TDK RF Solutions Inc.

SI-300

System Interface

User Manual

SI-300 System Interface

User Manual

TDK RF Solutions Inc.

Contents

About This User Manual

The SI-300 User Manual provides detailed information about SI-300 features and operation. This manual is designed to be used as a reference tool for installing and using the SI-300.

Chapter 1 introduces you to the basic features of SI-300, supported products, and specifications.

Chapter 2 provides installation instructions.

Chapter 3 covers operation of the SI-300.

Chapter 4 provides commands for remote programming.

Note: TDK RF Solutions has made every effort to ensure this manual is both easy to use and factually accurate. If you have any suggestions on improvements you would like to see in this document, or if you discover a discrepancy between the documentation and the SI-300's functionality, please notify TDK RF Solutions.

Safety Precautions

Safety Statement

The following general safety precautions must be observed during installation, operation, maintenance, and service to the product. Failing to follow these precautions or warnings listed in this manual may result in physical injury. TDK RF Solutions assumes no liability for the user's failure to follow these precautions.

Shock Hazard

To minimize shock hazard, the SI-300 must be connected to an electrical ground. The SI-300 is equipped with a three-conductor AC power cable. The power cable must be plugged into an approved three-contact electrical outlet.

Do not attempt to open the product case while power is present.

Service Precautions

The SI-300 contains no user serviceable parts. Do not install substitute parts or perform unauthorized modification to this product. Contact a TDK RF Solutions Sales and Support Office for service and repair requirements.

To minimize the risk of injury, do not attempt to service, repair, modify, or adjust this product.

Safety Messages

Warning messages such as the example below may appear in this document. To avoid personal injury and/or damage to the product, warning instructions must be followed.

WARNING: No user serviceable parts inside. Contact a TDK RF Solutions Sales and Support Office for service.

Introduction

Purpose and Functions

The TDK RF Solutions System Interface 300 is designed to integrate and control the various test instruments used in EMC test systems. The unique design of the SI-300 allows it to simultaneously perform several tasks involved in a typical system, which would otherwise require several different pieces of equipment.

The SI-300 can monitor field probes, control positioning devices (such as turntables, towers, clamp positioners, antenna positioners, and probe positioners), perform RF switching, and monitor power from a remote power meter.

The SI-300 provides the flexibility to design a test system for different test requirements. The unit has been designed with a user programmable architecture that allows it to be configured in many different modes. Manual and automated test systems are supported.

Features

The SI-300 is designed to simplify EMC testing. It reduces the complexity of a test system by doing several tasks such as RF switching, position control, field probe monitoring, and camera control. Additional features of the SI-300 are:

- Glass fiber optic cables are used for communication.
- Use of fiber optic cables and serial links allow communications to be uninterrupted by high RF fields.
- Universal power supply input 100-240 VAC, 50-60Hz.
- Remote (IEEE-488) and local (front panel) operation.
- Modular design allows for easy upgrades.
- Bright Graphical Display (240 x 64).
- Serial EEPROM stores critical configuration information.
- On-board drivers for up to 24 switches.
- Optional Internal RF switches on rear panel.

Hardware Support and Interface Capabilities

The SI-300 supports the following hardware components:

Monitoring Devices   RF field probes

Positioning Devices   Turntable
                                Antenna mast/polarizer
                                Absorption clamp

Positioning Interfaces   X-Y positioner
                                X-Y Antenna positioner

RF Switch Interface   Remote switches
                                Local switches on rear panel
                                Remote camera control
                                IEEE-488 computer interface
                                X-Y Antenna positioner

Technical Data

Architecture   8051 20 MHz w/20K flash

Communication Channels   4 channels, Bi-directional Serial

Fiber Interfaces   Fiber Communication   62.5 micron glass ST
                                Fiber Video Receiver   62.5 micron glass ST

Display   240x64 Graphical LCD w/back-light

Front Panel Controls   4 function keys, 4 special keys, and 12 numeric keys

Computer Interface   GPIB   IEEE-488 compatible

Mechanical   Occupies 2U of space in a 19 inch rack

Electrical   Power Supply   100-240 VAC, 50/60 Hz

CHAPTER 2
Installation

Before You Begin

Before you begin the installation of the SI-300, conduct an initial inspection of the unit and verify that you have received all components with your product.

Inspection

The SI-300 was thoroughly inspected and tested prior to shipment. Inspect the product for signs of physical damage that may have occurred during shipping. If damage is discovered, file a claim with the carrier.

