At certain angles the "S" lead indicator may be dim or not illuminated at all due to the voltage level being transmitted to that particular "S" lead. If an open fuse is suspected but the indicator is not illuminated, step through different cardinal angles to evaluate the indicator status.

Designator	Description	Indicator	Designator	Description	Indicator
F3	Synchro S3, 0.5A, Fast Acting	D5	F6:	Reference RH, 1.0A, Slow Acting	D17
F4	Synchro S2, 0.5A, Fast Acting	D4	F7:	Reference RL, 1.0A, Slow Acting	D12
F5	Synchro S1, 0.5A, Fast Acting	D16			

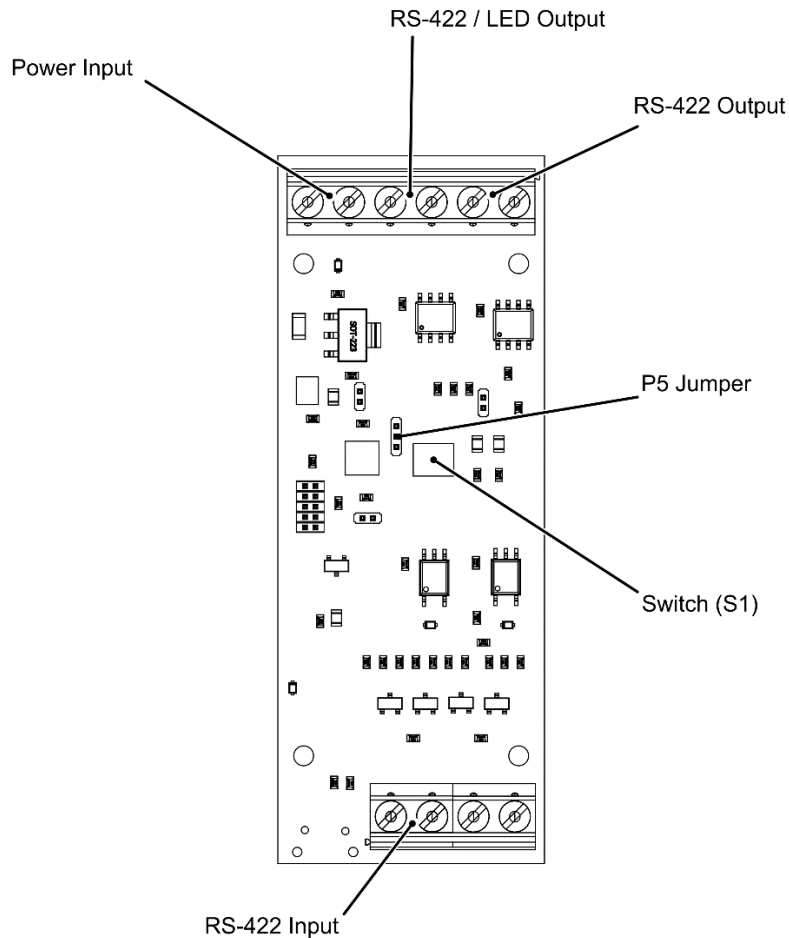


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Serial Isolators/Translators (PCB5-7)

The BBG-422ISO-GDMSI isolates the input interface(s) from the receiving device(s). Each PCB is programmed to accept NMEA-0183 \$--HDT and \$PPLAR. PCB 5 and 6 are configured for NMEA passthrough mode and simply observe the data to determine the status of the PRIMARY and SECONDARY LEDS located on the front panel. PCB 7 and 8 are configured for NMEA translate mode and convert the \$-HDT and \$PPLAR to \$PPXDR. The presence of both a valid \$--HDT and \$PPLAR sentence are required for output of a valid \$PPXDR sentence. If either input sentence is missing or invalid the isolator will not output. The table below defines the switch position for the available input and output baud rates and the jumper position for specified modes for the serial isolators.



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SERIAL ISOLATOR BAUD RATE AND MODE SELECTION				
	Configuration Switch S1			
	4	3	2	1
INPUT BAUD 4800	X	X	OFF	OFF
INPUT BAUD 19200	X	X	OFF	ON
INPUT BAUD 38400	X	X	ON	OFF
INPUT BAUD 57600	X	X	ON	ON
OUTPUT BAUD 4800	OFF	OFF	X	X
OUTPUT BAUD 19200	OFF	ON	X	X
OUTPUT BAUD 38400	ON	OFF	X	X
OUTPUT BAUD 57600	ON	ON	X	X
NMEA Translate	Jumper P5 installed 1-2			
NMEA Passthrough	Jumper P5 installed 2-3			

**Output baud rate is not configurable when in NMEA Passthrough mode.*

Indicators D2, D5, D6, and D7 provide a visual indication of the following:

LED	Description
D2	Blinks on receipt of PPLAR / HDT message.
D5	Data Good (Passthrough), or Baud Rate indicator (Translate)
D6	Baud Rate
D7	On when board is receiving power.

