

DOCUMENT CHANGE SUMMARY				
REV	PAGE	REMARKS	DATE	EDITOR
1.0	New Document	Draft	2010/12/7	JE KANG
1.01	4	Add your experience	2012/1/13	JE KANG
1.02		Changed Crevis TEL	2013/4/4	JE KANG
1.03		Environment Spec. 50°C→55°C (UL Temp)	2013/7/3	JE Kang

Table of Contents

1. Important Notes	4
1.1 Safety Instruction	5
1.1.1 Symbols	5
1.1.2 Safety Notes	5
1.1.3 Certification	5
2. SSI INTERFACE MODULE LIST	6
3. Specification	7
3.1 The Interface	7
3.1.1 ST-5351 (SSI Interface)	7
3.2 Environment Specification.....	8
3.3 Specification	9
4. Dimension.....	10
4.1 ST-5351.....	10
5. Configuration and Operational Function	11
5.1 ST-5351(SSi Interface)	11
5.1.1 Input Image Data - 10byte.....	11
5.1.2 Output Image Data - 2byte	12
5.1.3 Configuration Parameter Data.....	13
6. Trouble Shooting	13

1. Important Notes

Solid state equipment has operational characteristics differing from those of electromechanical equipment.

Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls describes some important differences between solid state equipment and hard-wired electromechanical devices.

Because of this difference, and also because of the wide variety of uses for solid state equipment, all persons responsible for applying this equipment must satisfy themselves that each intended application of this equipment is acceptable.

In no event will CREVIS be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, CREVIS cannot assume responsibility or liability for actual use based on the examples and diagrams.

Warning!



- ✓ **If you don't follow the directions, it could cause a personal injury, damage to the equipment or explosion**
- Do not assemble the products and wire with power applied to the system. Else it may cause an electric arc, which can result into unexpected and potentially dangerous action by field devices. Arching is explosion risk in hazardous locations. Be sure that the area is non-hazardous or remove system power appropriately before assembling or wiring the modules.
- Do not touch any terminal blocks or IO modules when system is running. Else it may cause the unit to an electric shock or malfunction.
- Keep away from the strange metallic materials not related to the unit and wiring works should be controlled by the electric expert engineer. Else it may cause the unit to a fire, electric shock or malfunction.

Caution!


- ✓ **If you disobey the instructions, there may be possibility of personal injury, damage to equipment or explosion. Please follow below Instructions.**
- Check the rated voltage and terminal array before wiring. Avoid the circumstances over 55℃ of temperature. Avoid placing it directly in the sunlight.
- Avoid the place under circumstances over 85% of humidity.
- Do not place Modules near by the inflammable material. Else it may cause a fire.
- Do not permit any vibration approaching it directly.
- Go through module specification carefully, ensure inputs, output connections are made with the specifications. Use standard cables for wiring.
- Use Product under pollution degree 2 environment.

1.1 Safety Instruction

1.1.1 Symbols

<p>DANGER</p> 	<p>Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death property damage, or economic loss.</p>
<p>IMPORTANT</p>	<p>Identifies information that is critical for successful application and understanding of the product</p>
<p>ATTENTION</p> 	<p>Identifies information about practices or circumstances that can lead to personal injury, property damage, or economic loss.</p> <p>Attentions help you to identity a hazard, avoid a hazard, and recognize the consequences</p>

1.1.2 Safety Notes

<p>DANGER</p> 	<p>The modules are equipped with electronic components that may be destroyed by electrostatic discharge. When handling the modules, ensure that the environment (persons, workplace and packing) is well grounded. Avoid touching conductive components, e.g. FnBUS Pin.</p>
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1.1.3 Certification

