2558 QUICK START GUIDE

Summary: The 2558 is designed to translate an analog input signal into an equivalent digital word to the programmable logic controller (PLC). Configuration of the module, taken from the full-length 2558 Installation and Operation Guide's Chapter 2, is as follows.

2.3. Configuring the Module

The Model 2558 must be configured for voltage or current inputs, voltage range, unipolar/bipolar mode, digital filtering/no filtering mode, return commonality, and 13 or 16 bit compatibility before wiring the input connectors and inserting the module into the I/O base. As shipped, all input channels are configured for current inputs, 5V range (see note below), unipolar mode, digital filtering enabled, offset scaling disabled, a common return, and 13 bit compatibility (see Figure 2.1).

NOTE:
The 5V input signal range configuration is used for both 0 to 5VDC and 1 to 5VDC or
0 to 20mA and 4 to 20mA input signal ranges.

Changing the module input channel configuration involves the following steps (notations in parenthesis are actual printed board titles) described in the following sections:

1. Selecting voltage (VOLTAGE) or current (20MA) input mode for each channel
2. Selecting 0 to 5V (5V) or 0 to 10V (10V) voltage range for each channel
3. Selecting unipolar (UNI) or bipolar (BI) input mode for each channel
4. Selecting digital filtering (EN) or no filtering (DIS) for the module
5. Selecting offset scaling (EN) or no offset (DIS) for the module
6. Selecting the 13 bit (13BIT) or 16 bit (16BIT) compatibility for the module
7. Configuring DIP switches to report the hardware selections to the microcomputer
8. Selecting channel return path as common (COM) or isolated (ISO)
9. Logging the configuration jumper settings for future reference

2.3.1. Selecting Voltage or Current Input Mode

Locate the 8 Voltage/Current Jumpers corresponding to input channels 1 through 8. See Figure 2.2 for the location of these jumpers. For each input channel, select current mode by placing the jumper in the "20MA" position or voltage mode by placing the jumper in the "VOLTAGE" position. For each input channel set to current mode, you must set the corresponding Voltage Range Jumper to the 5V position as described in the following section. As shipped, the jumpers are in current mode.

2.3.2. Selecting Voltage Range

Locate the Voltage Range Jumpers corresponding to input channels 1 through 8 (see Figure 2.2). For each input channel operating in current mode, set the corresponding Voltage Range Jumper to 5V.

CAUTION:
For each input channel configured for current mode, the corresponding Voltage Range Jumper must be set to 5V.

For each input channel operating in voltage mode, set the corresponding Voltage Range Jumper to "5V" for 0 to +5V or –5 to +5V input range or "10V" for 0 to +10V or –10 to +10V input range. As shipped, the 2558 is in "5V" range.

Channel Number	Voltage Current Jumper (Default: 20mA)	Voltage Range Jumper (Default: 5V)	Unipolar/Bipolar Jumper (Default: UNI)	Return Path Compatibility Jumper (Default: COM)
1	JP1	JP3	JP2	JP24
2	JP4	JP27	JP5	JP28
3	JP10	JP6	JP8	JP29
4	JP13	JP9	JP11	JP30
5	JP16	JP12	JP14	JP31
6	JP7	JP15	JP17	JP32
7	JP19	JP18	JP20	JP33
8	JP22	JP21	JP23	JP34

All Channels	Offset Scaling Jumper	Jumper Position	Digital Filtering Jumper	Jumper Position	Compatibility Mode Jumper	Jumper Position
1-8	JP40	DISABLED	JP25	ENABLE	JP26	13 BIT

