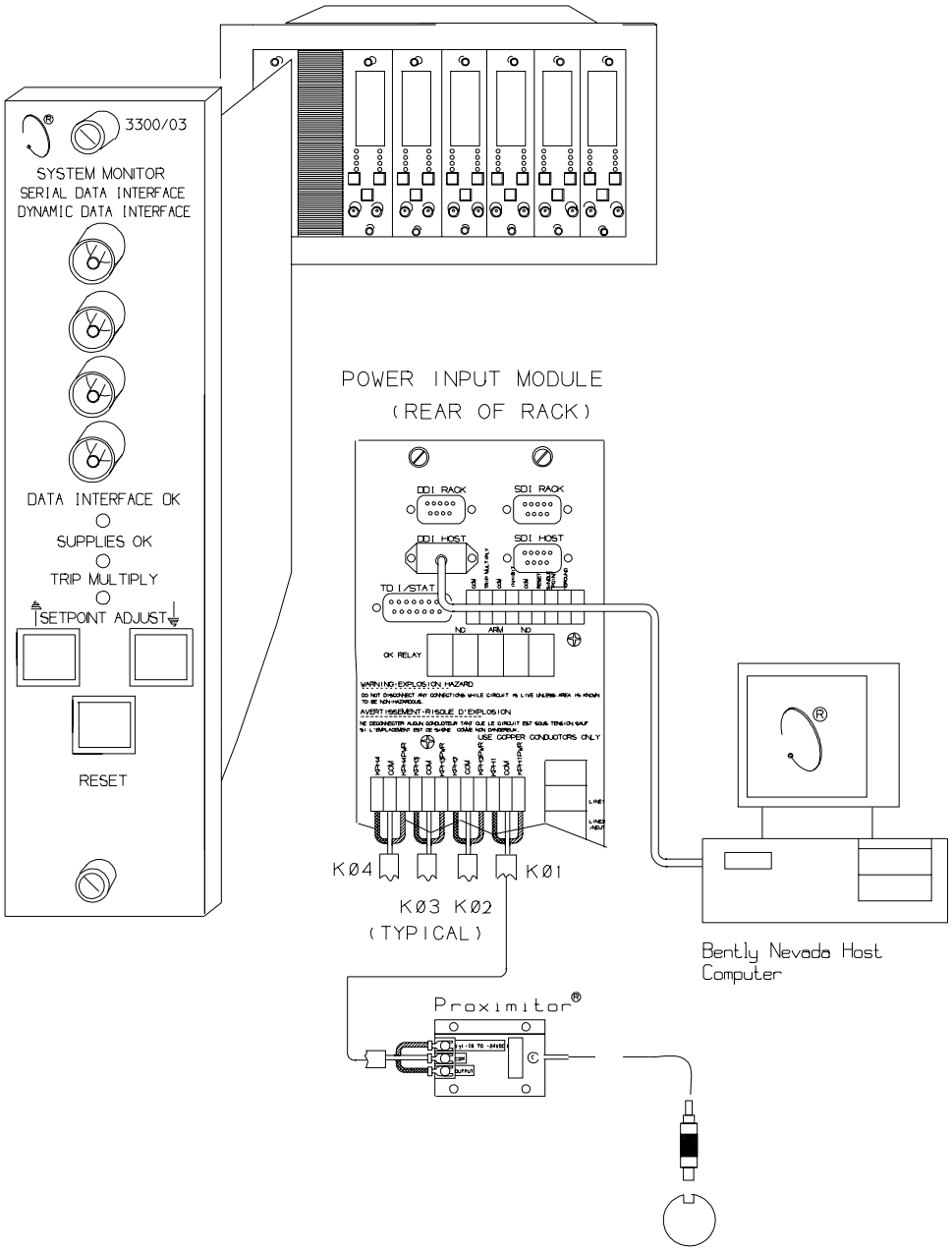
1. Serial Data Interface & Dynamic Data Interface



1.1 Data Interface Overview

The Serial Data Interface (SDI) and Dynamic Data Interface (DDI) are two distinct microprocessor interfaces between a host system and a 3300 rack. The Serial Data Interface collects static data and status values from the monitors within the rack. By using proper third party software, the values obtained from the rack can be viewed and stored. The Serial Data Interface connects the rack to an Allen-Bradley computer or Honeywell monitor system. The Dynamic Data Interface allows a host computer using TDM 2 software to obtain static data, status values, and steady state dynamic data from the buffered transducer outputs of the monitors within the rack.

The SDI and DDI are options available with the 3300/03 System Monitor. The SDI and DDI are located within the System Monitor slot of the 3300 rack. The DDI option also includes the SDI option, but the SDI is available as a separate option. The system can function simultaneously as a SDI and DDI.

1.1.1 Manual Overview

STRUCTURE

This manual covers installation and configuration of both the SDI and DDI. If your system has only the SDI, ignore the sections and references to DDI. If your system has only the DDI, follow the SDI installation section, but do not configure the SDI options.

NUMBERING CONVENTIONS

The base of all numbers in this manual is 10 unless otherwise noted. The text "Hex" follows numbers presented in hexadecimal format. "Bin" designates binary numbers.

NOTE: All pictorial diagrams showing data as it would appear on a Protocol/Line Analyzer are in Hexadecimal. See Query and Response messages on page 62 as an example.

1.2 Serial Data Interface Functions

The Serial Data Interface (SDI) is a communications processor that gathers and stores values for static data values and monitor status from each monitor within its rack. The SDI sends the stored values after receiving a request for the value from a host computer system. It can function concurrently with Dynamic Data Interface (DDI).

1.2.1 Modes Of Operation

The SDI communicates with each of the monitors within the rack using a serial communications link. If the DDI is not installed, the SDI will automatically configure itself on reset or power-up. It will then step through the monitors collecting data and status from each monitor. If DDI is installed, the SDI obtains the same values through the DDI and does not directly access the monitors.

1.2.2 Protocols

The SDI supports the Allen-Bradley DF1 and Modicon Modbus protocols. The interface can transmit over RS-232 or RS-422 physical link connections at baud rates up to 19.2k. Racks can be daisy chained together when using Modicon Modbus. The rack to rack communication across the daisy chain is always RS-422. Set the SDI jumpers to RS-422 for all but the first rack in the daisy chain. Allen-Bradley DF1 does not permit daisy chaining of racks.

Note: The maximum number of racks which can be daisy chained is dependent on the Baud Rate Used.

Baud Rate	Maximum number of racks which can daisy chained using Modicon Modbus
19200	24
9600	48
4800	96
2400	192
1200	255

1.2.3 Data

The SDI collects a variety of information from each of the monitors in the rack. The SDI can send up to 16 static values for each monitor slot including fast trending on proportional data, GAP, channel status, and alarm status. When using Modicon Modbus, the SDI can also send the host computer the monitor setpoint values. The SDI can obtain only static data; to collect dynamic data from the rack requires the Dynamic Data Interface and TDM 2 software.

1.2.4 Options

The communication channel of the SDI is flexible. By using jumpers, you can set baud rate, device address, error checking, parity, stop bits, modem control, and protocol.

1.3 Dynamic Data Interface Functions

The Dynamic Data Interface (DDI) is a data collector and a communications processor that performs dynamic sampling on the buffered transducer outputs of each of the monitors. The DDI also collects values for static data and monitor status directly from the monitors in the rack. The DDI can store data and send it to a Bently Nevada TDM 2 host computer system for storage, trending, and vibration diagnostics.