c-UL-us UL Listed Industrial Control Equipment, certified for U.S. and Canada

See UL File E235505

DNV CERTIFICATE No. A-10666

CE Certificate

EN 61000-6-2; Industrial Immunity

EN 61000-6-4; Industrial Emissions

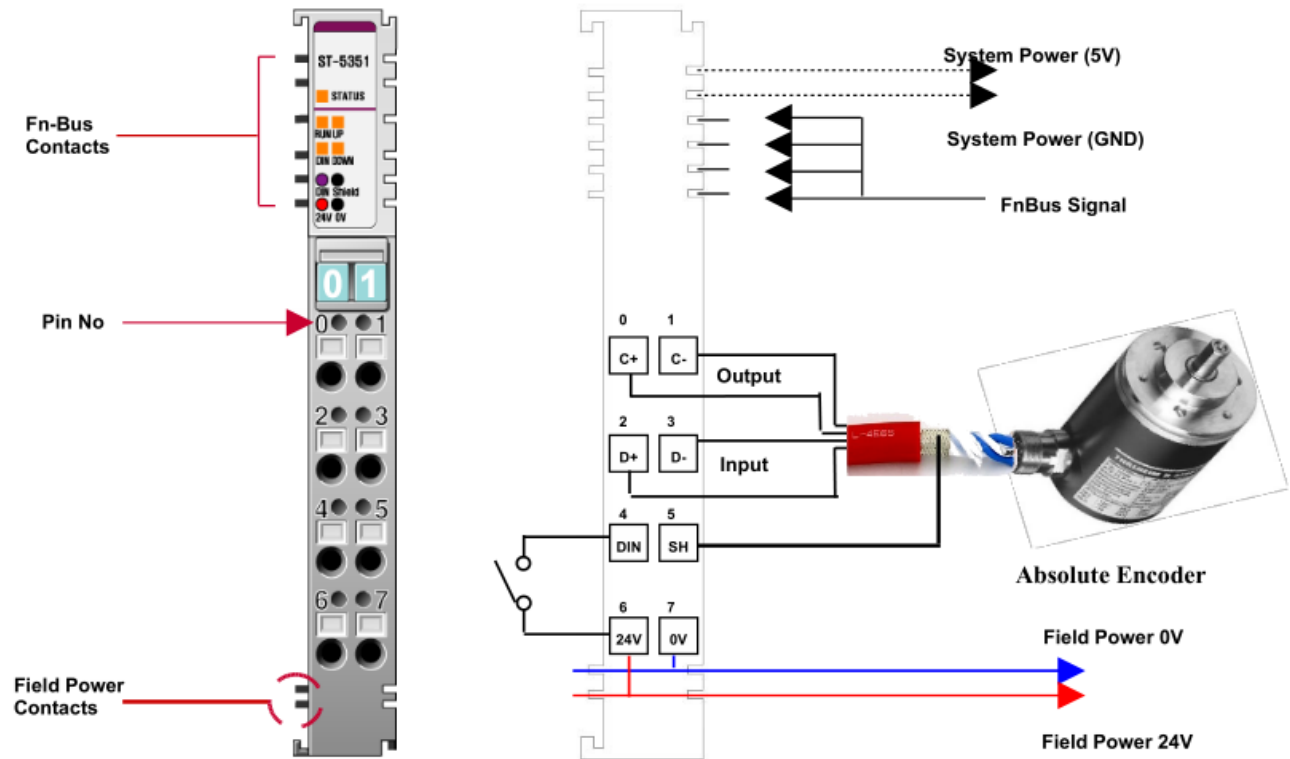
2. SSI INTERFACE MODULE LIST

ST-Number	Description	ID(hex)	Production Status
ST-5351	SSI Interface 1CH	9E	Active

3. Specification

3.1 The Interface

3.1.1 ST-5351 (SSI Interface)



Pin No.	Description	Pin No.	Description
0	C+ (RS422 Differential Output)	1	C- (RS422 Differential Output)
2	D+ (RS422 Differential Input)	3	D- (RS422 Differential Input)
4	DIN(Digital Input, Sink type)	5	Shield
6	Field Power 24V	7	Field Power 0V, Common

