



BBG-1014a

Digital to Synchro/Resolver and Serial "SMART" Converter Card

Description

The BBG-1014a is a PCbus compatible card which interfaces to any slot of an IBM PC or clone. This board supports standard 16 bit BCD input (speed log) and converts it into a synchro/resolver format and a serial data format.

The synchro format output is a standard 5 wire (S1, S2, S3, RL, and RH) at 90V LL or 11.8V LL. Resolver output is a standard 6 wire (Sin, Sin Return, Cos, Cos Return, RH, and RL) at 6.8Vrms. Standard reference inputs of 60 Hz and 400 Hz are supported with custom voltages and frequencies available upon request.

The serial data output uses the NMEA 0183 message structures and supports RS-232, RS-422, RS-423, RS-485, and MIL-STD-188C protocols.

The BBG-1014a is a "SMART" interface due to the onboard processor which communicates with the PCbus through shared memory, thus, requiring minimum PC processor time. DC power is supplied by the PCbus and Synchro/Resolver outputs are powered by the ac reference voltage. Therefore, no external power supplies are required.

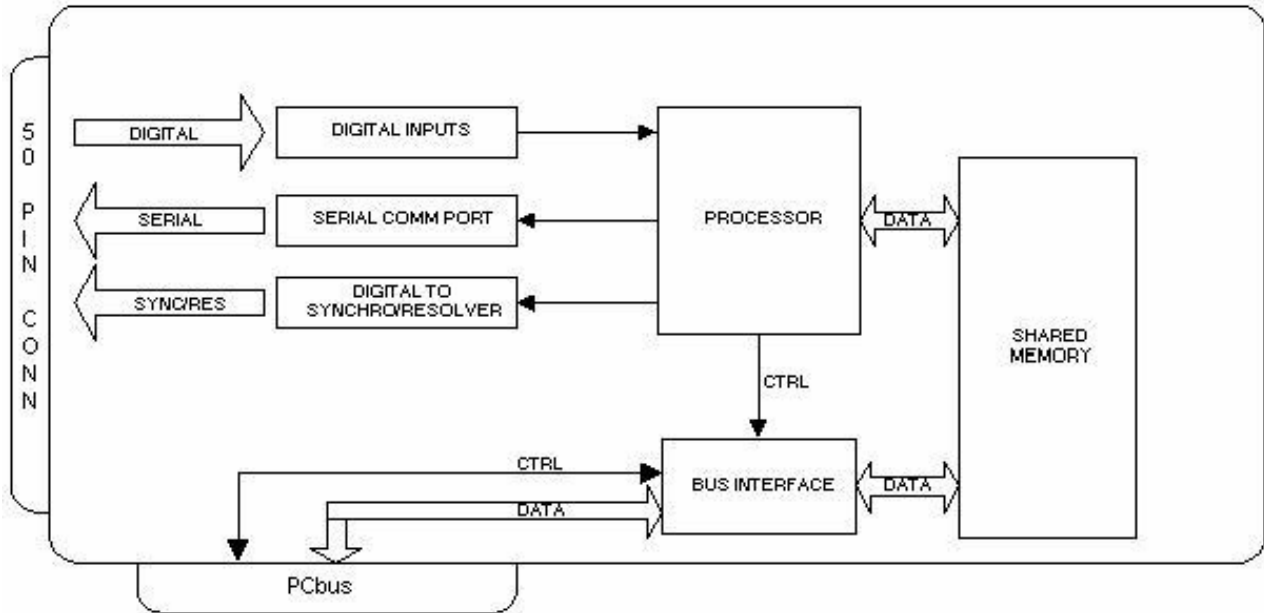
In situations not requiring a PC interface, the BBG-1014a operates in a "STAND-ALONE" mode. With the addition of an external +5 volt power supply, the onboard processor converts the BCD inputs into synchro/resolver and serial data formats without the requirement of a PCbus.

picture not available

Features

- IBM PC Compatible
- Digital Input, Synchro/Resolver and Serial Outputs
- NMEA-0183 Compatible Outputs
- RS-232, RS-422, RS-423, RS-485, MIL-STD-188C Protocols
- Stand-alone Mode with Additional +5V Power Supply
- Custom Implementations Available Upon Request



Chart**Technical Specifications**

BBG-1014a Specifications		
Power Supply	Volts MiliAmps	5 800
Operating Temperature Storage Temperature	C° C°	0 to +50 -65 to +150
Physical Characteristics Full Size IBM PC Card	Inches Centimeters	4.5 x 13.5 x 0.6 11.4 x 34.3 x 1.5



Overview

The DS-1014a is a full-size IBM PC card which inputs a 14-bit BCD value representing a speed or angular position. This information is processed by the onboard microcontroller and output in three different data formats. A NMEA-0183 serial data format updated at a rate of once per second is transmitted over both RS-232 and RS-422 interfaces. A factory configurable synchro or resolver output representing speed or angular position is output continuously at a user defined voltage and frequency. A binary angle measurement format (BAM) number as shown in Table 2, is passed through dual port memory to the PCbus on demand from the host computer.

The DS-1014a can, also, be used without a computer in a stand alone mode. An onboard microcontroller configures the card from power up or reset and provides all signals and control to read the BCD information and output the synchro/resolver information and the NMEA 0183 data message.

When used in a computer configuration, switches provide for bus address selection and interrupts IRQ2 thru IRQ7 are jumper selectable. Baud rates are switch selectable and can be programmed via the PC bus. Selectable baud rates include: 1200, 2400, 4800, 9600, and 19,200 bits per second. Default data output is 9600, 8 bits, no parity, and one stop bit (9600, 8, N, 1). Table 3 defines the switch position for the available baud rates.



