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SOFTWARE MANUAL

RF POWER AMPLIFIER

CA199.6BW2-6565R-SL

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Revision History

Version	Date	Author(s)	Revision Note
1.00	Sep.8.2017	K.Nishimura	Original

2.3. INTERFACE

The Model CA199.6BW2-6565R-SL can be controlled with Lantronix Xport.
Xport is set up by Deviceinstaller.
IP address is assigned automatically. Port is 502.

<Modbus/TCP>

Transaction Identifier	Protocol Identifier	Length	Unit Identifier
2byte 0xXXXX	2byte 0xXXXX	2byte 0xXXXX	1byte 0xXX

Response returns same one as received Header
(Transaction identifier, Protocol identifier, Unit identifier)

<Function Code>
Supports following Function Code.

<0x03 Read Holding Registers>
Read only.
One or continuous registers read is enabled. (32 max.)

1) Request

Transaction Identifier		Protocol Identifier		Length		Unit Identifier	Function	Starting Address		Quantity of Registers	
byte0	byte1	byte2	byte3	byte4	byte5	byte6	byte7	byte8	byte9	byte10	byte11
Hi	Lo	Hi	Lo	Hi	Lo	1 byte	1 byte	Hi	Lo	Hi	Lo
0xXX	0xXX	0xXX	0xXX	0x00	0x06	0xXX	0x03	0x00	0x02	0x00	0x03

2) Response

Transaction Identifier		Protocol Identifier		Length		Unit Identifier	Function	Byte court	Data 1		Data 2		Data 3	
byte0	byte1	byte2	byte3	bite4	byte5	byte6	byte7	byte8	byte9	byte10	byte11	byte12	byte13	byte14
Hi	Lo	Hi	Lo	Hi	Lo	1 byte	1 byte	1 byte	Hi	Lo	Hi	Lo	Hi	Lo
0xXX	0xXX	0xXX	0xXX	0x00	0x09	0xXX	0x03	0x06	0xXX	0xXX	0xXX	0xXX	0xXX	0xXX

3) Exception Response

Transaction Identifier		Protocol Identifier		Length		Unit Identifier	Function	Exception Code
byte0	byte1	byte2	byte3	byte4	byte5	byte6	byte7	byte8
Hi	Lo	Hi	Lo	Hi	Lo	1 byte	1 byte	1 byte
0xXX	0xXX	0xXX	0xXX	0x00	0x03	0xXX	0x83	0xXX

Exception Code	MODBUS Name	Comments
0x01	Illegal Function Code	The function code is unknown by the server
0x02	Illegal Data Address	Dependent on the request
0x03	Illegal Data Value	Dependent on the request
0x04	Server Failure	The server failed during the exaction

<0x06 Write Single Register>

Write only

One register rewriting is enabled

It is used to command below

- RF ON/OFF
- Reset for alarm clear (Clear latched faults)
- Reboot

1) Request

Transaction Identifier		Protocol Identifier		Length		Unit Identifier	Function	Register Address		Register Value	
byte0	byte1	byte2	byte3	byte4	byte5	byte6	byte7	byte8	byte9	byte10	byte11
Hi	Lo	Hi	Lo	Hi	Lo	1 byte	1 byte	Hi	Lo	Hi	Lo
0xXX	0xXX	0xXX	0xXX	0x00	0x06	0xXX	0x06	0x00	0x02	0x01	0x03

2) Response

Transaction Identifier		Protocol Identifier		Length		Unit Identifier	Function	Register Address		Register Value	
byte0	byte1	byte2	byte3	byte4	byte5	byte6	byte7	byte8	byte9	byte10	byte11
Hi	Lo	Hi	Lo	Hi	Lo	1 byte	1 byte	Hi	Lo	Hi	Lo
0xXX	0xXX	0xXX	0xXX	0x00	0x08	0xXX	0x06	0x00	0x02	0x01	0x03

3) Exception Response

Transaction Identifier		Protocol Identifier		Length		Unit Identifier	Function	Exception Code
byte0	byte1	byte2	byte3	byte4	byte5	byte6	byte7	byte8
Hi	Lo	Hi	Lo	Hi	Lo	1 byte	1 byte	1 byte
0xXX	0xXX	0xXX	0xXX	0x00	0x03	0xXX	0x86	0xXX

Exception Code	MODBUS Name	Comments
0x01	Illegal Function Code	The function code is unknown by the server
0x02	Illegal Data Address	Dependent on the request
0x03	Illegal Data Value	Dependent on the request
0x04	Server Failure	The server failed during the exaction
0x05	No Action	

<0x08 Diagnostics>

It is used to confirm the Modbus communication and checks whether same data can be received as transmitted data.

Sub function Code is 0x0000. The data is any 16bit.