3.2 Environment Specification

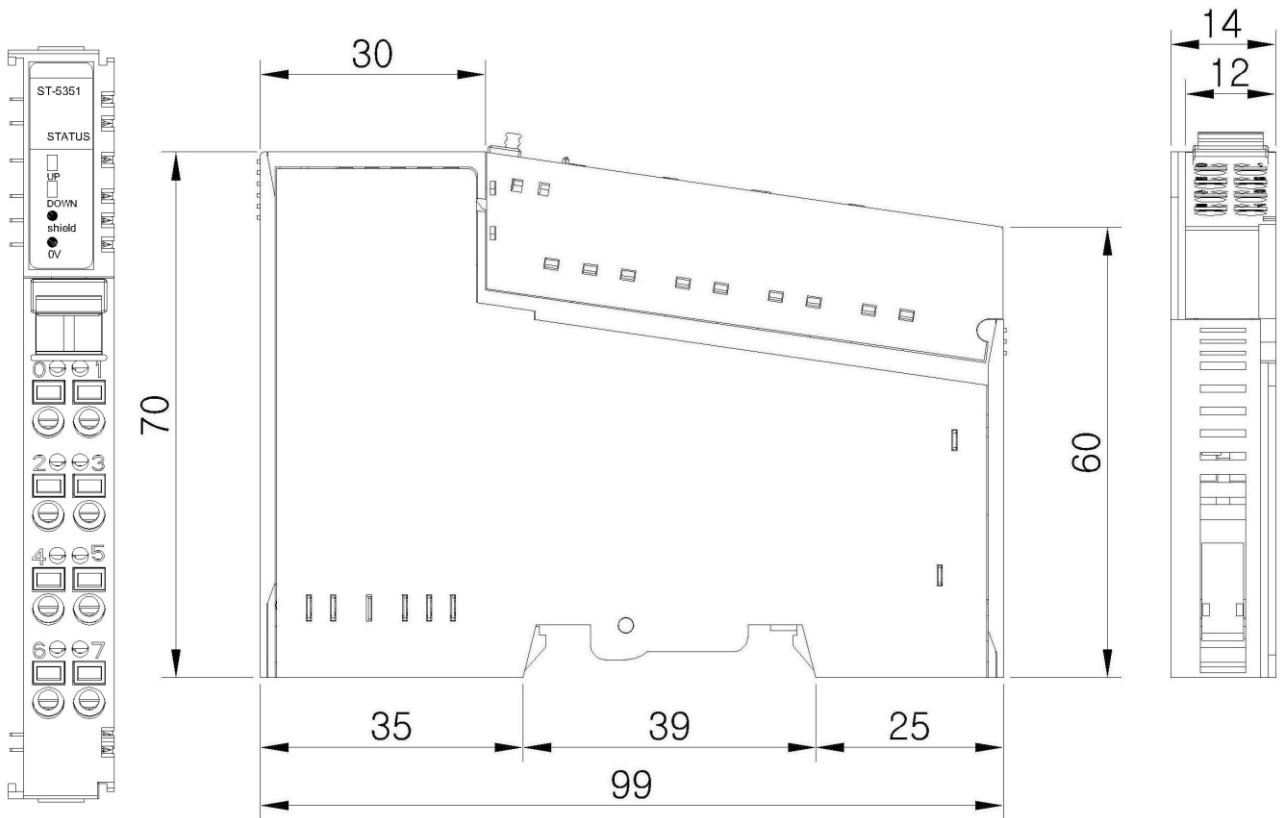
Environmental Specifications	
Operating Temperature	-20 ℃~55 ℃
Storage Temperature	-40 ℃ ~85 ℃
Relative Humidity	5%~90% non-condensing
Operating Altitude	2000m
Mounting	DIN rail
General Specifications	
Shock Operating	10g
Shock Non-Operating	30g
Vibration/Shock resistance	Displacement : 0.012Inch p-p from 10~57Hz Acceleration : 2G's from 57~500Hz Sweep Rate : 1 octave Per Minute Axes to test : x, y, z Frequency Sweeps Per Axis : 10
EMC resistance burst/ESD	EMC Directive
Installation Pos. /Protect. Class	Variable / IP20
Product Certification	UL / cUL, CE

3.3 Specification

Items	
Module Specification	
Number of Channel	1 Ch SSI Interface
Indicators	1 Green/Red FnBus Status 4 LEDs : RUN/WARN, UP DIN, DOWN
SSI Data Rate	62.5K, 100K, 125K, 250K, 500K, 1M, 2Mbps
SSI Data Width	Max. 30bit
SSI Data Delay Time	20usec~10msec
SSI Output	C+, C- RS422 Differential Output
SSI Input	D+, D- RS422 Differential Input
SSI Data Code Type	Gray Code or Natural Binary
Digital Input	24Vdc Input nominal, Sink Type Voltage Range : 11~28.8Vdc
Diagnostic	Field Power, SSI Frame
Common Type	1 Common, 1 Shield
General Specification	
Power Dissipation	Max. 150mA @5.0Vdc
Isolation	I/O to Logic : Photocoupler Isolation I/O to Field Power : Non-Isolation
Field Power	Supply Voltage : 24Vdc nominal Voltage Range : 11~28.8Vdc Power Dissipation: Max. 40mA @24Vdc
Wiring	I/O Cable Max. 2.0mm ² (AWG#14)
Weight	70g
Module Size	12mm × 99mm × 70mm
Environment Condition	Refer to Environment Specification.(Refer to page 7)