Supplied Components/Accessories

The SI-300 ships with the following components:

- SI-300 unit
- Fiber optic cable set(s) – one set for each module
- IEEE-488 serial cable
- AC power cable

Verify that you have received the above components. Contact a TDK RF Solutions Sales and Support Office to request additional or replacement components.

Installation Instructions

The following graphic displays a typical installation, with the SI-300 connected to 4 modules via four fiber optic cable sets and to a PC via the IEEE-488 serial cable.

Note: The modules and channel assignments in your system will vary.
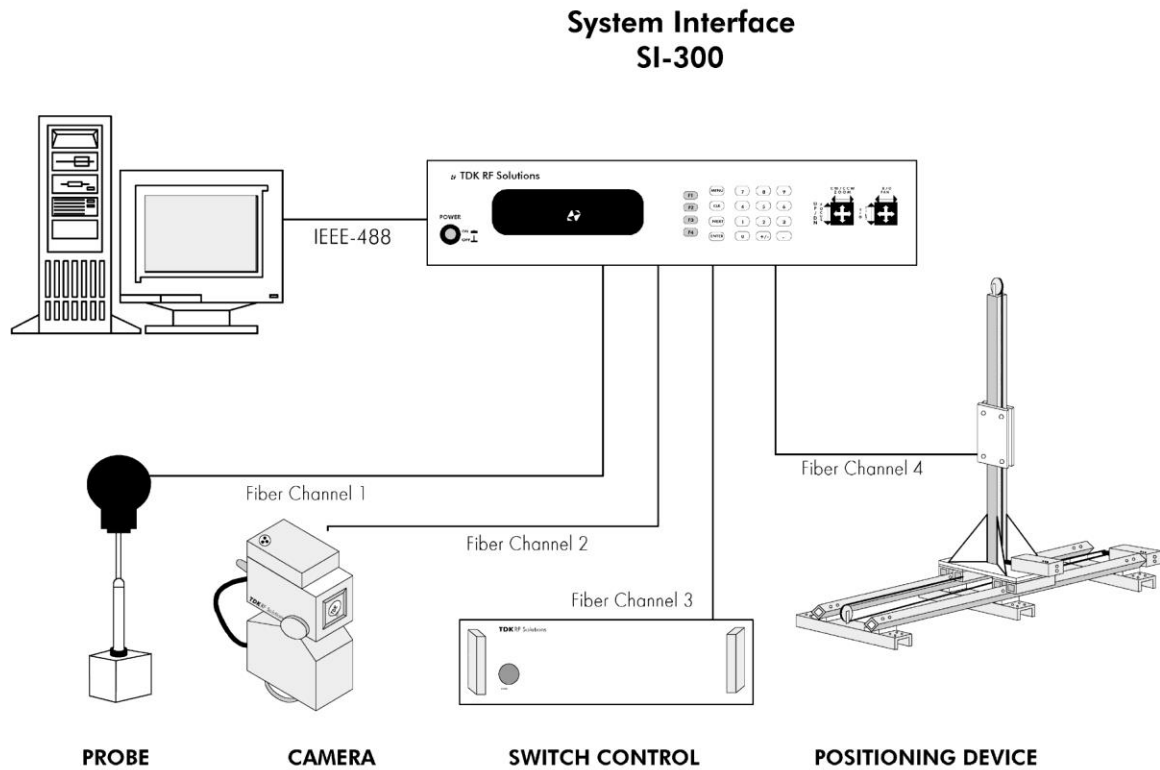
Front Panel

The following graphic displays the SI-300 Front Panel functions and indicators.
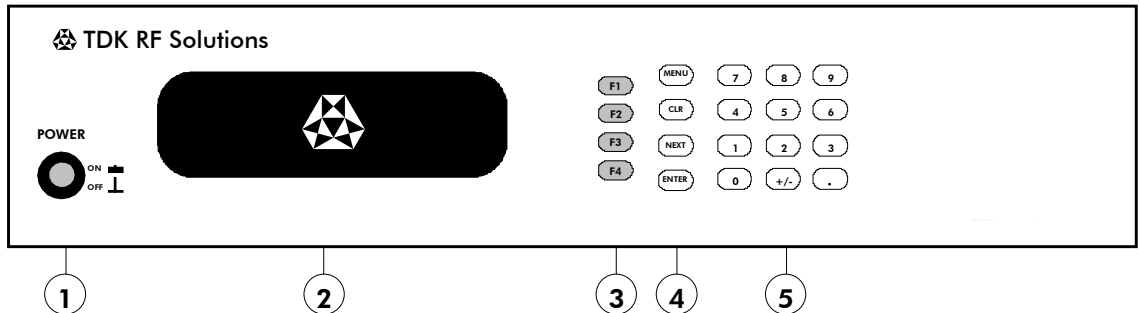
Figure 2: SI-300 Front Panel Layout

1   **Power switch** Used to power the unit on and off. Press the button once to power on (button remains in depressed position). Press the button again to power off (button returns to extended position).