1.3.1 Communications

DDI can communicate with the host computer by using a RS-232 or RS-422 physical communications link. The maximum baud rate for RS-232 is 19.2K and the maximum baud rate for RS-422 is 38.4K.

Up to 12 DDIs can be daisy chained together to one host computer. Each of the DDIs must have a unique address. The daisy chain connection between DDIs is always a RS-422 link. All the racks, except the first rack, must be jumper configured for RS-422.

1.3.2 Data

The DDI samples steady state dynamic data from the buffered transducer outputs of each of the monitors. The interface digitizes the data and stores it in processor memory. The DDI performs both synchronous and asynchronous sampling on each channel of a monitor with a buffered transducer output.

Synchronous sampling consists of 8 shaft revolutions, with 32 samples per shaft revolution. The DDI takes synchronous data with reference to a Keyphasor signal. The host sets which Keyphasor to use with each monitor. If the rack loses the Keyphasor, sampling can switch to another Keyphasor or a simulated Keyphasor. The host uses synchronous data to generate time base and orbit displays with phase information.

Asynchronous data consists of 1024 samples per channel. The host uses asynchronous data to generate a 400 line spectrum plot. The host sets the sampling rate to correspond to the frequency span needed to generate the spectrum.

The interface will measure the gap of each channel during synchronous sampling. The gap measurement has 12 bit resolution, and the DDI stores it as a static value.

The host computer can configure DDI to freeze sampling for all monitors assigned to a Keyphasor® and/or an associated Keyphasor when an alarm event occurs. The DDI will inhibit sampling for the alarmed monitors until the host computer issues a sampling resume command. The host computer can configure the DDI to continue sampling instead of freezing when an alarm event occurs. Valid alarms for freezing data are Alert or Danger.

The DDI obtains values for static data and alarm status directly from the monitors through a dedicated serial link. The interface collects the static values every 5 seconds and alarm status every second.

1.3.3 Keyphasor Transducers

The DDI can use any of four Keyphasor transducers to collect synchronous dynamic data. The DDI supports a Keyphasor operating range of 60 to 30,000 rpm, and can use any of the four Keyphasor transducers to sample the data from any monitor. The DDI measures the speed of all active Keyphasor signals at the start of sampling and stores the speed as a static value. The DDI also provides a simulated Keyphasor with a 5 rpm resolution. The interface can use a simulated Keyphasor to replace a missing Keyphasor. The DDI will flag a Keyphasor as invalid if its speed changes by more than ±12.5% between revolutions.

1.3.4 Event List

The DDI maintains a rack event list. The interface will place any of the following events to the event list when the event occurs:

Change in Alert Alarm status,
Change in Danger Alarm status,
Change in Channel OK status,
Change in Monitor OK status,
Change in Channel Bypass status,
Channel turns on or off,
Change in Danger Bypass status,
Trip Multiply turns on or off,
Activation or deactivation of Power Up Inhibit,
Change in Monitor Abort status,
Monitor enters or leaves Set Point Adjust Mode,
Monitor enters or leaves Calibration/Program Mode,
Monitor has stored Self Test Error Codes,
Communication with the monitor is lost or gained, and
Monitor configuration does not match monitor in rack.

The DDI transmits the event list to the host when the host computer requests the list. The events are time stamped by the DDI. After the DDI obtains an acknowledgement that the host has received the event list, the DDI clears the event list from memory.

1.3.5 Fast Trend

The DDI can fast trend all static data values. The DDI gets a new set of static data every 15 seconds and stores up to 40 samples (the last ten minutes of data).

1.3.6 Modbus Protocall Message Response Times

The SDI and DDI will collect and store static and Alarm Status data from the monitors, according to the following rate:

Type of Data	Collection/Storage Rate
Static Data	Every 5 seconds
Alarm Status	Every 1 second

2. Configuring the Data Interface

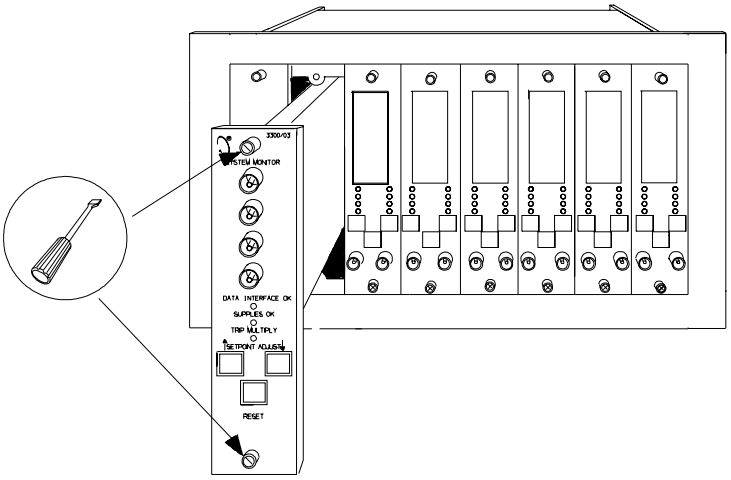
2.1 Disassembling the System Monitor

To install or set the options on either the Serial Data Interface or the Dynamic Data Interface, first remove the System Monitor from the rack. The only tool you need is a screwdriver.

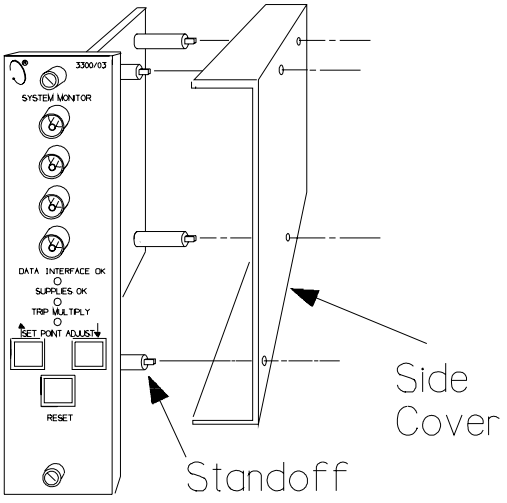
CAUTION

Improper rack operation may occur.

Power down rack when installing or removing a monitor.



1. Loosen the screws on the front panel and pull the System Monitor out from the rack.

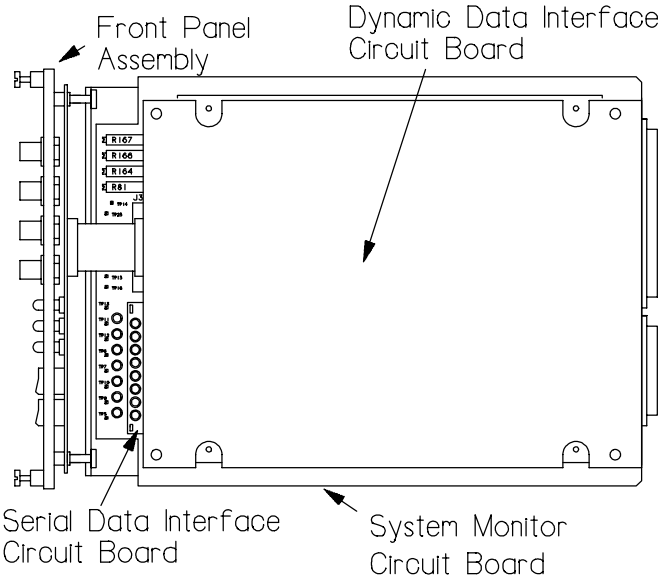


2. Remove the side cover by pinching the protruding tip on each of the 4 standoffs.

2.1.1 Data Interface Removal

3. Remove the Dynamic Data Interface circuit board by pinching the protruding tip on each of the 4 standoffs and gently prying the Dynamic Data Interface circuit board away from the Serial Data Interface.