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Default Configurations

PCB Configuration comes factory set to customer requirements. Configuration changes can be made based on the above configuration tables. A power reset is required after any configuration changes. Below are PCB factory default configuration settings:

SERIAL TO SYNCHRO CONVERTER DEFAULT CONFIGURATION SETTINGS								
	Configuration Switch S1							
	8	7	6	5	4	3	2	1
PCB1	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF
PCB2	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF
PCB3	OFF	OFF	ON	OFF	OFF	OFF	ON	OFF
PCB4	OFF	ON	OFF	OFF	OFF	OFF	ON	OFF

SERIAL ISOLATOR DEFAULT PCB CONFIGURATION SETTINGS							
	P3	P4	P5	Configuration Switch S1			
				4	3	2	1
PCB5	Install	Do Not Install	2-3	X	X	ON	OFF
PCB6	Install	Do Not Install	2-3	X	X	ON	OFF
PCB7	Do Not Install	Install	1-2	OFF	ON	ON	OFF
PCB8	Do Not Install	Install	1-2	OFF	ON	ON	OFF

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Connector List

Inputs and outputs are available on DIN rail terminal blocks provided with the SDU. Inputs and outputs are listed below:

TB1-1	115V AC 60 Hz Neutral (Input, 3.15A Fuse)
TB1-2	115V AC 60 Hz Line (Input, 3.15A Fuse)
TB1-3	GND
TB1-4	115V AC 400 Hz R1 (Input, 3.15A Fuse)
TB1-5	115V AC 400 Hz R2 (Input, 3.15A Fuse)
TB1-6	GND
TB1-7	R1 115V AC 60 Hz Heading (Output, 1A Fuse)
TB1-8	R2 115V AC 60 Hz Heading (Output, 1A Fuse)
TB1-9	HEADING S1 OUT 1X 60 Hz (Output)
TB1-10	HEADING S2 OUT 1X 60 Hz (Output)
TB1-11	HEADING S3 OUT 1X 60 Hz (Output)
TB1-12	GND
TB1-13	R1 115V AC 400 Hz Heading (Output, 1A Fuse)
TB1-14	R2 115V AC 400 Hz Heading (Output, 1A Fuse)
TB1-15	HEADING S1 OUT 1X 400 Hz (Output)
TB1-16	HEADING S2 OUT 1X 400 Hz (Output)
TB1-17	HEADING S3 OUT 1X 400 Hz (Output)
TB1-18	GND
TB1-19	R1 115V AC 400 Hz Roll (Output, 1A Fuse)
TB1-20	R2 115V AC 400 Hz Roll (Output, 1A Fuse)
TB1-21	ROLL S1 OUT 2X 400 Hz (Output)
TB1-22	ROLL S2 OUT 2X 400 Hz (Output)
TB1-23	ROLL S3 OUT 2X 400 Hz (Output)
TB1-24	GND
TB1-25	R1 115V AC 400 Hz Pitch (Output, 1A Fuse)
TB1-26	R2 115V AC 400 Hz Pitch (Output, 1A Fuse)
TB1-27	PITCH S1 OUT 2X 400 Hz (Output)
TB1-28	PITCH S2 OUT 2X 400 Hz (Output)
TB1-29	PITCH S3 OUT 2X 400 Hz (Output)
TB1-30	GND

**All power and reference fuses are Fast Acting.*

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TB2-1	R1 115V AC 400 Hz (no user connections)
TB2-2	R2 115V AC 400 Hz (no user connections)
TB2-3	+24VDC (no user connections)
TB2-4	24VDC GND (no user connections)

TB3-1	PRIMARY RS422- (A) Serial (\$PPLAR & \$HEHDT)
TB3-2	PRIMARY RS422+ (B) Serial (\$PPLAR & \$HEHDT)
TB3-3	GND
TB3-4	SECONDARY RS422- (A) Serial (\$PPLAR & \$HEHDT)
TB3-5	SECONDARY RS422+ (B) Serial (\$PPLAR & \$HEHDT)
TB3-6	GND
TB3-7	RS422- Out 1 (A) Serial (XDR)
TB3-8	RS422+ Out 1 (B) Serial (XDR)
TB3-9	GND
TB3-10	RS422- Out 2 (A) Serial (XDR)
TB3-11	RS422+ Out 2 (B) Serial (XDR)
TB3-12	GND
TB3-13	GND
TB3-14	GND
TB3-15	GND
TB3-16	GND