2   **LCD Display** 240 x 64 backlit liquid crystal display (LCD).

3   **Function Keys** General purpose programmable soft keys used to perform specific functions for each menu page.

4   **Special Keys** Used for standard functions identified on each key.

5   **Numeric Keypad** Used for data entry.

Rear Panel

The following graphic displays port locations on the SI-300's rear panel.
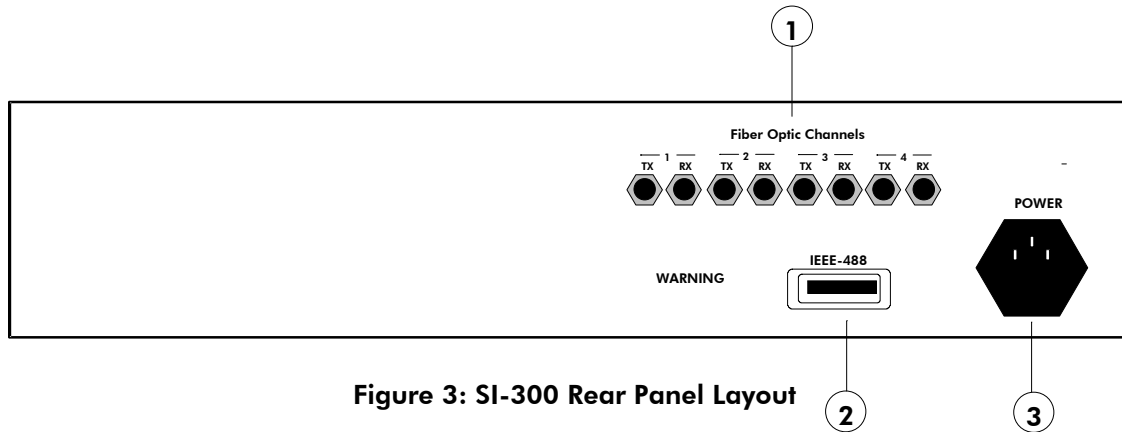
Figure 3: SI-300 Rear Panel Layout

1 **Fiber Optic Channel Ports** TX (transmit) and RX (receive) ports for up to four modules.

2 **IEEE-488 Port** Port used to connect the SI-300 to a PC to allow remote control of devices connected to the SI-300.

3 **Power Input** Attach AC power cable here.

To install SI-300:

The installation is simple, requiring only the following steps:

1 Connect fiber optic cables to each of the modules.

2 Connect the IEEE-488 bus to the control room computer.

3 Connect the power supply.

4 First power on the modules, and then power on the SI-300.

5 The Opening Screen appears on the LCD.

Cabling

Make sure the cables are positioned away from moving parts and do not interfere with the movement of the rack in any way.

Connect the remote modules to the SI-300 rear panel using the fiber-optic cables supplied. Each device communicates with the SI-300 using a serial communication link that requires a fiber-optic cable with two fibers, one RX (reception) and one TX (transmission). The RX and TX taken together are considered one channel. The RX port on the SI-300 needs to be connected to the TX port on the remote device, and the TX to the RX. The SI-300 has a dedicated channel for each type of remote device, which needs to be connected to the assigned fiber-optic port. The ports are re-configurable via the front panel and computer interface.

Connect the IEEE-488 cable to the control room computer using the cable supplied.

Power Supply

The SI-300 is equipped with a universal input AC power supply that can operate from a wide range of input AC power allowing it to be used internationally without any jumper settings. The allowable input voltage rating is 100-240 VAC, 50-60Hz. Connect the power cable to an approved grounded outlet.

Opening Screen

Power on the remote modules. Press the "Power" button on the SI-300. You should observe the opening screen shown below with the device name, company name, and IEEE 488 address.

