

Technical manual

SG2-PBUS Slave interface

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1 The SG2-PBUS

SG2-PBUS was developed for automation tasks using the fieldbus Profibus DP system. SG2-PBUS represents a “gateway” and can only be operated in combination with expandable SG2 base units. The control relay SG2 with Profibus DP gateway SG2-PBUS always operates as network slave.

1.1 System overview

The SG2-PBUS slaves are integrated into a Profibus fieldbus DP system.

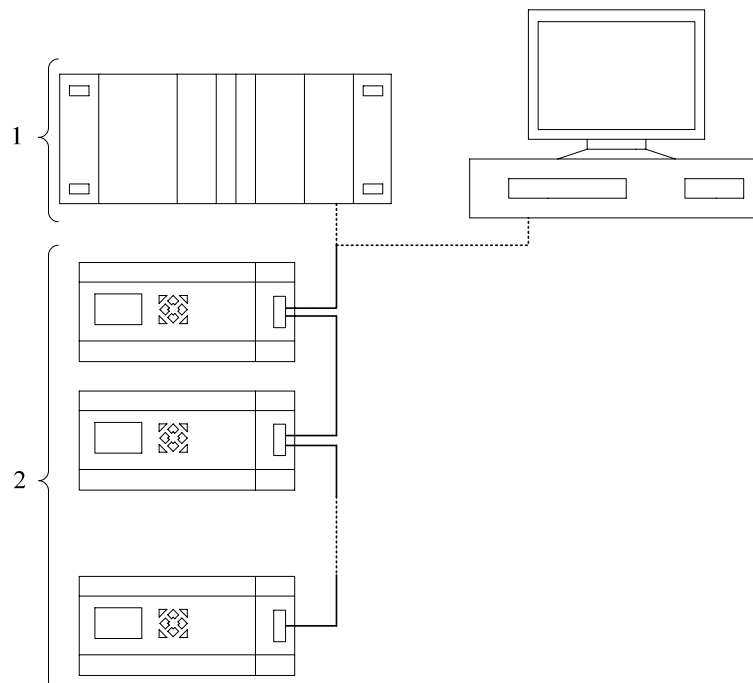


Fig1.1: Implementation of SG2-PBUS in the Profibus DP

- ① Master area, PLC(e.g.: SIMATIC S7-300) or PC
- ② Slave area

1.2 Structure of the unit

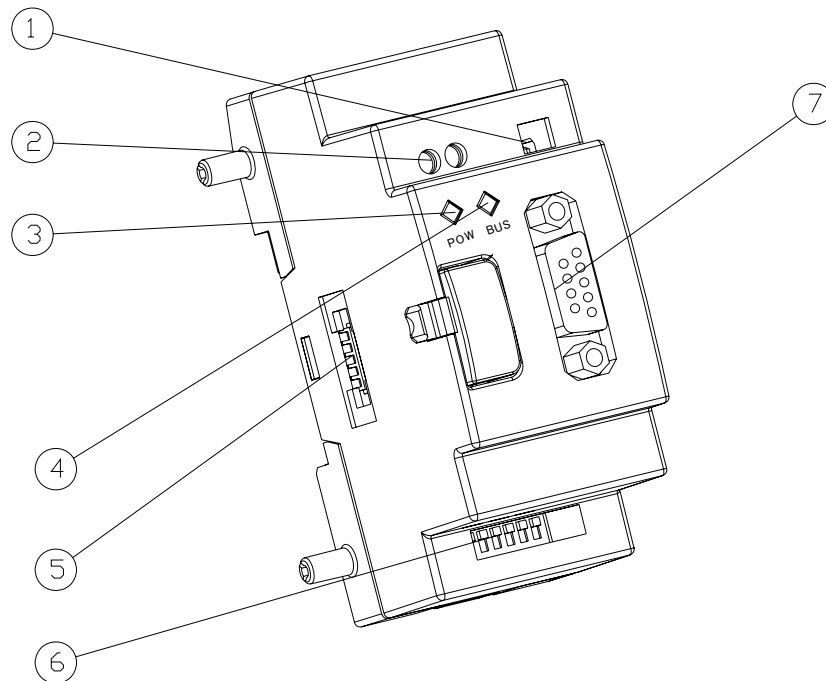


Fig1.2: View of device

- ① SW2: 2bit switch (terminal resistor switch)
- ② 24VDC power supply
- ③ POW led
- ④ BUS led
- ⑤ interface connecting with basic unit
- ⑥ SW1: 8bits switch (address setting switch)
- ⑦ Profibus DP connection, 9-pole socket

1.3 function description

SG2-PBUS enables SG2 basic unit to be connected to Profibus DP communication network. The following data can be transferred if appropriate module in GSD file is selected.

- **Data allowed to read (at the point of view of the DP master)**

All coils: I1-IC, X1-XC, M1-MF, Q1-Q8, Y1-YC, T1-TF, C1-CF, G1-GF, R1-RF
T1-TF's current value and preset value
C1-CF's current value and preset value
G1-GF's current value and preset value
RTC's current value and R1-RF's preset value
PWM's current value and preset value
SG2 base unit's Run/Stop status

- **Data allowed to write (at the point of view of the DP master)**

Coils: M1-MF, Q1-Q8, Y1-YC, T1-TF, C1-CF, G1-GF, R1-RF
T1-TF's preset value
C1-CF's preset value
G1-GF's preset value
RTC's current value and R1-RF's preset value
PWM's preset value
SG2 base unit's Run/Stop status

2 Installation

2.1 Connecting base unit

- 1) First connect the SG2-link to SG2-PBUS, then connect to the base unit. It is the same way as other expansion modules.
- 2) There can be at most 3 IO and 1 4AI expansion modules between SG2-PBUS and SG2 base unit.
- 3) The setting number of IO modules in the setting menu of SG2 base unit must be the same as the actual .