Figure 2.1 Shipping Jumper Configuration Locations

2.3.3. Selecting Unipolar or Bipolar Input Mode

Locate the Unipolar/Bipolar Jumpers for each channel (see Figure 2.2). Set each jumper to "UNI" for unipolar operation or "BI" for bipolar operation for each input channel. As shipped, "UNI" operation is selected.
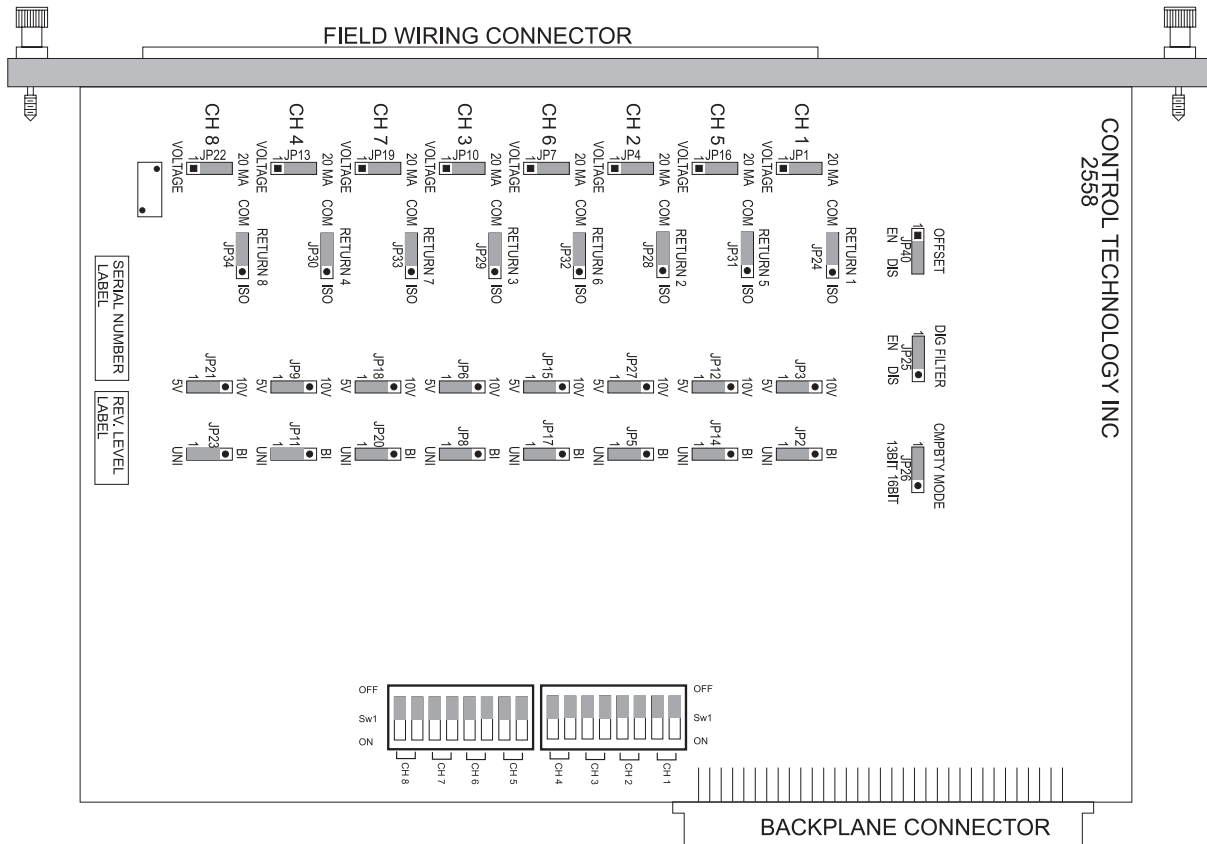

Figure 2.2 Jumper Board Configuration Locations
(jumper settings shown as shipped)

2.3.4. Selecting Digital Filtering

Locate the Digital Filtering Jumper "DIG FILTER" JP25 (see Figure 2.2). To enable digital filtering, set the jumper in the "EN" position; to disable, set to the "DIS" position. Since many analog input signals contain noise, CTI recommends using digital filtering unless maximum response time is required. As shipped, digital filtering is enabled for all 8 analog inputs.

2.3.5. Selecting Offset Scaling

Locate the Offset Scaling "OFFSET" jumper JP40 (see Figure 2.2). To enable offset scaling for all 8 inputs set the jumper to the "EN" position; to disable, set to the "DIS" position. As shipped, the Offset Scaling is disabled.