Menu Screen

After a brief setup period, the Menu Screen will appear, allowing the user to select one of four different modules by using the F1-F4 keys. Enter the page of interest and verify that the SI-300 is communicating with the remote module. The status of the device should change from "[N/A]" to "[A]" once communication is established. If it remains in the "[N/A]" mode, check that the remote device is powered on, then check that the fiber-optic cables are connected properly.
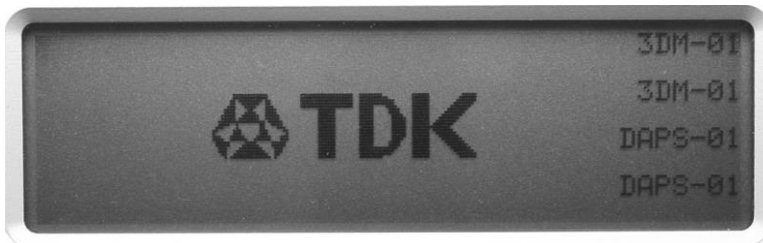
Displays up to 4 modules connected to the SI-300

CHAPTER 3
Operating Instructions

Getting Started - Front Panel Operation

The front panel of the SI-300 is designed to be user-friendly yet flexible enough to accommodate the wide variety of functions that the unit is used for.

1 The Graphical LCD has 4 general purpose Function Keys (F1-F4) for different uses, depending on the screen selected. These function keys are called "soft keys" since their function can be reconfigured by software. The screen will display a keyword (e.g. "STOP", "ZERO", etc.) next to each key depending on its current function. Some keys may be unused at a given time. Press the respective function key to perform the task described by the keyword.

2 There are four dedicated special keys that are used for various functions on the SI-300. The "MENU" key can be pressed at any time to return to the Main Menu. The "CLEAR" key can be used to clear data that has been entered on the screen. The "NEXT" key can be used to scroll through the different pages. The "ENTER" key can be used to process data from the numeric keypad.

3 Data entry is performed using the Numeric Keypad section. This includes numbers "0" through "9", a "+/-" key, and a "." key. A blinking cursor or a highlighted number indicates the current field that will be modified. Once the value has been entered, press "ENTER" for the value to take effect. Depending on the screen some numbers may be unused.

The following sections describe in detail how each different page is operated.

Menu Page

Press F1 to control this module

Press F2 to control this module

Press F3 to control this module

Press F4 to control this module

The main menu can always be reached by pressing the "MENU" key. This screen allows the user to easily maneuver through the different SI-300 modules. The SI-300 can be configured with as many as 4 different modules. These modules will be displayed on the right hand side of the screen. The module page can be accessed by pressing the corresponding "F" key. While in the menu page the "NEXT" key can be pressed to access the SI-300 options page.

Options Page

Go to **Main Menu**

Go to **GPIB Page**

Go to **Configuration Page**

The options menu can always be reached by pressing the "NEXT" key while in the main menu page. This screen allows the user to easily maneuver through the different SI-300 options.

The abbreviations and functions present on the menu screen are:

MODULE SELECT: (F1) Module Select: Pressing this key will take the user to the main menu screen where the user can choose one of four modules to operate.

GPIB ADDRESS: (F2) GPIB Address: Pressing this key will take the user to the GPIB page. This page can be used to check or change the GPIB address. The SI-300 retains the GPIB address in a serial EEPROM.

SI-300 CONFIG: (F3) SI-300 Configuration: Pressing this key will take the user to the configuration page. This page allows the user to change or configure the module on each channel (up to 4 channels). Note: The module configurations are preset at the

factory and the user should take special care when using the configuration features of the SI-300.

GPIB Page

```
GPIB ADDRESS: 22 _   (0-30)

                              EXIT
```
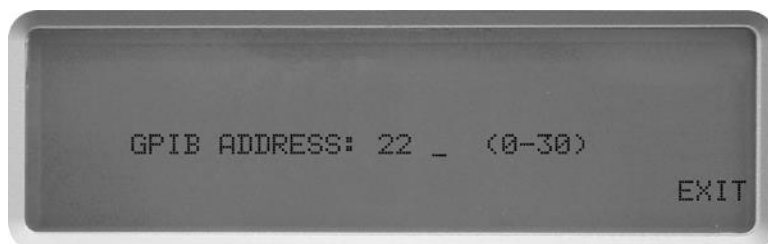
Enter a GPIB address

Return to **Main Menu**

This screen allows the user to check or change the GPIB address. Simply type in a number from 0 to 30 and then hit the "ENTER" key, and the new address will take effect. The address is stored in a serial EEPROM. The "EXIT" key can be pressed at any time to return to the main menu.

SI-300 CONFIG Page

```
                        NEXT  CHANNEL
SI-300 CONFIG
                              CONFIG
CHANNEL 1:VC-04
CHANNEL 2:VC-04
CHANNEL 3:VC-04
CHANNEL 4:  N/A               EXIT
```

Scroll through available channels

Configure the module that is currently highlighted

Return to **Main Menu**

Note: The Local Switch Module and Remote Switch Module versions of the SI-300 can only be configured by TDK RF Solutions personnel. Contact technical sales for more information.