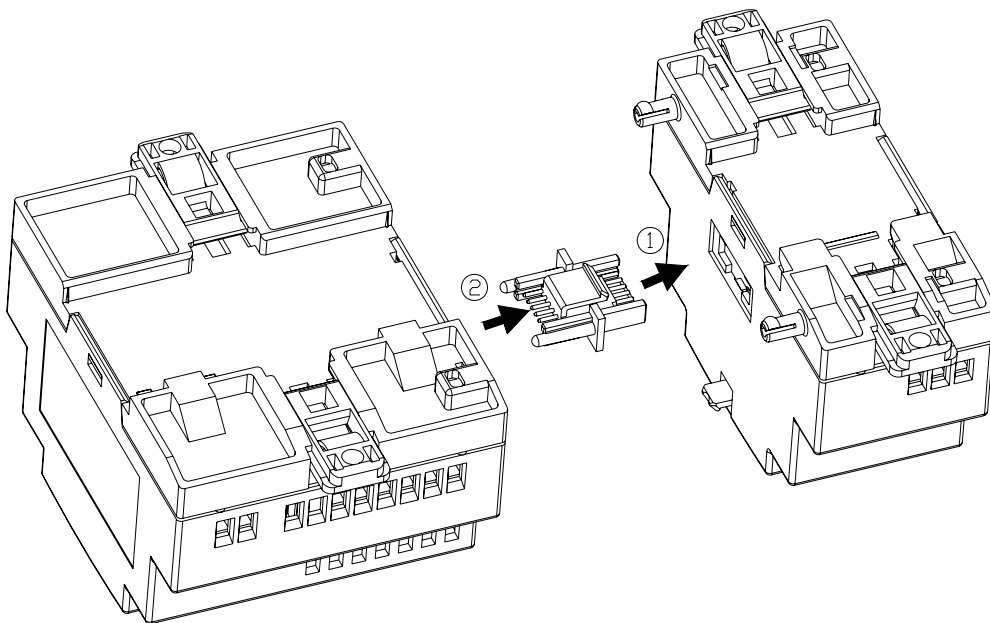


Fig2.1: Connecting SG2-PBUS to base unit

2.2 Connecting power supply

SG2-PBUS operates with a 24VDC supply voltage.

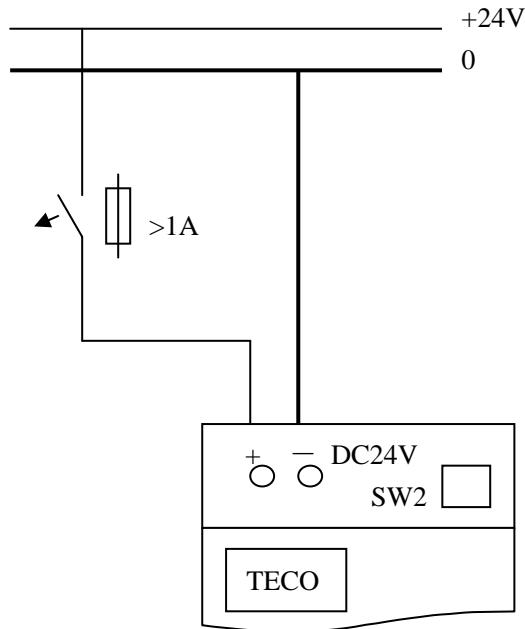


Fig2.2: Power supply

2.3 Connection Profibus DP Bus

Please use a special 9-pole Profibus DP plug and cable to connect the SG2-PBUS interface to the Profibus DP field bus. The type of cable used has an influence on the maximum available length of the bus line and thus on the data transfer rate.

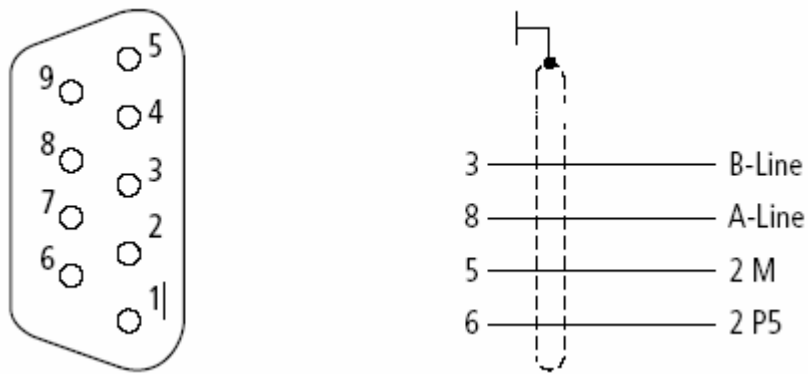


fig2.3: pin assignment

Pin	Signal name	Description
1	Unused	
2	Unused	
3	RxD/TxD-P (B- Line)	Send/receive data (positive)
4	Unused	
5	DGND (2M)	Data reference potential
6	VP (2 P5)	+5V DC
7	Unused	
8	RxD/TxD-N (A-Line)	Send/receive data (negative)
9	Unused	

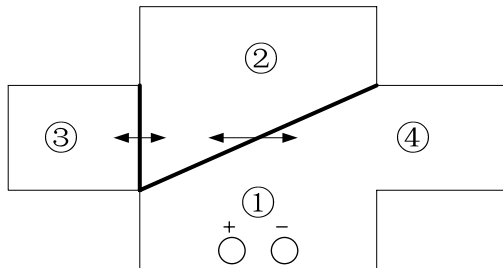
2.4 Terminal resistors

The first and last station in a bus segment must be connected to the bus with the bus terminating resistor switched on. The switch of module (sw2) enables the bus termination resistors to be switched on or off.

SW2-1	SW2-2	Termination resister
OFF	OFF	Off
ON	ON	on

2.5 Electronic isolation

The following electrical isolation is provided for the interfaces of the SG2-PBUS:



- ① 24VDC power supply of module
- ② 5VDC power supply of inner circuit
- ③ photocoupler isolation between SG2 base unit and power supply
- ④ photocoupler isolation between Profibus DP fieldbus and power supply

2.6 Data transfer rate

SG2-PBUS automatically detects the baud rate used in the Profibus DP network after it is power on. However, this requires at least one master station sends valid telegrams in the network.

The following transfer rates are supported: 9.6K bps to 12Mbps.

2.7 Maximum transfer distance

Cable type B should no longer be used with new applications because it is obsolete. Cable type A allows all transfer rates up to 12M bit/s to be used.

Parameter	Cable type A	Cable type B
Impedance	135 Ω — 165 Ω (f=3MHz---20MHz)	100 Ω — 130 Ω (f>100KHz)
Capacitance	<30Pf/m	<60Pf/m
Resistor	<110 Ω /KM	-----
Core cross-section (mm ²)	>0.34mm ² (22A WG)	>0.22mm ² (24 AWG)

Distance between stations when using Type A cable to IEC 61158:

Baud rate (Kbps)	Max. length type A Cable (m)
9.6	1200
19.2	1200
93.75	1200
18.75	1000
500	400
1500	200
3000	100
6000	100
12000	100

3 Operation

3.1 Initial power up

Before you switch on SG2-PBUS, verify that it is properly connected the module to power supply, to the bus connectors and to the base unit. If the unit has factory settings, you need to define the station address manually through integrated SW1.