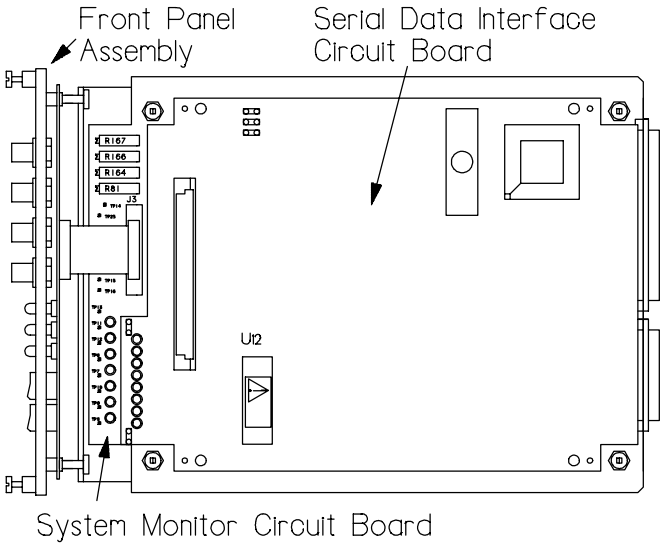
NOTE: This step is required only if the unit is a DDI.



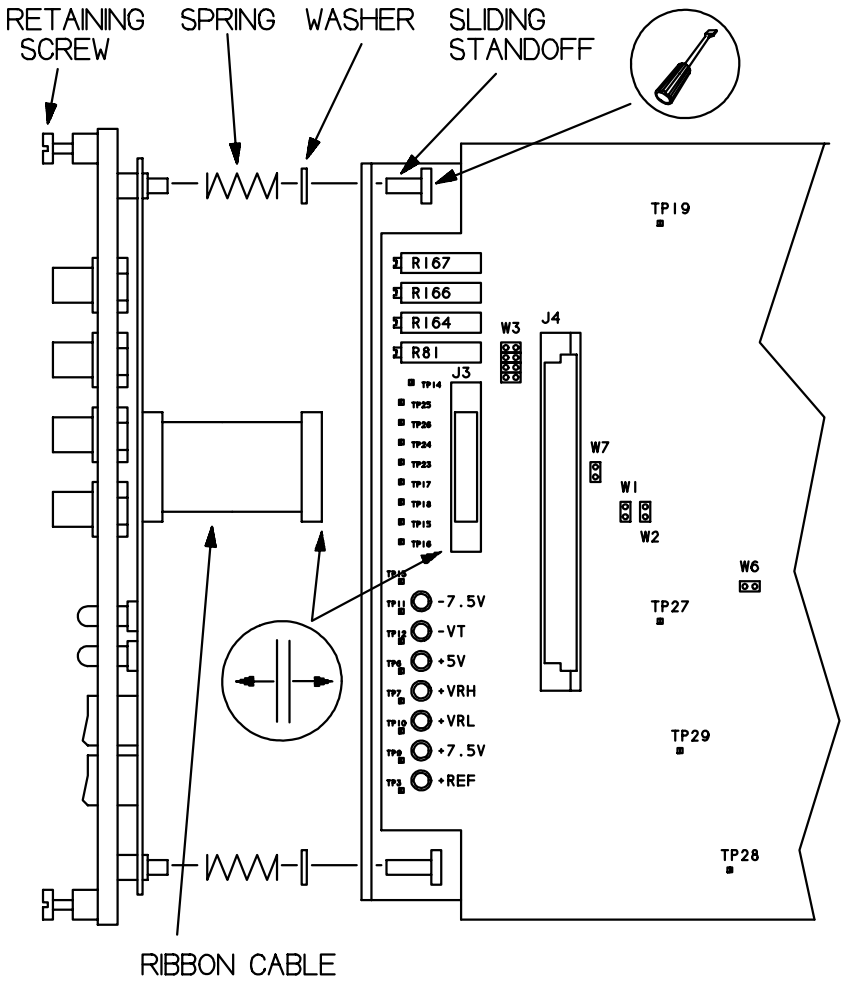
WARNING

The I.C. number U12 on the SDI circuit board contains lithium. Breaking open the I.C. may expose lithium. Improper handling of exposed lithium may cause injury.

4. Remove the Serial Data Interface circuit board by gently prying it away from the two mating connectors and 4 standoffs on the System Monitor circuit board.

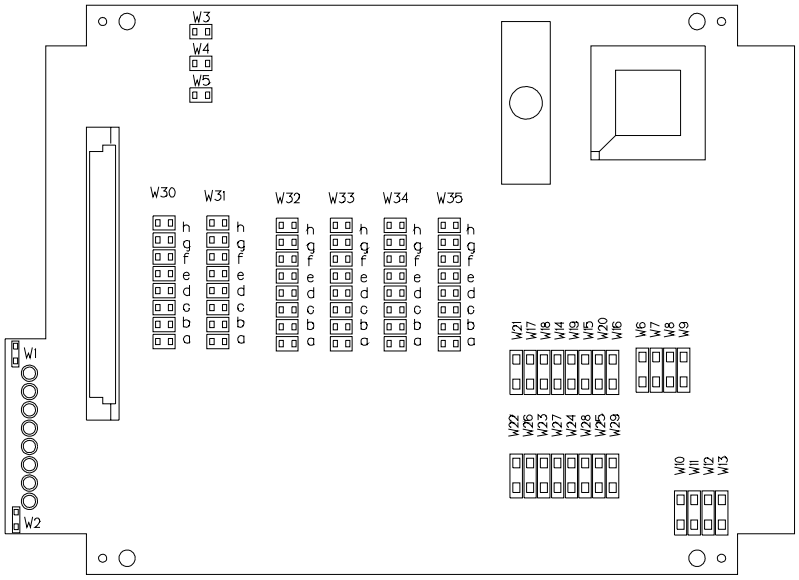


2.1.2 Front Panel Removal



2.2 Data Interface Options

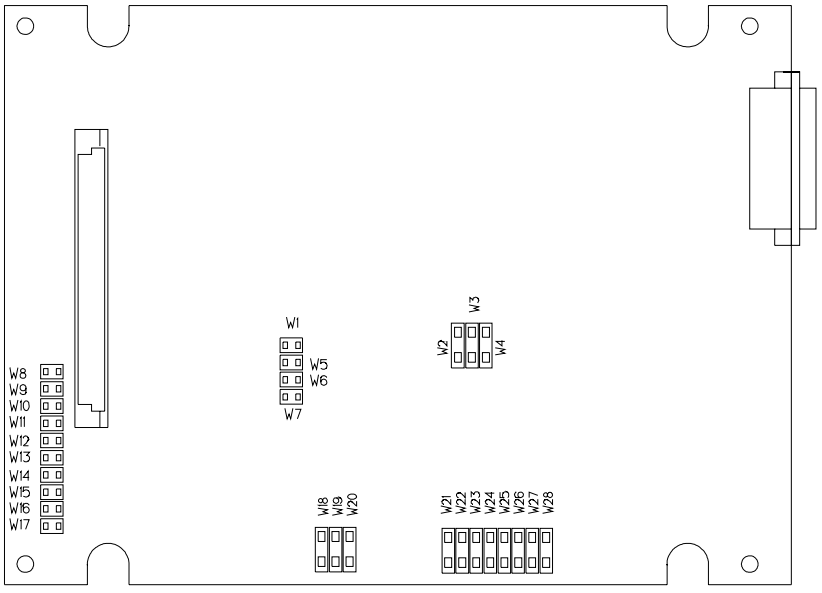
The Serial Data Interface and the Dynamic Data Interface have several jumper-programmable options. Change these options by removing and then installing the jumpers on both the SDI and DDI circuit boards.