This screen allows the user to change or configure each module on the SI-300.

The abbreviations and functions present on the configure screen are:

NEXT CHANNEL:	(F1) Next Channel: Pressing this key scrolls the user through the four available fiber optic serial channels on the SI-300. Once the proper channel is highlighted then the user can change or configure the module on this channel.
CONFIG:	(F2) Configure: Pressing this key allows the user to enter the configuration for the module that is currently highlighted. Not every module has a configuration screen.
EXIT:	(F4) Exit: This key takes the user back to the Main Menu

Positioner (Turntable/Tower/X-Y/Clamp) Module

OPERATION PAGE

Set position to zero

Set position

Go to position

Stop device during motion
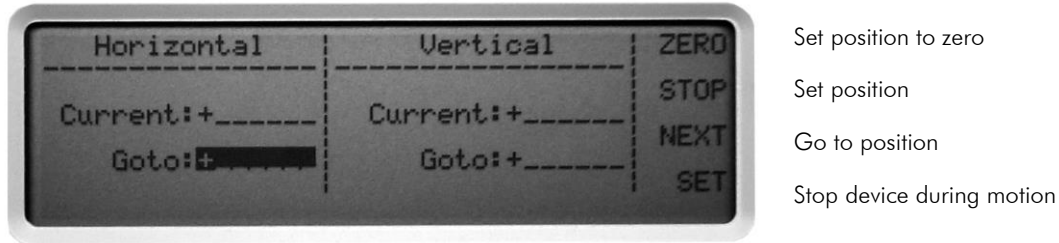
Enter the Positioner Module page by selecting appropriate F-key from the Module Page. The control page for the Tower, Clamp, and Turntable are identical except for the headings identifying the type of mechanical device. The control page for the X-Y positioner is different because it contains information for both the X and Y-axis.

The abbreviations and functions present on the positioner screens are:

ZERO:
(F1) Zero: This sets the current position to zero.

H/V:
(F1) Horizontal or Vertical. This is only displayed for the Tower. Enables the user to move the antenna in the vertical or horizontal position.

SET POS:
(F2) Set position. Enables the user to enter a position in the POSITION: field. This allows the user to specify an initial position, or to reset a present position. By pressing the "+/-" key the polarity of the value will change. Once the user has typed in a 3-digit number the "ENTER" key must be pressed for the value to take effect. This value will be maintained and updated during motion. The count is understood to be in degrees when dealing with turntables and in centimeters when dealing with linear travel machines. The value entered should be within the lower and higher limits.

SET GOTO:
(F3) Go to position. Enables the user to enter a position in the GO TO: field. By pressing the "+/-" key the polarity of the value will change. Once the user has typed in a 3-digit number the "ENTER" key must be pressed for the positioner to move to the desired position. The value should be within the lower and higher limits.

STOP:
(F4) Stop device during motion.

Each device has its own configuration page where the high and low limits can be adjusted from -999 to +999. The default configuration is +000(low limit) to +999(high limit). The limits are stored in the serial EEPROM. The positioning device can be maneuvered using the SET GOTO function key.

Enter the positioner configuration page by first going to the options page and pressing the "F3" key to go to the SI-300 configuration page. The user can scroll through each channel using the "F1"(NEXT CHANNEL) key. Once the proper positioner is highlighted the "F2"(CONFIG) key can be pressed to enter the positioner configuration page.
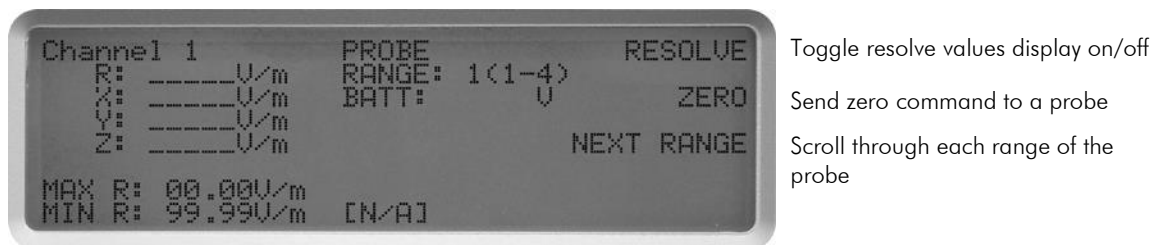
The abbreviations and functions present on the positioner configuration screens are:

PREV: (F3) Previous: Pressing this key will take the user back to the SI-300 configuration page.