2.3.6. Selecting Compatibility Mode

Locate the Compatibility Mode "CMPBTY MODE" jumper JP26 (see Figure 2.2). To enable 16 bit compatibility mode for all 8 inputs set the jumper to the "16BIT" position. As shipped, the 13 bit compatibility mode is enabled.

2.3.7. Configuring Switches to Report Hardware Configuration

Once the hardware jumpers are selected this information needs to be reported to the microcomputer. The information is reported via DIP switches SW1 and SW2 (see Figure 2.2). Each output channel uses 2 switches with a BCD code to indicate the state of the hardware jumpers.

2 (MSB)	1 (LSB)	Range
OFF	OFF	Unipolar 5VDC
OFF	ON	Unipolar 10VDC
ON	OFF	Bipolar 5VDC
ON	ON	Bipolar 10VDC
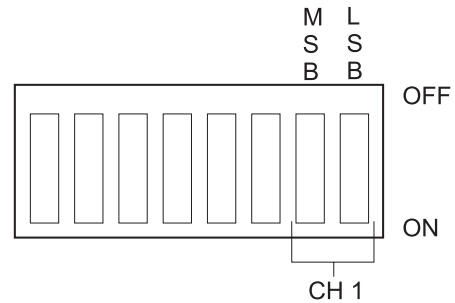
> *NOTE:*
> *The OFF position is selected by actuating the switch in the direction of the center of the printed circuit board.*

> *NOTE:*
> *Standard shipping configuration is all switches in the OFF position Unipolar 5VDC range.*

2.3.8. Selecting Channel Return Path as Common or Isolated

Locate the return jumpers 1-8 (see Figure 2.2). To enable a common channel 1-8 return path, select the "COM" (common) position. To isolate individual channels, choose the "ISO" (isolated) position. As shipped, all 8 channels are in "COM" (common) mode.

2.3.9. Jumper Settings for Future Reference

See Appendix B. Jumper Settings Log Sheet to record any changes to the module's jumper settings.

2.4. Inserting the Module into the I/O Base

Insert the module into the I/O base by carefully pushing the module into the slot. When the module is fully seated in the slot and backplane connector, tighten the captive screws at the top and bottom to hold the module in place. To remove the module from the I/O base, loosen the captive screws then remove the module from the I/O base. Be careful not to damage the edge card at the back of the module when inserting or removing the module.

2.5. Wiring the Input Connectors

Input signals are accepted through a connector assembly located on the front of the module. The connector assembly consists of a standard Siemens® front panel edge connector that mates with the printed circuit board. Wiring is connected to the front connector via recessed screw terminals. The screw terminals can accept wire sizes up to single stranded 14-gauge wire. The actual size used depends on the external device providing the input signal. Consult the device manufacturer's recommendations for selecting the input wire size.

To assign an input to a specific channel, locate the appropriate channel position on the screw terminal connector as shown in the following figure:
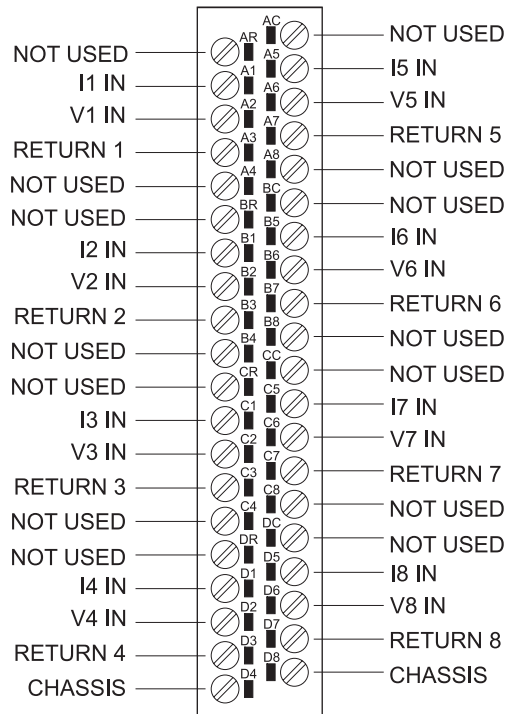

Figure 2.3 Screw Terminal Connector Wiring

2.5.1. Connecting Voltage Input Wiring

For voltage input circuits, connect the signal wire to the V# In screw terminal, and the return wire to the Return# screw terminal. Insert the wires in the appropriate holes on the front of the connector.

