



Innovative Solutions in Engineering

## BBG-ACP/ARP+SIM3

## Synchro to ACP/ARP Converter with Simulated Outputs



### *Description*

The BBG-ACP/ARP+SIM3 is a stand-alone system, which provides data format conversion of Synchro to ACP/ARP.

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

Supports live mode and simulated modes.

### *Applications*

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

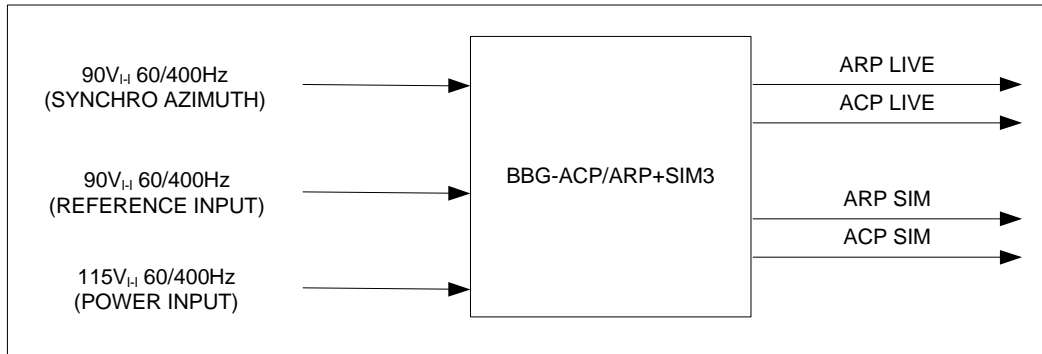
### *Features*

- ACP/ARP Output
  - Adjustable number of ACPs per revolution
  - Simulated ARP and ACP output
- 90V, 400Hz Synchro Input
- RS-232/RS422 Control
- Front Panel Control
- Simulated Outputs

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*Chart*

The BBG-ACP/ARP+SIM3 operates on 115/230 VAC 60/400 Hz power and 115VAC 60/400 Hz reference inputs and is capable of interfacing to one synchro input and one serial control to output live and simulated ACP/ARP data (RS-422).

*Technical Specifications*

Parameter	Value	Units
<b>Inputs</b>		
Power Supply	115/230	Volts AC
	1	Amps
	60/400	Hertz
Reference	115	Volts
	0.5	Amps
	60/400	Hertz
Synchro Azimuth	90	Volts AC
	60/400	Hertz
	0 – 360	Degrees of Azimuth
Serial Control	RS-232/RS-422	
<b>Outputs</b>		
ARP	1 pulse/revolution	RS-422
ACP	8192 or 16384 pulses/revolution	RS-422
<b>Temperature Range</b>		
Operating	0 to +50	C°
Storage	-65 to +150	C°



<b>Dimensions</b>		
	12(W) x 16(H) x 8(D)	In
	40.64(W) x 30.48(H) x 20.32(D)	Cm
<b>Weight</b>	26	lbs

## OVERVIEW

The BBG-ACP/ARP+SIM3 is a Synchro azimuth to ACP/ARP converter. The unit is powered by 115/230 VAC 60/400Hz. The Synchro reference can be either 60Hz or 400Hz at 115VAC. The unit receives Synchro input and generates one ARP at the zero crossing. The unit can be configured to produce either 8192 or 16384 ACP pulses per 360-degree rotation. The ACP and ARP signals are driven with RS-422 drivers giving a balanced output.

The BBG-ACP/ARP+SIM3 has both Live and Simulated outputs. For the Live output, the BBG-ACP/ARP+SIM3 reads the Synchro input and generates the ACP and ARP signals. The Simulated output is based on an internal clock that is used to generate the ACP and ARP signals. The number of ACP pulses generated per revolution is selectable for both the Live and Simulated outputs. In addition, the Simulated output allows control of the rotation rate of the Simulated ACP and ARP signals.

## INPUTS/OUTPUTS

Inputs and outputs are available on standard DIN rail terminal blocks and BNC connectors. Inputs and outputs are listed below:

### Digital Interface

Live:

Azimuth Reference Pulse (ARP) Output:

The ARP signal indicates the radar antenna is passing through zero degrees and occurs once per revolution of the radar antenna. The output is based on the Synchro signal input.

Azimuth Change Pulse (ACP) Output:

The ACP output can be set for either 8192 or 16384 of pulses per revolution using a switch located inside the unit. The output is based on the Synchro signal input.



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Simulated:

Azimuth Reference Pulse (ARP) Output:

The ARP signal indicates the radar antenna is passing through zero degrees and occurs once per revolution of the radar antenna.

Azimuth Change Pulse (ACP) Output:

The ACP output can be set for either 8192 or 16384 pulses per revolution using a switch located on the front panel. The ACP rate is continuously variable from 0 RPM to 60 RPM by a front panel control knob. The rate of rotation for the simulated ARP will be displayed on the front panel LCD.