2.2.1 Serial Data Interface

Circuit Board

Part Number 87870-01



2.2.2 Dynamic Data Interface

Circuit Board

Part Number 87880-01
or 140514-01

2.2.3 Data Interface Operation Mode Option

To set the mode of operation for the SDI and DDI, remove the jumpers from headers W4 and W5 on the SDI circuit board. Install the jumpers as specified in the following table.

Table 1. Operation Mode

	INSTALL JUMPERS	REMOVE JUMPERS
Use External Data Manager	None	W4 & W5
SDI Enabled	W4	None
SDI Disabled	None	W4
DDI Enabled*	W5	None
DDI Disabled	None	W5

* To use this option the DDI board must be installed in the System Monitor.

2.2.4 Device Address Option

The Serial Data Interface and Dynamic Data Interface have the same communication channel address. To set the address remove the jumpers from W33A through W33H on the SDI board. Set the address in binary. Install a jumper for a 1 and remove a jumper for a 0. W33A corresponds to the least significant bit and W33H corresponds to the most significant bit. To set the address to 37 (100101 Bin) a jumper would be installed on headers W33A, W33C and W33F. The following table gives examples of address options.

Table 2. Address Option Examples

ADDRESS	W33A	W33B	W33C	W33D	W33E	W33F	W33G	W33H
1*	Install	Remove	Remove	Remove	Remove	Remove	Remove	Remove
2	Remove	Install	Remove	Remove	Remove	Remove	Remove	Remove
3	Install	Install	Remove	Remove	Remove	Remove	Remove	Remove
4	Remove	Remove	Install	Remove	Remove	Remove	Remove	Remove
5	Install	Remove	Install	Remove	Remove	Remove	Remove	Remove
15	Install	Install	Install	Install	Remove	Remove	Remove	Remove
32	Remove	Remove	Remove	Remove	Remove	Install	Remove	Remove
100	Remove	Remove	Install	Remove	Remove	Install	Install	Remove
200	Remove	Remove	Remove	Install	Remove	Remove	Install	Install
255	Install	Install	Install	Install	Install	Install	Install	Install

* Unit shipped with this option selected.

2.2.5 Unused Jumpers

The option headers W1, W3, W30A through W30H, W31H, W32G, W32H, and W34A through W34H are not used. Remove the jumpers from these headers to ensure correct operation.

2.3 Setting Options on the Serial Data Interface

2.3.1 SDI Communication Protocol Options

To set the communication protocol for the Serial Data Interface (SDI), remove the jumpers from headers W22 through W29 on the SDI board. Install the jumpers as specified in Table 3.

Table 3. SDI Communication Protocol Options

PROTOCOL	INSTALL JUMPERS	REMOVE JUMPERS
RS-232*	W26, W27, W28 and W29	W22, W23, W24 and W25
RS-422	W22, W23, W24 and W25	W26, W27, W28 and W29

* Unit shipped with this option selected.

NOTE: RS-232 cannot be used for rack to rack communication. RS-422 must be used to daisy chain racks together.

2.3.2 SDI Communication Channel Termination Options

Terminate the communication channel on the last rack and first rack of the daisy chain; otherwise, noise may be interpreted as a message. To set the termination, remove the jumpers from headers W10 through W13 on the SDI board. Install the jumpers as specified in Table 4.

Table 4. SDI Communication Channel Termination Options

SINGLE RACK SYSTEM USING. . .	INSTALL JUMPERS	REMOVE JUMPERS
RS - 232 *	W10 , W11 W12, W13	None
RS - 422	W10, W11	W12, W13

OR

Multiple Rack with	First Rack		Center Racks (This applies if you have more than two racks)		Last Rack	
	Install Jumpers	Remove Jumpers	Install Jumpers	Remove Jumpers	Install Jumpers	Remove Jumpers
RS-232 on the 1st Rack	W12,W13	W10,W11	NONE	W10,W11 W12,W13	W10,W11	W12,W13
RS-422 on the 1st Rack	NONE	W10,W11 W12,W13	NONE	W10,W11 W12,W13	W10,W11	W12,W13

* Unit shipped with this option selected.

To select RS-232 or RS-422 on the SDI to Host link requires installation or removal of jumpers on the Power Input Module (PIM) in addition to those described above. These jumpers select whether DCOM or ICOM is routed to the appropriate pins on the SDI HOST connector. The PIM is shipped from the factory configured for RS 232. The jumper option is shown below.

JUMPERS LOCATED ON THE POWER INPUT MODULE

Communications Protocol	SDI HOST	
	Install	Remove
RS 232	W1A	W1B
RS 422	W1B	W1A

2.3.3 SDI Baud Rate Options

To set the SDI baud rate, remove the jumpers from headers W32A through W32D on the SDI board. Install the jumpers as specified in Table 5.

Table 5. SDI Baud Rate Options

BAUD RATE	INSTALL JUMPERS	REMOVE JUMPERS
19.2K	W32D	W32A, W32B & W32C
9.6K*	W32A, W32B & W32C	W32D
4.8K	W32B & W32C	W32A & W32D
2400	W32A & W32C	W32B & W32D
1200	W32C	W32A, W32B & W32D
600	W32A & W32B	W32C & W32D
300	W32B	W32A, W32C & W32D
150	W32A	W32B, W32C & W32D

* Unit shipped with this option selected.

2.3.4 SDI Communication Options

To set the various communication options for the SDI communication channel, remove the jumpers from headers W35A through W35G, W32E, and W32F on the SDI board. Install the jumpers as specified in Table 6.

Table 6. SDI Communication Options

OPTION		INSTALL JUMPERS	REMOVE JUMPERS
Cyclic Redundancy Check	Enabled*	W35A	None
	Disabled	None	W35A
Modem	Enabled	W35D	None
	Disabled*	None	W35D
Parity	Even*	None	W35B & W35C
	Odd	W35B	W35C
	None **	W35C	W35B
Stop Bits	One*	None	W35E
	Two **	W35E	None
Protocol	Modbus*	None	W35F & W35G
	Allen-Bradley	W35F	W35G
Number Format	BCD ***	W35H	None
	Hexadecimal*	None	W35H
Time Outs	3 Bytes*	None	W32E & W32F
	10 Bytes	W32E	W32F
	25 Bytes	W32F	W32E
	50 Bytes	W32E & W32F	None

* Unit shipped with this option selected.

** If Parity = "NONE", then Stop Bits must = TWO". This is a Modican ModBus requirement.

*** BCD is used only with Allen - Bradley Protocol.

NOTE: If modem is selected the maximum baud rate is 9600.

2.4 Setting Options on the Dynamic Data Interface

2.4.1 DDI Communication Protocol Options

To set the communication protocol for the Dynamic Data Interface (DDI), remove the jumpers from headers W14 through W21 on the SDI circuit board. Install the jumpers as specified in Table 7.

Table 7. DDI Communication Protocol Options

PROTOCOL	INSTALL JUMPERS	REMOVE JUMPERS
RS-232*	W14, W15, W16 and W17	W18, W19, W20 and W21
RS-422	W18, W19, W20 and W21	W14, W15, W16 and W17

* Unit shipped with this option selected.

NOTE: RS-232 cannot be used for rack to rack communication. RS-422 must be used to daisy chain racks together.