When the wires are inserted, tighten the screws. Repeat this procedure for the remaining voltage input channels.

2.5.2. Connecting Current Input Wiring

For current input circuits, connect the signal wire to the I# screw terminal, and the return wire to the Return# screw terminal. Insert the wires in the appropriate holes on the front of the connector. When the wires are inserted, tighten the screws. Repeat this procedure for the remaining current input channels.

2.5.3. Connecting the Shield Wiring

Control Technology Inc. recommends that all wires be shielded twisted pair with a foil wrap shield and a separate drain wire and that they be installed in a metallic conduit. Use Belden cable 8761 or equivalent which contains a foil wrap shield and a separate drain wire. The shield and the foil wrap should be twisted together and should be terminated at only one end. The other end should be left in an open circuit condition. CTI recommends that the shield be terminated at the PLC end of the signal wire. Special components are installed on the module to aid in the rejection of noise.

When entering the industrial cabinet the shield should be routed from the main terminal strip all the way to the PLC. Signal leads that do not maintain a shield from the terminal strip to the PLC act as antennas and are susceptible to radiated and conducted emissions in the cabinet. Unprotected cables may introduce measurement errors in the module.

The front connector on the module contains a CHASSIS terminal which may be used for the shield wire if the installation is in a noise free environment. If the installation is in an extremely noisy environment CTI strongly recommends that the shielded wires terminated to the PLC chassis ground.

CTI has exhaustively tested this product to maximize its ability to reject noise from inductive sources as well as showering arcs, fast transients and other high frequency generators and has determined that the best performance results from connecting all shield wires together at the PLC module and terminating this single wire to the chassis ground with a large current capacity conductor. CTI recommends using a #8 gauge wire are larger from the PLC chassis to the earth ground connection.
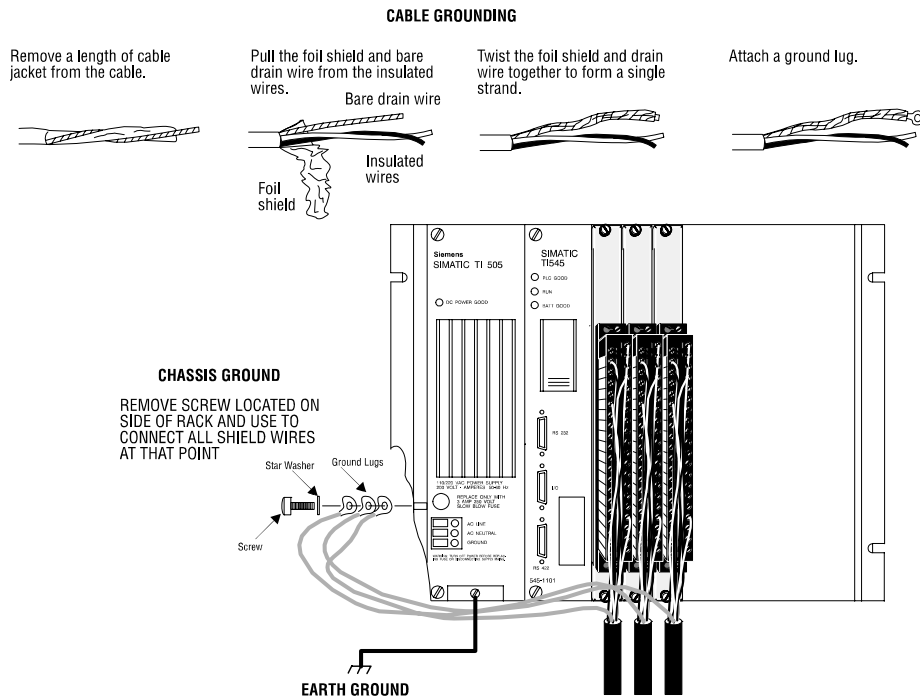
Figure 2.4 Shield Wire Termination