BBG-1014a Binary Angle Measurement Format		
Bit	Deg./Bit	Min./Bit
1 (MSB)	180	10,800
2	90	5,400
3	45	2,700
4	22.5	1,350
5	11.25	675
6	5.625	337.5
7	2.813	168.75
8	1.405	84.38
9	0.7031	42.19
10	0.3516	21.09
11	0.1758	10.55
12	0.0879	5.27
13	0.0439	2.64
14	0.0220	1.32
15	0.0110	0.66
16 (LSB)	0.0055	0.33



BBG-1014a Baud Rate Selection								
BAUD RATE (bits per sec)	Configuration Switch S1							
	1	2	3	4	5	6	7	8
1200	1	1	0	X	X	X	X	X
2400	0	0	1	X	X	X	X	X
4800	1	0	1	X	X	X	X	X
9600	0	1	1	X	X	X	X	X
19200	1	1	1	X	X	X	X	X
1 = off, 0 = on, X = Don't Care								

Software

A C driver program "gyrol_dr.c" is included with the DS-1014a. This file contains the function calls needed to operate the pc interface. The function "get_speed" reads the BCD value from dual port memory and converts the data to a floating point angle. The function "set_baud" allows changing of the baud rate under computer control. The function "reset_spd_log" is used to reset the interface card to it's default configuration.



Selecting an Address

The DS-1014a uses sixteen (16) I/O addresses. The card reset register requires two addresses, the baud rate configuration register requires one address, and the BCD input register requires one address. The remaining 12 addresses are decoded and reserved for future requirements.

The base address of the card is set by switches SW1, SW2, and SW3. SW1 sets address bits 15-12, SW2 sets address bits 11-8, and SW3 sets address bits 7-4. This allows the card to be placed on any 16 bit boundary in I/O space.

Examples of switch positions and card addresses follow with an I/O map of the card shown in Table 4.

Example:

SW1 is set to 0, SW2 is set to 3, and SW3 is set to 0. The address of the card is 300-30F. (Factory Default)

Example:

SW1 is set to 0, SW2 is set to 3, and SW3 is set to 2. The address of the card is 320-32F.

I/O Address Map			
Address	Register	Address	Register
XX0	Set Baud	XX8	Not Used
XX1	Not Used	XX9	Not Used
XX2	Clear Reset	XXA	Enable Reset
XX3	Not Used	XXB	Not Used
XX4	Not Used	XXC	Not Used
XX5	Not Used	XXD	BCD Input
XX6	Not Used	XXE	Not Used
XX7	Not Used	XXF	Not Used



NMEA-0183 Format

The BBG-1014a can be factory programmed for any NMEA-0183 data format. Current data format is as follows:

\$PTBBG,XXX.XX,A*CSCRLF

\$ Start of message ascii character 24 Hex
 PT Proprietary message
 BBG BBG Incorporated
 XXX.XX Channel 1 synchro/resolver angle (ex: 045.01)
 A Validity (A = valid, V = Invalid)
 * Ascii character 2A Hex
 CS Checksum (8 bit XOR of characters between \$ and *)
 CR Carriage return
 LF Line feed

Optional Synchro/Resolver Outputs

The BBG-1014a can be factory configured for 90Vrms, 11.8Vrms, and/or 6.8Vrms synchro or resolver outputs at 60Hz or 400Hz. Custom voltages and frequencies are available upon request. Please specify desired voltage when ordering card.

BBG-1014a Jumper Configuration		
Jumper	Pins	Not Used
P2	1-2 3-4 5-6 7-8 9-10 11-12	IRQ2 IRQ3 IRQ4 IRQ5 IRQ6 IRQ7
P26	In	RS422 Receiver Enable
P28	In	RS232 Receiver Enable
P30	In	RS422 Transmit Enable



CONNECTOR LIST FOR DS-1014a

I/O CONNECTOR TYPE: DD50PA

CONNECTOR MATE: DD50S

Pin No.	Signal	Pin No.	Signal
1	BCD Valid	26	BCD6 (Input)
2	BCD Valid	27	BCD5 (Input)
3	BCD Hold Off	28	BCD4 (Input)
4	Ground	29	BCD3 (Input)
5	Spare	30	BCD2 (Input)
6	Spare	31	BCD1 (Input)
7	Spare	32	BCD0 (Input)
8	Spare	33	-15V (Input) *
9	S4/+COS (Output)	34	+5V (In/Out) **
10	S3/-SIN (Output)	35	+5V (In/Out) **
11	S2/-COS (Output)	36	Ground
12	S1/+SIN (Output)	37	Ground
13	RF1 (Ref+ Input)	38	TXD232 (Output)
14	RL1 (Ref- Input)	39	RXD232 (Input)
15	Spare	40	TXC232 (Output)
16	+15V (Input) *	41	RXC232 (Input)
17	+15V (Input) *	42	TXD422+ (Output)
18	BCD14 (Input)	43	TXD422- (Output)
19	BCD13 (Input)	44	RXD422+ (Input)
20	BCD12 (Input)	45	RXD422- (Input)
21	BCD11 (Input)	46	RXC422+ (Output)
22	BCD10 (Input)	47	TXC422- (Output)
23	BCD9 (Input)	48	TXC422+ (Input)
24	BCD8 (Input)	49	RXC422- (Input)
25	BCD7 (Input)	50	-15V (Input) *

* NOTE: +15V and -15V are not required if using reference powered Digital-to- Synchro Converters.

** NOTE: +5V is an output if using a standard PCbus computer and an input if operating in the stand alone mode.