EXIT: (F4) Exit: This key takes the user back to the Main Menu

This page allows the user to specify the high and low limits of the positioner. The user can press the "NEXT" key to scroll through the different limits. By using the numeric keypad and the "+/-" key the user can enter a 3-digit number for the high and low limits. Once the "ENTER" key is pressed, this number is saved in the serial EEPROM.

Probe Module Operation

Toggle resolve values display on/off

Send zero command to a probe

Scroll through each range of the probe

Enter the Probe page by pressing the appropriate F-key from the Module page. The information displayed includes the field values, the maximum and minimum readings, the battery voltage and the range setting. The maximum and minimum values are constantly being checked against the current R (resultant) reading. When the range setting of the probe is changed, the maximum and minimum values are reset.

The following is a description of the different functions present on the probe screen:

RESOLVE: (F1) Resolve: This key toggles on and off the acquisition and display of the resolved (X, Y, and Z) field values. The R (resultant) value is always displayed. The user may choose to view the resolved (X, Y and Z) values to get information on the components of the resultant field. Showing all four-field values slows down the total sample rate, and should only be enabled if the X, Y, and Z values are of interest.
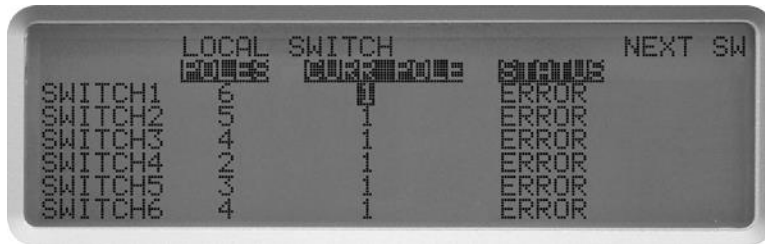
ZERO: (F2) Zero: This key sends out a zero command to the probe. This should only be done when there is no field present. The probe will calculate the offsets present at this no field condition, and correct future readings for this offset. This helps correct for drifts in the analog circuitry of the probe due to temperature or other factors.

The value displayed immediately after pressing this key will
be close to zero.

NEXT RANGE: (F3) Next Range: This key changes the current range value.
The range value goes from 1 to 4. This key scrolls through
each range of the probe.

RF Switch Module Operation

Scroll through the switches on the
page

OPERATION PAGE

Enter the RF Switch Module page by pressing the appropriate F-key from the Module page.
This page displays the status and control options for all switches connected to the particular
module. There are two different types of Switch modules available depending on the
configuration of the SI-300. The "LOCAL SWITCH MODULE" refers to any switches that are
on the rear panel of the SI-300. The "REMOTE SWITCH MODULE" refers to any switches
that are in the RSM-2. There can be up to 3 remote switch modules.

The following is a description of the different functions present on the switch screen:

POLES: This column displays the number of poles for each switch.

CURR POLE: This column displays the current pole setting. The number
that is highlighted corresponds to the current switch that can
be edited with the keypad to change the pole setting.

STATUS: This column displays the status of each switch. Each switch
has circuitry that indicates whether the switch is properly
set. If it is properly set it will display "GOOD" otherwise it
will display "ERROR".

NEXT SW: (F1) Next Switch: This key allows the user to scroll through
the different switches on the page. There are up to 6 switches
depending on the configuration.

When the proper switch has been selected using the "F1" key, the user can edit the pole
setting using the keypad. First enter the number from the keypad then press "ENTER" and
the switch will change to the desired pole.

Remote Programming

The SI-300 can be remotely programmed using an IEEE-488 bus. The address setting is done on the GPIB ADDRESS page of the SI-300. This page can be selected by pressing F2 in the Main Menu page. The address is displayed during power up and on the GPIB ADDRESS page.

SI-300 System Commands v. 3.15

COMMAND	FUNCTION
*RST	RESETS SI300
SI:**MODULE**	Returns to the Main Menu (Module) Page
SI:**MENU**	Returns to the Options Page
*IDN?	Returns "SI-300 SYSTEM INTERFACE"
SI:**CONFIGX**:**CHZ**	Configure Channel Z with module X (hex value)
	Module #(hex)
	0　　　　　　VC-03
	1　　　　　　VC-04
	2　　　　　　FP4000
	3　　　　　　FP6000
	4　　　　　　PP02-X
	5　　　　　　PP02-Y
	6　　　　　　Local Switch Module
	7　　　　　　Remote Switch Module 1
	8　　　　　　Remote Switch Module 2
	9　　　　　　Remote Switch Module 3
	A　　　　　　Preamp
	B　　　　　　3DM-01
	C　　　　　　DAPS-01
	D　　　　　　Local PreAmp
	E　　　　　　ORTHO
	F　　　　　　FL7000
	G　　　　　　FP7000
	H　　　　　　CCAVM-H
	I　　　　　　CCAVM-V
	J　　　　　　TT
	K　　　　　　MAST
	L　　　　　　DUAL-X