ACP/ARP Polarity Selection:

Jumper affects both the simulated and the live ACP/ARP outputs.

<b>ACP and ARP Polarity Selection Jumpers</b>		
Signal	Jumper Position	
	Positive Pulse	Negative Pulse
ARP	P6 1 – 2	P6 Open
ACP	P5 1 – 2	P5 Open



**ACP/ARP 422/423 output Selection:**

The ACP and ARP outputs are selectable as either Balanced outputs or Unbalanced outputs. The Balanced output drives both the center conductor and the shield of the cable. The center conductor is the positive polarity signal while the shield is the negative polarity of the signal.

The Unbalanced output drives the center conductor and the shield is connected to ground. The center conductor is the positive polarity signal and the shield is signal ground.

<b>ACP and ARP Polarity Selection Jumpers</b>		
Signal	Jumper Position	
	RS422 (Balanced)	RS423 (Unbalanced)
ARP Live	P9 2 – 3	P9 1 – 2
ACP Live	P10 2 – 3	P10 1 – 2
ARP Sim.	P1 2 – 3	P1 1 – 2
ACP Sim.	P2 2 – 3	P2 1 – 2

**Serial Interface****Serial Input:**

The serial input is configurable as either an RS232 or RS422 interface via a jumper on the internal print circuit card. Table 1 shows the jumper configurations:

<b>PROTOCOL SELECTION</b>		
Protocol	Jumper Position	
	RS-232 Control	JP18 2 – 3
RS-422 Control	JP18 1 – 2	JP11 1 – 2

Table 1. Protocol Configuration Jumpers



Serial Message Formats:

Control Message:

\$PSBBG,RR,S,L<CR><LF>

The message is formatted using NMEA0183 proprietary message format definition. The message header is: "\$PSBBG," indicating this is a message to set the following values:

RR – two digit number from 2 to 70 in integer values selecting the simulated ARP rate in Revolutions Per Minute.

S – 0 selects 8192 pulses/revolution, 1 selects 16384 pulses/revolution for the simulated ACP.

L – 0 selects 8192 pulses/revolution, 1 selects 16384 pulses/revolution for the Live ACP.

Baud Rate and Default Values:

Switch SW1 on PCB1 controls the baud rate for the serial interface. SW1 also controls the default pulses per revolution for the Live output.

Note: LCD1 jumper on PCB2 may need to be removed from pins 3 & 4. – Contact Factory if Required.

<b>CONTROL BAUD RATE, LIVE ACP RATE</b>								
BAUD RATE (bits per sec)	Configuration Switch S1							
	1	2	3	4	5	6	7	8
2400	1	1	0	X	X	X	X	X
4800	0	0	1	X	X	X	X	X
9600	1	0	1	X	X	X	X	X
19200	0	1	1	X	X	X	X	X
38400	1	1	1	X	X	X	X	X
ACP 8192/rev	X	X	X	X	X	X	0	0
ACP 4096/rev	X	X	X	X	X	X	1	0
ACP 16384/rev	X	X	X	X	X	X	X	1
1 = off, 0 = on, X = Don't Care								



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The simulated interface always defaults to ARP = 2RPM and ACP=8192.

## Front Panel Controls and Status Indicators

Power Switch – Applies and removes power and reference to internal circuitry.

Lamp Indicators – Indicates 60Hz and 400Hz inputs; Lamps are lit when power is present and Power Switch is in the “ON” position.

ARP Rate Switch – Labeled “RATE” and increases the ARP rate when turned clockwise and decreases the ARP rate when turned counter-clockwise.

ACP Rate Switch – Labeled above “8192/16384” and below “CHANGE”. The switch is a momentary switch and when pressed and held down the ACP rate will toggle from either 8192 or 16384 to the other value. The switch must be released and held down again to toggle back the original rate.

LED Display – Shows current configuration state of the unit. The first two digit field indicates the current simulated ARP rate in RPM. The second field indicates the simulated ACP rate and displays a “8” to indicate a rate of 8192 and “16” to indicate a rate of 16384. The third field indicates the ACP rate for the live interface and displays a “8” for 8192 and “16” for 16384.

## Synchro Interface

Synchro Input:

The Synchro input accepts 90 volt Line to Line, 60 or 400 Hertz Synchro. Default synchro format is single channel 1X input. Custom voltages and frequencies are available upon request. The input is used to develop the ARP and ACP signals for the Live ACP/ARP outputs.



**Reference Interface**

Reference Input:

The reference input is 115 Volt, 60 or 400 Hertz.