2.6. Installing the Screw Terminal Connector

When all the input signal wires are connected to the screw terminal connector, carefully install the connector on the front of the module.
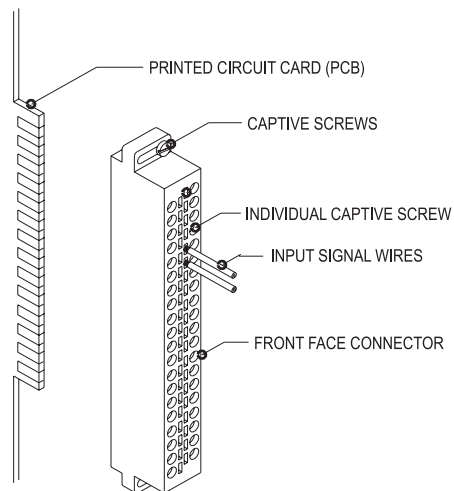

Figure 2.5 Input Connector Assembly

2.7. Checking Module Operation

First turn on the base power. If the module diagnostics detect no problems, the status indicator on the front of the module will light. If the status indicator does not light, begins blinking (or goes out during operation), the module has detected a failure. For information on viewing failed module status, refer to your TISOFT user manual. To diagnose and correct a module failure, refer to the next section on troubleshooting.

You must also check that the module is configured in the memory of the PLC. This is important because the module will appear to be functioning regardless of whether it is communicating with the PLC. To view the PLC memory configuration chart listing all slots on the base and the inputs or outputs associated with each slot, refer to your TISOFT Programming Manual. An example chart is shown in the following figure.

```
I/O MODULE DEFINITION FOR CHANNEL ... 1   BASE ..... 00

                 I/O   NUMBER OF BIT AND WORD I/O   SPECIAL
        SLOT  ADDRESS        X    Y    WX  WY      FUNCTION
         01 .... 0001 ........ 00 .. 00 .. 08 .. 00 ....... NO
         02 .... 0000 ........ 00 .. 00 .. 00 .. 00 ....... NO
                                    .
                                    .
                                    .
         15 .... 0000 ........ 00 .. 00 .. 00 .. 00 ....... NO
         16 .... 0000 ........ 00 .. 00 .. 00 .. 00 ....... NO
```

Figure 2.6 Example I/O Configuration Chart

In this example, the Model 2558 module is inserted in slot 1 in I/O base 0. Data for channel 1 appears in word location WX1, data for channel 2 appears in word location WX2, etc. For your particular module, look in the chart for the number corresponding to the slot occupied by the module. If word memory locations appear on this line, then the module is registered in the PLC memory and the module is ready for operation.

If the line is blank or erroneous, re-check the module to ensure that it is firmly seated in the slots. Generate the PLC memory configuration chart again. If the line is still incorrect, contact your local distributor or CTI at 1-800-537-8398 for further assistance.

CHAPTER 3. TROUBLESHOOTING

If the module provides improper readings or the status indicator is not on, use the following chart to determine the appropriate corrective action.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Indicator is not lit	Base power is off Defective module	Turn base on Return the module to CTI for repair
Indicator is blinking	Calibration data no longer stored in memory	Return the module to CTI for calibration
Incorrect inputs	Blown fuse Wrong addresses for word input	Return the module to CTI for repair Check program for correct word input addresses
	Not logged-in Incorrect jumper settings	Read I/O configuration Refer to Section 2.3 of this Installation & Operation Guide for jumper settings
	Incorrectly calibrated	Return the module to CTI for recalibration
	Noisy signal	Check for proper shield termination at input connectors
	Offset scale enabled	If JP40 is enabled all inputs are scaled for 4-20mA offset operation

Figure 3.1 Troubleshooting Matrix

> *CAUTION:*
> ***The module fuse F2 is not user serviceable. If this fuse is blown, the module has a serious component failure and should be returned to CTI for repair.***

When it is inconvenient to visually check the status indicator, use the TISOFT "Display Failed I/O" or "Show PLC Diagnostics" support functions.