3.2 Setting station address

Every Profibus DP station requires an unique address in the Profibus DP structure. Using the integrated switch 1 on the SG2-PBUS to set address. SW1-1 is the lowest bit, and SW1-7 is highest bit, SW1-8 is not used. Address range: 000~~0126, the default address is 0.

SW1_7	SW1-6	SW1-5	SW1-4	SW1-3	SW1-2	SW1-1	address
OFF	OFF	OFF	OFF	OFF	OFF	OFF	0
OFF	OFF	OFF	OFF	OFF	OFF	ON	1
OFF	OFF	OFF	OFF	OFF	ON	OFF	2
OFF	OFF	OFF	OFF	OFF	ON	ON	3
OFF	OFF	OFF	OFF	ON	OFF	OFF	4
----	----	----	----	----	----	----	----
ON	ON	ON	ON	ON	OFF	ON	125
ON	ON	ON	ON	ON	ON	OFF	126

3.3 LED Status displays

SG2-PBUS is equipped with two dual-color LEDs(GREEN/RED) indicator for quick diagnostics: POW LED and BUS LED.

3.3.1 POW LED

- 1) LED lit green:
 - Power supply present
 - Communication with the base unit correct
- 2) LED flashing yellow(4Hz):
 - Hardware verification failure
- 3) LED flashing yellow(2Hz):
 - Expansion IO number setting wrong in SG2 base unit
- 4) LED flashing red(2Hz):
 - Connection to SG2 base unit failure
- 5) LED flashing red(1Hz):
 - Communication error with SG2 base unit occur
- 6) LED not lit
 - No Power supply present

3.3.2 BUS LED

- 1) LED lit green:
 - Data exchange on Profibus DP fieldbus
- 2) LED not lit
 - Data exchange aborted

3.4 Influence on cycle scan time

Communication between the basic unit and SG2-PBUS extends the cycle scan time of the basic unit.

In the worst case, this time can be extended by 100ms. This should be taken into account when you calculate the response times of the basic unit .

4 Communication functions

4.1 Slave modules

You can select the following 5 SG2-PBUS slave modules described in the GSD file via network configuration tools. These modules are described in detail in chapters 5, 6.

MODULE		INPUT/OUTPUT (BYTE)	SERVICE	CODE
CONTROL COMMAND	MODULE1:	INPUT/OUTPUT 14 BYTES	<ul style="list-style-type: none"> Status of all coils Run/Stop status of basic unit Value of function block 	0XBD
INPUT/ OUTPUT	MODULE 2:	INPUT 7 bytes	<ul style="list-style-type: none"> coil (I, X, Q, Y) 	0X96
	MODULE 3:	INPUT 2 BYTES	<ul style="list-style-type: none"> coil (M) 	0X91
	MODULE 4:	OUTPUT 2 YTES	<ul style="list-style-type: none"> coil (M) 	0XA1
	MODULE 5:	OUTPUT 3 BYTES	<ul style="list-style-type: none"> coil (Q, Y) 	0XA2

4.2 Diagnostics data

No.	Name	Value and meaning
0	Length	0x04: Length of user data is 4 bytes
1	Diagnostics	0x00: SG2-PBUS is connected with SG2 0x01: SG2-PBUS is not connected with SG2
2	Reserved	0x00
3	Reserved	0x00

4.3 GSD file

The GSD file is required for network configuration in Profibus DP fieldbus. The GSD file contains standard Profibus DP station descriptions and is contained in the Appendix of this manual.

5 Input/output modules

5.1 Input module 2

If this module is selected through network configuration tools, the follow coils of basic unit can be read out by master station. The byte format is as follows.

BYTE	MEANING	VALUE
0	COIL (I_L)	TABLE: COIL_I
1	COIL (I_H)	TABLE: COIL_I
2	COIL (X_L)	TABLE: COIL_X
3	COIL (X_H)	TABLE: COIL_X
4	COIL (Q)	TABLE: COIL_Q
5	COIL (Y_L)	TABLE: COIL_Y
6	COIL (Y_H)	TABLE: COIL_Y

5.2 Input module 3

If this module is selected through network configuration tools, the follow coils of basic unit can be read out by master station. The byte format is as follows.

BYTE	MEANING	VALUE
0	COIL (M_L)	TABLE: COIL_M
1	COIL (M_H)	TABLE: COIL_M

5.3 Output module 4

If this module is selected through network configuration tools, the follow coils of basic unit can be set or cleared by master station. The byte format is as follows.

BYTE	MEANING	VALUE
0	COIL (M_L)	TABLE: COIL_M
1	COIL (M_H)	TABLE: COIL_M

5.4 Output module 5

If this module is selected through network configuration tools, the follow coils of basic unit can be set or cleared by master station. The byte format is as follows.

BYTE	MEANING	VALUE
0	COIL Q	TABLE: COIL_Q
1	COIL (Y_L)	TABLE: COIL_Y
2	COIL (Y_H)	TABLE: COIL_Y

BIT ALLOCATION TABLE:

COIL_I

I1_I8

BIT								MEANING
7	6	5	4	3	2	1	0	
							0/1	I1
						0/1		I2
					0/1			I3
				0/1				I4
			0/1					I5
		0/1						I6
	0/1							I7
0/1								I8

I9_IC

BIT								MEANING
7	6	5	4	3	2	1	0	
							0/1	I9
						0/1		IA
					0/1			IB
				0/1				IC
			0					
		0						
	0							
0								

COIL_X

X1_X8

BIT								MEANING
7	6	5	4	3	2	1	0	
							0/1	X1
						0/1		X2
					0/1			X3
				0/1				X4
			0/1					X5
		0/1						X6
	0/1							X7
0/1								X8

X9_XC

BIT								MEANING
7	6	5	4	3	2	1	0	
							0/1	X9
						0/1		XA
					0/1			XB
				0/1				XC
			0					
		0						
	0							
0								

COIL_Q

Q1_Q8

BIT								MEANING
7	6	5	4	3	2	1	0	
							0/1	Q1
						0/1		Q2
					0/1			Q3
				0/1				Q4

			0/1					Q5
		0/1						Q6
	0/1							Q7
0/1								Q8

COIL_Y

Y1_Y8

BIT								MEANING
7	6	5	4	3	2	1	0	
							0/1	Y1
						0/1		Y2
					0/1			Y3
				0/1				Y4
			0/1					Y5
		0/1						Y6
	0/1							Y7
0/1								Y8