2.4.2 DDI Communication Channel Termination Options

Terminate the communication channel on the last rack and first rack of the daisy chain; otherwise, noise may be interpreted as a message. To set the termination remove the jumpers from headers W6 through W9 on the SDI board. Install the jumpers as specified in Table 8.

Table 8. DDI Communication Channel Termination Options

SINGLE RACK SYSTEM USING. . .	INSTALL JUMPERS	REMOVE JUMPERS
RS - 232 *	W8 , W9 W6, W7	None
RS - 422	W8, W9	W6, W7

OR

Multiple Rack with	First Rack		Center Racks (This applies if you have more than two racks)		Last Rack	
	Install Jumpers	Remove Jumpers	Install Jumpers	Remove Jumpers	Install Jumpers	Remove Jumpers
RS-232 on the 1st Rack	W6,W7	W8,W9	NONE	W6,W7 W8,W9	W8,W9	W6,W7
RS-422 on the 1st Rack	NONE	W8,W9 W6,W7	NONE	W6,W7 W8,W9	W8,W9	W6,W7

* Unit shipped with this option selected.

To select RS - 232 or RS - 422 on the DDI to Host link requires installation or removal of jumpers on the Power Input Module (PIM) in addition to those described above. These jumpers select whether DCOM or ICOM is routed to the appropriate pins on the DDI HOST connector. The PIM is shipped from the factory configured for RS 232. The jumper option is shown below.

JUMPERS LOCATED ON THE POWER INPUT MODULE

Communications Protocol	DDI HOST	
	Install	Remove
RS 232	W1C	W1D
RS 422	W1D	W1C

2.4.3 DDI Modem Option

To use a modem with the DDI, install a jumper in header W31G. For no modem, remove the jumper. If the jumper is installed, the DDI's parity is set to none; otherwise, the parity is even.

2.4.4 DDI Baud Rate Options

To set the DDI baud rate, remove the jumpers from headers W31A through W31D on the SDI board. Install the jumpers as specified in Table 9.

Table 9. DDI Baud Rate Options

BAUD RATE	INSTALL JUMPERS	REMOVE JUMPERS
38.4K	W31A & W31D	W31B & W31C
19.2K	W31D	W31A, W31B & W31C
9.6K*	W31A, W31B & W31C	W31D
4.8K	W31B & W31C	W31A & W31D
2400	W31A & W31C	W31B & W31D
1200	W31C	W31A, W31B & W31D
600	W31A & W31B	W31C & W31D
300	W31B	W31A, W31C & W31D
150	W31A	W31B, W31C & W31D

* Unit shipped with this option selected.

NOTE: The 38.4K option is valid only when using RS-422 communications.

2.4.5 DDI Time Outs Options

To set the DDI time out options, remove the jumpers from headers W31E and W31F on the SDI board. Install the jumpers as specified in Table 10.

Table 10. DDI Time Outs Options

TIME OUTS	INSTALL JUMPERS	REMOVE JUMPERS
3 Bytes*	None	W31E & W31F
10 Bytes	W31E	W31F
25 Bytes	W31F	W31E
50 Bytes	W31E & W31F	None

* Unit shipped with this option selected.

2.5 Setting Options for Keyphasor® Conditioning

2.5.1 Keyphasor Triggering Edge Options

To set the edge of the Keyphasor signal that initiates sampling, remove the jumpers from headers W21 through W28 on the DDI board. Install the jumpers as specified in Table 11.

Table 11. Keyphasor Triggering Edge Options

Keyphasor TRIGGER EDGE		INSTALL JUMPERS	REMOVE JUMPERS
Keyphasor 1	Falling*	W21	W25
	Rising	W25	W21
Keyphasor 2	Falling*	W24	W23
	Rising	W23	W24
Keyphasor 3	Falling*	W26	W22
	Rising	W22	W26
Keyphasor 4	Falling*	W27	W28
	Rising	W28	W27

* Unit shipped with this option selected.

NOTE: If the Keyphasor signal is produced by a protrusion, set the triggering for a rising edge; otherwise, set the triggering for a falling edge.

2.5.2 Keyphasor Threshold Options

To set manual or automatic threshold for Keyphasor signal conditioning, remove the jumpers from headers W1, W5 through W7 and W11 through W14 on the DDI board. Install the jumpers as specified in Table 12.

Table 12. Keyphasor Threshold Options

THRESHOLD		INSTALL JUMPERS	REMOVE JUMPERS
Keyphasor 1	Manual	W12	W11
	Automatic*	W11	W12
Keyphasor 2	Manual	W13	W14
	Automatic*	W14	W13
Keyphasor 3	Manual	W5	W1
	Automatic*	W1	W5
Keyphasor 4	Manual	W7	W6
	Automatic*	W6	W7

* Unit shipped with this option selected.

NOTE: If manual threshold is selected, use the section titled Keyphasor Threshold Adjustment to adjust the Keyphasor threshold.

2.5.3 Keyphasor Hysteresis Options

To set the hysteresis level to use for Keyphasor signal conditioning, remove the jumpers from headers W2 through W4, W8 through W10, and W15 through W20 on the DDI board. Install the jumpers as specified in Table 13.

Table 13. Keyphasor Hysteresis Options

Keyphasor	HYSTERESIS -VT Voltage =		INSTALL JUMPERS	REMOVE JUMPERS
	-24V	-18V		
1	0.2	0.16	W9	W8 & W10
	0.5*	0.42	W8	W9 & W10
	1.25	1.0	W10	W8 & W9
	2.0	1.6	None	W8, W9 & W10
2	0.2	0.16	W16	W15 & W17
	0.5*	0.42	W15	W16 & W17
	1.25	1.0	W17	W15 & W16
	2.0	1.6	None	W15, W16 & W17
3	0.2	0.16	W4	W3 & W2
	0.5*	0.42	W2	W3 & W4
	1.25	1.0	W3	W2 & W4
	2.0	1.6	None	W2, W3 & W4
4	0.2	0.16	W19	W18 & W20
	0.5*	0.42	W18	W19 & W20
	1.25	1.0	W20	W18 & W19
	2.0	1.6	None	W18, W19 & W20

* Unit shipped with this option selected.

NOTE: The amount of hysteresis in the Keyphasor conditioning circuit is dependent on the level of the transducer voltage supply. To determine the supply level on your system consult the power supply manual.

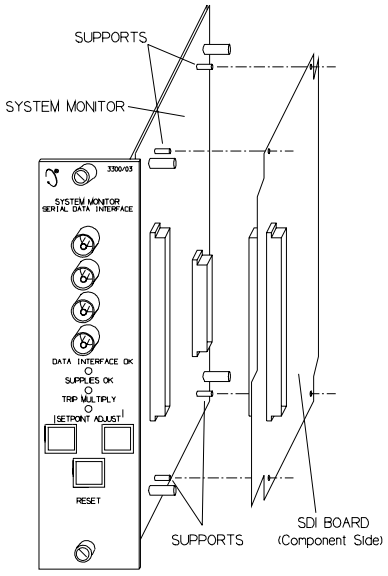
2.6 Data Interface Installation

Before installing the SDI and DDI, set the options as described in the sections titled Setting Options on the Serial Data Interface, Setting Options on the Dynamic Data Interface, and Setting Options for Keyphasor Conditioning.