4. Dimension (mm)

4.1 ST-5351



5. Configuration and Operational Function

5.1 ST-5351(SSI Interface)

5.1.1 Input Image Data - 10byte

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Current SSI Data LL							
1	Current SSI Data LH							
2	Current SSI Data HL							
3	Current SSI Data HH							
4	Latched SSI Data LL							
5	Latched SSI Data LH							
6	Latched SSI Data HL							
7	Latched SSI Data HH							
8	RUN	WARN	LDF	---	DEC	INC	---	DIN
9	---	---	---	WFP	---	---	WSSIF	WSSID

- SSI Data word is a 32bit-wide data.
- **RUN** : SSI Clock Output Enabled Flag
- **WARN**: Warning. Any warning has occurred, WFP, WSSIF or WSSID.
- **LDF**: Latched Data Flag, if terminal's DIN goes OFF→ON, sets the flag and updates Latched SSI Data.
- **DEC**: SSI Data Decrement. It was set, it lasts until INC.
- **INC**: SSI Data Increment. It was set, it lasts until DEC.
- **DIN**: Digital Input Current Status.
- **WFP**: Warning of Field Power (SSI Power).
- **WSSIF**: Warning of SSI Frame. The last bit of frame data is not trailed with 0.
- **WSSID**: Warning of SSI Data. SSI Data is 0 during gap of frames. Generally when invalid wiring or cross wiring.

5.1.2 Output Image Data - 2byte

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	RUN	GRAY	LDFCLR	SSI Data Length (0~30)				
1	SSI Data Delay Time Selection				SSI Data Rate Selection			

- **RUN**: SSI Clock Output Command. 1:Run, 0:Stop
- **GRAY**: Conversion Binary to Gray code. 1:Gray, 0:Binary
It has effect on Current SSI Data and Latched SSI Data.
- **LDFCLR**: LDF (Latched Data Flag) Clear, it acts on both edge. (0→1, 1→0)
- **SSI Data Length**: Sensor Resolution Bit + Sensor Number of turn Bit.

Example) Sensor Resolution (Step/Revolution) =8192 →13bit, Sensor Number of turn=4092→12bit
SSI Data Length must be 25(13bit + 12bit)

- SSI Data Rate Selection

Value	Description
0 (B'0000)	125Kbps(default)
1 (B'0001)	62.5Kbps
2 (B'0010)	100Kbps
3 (B'0011)	125Kbps
4 (B'0100)	250Kbps
5 (B'0101)	500Kbps
6 (B'0110)	1Mbps
7 (B'0111)	2Mbps

- SSI Data Delay Time Selection

Value	62.5K	100K	125K	250K	500K	1M	2M
0 (B'0000)	300usec (default)						
1 (B'0001)	400usec	300usec	200usec	100usec	70usec	35usec	20usec
2 (B'0010)	400usec	300usec	200usec	100usec	70usec	35usec	
3 (B'0011)	400usec	300usec	200usec	100usec	70usec		
4 (B'0100)	400usec	300usec	200usec	100usec			
5 (B'0101)	400usec	300usec	200usec				
6 (B'0110)	400usec	300usec					
7 (B'0111)	400usec						
8 (B'1000)	500usec						
9 (B'1001)	750usec						
10(B'1010)	1msec						
11(B'1011)	2msec						
12(B'1100)	3msec						
13(B'1101)	4msec						
14(B'1110)	5msec						
15(B'1111)	10msec						

5.1.3 Configuration Parameter Data

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Reserved							
1	Reserved							

6. Trouble Shooting

ATTENTION



In this manual, it couldn't be described all variety case with Network Adapter of several protocols. So if you couldn't find any fault after investigating all below cases, refer to NA user manual.

LED Status	Cause	Action
All LED turns off	- No power	- Check main power Cable
	- System power is not supplied.	- Contact Sales team and send module for repair.
STATUS LED flashes red	<ul style="list-style-type: none"> - Excess of expansion slot - Excess of IO size - Wrong IO composition - Occurrence of EEPROM checksum error 	<ul style="list-style-type: none"> - Use expansion slot up to 32. - Compose that IO total size is not excess. - Check composition I/O Module