Y9_YF

BIT								MEANING
7	6	5	4	3	2	1	0	
							0/1	Y9
						0/1		YA
					0/1			YB
				0/1				YC
			0					
		0						
	0							
0								

COIL_M

M1_M8

BIT								MEANING
7	6	5	4	3	2	1	0	
							0/1	M1
						0/1		M2
					0/1			M3
				0/1				M4
			0/1					M5
		0/1						M6
	0/1							M7
0/1								M8

M9_MF

BIT								MEANING
-----	--	--	--	--	--	--	--	---------

7	6	5	4	3	2	1	0	
							0/1	M9
						0/1		MA
					0/1			MB
				0/1				MC
			0/1					MD
		0/1						ME
	0/1							MF
0								

6 Control command module

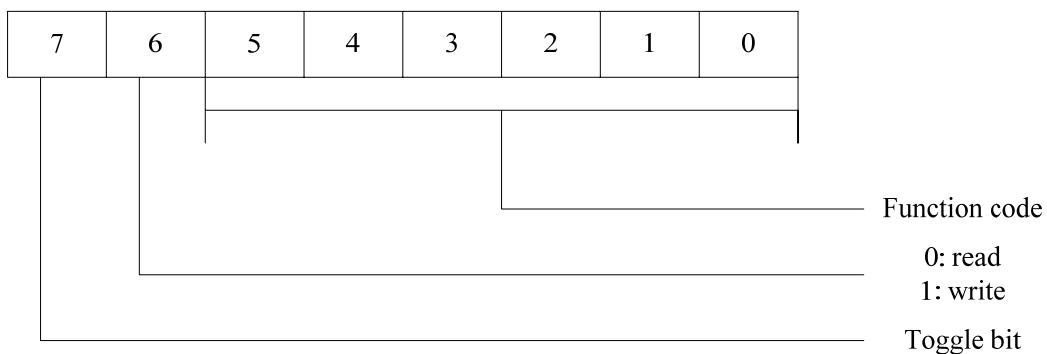
This module allows extended data exchange services on the Profibus DP fieldbus network. If this module is selected through network configuration tools, the follow values of basic unit can be read out or wrote into by master station.

- Run/stop status of basic unit
- Coils
- Function block values

The control command occupies a 14 bytes protocol as follows:

- byte 0: activate the required services
- byte 1: specify the service type
- byte 2: specify the service index
- byte 3: specify the service data length
- byte 4~13: represent specific transferred data

Bit format of byte 0:



Two point to note:

- To send a command, bit 7 seven must be toggled, i.e. set either from 1 to 0 or from 0 to 1.
- Only after the “Control commands” data exchange has been completed, will the I/O data be refreshed.

Function code definition:

Function code	Meaning
0	Read /write status of SG2 (run/stop)
1	Read /write coils
2	Read /write functionblock values
3~31	Reserved

6.1 Read /write run/stop status of SG2

Byte	Meaning		Send data (hex)	
			Master	Slave
0	Command	Read	00H/80H	
		Write	40H/C0H	
	Response	Read successful		82H/02H
		write successful		81H/01H
command rejected			80H/00H	
1	Type		00H	00H
2	Index		00H	00H
3	Length		01H	01H
4	Data	Read	00	Table: SG2 status
		Write	Table: SG2 status	00

Table: SG2 status

bit								value (hex)	Meaning
7	6	5	4	3	2	1	0		
0	0	0	0	0	0	0	0	0	Stop
0	0	0	0	0	0	0	1	1	run

6.2 Read/write coils

Byte	Meaning	Send data (hex)
------	---------	-----------------

		<i>Master</i>	<i>Slave</i>	
0	Command	Read	01H/81H	
		Write	41H/C1H	
	Response	Read successful		82H/02H
		write successful		81H/01H
command rejected			80H/00H	
1	Type		Table: coil status	Table: coil status
2	Index		Table: coil status	Table: coil status
3	Length		Table: coil status	Table: coil status
4	Coil status (Low byte)	Read	00	Table: coil status
		Write	Table: coil status	00
5	Coil status (High byte)	Read	00	Table: coil status
		Write	Table: coil status	00

Table: coil status

Type	Meaning		Index	Length
0	Byte4	R1-R8	1	1
	Byte 5	R9-RF	1	1
1	Byte 4	G1-G8	1	1
	Byte 5	G9-GF	1	1
2	Byte 4	T1-T8	1	1
	Byte 5	T9-TF	1	1
3	Byte 4	C1-C8	1	1
	Byte 5	C9-CF	1	1
4	Byte 4	M1-M8	1	1
	Byte 5	M9-MF	1	1
5	Byte 4	I1-I8	1	1
	Byte 5	I9-IC	1	1
6	Byte 4	X1-X8	1	1
	Byte 5	X9-XC	1	1
7	Byte 4	Q1-Q8	1	1
	Byte 5	00H	1	1
8	Byte 4	Y1-Y8	1	1
	Byte 5	Y9-YC	1	1

6.3 Read/write function blocks

<i>Byte</i>	<i>Meaning</i>	<i>Send data (hex)</i>
-------------	----------------	------------------------

				<i>Master</i>	<i>Slave</i>
0	Command	Read		02H/82H	
		Write		42H/C2H	
	Response	Read successful			82H/02H
		write successful			81H/01H
		command rejected			80H/00H
1	Type			Table: Type definition	Table: Type definition
2	Index			00H	00H
3	Length			01H	01H
4~13	Data	Read		00	
		Write			00

Table: Type definition

Value (Hex)	Meaning
00H	Timer current value
80H	Timer preset value
01H	Counter current value
81H	Counter preset value
02H	RTC current value
82H	RTC preset value
03H	Comparator current value
83H	Comparator preset value
04H	PWM current value
84H	PWM preset value

6.3.1 TIMER

6.3.1.1 TIMER CURRENT VALUE

<i>Byte</i>	<i>Meaning</i>		<i>Send data (hex)</i>	
			<i>Master</i>	<i>Slave</i>
0	Command	Read	02H/82H	
	Response	Read successful		82H/02H
		command rejected		
1	Type		00H	00H