WARNING

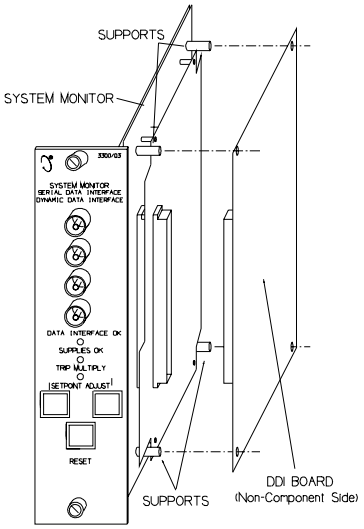
The I.C. number U12 on the SDI circuit board contains lithium. Breaking open the I.C. may expose lithium. Improper handling of exposed lithium may cause injury.

1. Install the Serial Data Interface by attaching the SDI circuit board to the four small post and the two mating connectors on the System Monitor Board.

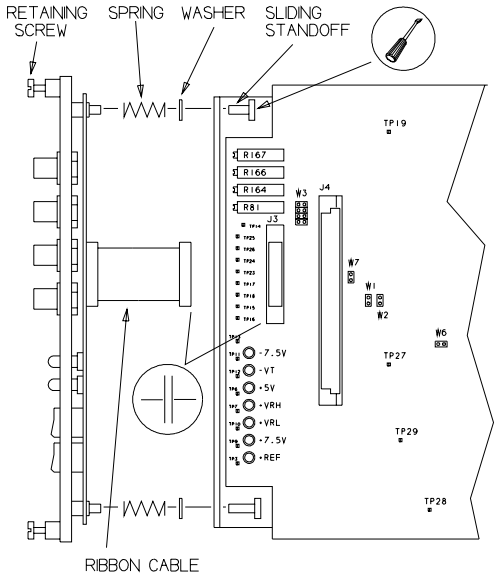


2. In the Dynamic Data Interface by attaching the DDI circuit board to the four large posts on the System Monitor and the mating connector on the SDI circuit board.

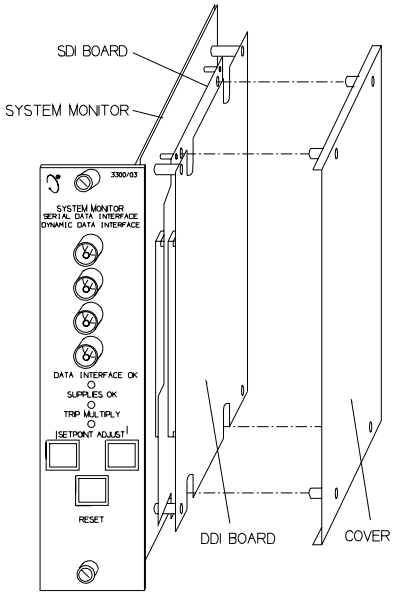
NOTE: This step applies to only DDI units. For SDI units skip to step 3.



3. If you are upgrading to a SDI or DDI, the front panel must be replaced with the new front panel in the upgrade kit.



4. Attatch the new cover by connecting the cover stand-offs to the SDI board.



2.6.1 Rack Configuration

The SDI and DDI must be configured according to what monitors are located within its rack. The method used depends on which of the data interfaces are active.

The SDI and DDI will automatically configure themselves when the rack is powered up or if the self test is run (see next page). The DDI configuration is set for testing purposes. The DDI is configured by the user through the host software. If both the SDI and DDI are functioning, both interfaces use the DDI configuration.

2.6.2 Adding A New Monitor In The Rack

If you add a new monitor to the rack, configure the data interfaces for the monitor. The rack will be reconfigured by initiating a self test for the SDI or by using the host software for DDI.

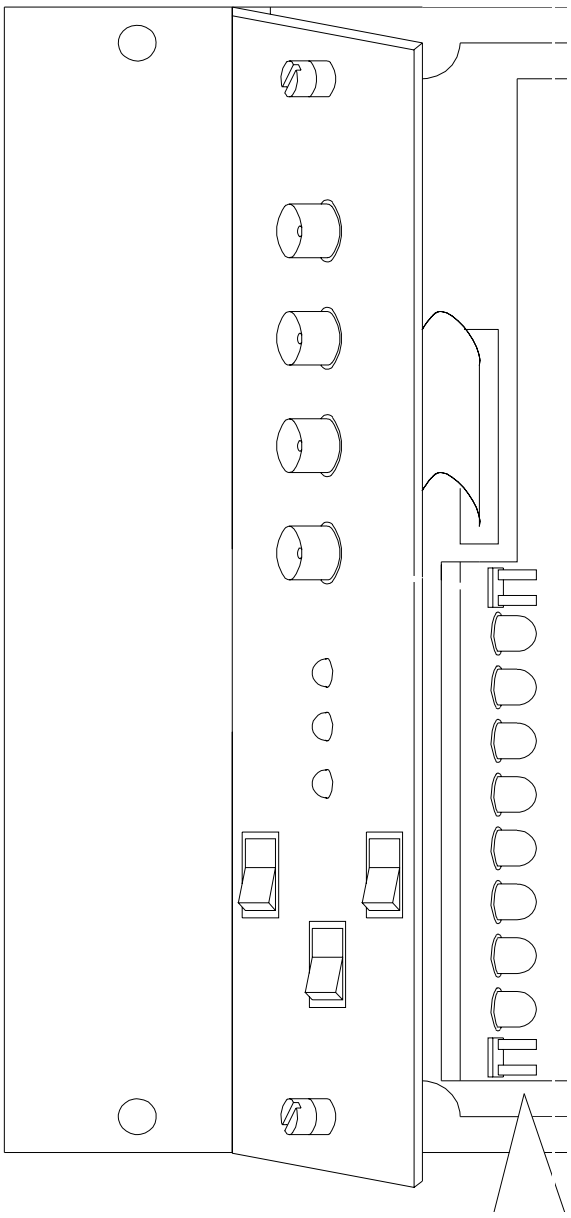
2.6.3 Initiate Self Test

The SDI and DDI will run a self test upon power up or reset. To initiate a self test, execute the following steps.

1. Unscrew the two screws on the front of the System Monitor and move the front panel to the left.

2. Insert a screwdriver into the unit and short across the header until all the LEDs turn on. The LEDs should all come on within 5 seconds.

3. Remove the screwdriver from the unit. The unit will execute 7 different selftests. As each test is completed, its corresponding LED will go off. If a test fails, the LED for that test will remain on and the Data Interface LED on the front panel will go off (see next page). The LEDs should go off from the top down. After the upper seven LEDs have turned off, LED 8 will flash for approximately 50 seconds while the SDI and DDI configure for the rack. All eight LEDs will then flash on and off in unison. At this time, the data interface has started collecting data and is ready for the host to configure the DDI.



2.6.4 Error Codes

Each of the top seven LEDs represents one of seven separate self tests performed by the instrument. The following table states what self test is represented by each LED and what action to take if a test fails. LED 1 is the uppermost LED.