1) Request

Transaction Identifier		Protocol Identifier		Length		Unit Identifier	Function	Sub-function Code		Data	
byte0	byte1	byte2	byte3	byte4	byte5	byte6	byte7	byte8	byte9	byte10	byte11
Hi	Lo	Hi	Lo	Hi	Lo	1 byte	1 byte	Hi	Lo	Hi	Lo
0xXX	0xXX	0xXX	0xXX	0x06		0xXX	0x08	0x00	0x00	0xXX	0xXX

Sub-function Code	Name
0x00	Return Query Data

2) Response

Transaction Identifier		Protocol Identifier		Length		Unit Identifier	Function	Sub-function Code		Data	
byte0	byte1	byte2	byte3	byte4	byte5	byte6	byte7	byte8	byte9	byte10	byte11
Hi	Lo	Hi	Lo	Hi	Lo	1 byte	1 byte	Hi	Lo	Hi	Lo
0xXX	0xXX	0xXX	0xXX	0x06		0xXX	0x08	0x00	0x00	0xXX	0xXX

<Register Map>

Below is the list of Register Map. Address offset is enabled.

- ◆ Definition: Default: RF Disable
- ◆ Reset Operation
  - ➢ Default: RF OFF, Shut Down
    When these errors are detected, SSA operation goes to Default.
    To recover from this state:
    1. Send the "Fault Reset" command (Address 2) to the SSA via Modbus.
    2. Send the "RF Enable" command (Address 1) to the SSA via Modbus.

- ◆ Multiplier
  - ➢ 1
    The number shown on the Modbus is the actual performance value.
  - ➢ 0.1
    The actual performance value is **x 0.1**. The last number shown on the Modbus is actually the first number after the decimal point.

- ➢ Remove Cause: Warning
  When there errors are detected, an Error code will be notified on Address 11 but SSA operation continues as before the error detection.
  To remove these Error Code:
  1. Check what causing the error and remover or fix the error cause.
  2. Send the "Fault Reset" command (Address 2) to the SSA via Modbus. SSA operation continues as before putting reset command.

Address	Address	Description	Function	Display Range	Multiplier	Unit	Permitted Raw Value	Threshold (Lower)	Threshold (Upper)	command /status	Error Code	Error Type	Error Operation	Reset Operation
1	0x0001	RF Enable/Disable	0x03,0x06	0 or 1	n/a	n/a	0 or 1	n/a	n/a	0: Disable 1: Enable	n/a	n/a	n/a	n/a
2	0x0002	Fault Reset	0x03,0x06	0 or 1	n/a	n/a	1 or 4	n/a	n/a	1: Fault Reset 4:Warning Reset	n/a	n/a	n/a	n/a
3	0x0003	System Reboot	0x03,0x06	0 or 1	n/a	n/a	1	n/a	n/a	1:Reboot	n/a	n/a	n/a	n/a
4	0x0004	-	-	-	-	-	-	-	-	-	-	-	-	-
5	0x0005			-	-	-	-	-	-	-	-	-	-	-
6	0x0006			-	-	-	-	-	-	-	-	-	-	-
7	0x0007													
8	0x0008	-	-	-	-	-	-	-	-	-	-	-	-	-
9	0x0009	-	-	-	-	-	-	-	-	-	-	-	-	-
10	0x000a	Alarm Code	0x03	0 or 100-501	n/a	n/a	Read only	n/a	n/a	0: No Error 1-501: Error	See Error Code List	Fault	RF OFF Shut down	n/a
11	0x000b	Warning Code	0x03	0 or 1	n/a	n/a	Read only	n/a	n/a	0: Disable 1: Enable	See Error Code List	Warning	n/a	n/a
12	0x000c	-	-	-	-	-	-	-	-	-	-	-	-	-
13	0x000d	-	-	-	-	-	-	-	-	-	-	-	-	-