2	Index	Table: Timer C_V	Table: Timer C_V
3	Length	Table: Timer C_V	Table: Timer C_V
4~13	Data	00H	Table: Timer C_V

Table: Timer C_V

Index	Meaning		length
0	Byte4	T1_CV_H	1
	Byte5	T1_CV_L	1
1	Byte4	T2_CV_H	1
	Byte5	T2_CV_L	1
2	Byte4	T3_CV_H	1
	Byte5	T3_CV_L	1
3	Byte4	T4_CV_H	1
	Byte5	T4_CV_L	1
4	Byte4	T5_CV_H	1
	Byte5	T5_CV_L	1
5	Byte4	T6_CV_H	1
	Byte5	T6_CV_L	1
6	Byte4	T7_CV_H	1
	Byte5	T7_CV_L	1
7	Byte4	T8_CV_H	1
	Byte5	T8_CV_L	1
8	Byte4	T9_CV_H	1
	Byte5	T9_CV_L	1
9	Byte4	TA_CV_H	1
	Byte5	TA_CV_L	1
A	Byte4	TB_CV_H	1
	Byte5	TB_CV_L	1
B	Byte4	TC_CV_H	1
	Byte5	TC_CV_L	1
C	Byte4	TD_CV_H	1
	Byte5	TD_CV_L	1
D	Byte4	TE_CV_H	1
	Byte5	TE_CV_L	1
E	Byte4	TF_CV_H	1
	Byte5	TF_CV_L	1

6.3.1.2 TIMER PRESET VALUE

Byte	Meaning	Send data (hex)	
		Master	Slave

0	Command	Read	02H/82H	
		Write	42H/C2H	
	Response	Read successful		82H/02H
		write successful		81H/01H
command rejected			80H/00H	
1	Type		80H	80H
2	Index		Table: Timer P_V	Table: Timer P_V
3	Length		Table: Timer P_V	Table: Timer P_V
4~13	Data		Table: Timer P_V	Table: Timer P_V

Table: Timer P_V

Index	Meaning		Length
0	Byte4	T1_PV_H	1
	Byte5	T1_PV_L	1
1	Byte4	T2_PV_H	1
	Byte5	T2_PV_L	1
2	Byte4	T3_PV_H	1
	Byte5	T3_PV_L	1
3	Byte4	T4_PV_H	1
	Byte5	T4_PV_L	1
4	Byte4	T5_PV_H	1
	Byte5	T5_PV_L	1
5	Byte4	T6_PV_H	1
	Byte5	T6_PV_L	1
6	Byte4	T7_PV_H	1
	Byte5	T7_PV_L	1
7	Byte4	T8_PV_H	1
	Byte5	T8_PV_L	1
8	Byte4	T9_PV_H	1
	Byte5	T9_PV_L	1
9	Byte4	TA_PV_H	1
	Byte5	TA_PV_L	1
A	Byte4	TB_PV_H	1
	Byte5	TB_PV_L	1
B	Byte4	TC_PV_H	1
	Byte5	TC_PV_L	1
C	Byte4	TD_PV_H	1
	Byte5	TD_PV_L	1
D	Byte4	TE_PV_H	1
	Byte5	TE_PV_L	1
E	Byte4	TF_PV_H	1
	Byte5	TF_PV_L	1

6.3.2 COUNTER

6.3.2.1 COUNTER CURRENT VALUE

Byte	Meaning		Send data (hex)	
			Master	Slave
0	Command	Read	02H/82H	
	Response	Read successful		82H/02H
		command rejected		80H/00H
1	Type		01H	01H
2	Index		Table: Counter C_V	Table: Counter C_V
3	Length		Table: Counter C_V	Table: Counter C_V
4~13	Data		Table: Counter C_V	Table: Counter C_V

Table: Counter C_V

Index	Meaning		Length
0	Byte4	00H	1
	Byte5	C1_CV_H	1
	Byte6	C1_CV_M	1
	Byte7	C1_CV_L	1
1	Byte4	00H	1
	Byte5	C2_CV_H	1
	Byte6	C2_CV_M	1
	Byte7	C2_CV_L	1
2	Byte4	00H	1
	Byte5	C3_CV_H	1
	Byte6	C3_CV_M	1
	Byte7	C3_CV_L	1
3	Byte4	00H	1
	Byte5	C4_CV_H	1
	Byte6	C4_CV_M	1
	Byte7	C4_CV_L	1
4	Byte4	00H	1
	Byte5	C5_CV_H	1
	Byte6	C5_CV_M	1
	Byte7	C5_CV_L	1
5	Byte4	00H	1
	Byte5	C6_CV_H	1
	Byte6	C6_CV_M	1
	Byte7	C6_CV_L	1

6	Byte4	00H	1
	Byte5	C7_CV_H	1
	Byte6	C7_CV_M	1
	Byte7	C7_CV_L	1
7	Byte4	00H	1
	Byte5	C8_CV_H	1
	Byte6	C8_CV_M	1
	Byte7	C8_CV_L	1
8	Byte4	00H	1
	Byte5	C9_CV_H	1
	Byte6	C9_CV_M	1
	Byte7	C9_CV_L	1
9	Byte4	00H	1
	Byte5	CA_CV_H	1
	Byte6	CA_CV_M	1
	Byte7	CA_CV_L	1
A	Byte4	00H	1
	Byte5	CB_CV_H	1
	Byte6	CB_CV_M	1
	Byte7	CB_CV_L	1
B	Byte4	00H	1
	Byte5	CC_CV_H	1
	Byte6	CC_CV_M	1
	Byte7	CC_CV_L	1
C	Byte4	00H	1
	Byte5	CD_CV_H	1
	Byte6	CD_CV_M	1
	Byte7	CD_CV_L	1
D	Byte4	00H	1
	Byte5	CE_CV_H	1
	Byte6	CE_CV_M	1
	Byte7	CE_CV_L	1
E	Byte4	00H	1
	Byte5	CF_CV_H	1
	Byte6	CF_CV_M	1
	Byte7	CF_CV_L	1

6.3.2.2 COUNTER PRESET VALUE

<i>Byte</i>	<i>Meaning</i>	<i>Send data (hex)</i>
-------------	----------------	------------------------

			<i>Master</i>	<i>Slave</i>
0	Command	Read	02H/82H	
		Write	42H/C2H	
	Response	Read successful		82H/02H
		write successful		81H/01H
command rejected			80H/00H	
1	Type		81H	81H
2	Index		Table: counter P_V	Table: counter P_V
3	Length		Table: counter P_V	Table: counter P_V
4~13	Data		Table: counter P_V	Table: counter P_V