Table 14. Self Test LEDs

LED	SELF TEST NAME	EFFECT OF ERROR	RECOMMENDED ACTION
1	RAM	Neither SDI nor DDI can function.	Replace SDI board.
2	ROM	Neither SDI nor DDI can function.	Replace SDI board.
3	±14V Supply and Signal Conditioning	DDI will not collect dynamic data.	Replace DDI board.*
4	Reference Frequencies and Frequency Multiplier IC	DDI will not collect dynamic data.	Replace DDI board.*
5	Sampling Logic and Keyphasor Tag	DDI will not collect dynamic data.	Replace DDI board.*
6	Communication Channels	Neither SDI nor DDI can function.	Replace SDI board.
7	Timers	Neither SDI nor DDI can function.	Replace SDI board.
8	Unused		

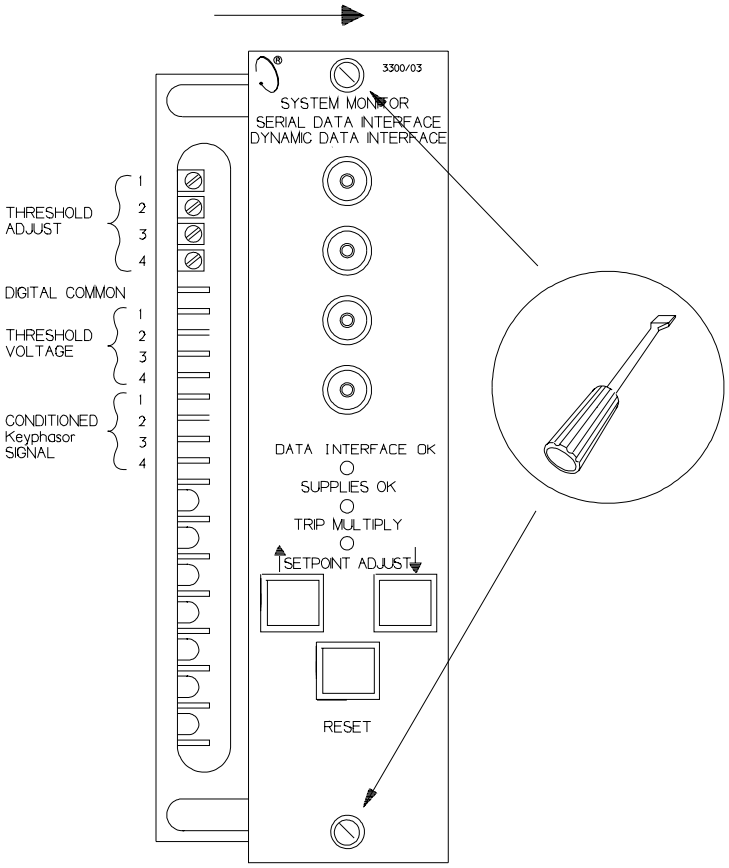
* The problem is probably on the DDI board, but there is a chance that the problem is on the SDI board. If replacing the DDI board does not fix the problem, then replace the SDI board.

If the unit is configured only for SDI operation, self tests 3, 4, and 5 are invalid and will not be executed even if the DDI board is installed. If LEDs 3,4,and 5 are on and only the SDI board is installed check to see if a jumper is on the W5 header of the SDI board. If the jumper is installed remove the jumper.

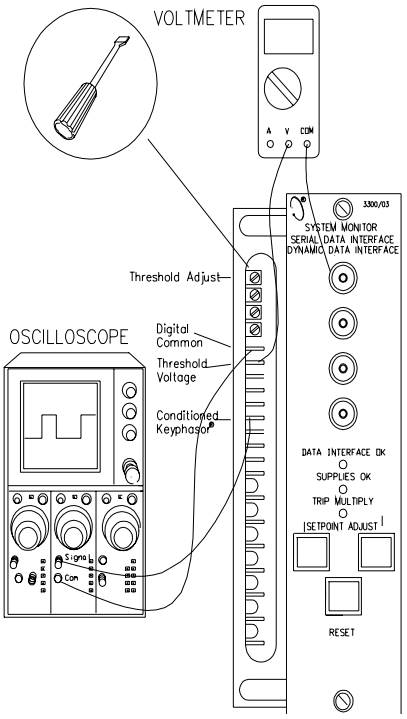
2.6.5 Keyphasor Threshold Adjustment

If you select manual threshold for Keyphasor conditioning, use the following procedure to set the threshold. The procedure shown is for the Keyphasor 1 conditioning circuit; use the same procedure for all four Keyphasor conditioning circuits.

1. Unscrew the front panel of the System Monitor and move the panel to the right.



2. Connect the common cable of an oscilloscope to the digital common test point (**DCOM**) and the signal probe of the oscilloscope to the test point for the conditioned Keyphasor signal (**KPH1**).

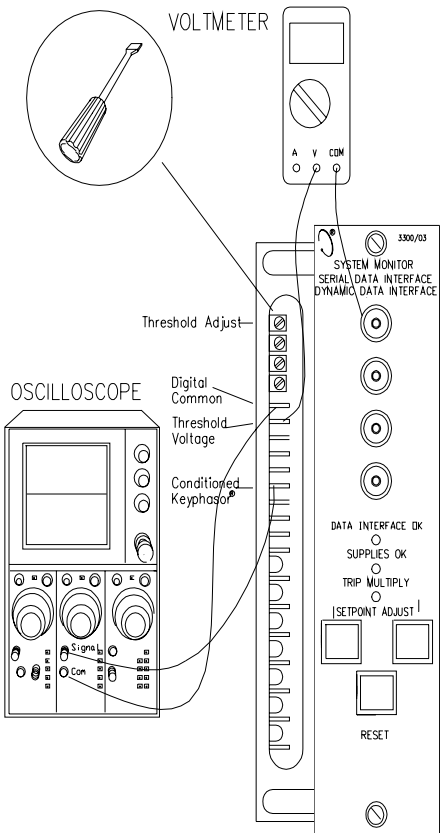


3. Connect the common cable of a voltage meter to the outer conductor of the BNC connector for Keyphasor 1 (**KØ1**) and the positive lead to the test point for the threshold voltage (**THRESHOLD 1**).

4. Turn the threshold pot fully counterclockwise, and then turn the pot clockwise until a pulsed waveform appears on the oscilloscope. Measure and record the threshold voltage at this point.

5. Continue turning the threshold potentiometer (**THRESHOLD 1)** until the pulsed waveform is lost. Measure and record the threshold voltage at this point.

6. Calculate the half way point between the two voltage readings taken in steps 4 and 5. Adjust the threshold to the half way point.



3. Connecting Cables

3.1 Introduction

This section describes how to connect the SDI to the host computer system. The diagrams for the cables used in this section are located in the section called CABLE DIAGRAMS. Be sure to set the jumpers for SDI and/or DDI communications channels as described in the Options section. Verify that the communication options are correctly set on the Power Input Module (PIM). (Refer to the Power Supply manual for the PIM option configurations.)

This section is divided into five parts. Each part corresponds to a different wiring configuration used to connect the SDI or DDI to the host system.

SECTION	HOST SYSTEM
3.1	Allen-Bradley 1770-KF2
3.2	Allen-Bradley 1771-KE or 1785-KE
3.3	Honeywell PLC® Gateway or Data Highway Port
3.4	Dynamic Data Interface Cabling

NOTE: The part numbers for the cables shown in the following sections have been abbreviated to simplify the drawings. For a complete part number consult the CABLE DIAGRAMS section of the manual.

3.2 Test Package

Bently Nevada offers a test package to verify the SDI connections and protocol settings. The package name is SDI/SI Test Package, part number 101209-01 for 5¼ in disks and 101209-02 for 3½ in disks. Call your local Bently Nevada Corporation representative to order this package.

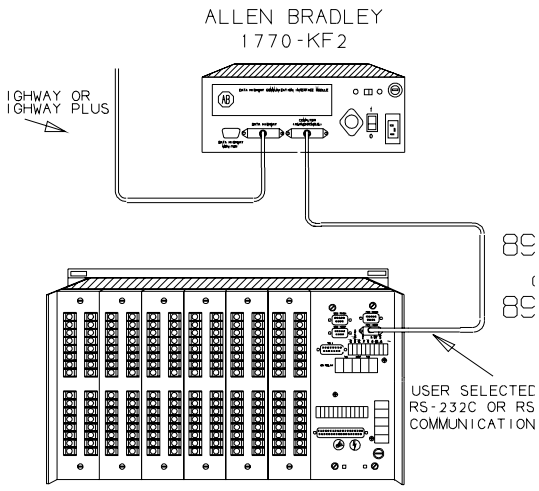
3.3 Cable Connection to Allen-Bradley 1770-KF2 Communications Module

The 1770-KF2 is a stand alone communication interface which provides a RS-232C or RS-422A link between asynchronous devices and an Allen-Bradley Data Highway or Data Highway Plus communications network.