If after consulting the chart above, you are unable to diagnose or solve the problem, contact your local distributor or CTI at 1-800-537-8398 for further assistance.

SPECIFICATIONS

Input Channels:	8 analog input channels
Signal Range:	Unipolar: 0 to 5VDC, 0 to 10VDC, or 0 to 20mA Bipolar: -5 to +5VDC, -10 to +10VDC, or -20 to +20mA
Update Time:	8WX mode: 5 mSec all channels
Digital Filtering Time Constant:	0.3 Sec
DC Input Resistance:	Voltage Mode: 780kΩ Current Mode: 250Ω
DC Accuracy:	Voltage Mode: 0.125% of full scale from 0° to 60°C Current Mode: 0.225% of full scale from 0° to 60°C

Resolution (8WX Mode):	Unipolar: 15 bits plus sign: 0-5VDC range=156μV/step
	   0-10VDC range=312μV/step
	   0-20mA range=0.625μA/step
	
	Bipolar: 15 bits plus sign: -5 to +5VDC=156μV/step
	   -10 to +10VDC range=312μV/step
	   -20 to +20mA range=0.625μA/step

Common Mode Rejection:	>120db @ 60Hz (digital filtering disabled)
Normal Mode Rejection:	>40db @ 500 Hz (digital filtering enabled)
Connector:	Removable
Wire Gauge:	14-22 AWG
Input Protection:	Input ESD Protection: 20,000V, IEC 1000-4-2, level 4 Overrange Protection: +/- 300VDC
Isolation:	1500VDC channel-to-PLC
Module Size:	Single wide
Backplane Power Consumption:	3.0 Watts (maximum)
Operating Temperature:	0° to 60°C (32° to 140°F)
Storage Temperature:	-40° to 85°C (-40° to 185°F)
Humidity:	5% to 95% (non-condensing)
Agency Approvals Pending:	UL, ULC, FM (Class 1, Div 2) CE
Shipping Weight:	1.5 lb. (0.68 Kg)

Specifications subject to change without notice.

APPENDIX A. COMPATIBILITY WITH SIEMENS® 505-6108A/B

Overview

The CTI 2558 Analog Input Module was designed to be a drop-in replacement for the Siemens® models 505-6108-A and 505-6108-B. From set up of the module to wiring and PLC reporting, the user will find many similarities between the CTI and Siemens® models.

Using the CTI 2558 in a 505-6108-A and/or 505-6108-B application

The CTI 2558 should fulfill all the following requirements for the 505-6108-A and 505-6108-B replacement(s), as outlined below:

Module setup

Since the CTI 2558 allows for both Unipolar and Bipolar setup, the module does have a slightly different module setup. See Chapter 2.3 Configuring the Module for Operation to determine the details in module setup.

Wiring

The wiring of the input connector is the same between the module. See Chapter 2.5 Wiring the Output Connector for a detailed explanation of how this is accomplished.

PLC Reporting

The word format is the same between the modules. See Chapter 1 for a more detailed explanation on PLC reporting.

APPENDIX B. JUMPER SETTINGS LOG SHEET

Channel Number	Voltage Current Jumper (20mA or V)	Voltage Range Jumper (5V or 10V)	Unipolar/Bipolar Jumper (UNI or BI)	Return Path Compatibility Jumper (COM or ISO)
1	JP1:	JP3:	JP2:	JP24:
2	JP4:	JP27:	JP5:	JP28:
3	JP10:	JP6:	JP8:	JP29:
4	JP13:	JP9:	JP11:	JP30:
5	JP16:	JP12:	JP14:	JP31:
6	JP7:	JP15:	JP17:	JP32:
7	JP19:	JP18:	JP20:	JP33:
8	JP22:	JP21:	JP23:	JP34:

All Channels	Offset Scaling Jumper	Jumper Position	Digital Filtering Jumper	Jumper Position	Compatibility Mode Jumper	Jumper Position
1-8	JP40		JP25		JP26	

Record the configuration jumper settings on this log for future reference. Make additional copies if necessary.