Table: counter P_V

Mode 1-7

Index	Meaning		Length
0	Byte4	00H	1
	Byte5	C1_PV_H	1
	Byte6	C1_PV_M	1
	Byte7	C1_PV_L	1
	Byte8	00H	
	Byte9	00H	
	Byte10	00H	
	Byte11	00H	
	Byte12	00H	
	Byte13	00H	
...
E	Byte4	00H	1
	Byte5	CF_PV_H	1
	Byte6	CF_PV_M	1
	Byte7	CF_PV_L	1
	Byte8	00H	
	Byte9	00H	
	Byte10	00H	
	Byte11	00H	
	Byte12	00H	
	Byte13	00H	

Mode 8

Index	Meaning		Length
0	Byte4	T_H	1
	Byte5	T_L	

	Byte6	00H	
	Byte7	C1_ON_H	
	Byte8	C1_ON_M	
	Byte9	C1_ON_L	
	Byte10	00H	
	Byte11	C1_OFF_H	
	Byte12	C1_OFF_M	
	Byte13	C1_OFF_L	
...
E	Byte4	T_H	1
	Byte5	T_L	1
	Byte6	00H	1
	Byte7	CF_ON_H	1
	Byte8	CF_ON_M	1
	Byte9	CF_ON_L	1
	Byte10	00H	1
	Byte11	CF_OFF_H	1
	Byte12	CF_OFF_M	1
	Byte13	CF_OFF_L	1

6.3.3 RTC

6.3.3.1 RTC CURRENT VALUE

Byte	Meaning		Send data (hex)	
			Master	Slave
0	Command	Read	02H/82H	
		Write	42H/C2H	
	Response	Read successful		82H/02H
		write successful		81H/01H
command rejected			80H/00H	
1	Type		02H	02H
2	Index		Table: RTC C_V	Table: RTC C_V
3	Length		Table: RTC C_V	Table: RTC C_V
4~13	Data		Table: RTC C_V	Table: RTC C_V

Table: RTC C_V

Index	Meaning		Length
0	Byte4	YEAR	1

	Byte5	MONTH	1
	Byte6	DAY	1
	Byte7	WEEK	1
	Byte8	HOUR	1
	Byte9	MINUTE	1
	Byte10	SECOND	1

6.3.3.2 RTC PRESET VALUE

Byte	Meaning		Send data (hex)	
			Master	Slave
0	Command	Read	02H/82H	
		Write	42H/C2H	
	Response	Read successful		82H/02H
		write successful		81H/01H
command rejected			80H/00H	
1	Type		82H	82H
2	Index		Table: RTC P_V	Table: RTC P_V
3	Length		Table: RTC P_V	Table: RTC P_V
4~13	Data		Table: RTC P_V	Table: RTC P_V

Table: RTC P_V

Mode 1, 2

Index	Meaning		Length
0	Byte4	R1:ON_WEEK	1
	Byte5	R1:OFF_WEEK	1
	Byte6	R1:ON_HOUR	1
	Byte7	R1:OFF_HOUR	1
	Byte8	R1:ON_MINUTE	1
	Byte9	R1:OFF_MINUTE	1
...
E	Byte4	RF:ON_WEEK	1
	Byte5	RF:OFF_WEEK	1
	Byte6	RF1:ON_HOUR	1
	Byte7	RF:OFF_HOUR	1
	Byte8	RF:ON_MINUTE	1
	Byte9	RF:OFF_MINUTE	1

Mode 3

Index	Meaning		Length
0	Byte4	R1:ON_YEAR	1
	Byte5	R1:OFF_YEAR	1
	Byte6	R1:ON_MONTH	1
	Byte7	R1:OFF_MONTH	1
	Byte8	R1:ON_DAY	1
	Byte9	R1:OFF_DAY	1
...
E	Byte4	RF:ON_YEAR	1
	Byte5	RF:OFF_YEAR	1
	Byte6	RF:ON_MONTH	1
	Byte7	RF:OFF_MONTH	1
	Byte8	RF:ON_DAY	1
	Byte9	RF:OFF_DAY	1

6.3.4 COMPARATOR

6.3.4.1 COMPARATOR CURRENT VALUE

Byte	Meaning		Send data (hex)	
			Master	Slave
0	Command	Read	02H/82H	
	Response	Read successful		82H/02H
		command rejected		80H/00H
1	Type		03H	03H
2	Index		Table: comparator C_V	Table: comparator C_V
3	Length		Table: comparator C_V	Table: comparator C_V
4~13	Data		Table: comparator C_V	Table: comparator C_V

Table: comparator C_V

Index	Meaning		Length
0	Byte4	A1_CV_H	1
	Byte5	A1_CV_L	1
	Byte6	A2_CV_H	1
	Byte7	A2_CV_L	1
	Byte8	A3_CV_H	1
	Byte9	A3_CV_L	1

	Byte10	A4_CV_H	1
	Byte11	A4_CV_L	1
1	Byte4	A5_CV_H	1
	Byte5	A5_CV_L	1
	Byte6	A6_CV_H	1
	Byte7	A6_CV_L	1
	Byte8	A7_CV_H	1
	Byte9	A7_CV_L	1
	Byte10	A8_CV_H	1
	Byte11	A8_CV_L	1

6.3.4.2 COMPARATOR PRESET VALUE

Byte	Meaning		Send data (hex)	
			Master	Slave
0	Command	Read	02H/82H	
		Write	42H/C2H	
	Response	Read successful		82H/02H
		write successful		81H/01H
command rejected			80H/00H	
1	Type		83H	83H
2	Index		Table: comparator P_V	Table: comparator P_V
3	Length		Table: comparator P_V	Table: comparator P_V
4~13	Data		Table: comparator P_V	Table: comparator P_V

Table: comparator P_V

Index	Meaning		Length
0	Byte4	G1_PV_H	1
	Byte5	G1_PV_L	1
1	Byte4	G2_PV_H	1
	Byte5	G2_PV_L	1
2	Byte4	G3_PV_H	1
	Byte5	G3_PV_L	1
3	Byte4	G4_PV_H	1
	Byte5	G4_PV_L	1
4	Byte4	G5_PV_H	1
	Byte5	G5_PV_L	1
5	Byte4	G6_PV_H	1
	Byte5	G6_PV_L	1