With the KF2 module, either RS-232C or RS-422A may be used. If RS-232C is selected, connections between the KF2 and the Power Input Module (PIM) should be made with cable part number 89968. If RS-422A is specified, use cable part number 89970. Connect the cable to the SDI HOST connector on the PIM.

The maximum cable length for RS-232C is 100 feet (30.5 metres). The maximum cable length for RS-422A is 4000 feet (1219.2 metres). Use the RS-422A interface whenever possible.

NOTE: Since the Allen-Bradley protocols are full duplex, only one 3300 rack may be connected per KF2 module.

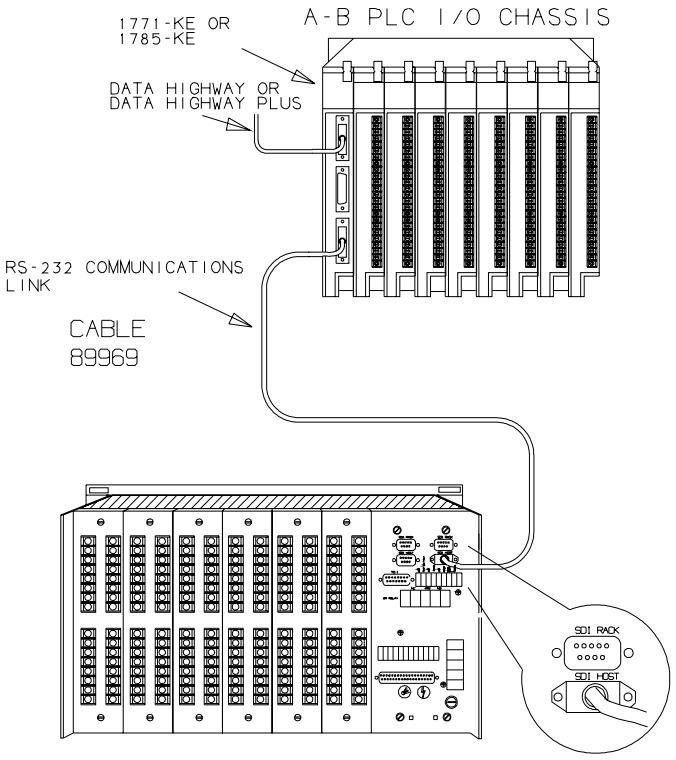


3.4 Cable Connection to Allen-Bradley 1771-KE or 1785-KE Communications Modules

Both the 1771-KE and the 1785-KE are designed to be installed in an I/O chassis. A 1771-KE provides an interface between a RS-232C communication link and an Allen-Bradley Data Highway Communication link. A 1785-KE provides an interface between a RS-232C communication link and an Allen-Bradley Data Highway Plus communication link.

Connect the Allen-Bradley module to the PIM using cable part number 89969. Connect the cable to the SDI HOST connector on the PIM. The 89969 cable is available in lengths of 10, 25, 50 and 100 feet (3, 7.6, 15.2 and 30.5 meters). When distances beyond 100 feet are required, install a pair of modems in the communications link.

NOTE: Since the Allen-Bradley protocols are full duplex, only one 3300 rack may be connected per KE module.



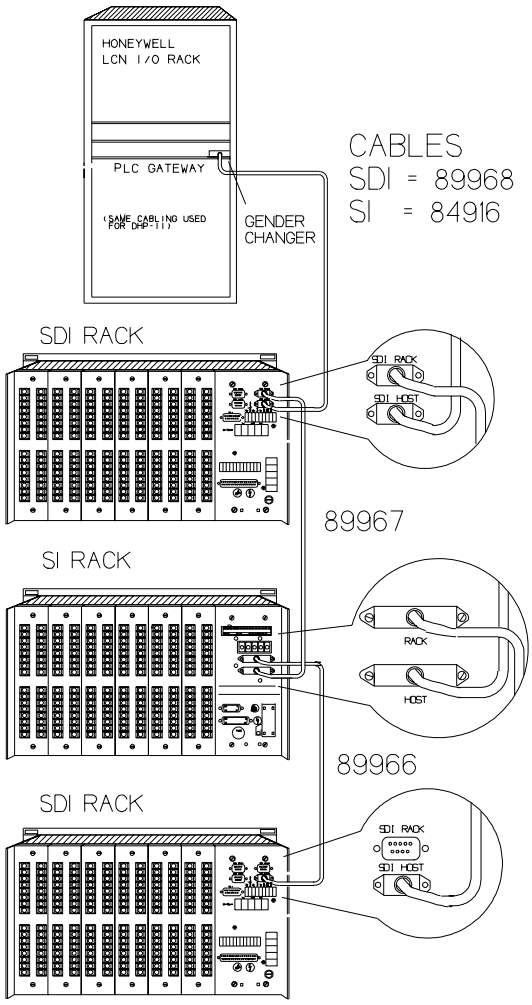
3.5 Cable Connection to Honeywell PLC® Gateway or Data Highway Port

The Honeywell PLC Gateway (PLCG) provides an interface between RS-232C devices using Modicon Modbus protocol and the TDC 3000 Local Control Network (LCN). The DHP-II provides a similar interface to the Honeywell Data Highway.

Connect the Honeywell interface and the PIM with cable part number 89968. Connect the cable to the SDI HOST connector on the PIM. This cable is limited to 100 feet (30.5 metres). Since the Modbus protocol is master/slave, multiple 3300 racks may be connected in a daisy chain. Connect daisy chained racks by attaching the male end of a cable to the SDI RACK connector on the first rack and then connecting the female end of the cable to the **SDI HOST** connector of the next rack. The following table gives the part number of the cable to use based upon connecting both SDIs and Serial Interfaces (SI) in a daisy chain. * See Appendix G for more information.

HOST	RACK	CABLE
PLCG or DHP-II	SDI	89968
PLCG or DHP-II	SI	84916
SDI	SDI	47125
SDI	SI	89967
SI	SDI	89966
SI	SI	84915

Since rack-to-rack communication uses the RS-422A standard, it can support cable distances up to 4000 feet between racks.



3.6 Dynamic Data Interface Cabling

The DDI communication link provides an interface between the Bently Nevada host computer and a Bently Nevada data interface. Data interfaces can include the Dynamic Data Interface, Dynamic Data Manager Communications Processor, Transient Data Manager Communications Processor, and Process Data Manager Communications Processor.

You can use either RS-232C or RS-422A to communicate between the DDI and the host computer. See the Table to the right (this page). Connect the cable to the **DDI HOST** connector on the PIM. Up to 12 data interfaces can be daisy chained together to one host computer. Use cable part number 47125 to connect one data interface to another. Connect from **DDI RACK** (**DCE TO NEXT RACK** on a DDM, PDM or TDM) to **DDI HOST** (**DTE TO HOST COMPUTER** on a DDM, PDM or TDM) on the next rack in the daisy chain.

The maximum cable length is 100 feet (30.5 meters) for RS-232C and 4000 feet (1200 metres) for RS-422A. All daisy chain connections must use RS-422A.