	M	DUAL-Y
	N	PORT
	O	N/A
SI:**CHZ**	Changes to the module page on channel Z	
SI:**Q**:**CHZ**	Returns module number on channel Z in hex format: 0 to 9 then A to B	
	"M=2" module on channel x is an FP4000	

SI-300 Probe Module Commands

COMMAND	FUNCTION
PR:**REQF**:**CHZ**	Request Resultant Field on channel Z
PR:**REQX**:**CHZ**	Request X axis reading on channel Z
PR:**REQY**:**CHZ**	Request Y axis reading on channel Z
PR:**REQZ**:**CHZ**	Request Z axis reading on channel Z
PR:**BATT**:**CHZ**	Request Battery Voltage of probe on channel Z
PR:**DISF**:**CHZ**	Only acquire and display resultant field
PR:**DISA**:**CHZ**	Acquire and display both resultant field and the components (X, Y, and Z).
PR:**REQMAXR**:**CHZ**	Request the maximum resultant field on channel Z
PR:**REQMINR**:**CHZ**	Request the minimum resultant field on channel Z
PR:**SETRNGX**:**CHZ**	Set the range of the probe to X on channel Z $1<=X<=4$

<u>**Command Variables**</u>

CH = Channel

Z = channel number, either "1" "2" "3" or "4"

SI-300 X-Y Positioner Commands

COMMAND	FUNCTION
MC:CP*SPPP.P***:CH***Z*	Change position of either axis on channel z.
MC:GO*SPPP.P***:CH***Z*	Go to command of either axis on channel Z
MC:STOP	Emergency stop the positioner
MC:ST:CH*Z*	Stop the motor of either axis on channel Z
MC:ZERO:CH*Z*	Set to zero the current position of either axis on channel Z
MC:PP:CH*Z*	Ask for current position of either axis on channel Z
MC:STATUS:CH*Z*	Ask if motion is complete in current position of either axis on channel Z (returns 1 if complete, else 0)
MC:RXAxxx:CHz	Changes the ratio for the X-Axis
MC:RCX:CHz	Sets the new X-Axis ratio as the current ratio
MC:RYAxxx:CHz	Changes the ratio for the y-Axis
MC:RCY:CHz	Sets the new Y-Axis ratio as the current ratio

Command Variables

MC = Motor Controller

CH = Channel

S = sign, either "+" or "-"

PPP = number "000" to "999" (decimal optional)

Z = channel number, either "1" "2" "3" or "4"

SI-300 Switch Module Commands

COMMAND	FUNCTION
RS:SPXY:CHZ	Set switch X to pole Y on channel Z 1<=X<=6(total of 6 switches max) 1<=Y<=9(total of 9 poles max)
RS:I:CHZ	Initialize all switches on channel Z
RS:CPXY:CHZ	Configure number of poles Y on switch X on channel Z 1<=X<=6(total of 6 switches max) 1<=Y<=9(total of 9 poles max)
RS:CSX:CHZ	Configure number of switches X on channel Z 1<=X<=6(total of 6 switches max)
RS:QPX:CHZ	Returns the number of poles in switch X on channel Z (Ex. "P=3" for 3 poles)
RS:QS:CHZ	Returns the number of switches on channel Z (Ex. "S=2" for 2 switches)

Command Variables

CH = Channel

Z = channel number, either "1" "2" "3" or "4"

SI-300 3DM-01 Commands

COMMAND	FUNCTION
MC:GO_SPPP_**:CH**_Z_	Go to command of either axis on channel Z
MC:PP:CH_Z_	Ask for current position of either axis on channel Z
MC:STOP	Emergency stop the 3-D manipulator
MC:ST:CH_Z_	Stop the motor of either axis on channel Z
MC:ZERO:CH_Z_	Set to zero the current position of either axis on channel Z
MC:CP_SPPP_**:CH**_Z_	Change position of either axis on channel Z
MC:STATUS:CH_Z_	Queries the status of motion (reports 1 as complete, else 0)
MC:RHDxxx:CHz	Changes the ratio for the 3DM – Heavy Duty
MC:RCH:CHz	Sets the new 3DM-Heavy Duty ratio as the current ratio
MC:RLDxxx:CHz	Changes the ratio for the 3DM – Light Duty
MC:RCL:CHz	Sets the new 3DM – Light Duty ratio as the current ratio