6	Byte4	G7_PV_H	1
	Byte5	G7_PV_L	1
7	Byte4	G8_PV_H	1
	Byte5	G8_PV_L	1
8	Byte4	G9_PV_H	1
	Byte5	G9_PV_L	1
9	Byte4	GA_PV_H	1
	Byte5	GA_PV_L	1
A	Byte4	GB_PV_H	1
	Byte5	GB_PV_L	1
B	Byte4	GC_PV_H	1
	Byte5	GC_PV_L	1
C	Byte4	GD_PV_H	1
	Byte5	GD_PV_L	1
D	Byte4	GE_PV_H	1
	Byte5	GE_PV_L	1
E	Byte4	GF_PV_H	1
	Byte5	GF_PV_L	1

6.3.5 PWM

6.3.5.1 PWM CURRENT VALUE

Byte	Meaning		Send data (hex)	
			Master	Slave
0	COMMAND	Read	02H/82H	
	Response	Read successful		82H/02H
		command rejected		80H/00H
1	Type		04H	04H
2	Index		Table: PWM C_V	Table: PWM C_V
3	Length		Table: PWM C_V	Table: PWM C_V
4~13	Data		Table: PWM C_V	Table: PWM C_V

Table: PWM C_V

Index	Meaning		Length
0	Byte4	PW1_RUN_NUM	1
	Byte5	PW_H	1
	Byte6	PW_L	1

	Byte7	PT_H	1
	Byte8	PT_L	1

6.3.5.2 PWM PRESET VALUEL

<i>Byte</i>	<i>Meaning</i>		<i>Send data (hex)</i>	
			<i>Master</i>	<i>Slave</i>
0	Command	Read	02H/82H	
		Write	42H/C2H	
	Response	Read successful		82H/02H
		write successful		81H/01H
command rejected			80H/00H	
1	Type		84H	84H
2	Index		Table: PWM P_V	Table: PWM P_V
3	Length		Table: PWM P_V	Table: PWM P_V
4~13	Data		Table: PWM P_V	Table: PWM P_V

Table: PWM P_V

Index	Meaning		Length
0	Byte4	PW1_H	1
	Byte5	PW1_L	1
	Byte6	PT1_H	1
	Byte7	PT1_L	1
1	Byte4	PW2_H	1
	Byte5	PW2_L	1
	Byte6	PT2_H	1
	Byte7	PT2_L	1
2	Byte4	PW3_H	1
	Byte5	PW3_L	1
	Byte6	PT3_H	1
	Byte7	PT3_L	1
3	Byte4	PW4_H	1
	Byte5	PW4_L	1
	Byte6	PT4_H	1
	Byte7	PT4_L	1
4	Byte4	PW5_H	1
	Byte5	PW5_L	1
	Byte6	PT5_H	1

	Byte7	PT5_L	1
5	Byte4	PW6_H	1
	Byte5	PW6_L	1
	Byte6	PT6_H	1
	Byte7	PT6_L	1
6	Byte4	PW7_H	1
	Byte5	PW7_L	1
	Byte6	PT7_H	1
	Byte7	PT7_L	1
7	Byte4	PW8_H	1
	Byte5	PW8_L	1
	Byte6	PT8_H	1
	Byte7	PT8_L	1

note:

1.Read successful: the command master sent is valid, and slave returns the needed value.

2.Write successful the command master sent is valid, and slave accomplish the task.

3.Command rejected: the command master sent is invalid, the command is rejected by slave.

Invalid command:

- 1) Command code error
- 2) Toggle bit inefficacy
- 3) Type code error
- 4) Index out of range
- 5) Length out of range

APPENDIX

1 GSD FILE

```
#Profibus_DP
; Release
GSD_Revision      =1
Hardware_Release  ="HW_V1.0"
Software_Release  ="SW_V1.0"
Revision          ="V1.0"
; Name
Vendor_Name       ="TAIAN-TECH"
Model_Name        ="SG2_PROFIBUS_DP"
;
Ident_Number      =0x7200                ;(the same with sg2)
Protocol_Ident    =0                    ;profibus dp
Station_Type      =0                    ;dp slave
FMS_supp          =0                    ;pure dp device

9.6_supp          =1
19.2_supp         =1
45.45_supp        =1
93.75_supp        =1
187.5_supp        =1
500_supp          =1
1.5M_supp         =1
3M_supp           =1
6M_supp           =1
12M_supp          =1

MaxTsdr_9.6       = 60
MaxTsdr_19.2     = 60
MaxTsdr_93.75    = 60
MaxTsdr_187.5    = 60
MaxTsdr_500      = 100
MaxTsdr_1.5M     = 150
MaxTsdr_3M       = 250
MaxTsdr_6M       = 450
MaxTsdr_12M      = 800
;<Model definition unit>
Implementation_Type ="SPC3"
Slave_Family        =2@TAIAN@SG2        ;2:SWITCH taian:firstfile
```

```

SG2 :secondfile
Bitmap_Device      ="SG2"
Bitmap_Diag       ="SG2"
;Bitmap_SF        ="SF_STAT"

; OrderNumber     ="SG2 _PROFIBUS_DP XXXX"

Freeze_Mode_supp  = 1                ;supported
Sync_Mode_supp    = 1                ;supported
Auto_Baud_supp    = 1                ;Supported
Set_Slave_Add_supp = 0                ;can not change via profibus
Redundancy        = 0                ;not supported
Repeater_Ctrl_Sig = 0                ;NOT CONNECTED
Fail_Safe         = 0
Min_Slave_Intervall =10              ;a poll cycle of 1ms(10*100us)
24V_Pins         = 0                ;NOT CONNECTED

Modular_Station   =1
Max_Module        =5
Modul_Offset      = 1
Max_Input_Len     =23
Max_Output_Len    =19
Max_Data_Len      =42
Max_Diag_Data_Len =10
Max_User_Prm_Data_Len =0

; Diagnostics unit
Unit_Diag_Bit(0)  = "not connected with SG2"
; Module-Definitions:
Module            =" Control commands, 14 bytes"  0XBBD
1
EndModule
Module            =" Inputs, 7 bytes"           0X96
2
EndModule
Module            =" Inputs, 2 byte"            0X91
3
EndModule
Module            =" Outputs, 2 bytes "         0XA1
4
EndModule
Module            ="Outputs, 3 byte"           0XA2
5
EndModule

```

2 DIAGNOSTICS

Event	Explanation	Remedy
POW LED not lit	No power supply	Check power connection
POW LED yellow flashing 4Hz	Hardware failure	Send to factory for repair
POW LED yellow flashing 2Hz	Expansion IO number setting wrong	Check the actual expansion number with the setting
POW LED red flashing 2Hz	Not correctly connected to base unit	Check the connection to the base unit
POW LED red flashing 1Hz	Bus traffic error	Check the connection to the bus