TB1-31	SPARE - R1 115V AC 60 Hz Heading
TB1-32	SPARE - R2 115V AC 60 Hz Heading
TB1-33	SPARE - HEADING S1 OUT 1X 60 Hz
TB1-34	SPARE - HEADING S2 OUT 1X 60 Hz
TB1-35	SPARE - HEADING S3 OUT 1X 60 Hz
TB1-36	GND
TB1-37	SPARE - R1 115V AC 400 Hz Heading
TB1-38	SPARE - R2 115V AC 400 Hz Heading
TB1-39	SPARE - HEADING S1 OUT 1X 400 Hz
TB1-40	SPARE - HEADING S2 OUT 1X 400 Hz
TB1-41	SPARE - HEADING S3 OUT 1X 400 Hz
TB1-42	GND
TB1-43	SPARE - R1 115V AC 400 Hz Roll
TB1-44	SPARE - R2 115V AC 400 Hz Roll
TB1-45	SPARE - ROLL S1 OUT 2X 400 Hz

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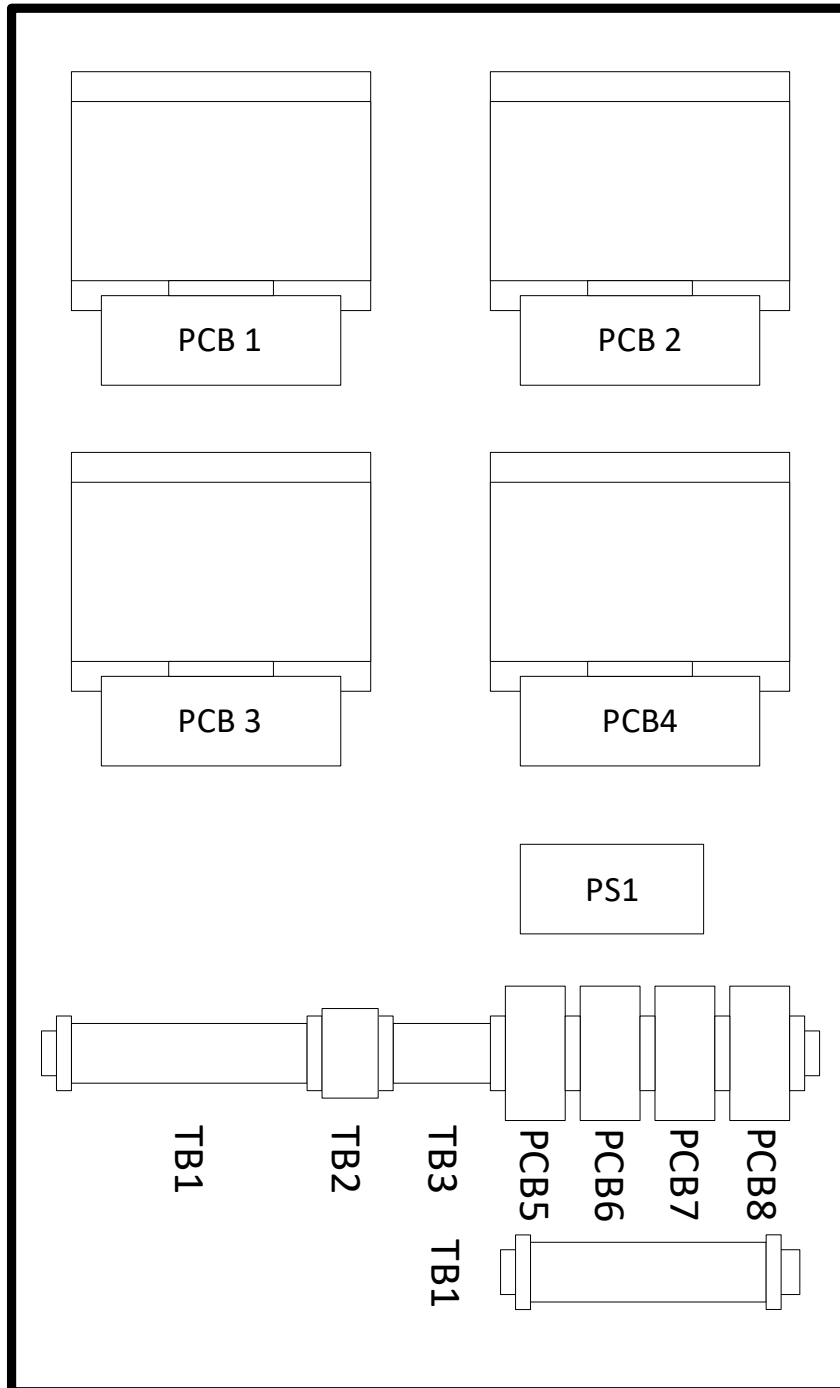


TB1-46	SPARE - ROLL S2 OUT 2X 400 Hz
TB1-47	SPARE - ROLL S3 OUT 2X 400 Hz
TB1-48	GND
TB1-49	SPARE - R1 115V AC 400 Hz Pitch
TB1-50	SPARE - R2 115V AC 400 Hz Pitch
TB1-51	SPARE - PITCH S1 OUT 2X 400 Hz
TB1-52	SPARE - PITCH S2 OUT 2X 400 Hz
TB1-53	SPARE - PITCH S3 OUT 2X 400 Hz
TB1-54	GND

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Internal Layout



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Mounting Information