Command Variables

$S=$ sign, either "+" or "-" MC = Motor Controller

PPP or PPP.P= number "000" to "999" (decimal optional)

$Z=$ channel number, either "1" "2" "3" or "4"

SI-300 DAPS-01 Commands

COMMAND	FUNCTION
MC:GO*SPPP*:CH*Z*	Go to command of either axis on channel Z
MC:PP:CH*Z*	Ask for current position of either axis on channel Z
MC:STOP	Emergency stop the 3-D manipulator
MC:ST:CH*Z*	Stop the motor of either axis on channel Z
MC:ZERO:CH*Z*	Set to zero the current position of either axis on channel Z
MC:CP*SPPP*:CH*Z*	Go to the desired position of either axis on channel Z
MC:V1:CH*Z*	Rotates the antenna's vertical polarization +90° on channel Z
MC:V2:CH*Z*	Rotates the antenna's vertical polarization -90° on channel Z [future use]
MC:H1:CH*Z*	Rotates the antenna's horizontal polarization -90° on channel Z
MC:STATUS:CH*Z*	Queries the status of motion (reports 1 as complete, else 0)
MC:POL:CH*Z*	Queries the polarization of the antenna
MC:RDPxxx:CHz	Changes the ratio for the DAPS
MC:RCD:CHz	Sets the new DAPS ratio as the current ratio

Command Variables

S= sign, either "+" or "-"

MC = Motor Controller

PPP or PPP.P= number "000" to "999" (decimal optional)

Z= channel number, either "1" "2" "3" or "4"

Service

Replaceable Parts

The SI-300 contains no user replaceable parts. For service, contact a TDK RF Solutions Sales and Support Office.

Service and Ordering Information

To request service, to place an order, or to learn more about the TDK RF Solutions products that best meet your needs, contact your TDK representative:

TDK RF Solutions Inc.
1101 Cypress Creek Rd.
Cedar Park, Texas 78613 USA
Phone: 512-258-9478
Fax: 512-258-0740
E-mail: info@tdkrf.com
World Wide Web: www.tdkrfsolutions.com

Maintenance

The design of the SI-300 is such that little or no maintenance is required under normal usage. To ensure years of uninterrupted service from SI-300, perform the following procedures:

1 Inspect the SI-300 on a regular basis to make sure that the unit is clean and functioning properly, and all cables and connectors are securely fastened and in good condition.

2 Tighten the screws that mount the unit to the rack. Vibration caused by equipment operation may loosen screws over time.

3 Verify that the product has not been damaged in any way. If damage has occurred, it should be repaired properly. Call your TDK RF Solutions representative to request service. Physical damage to the product should be repaired prior to placing it in service.

Perform the recommended maintenance every three months. This time may be varied depending on the frequency of use.

APPENDIX C
Warranty

TDK RF Solutions Inc. warrants to the end-user customer that this product, exclusive of software (referred to herein as "Hardware" or "Product") will be free from defects in material and workmanship for a period of one (1) year from date of shipment. If TDK RF Solutions receives notice of any such defects during the warranty period, TDK RF Solutions will, at its option, either repair or replace the Product which it finds to be defective at no charge (except for shipping and insurance). Repair of defective Product may be with either new or rebuilt replacement parts that will be warranted for the remainder of the original warranty period. Any exchanged parts under this warranty will become the property of TDK RF Solutions. Replacement Product may be either new or reconditioned. If the Product is discontinued and no longer available, then it may be replaced with Product determined by TDK RF Solutions to be of similar value and performance.

TDK RF Solutions warrants to the end-user customer that the TDK RF Solutions-branded software included with the Product (herein referred to as "TDK Software") when properly installed and used will materially operate in material conformance with the specifications found in the user documentation, for a period of ninety (90) days from the date of purchase. If TDK RF Solutions receives notice of any defects in materials or workmanship in the TDK Software media during the warranty period, TDK RF Solutions will replace the TDK Software media which it finds to be defective at no charge (except for shipping and insurance).

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This Limited Warranty extends only to the original end-user customer and is not transferable to any subsequent purchaser. This Limited Warranty is void if items are shipped outside the USA without prior knowledge of TDK RF Solutions.

A return authorization is required for repairs under warranty. In order to obtain warranty service, you must deliver the Product to TDK RF Solutions freight prepaid, in either its original package or packaging providing a degree of protection equivalent to that of the original packaging, along with proof of purchase. [Please contact TDK RF Solutions at the number listed below for further information.]

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