3 TECHNICAL DATA

3.1 LED status

Power led (POW)	Green
PROFIBUS DP led (BUS)	Green

3.2 Normal data

Item		Specification
Power supply voltage		DC24V
Power Dissipation		
Ambient	Operation temperature	0~55°C
	Storage temperature	-40~70°C
	Operation humidity	20~90% RH No Frost
	Environmental gas	No corrosive gas exists
Main setup	Vibration resistance	IEC60068-2-6 standard 0.075mm amplitude/1.0g acceleration
	Impact resistance	IEC60068-2-27 standard 15g peak, 11ms duration
Installation	Degree of protection	IP20
	Fixation way	Direct installation or DIN Rail (35mm) installation

	Direction	Unlimited
Dimension		
Weight		

3.3 Profibus DP functions

Function		PROFIBUS DP slave
Device connection		9 pole socket
Interface		RS485
Bus protocol		PROFIBUS DP
Baud rate		Auto search , up to 12M
Bus Terminating resistor		On communication module1
Station address		Setting address by switch
Services	Input module	• read data :coil (I, X, Q, Y) (M)
	Output module	• write data: coil (Y, Q) (M)
	Control Command module	Read/write • status of coil • status of SG2 • Actual and preset value of function
synchronization		Support
freezed		Support

note:

- 1) Synchronization: Master station sends output data and command selected slave station to lock the data, then selected slave receives the synchronization command from master and sends the data to basic unit.
- 2) Freezed: if master station need the selected slave station data in the same time, master station will send freezed command to all selected station, when selected slave stations receive the command and refresh the output data until they receive the another command.

4 APPLICATION SAMPLE

Task: use I124.0 and I124.1 in master station cpu313c-2dp to

control Q1 and Q2 of SG2.

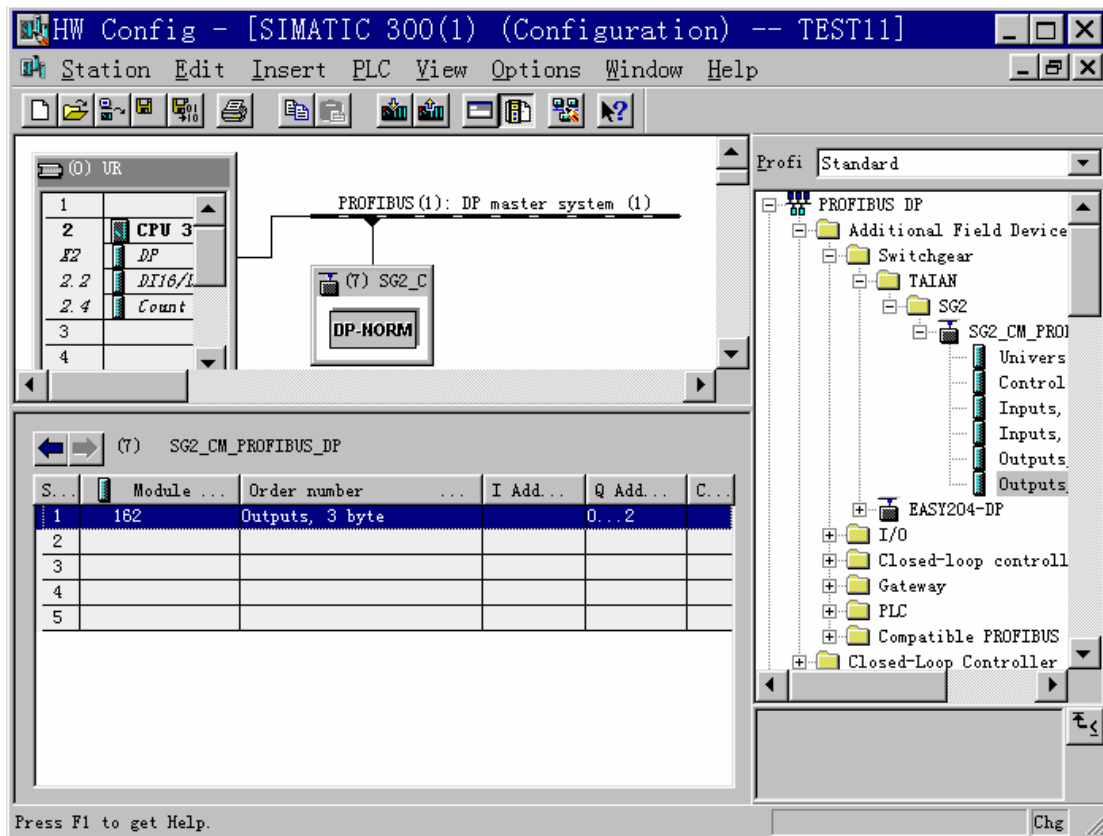
4.1 Setting station address

SW1_7	SW1-6	SW1-5	SW1-4	SW1-3	SW1-2	SW1-1	Address
OFF	OFF	OFF	OFF	ON	ON	ON	7

4.2 Hardware configuration

Open the application program of hardware, and add SG2_DP FILE

Hardware configuration



The actual module setting address must be same as in hardware configuration.

4.3 Master station map area description

No.	Address	Meaning
0	Q0.0-Q0.7	COIL Q
1	Q1.0-Q1.7	COIL Y_L
2	Q2.0-Q2.7	COIL Y_H

4.4 Program

The screenshot shows the SIMATIC Manager interface. At the top, the title bar reads "LAD/STL/FBD - [OB1 -- TEST11\SIMATIC 300(1)\CP...". The menu bar includes "File", "Edit", "Insert", "PLC", "Debug", "View", "Options", "Window", and "Help". Below the menu is a toolbar with various icons for file operations and editing.

A variable declaration table is visible, with the following data:

Address	Declaration	Name	Type	Initial value	Comment
0.0	temp	OB1_EV_CLASS	BYTE		Bits 0-3
1.0	temp	OB1_SCAN_1	BYTE		1 (Cold r

Below the table, the main editor area shows the following content:

```

OB1 : "Main Program Sweep (Cycle)"
Comment:
Network 1: Title:
Comment:
A   I   124.0
=   Q   0.0
A   I   124.1
=   Q   0.1
    
```

At the bottom of the editor, there is a "BOOL" label and a status bar with navigation arrows and the text "1: Error 2: Info".