Address	Address	Description	Function	Display Range	Multiplier	Unit	Permitted Raw Value	Threshold (Lower)	Threshold (Upper)	command /status	Error Code	Error Type	Error Operation	Reset Operation
14	0x000e	-	-	-	-	-	-	-	-	-	-	-	-	-
15	0x000f	Moisture	0x03	0 - 999	0.1	%	Read only	n/a	n/a	n/a	n/a	n/a	n/a	n/a
16	0x0010	Input Power	0x03	0 - 666	1	mV	Read only	0mV	350mV	Operation Value	100	Fault	RF: Disable	Default
17	0x0011	Forward Power	0x03	0 - 3300	1	W	Read only	0W	3300W	Operation Value	101	Fault	RF: Disable	Default
18	0x0012	Reflected Power	0x03	0 – 3000	1	W	Read only	0W	3000W	Operation Value	102	Fault	RF: Disable	Default
19	0x0013	Current DA	0x03	0 – 80	0.1	A-	Read only-	0A	8.0A-	Operation Value	200	Warning	n/a	n/a-
20	0x0014	Current FA-1	0x03-	0 - 500	0.1	A	Read only	0A	50.0A	Operation Value-	201	Warning	n/a	n/a
21	0x0015	Current FA-2	0x03	0 - 500	0.1	A	Read only	0A	50.0A	Operation Value-	202	Warning	n/a	n/a
22	0x0016	Current FA-3	0x03	0 - 500	0.1	A	Read only	0A	50.0A	Operation Value	203	Warning	n/a	n/a
23	0x0017	Current FA-4	0x03	0 - 500	0.1	A	Ready only	0A	50.0A	Operation Value	204	Warning	n/a	n/a
24	0x0018	Voltage	0x03	0 - 520	0.1	V	Read only	42.0V	52.0V	Operation Value	211	Warning	n/a	n/a
25	0x0019	Temperature(DA)	0x03	0 - 700	0.1	degC	Read only	n/a	60.0degC	Operation Value	300	Fault	Shut down RF: Disable	Default
26	0x001a	Temperature(FA1)	0x03	0 - 700	0.1	degC-	Read only	n/a	60.0degC	Operation Value	301	Fault	Shut down RF: Disable	Default
27	0x001b	Temperature(FA2)	0x03	0 - 700	0.1	degC	Read only	n/a	60.0degC	Operation Value	302	Fault	Shut down RF: Disable	Default
28	0x001c	Water Flow	0x03	0 - 300	0.1	L/min	Read only	11.4L/min	30.0L/min	Operation Value	500	Fault	Shut down RF: Disable	Default
29	0x001d	Water Leak	0x03	0 or 1	n/a	n/a	Read only	n/a	n/a	0: OK 1: Alarm	501	Fault	Shut down RF: Disable	Default

30	0x001e	Thermostat Status	0x03	0 or 1	n/a	n/a	Read only	n/a	n/a	Bit2:Thermo(FA2)	302	Fault	Shut down RF: Disable	Default
										Bit1:Thermo(FA1)	301			
										Bit0:Thermo(DA)	300			
31	0x001f	Power Supply Status	0x03	0 or 1	n/a	n/a	Read only	n/a	n/a	Over3	400	-Fault	Shut down RF: Disable	Default
										Bit5:Pow Supply6	401-448	Warning	n/a	n/a
										Bit4:Pow Supply5				
										Bit3:Pow Supply4				
										Bit2:Pow Supply3				
										Bit1:Pow Supply2				
										Bit0;Pow Supply1				

Alarm Code	Bit0 Power Supply1	Bit1 Power Supply2	Bit2 Power Supply3	Bit3 Power Supply4	Bit4 Power Supply5	Bit5 Powersupply6
401	✓					
402		✓				
404			✓			
408				✓		
416					✓	
432						✓
403	✓	✓				
405	✓		✓			
409	✓			✓		
417	✓				✓	
433	✓					✓
406		✓	✓			
410		✓		✓		
418		✓			✓	
434		✓				✓
412			✓	✓		
420			✓		✓	
436			✓			✓
424				✓	✓	
440				✓		✓
448					✓	✓

<Error code>

Below is the list of Error Code.

When you read register 10～11, the codes below are displayed if any errors have occurred.

Error Code 0: No error

●:Default (RF Disable, Power Shut Down)

▲RF Disable

○: Error Code Notification Only

Error Code	Error Name	Threshold	Internal Fault	Warning
100	Input Power	>531mV	▲	
101	Forward Power	>3300W	▲	
102	Reflected Power	>3000W	▲	
200	Current DA	>8A		○
201	Current FA-1	>50A		○
202	Current FA-2	>50A		○
203	Current FA-3	>50A		○
204	Current FA-4	>50A		○
211	Voltage	<42V or >52V		○
300	Thermostat(DA)	>+60±5℃	●	
301	Thermostat(FA1)	>+60±5℃	●	
302	Thermostat(FA2)	>+60±5℃	●	
303	Temperature(DA)	>+60℃	●	
304	Temperature(FA1)	>+60℃	●	
305	Temperature(FA)	>+60℃	●	
400	AC/DC Power Supply	>3 (Error)	●	
401-448	AC/DC Power Supply	1(Error) or 2(Error)		○
500	Water Flow	<11.4L/m	●	
501	Water Leak	0 (No Error) or 1 (Error)	●	

Input Drive Power Reference Value

RF Input Level From Signal Generator	Modbus Indication Value (mV) Address 16
-10.0dBm (0.10mW)	22 mV
-9.0dBm (0.13mW)	68 mV
-8.0dBm (0.16mW)	102 mV
-7.0dBm (0.20mW)	132 mV
-6.0dBm (0.25mW)	161 mV
-5.0dBm (0.32mW)	190 mV
-4.0dBm (0.40mW)	221 mV
-3.0dBm (0.50mW)	254 mV
-2.0dBm (0.63mW)	290 mV
-1.0dBm (0.79mW)	330 mV
0dBm (1.00mW)	373 mV
+1.0dBm (1.26mW)	420 mV
+2.0dBm (1.58mW)	474 mV
+3.0dBm (2.00mW)	531 mV
+4.0dBm (2.51mW)	595 mV
+5.0dBm (3.16mW)	666 mV