**CONNECTOR LIST**

Inputs and outputs are available on DIN rail terminal blocks provided with the BBG-ACP/ARP+SIM3. Inputs and outputs are listed below:

I/O CONNECTOR TYPE: DIN Terminal Blocks

CONNECTOR MATE: Ferrules

<b>Signal</b>	<b>Connector</b>
ACN 115V AC 60 Hz NEUTRAL (FUSED INPUT) (3.15 Amp)	TB1 – 1
ACL 115V AC 60 Hz LINE (FUSED INPUT) (3.15 Amp)	TB1 – 2
Chassis Ground (E1)	TB1 – 3
R1 115V AC 60/400 Hz INPUT	TB1 – 4
R2 115V AC 60/400 Hz INPUT	TB1 – 5
AZIMUTH S1 IN 1X 60/400 Hz	TB1 – 6
AZIMUTH S2 IN 1X 60/400 Hz	TB1 – 7
AZIMUTH S3 IN 1X 60/400 Hz	TB1 – 8
Chassis Ground (E1)	TB1 – 9
Serial Control (RXD232/422B Input)	TB1 – 10
Serial Control (RXD422A Input)	TB1 – 11
Chassis Ground (E1)	TB1 – 12
Serial Control (TXD232/422B Output Status (RS-422) A (Unit TX))	TB1 – 13
Serial Control (TXD422A Output Status (RS-422) B (Unit RX))	TB1 – 14
Serial Control (RS232 Return) Signal Ground	TB1 – 15



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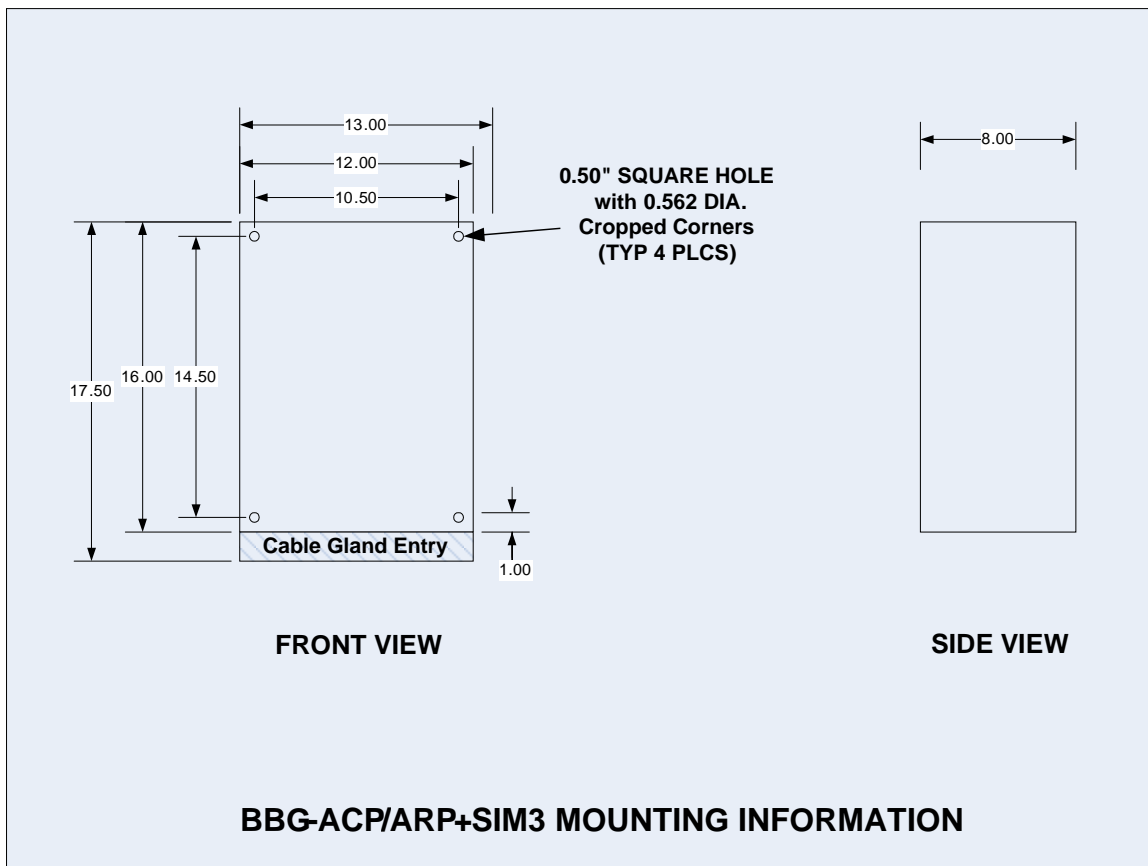


# BBG-ACP/ARP+SIM3

# Product Specifications

## ACP ARP BNC Connectors

Signal	Connector (BNC)
ARP Live	J1
ACP Live	J2
ARP Simulated	J3
ACP Simulated	J4



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