

4861/2361 Errata

E.1 INTRODUCTION

This Errata contains additional information and changes to the manual caused by the introduction of the Model 2361 Serial-to-Analog Interface.

E.2 GENERAL INFORMATION

Revision 02.04 of the 4861/2361 series units provided the following changes:

1. Improved GPIB performance.
2. SCPI command additions for configuring the serial interface. See SYSTEM subsystem changes in Table 3-2. The new commands are defined in the Table 3-3 change pages.
3. SCPI command additions to set unit default values in the E²ROM. See CALibrate subsystem changes in Table 3-2. The new commands are defined in Table 3-3 change pages.
4. SCPI notes clarified. The SCPI lists format is (@ space 1,2,3,n) or (@space 1:n). Examples are: (@ 1,2) or (@ 1:4). The space between the @ and the first number were hard to distinguish in the examples. (@ 1,2,...n) is not a true format, rather it means the list of items can be up to n characters long.

E.3 CE APPROVAL

EMI/RFI WARNING inside the front cover modified to include the 2361 as having passed the FCC and CE tests.

Paragraph 1.13 modified to include the 2361's CE certificate.

E.4 SERIAL PROGRAMMING SECTION

New 3.9 section added to the manual to cover the operation of the serial interface. See pages 7 - 10 of this errata.

Figure 1-5 2361 Certificate of Compliance

TABLE 3-2 SCPI COMMAND TREE

Keyword	Parameter Form	Notes & Single Letter Commands
SYSTem		System Address
:COMMunicate		
:GPIB		4861 and OEM Bd
:ADDRes	0 - 30 [4]	
:EXTernal	0 1 or OFF ON [0]	
:MODE	SINGLE DUAL SECONdary	
:SERial (13)		2361 and OEM Bd
[:RECeive]		
:BAUD	<numeric value> [9600]	
:PARity	EVEN ODD [NONE]	
:BITS	7 [8]	
:SBITs	[1] 2	
:NETwork	[OFF] ON	
:ADDRes	0-15 [4]	
:ERRor?	(0, "No error")	
:VERSion?	(1994.0)	
CALibrate		Calibrate
:SOURce		
:OFFset	numeric list	DO
:MEASure		
:GAIN	numeric	AC
:OFFset	numeric	AO
:IDN	string	
:DATE	mm/dd/yy	
:FAULT	1(On) 0(Off) [0]	
:LOCK	1(On) 0(Off) [0]	
:DEFault		
:TABLE		

**TABLE 3-3 SCPI COMMANDS AND QUERIES
(CONTINUED)**

Keyword	Default Value	Description
SYSTem	-	Starts System command branch.
:COMMunicate	-	Identifies communication subsystem commands
:GPIB	-	Controls GPIB (IEEE 488) port settings
ADDRess(1)	04	Sets GPIB primary address. Values = 0 - 30 for Single mode, 0-29 for Dual mode and 1 to 30 for Secondary addressing. Provide 70 ms delay after an address change before next command Note - The GPIB address and the serial address are the same parameter. Changing either one, changes both settings.
:ADDRess?		Returns 0 - 30 for 4863 primary address.
:EXTernal	OFF	Enables an external address switch to be used to input a switch setting for the GPIB address instead of the value saved in E ² ROM.. Values = 0 1 or OFF ON.
:MODE	SINGLE	Selects GPIB address mode. Single mode uses one primary address to transfer data with commands. Dual enables two consecutive primary addresses. Secondary uses one primary address and secondary address 00 and 01. The higher address is used for transparent data transfer. Values = SINGLE DUAL SECondary. Provide 70 ms delay after a mode change to next command.
:SERial		Controls Serial Interface settings
:BAUd	9600	Sets serial baud rate. Values = 600, 1200, 2400, 4800, 9600, 19200 and 38400. Rate change becomes effective for the next command.
:PARity	NONE	Sets serial parity. Values = EVEN, ODD or NONE.

**TABLE 3-3 SCPI COMMANDS AND QUERIES
(CONTINUED)**

Keyword	Default Value	Description
:BITS	8	Sets number of data bits per character. Values= 7 8.
:SBITs	1	Sets number of stop bits between characters. Value = 1 2.
:NETwork	OFF	Sets full-duplex, point-to-point operation or half duplex network mode. When network is enabled, every serial message has to be preceded by a two character, <STX><Addr> sequence. Values are ON and OFF.
:ADDRess	4	Sets network address. Values are 0 to 15 for <Addr> character values of 30 to 3F hex. Provide 70 ms delay after an address change before next command. Note - The serial address and the GPIB address are the same parameter. Changing either one, changes both settings.
:ERRor?	0, "No error"	Requests next entry in 4863's error/event queue. Error messages are: 0, "no error" -100, "Command error" -200, "Execution error" -400, "Query error"
:VERSion?	1994.0	4863 returns the <value> of the applicable SCPI version number.

**TABLE 3-3 SCPI COMMANDS AND QUERIES
(CONTINUED)**

Keyword	Default Value	Description
<p>CALibrate</p> <p>:DEfault</p> <p>:TABLE</p>	<p>-</p> <p>-</p>	<p>Starts Calibrate branch</p> <p>Sets values in E2ROM to factory defaults and performs the *SAV 0 function. Does not affect the CALibrate:SOURce or :MEASure calibration settings.</p> <p>Sets CALibrate:SOURce and :MEASure calibration values in the E2ROM to the initial settings and performs the *SAV 0 function. The initial settings are nominal values so the unit will function and run its calibration program. Analog signal accuracy is not guaranteed after running this command.</p> <p>CAUTION - This command overwrites any saved calibration values</p>

3.9 SERIAL INTERFACE OPERATION

Units with serial interfaces are controlled the same as with the GPIB interface. The commands are the same except for those specific to setting the GPIB address or the serial format and network address. The major difference is that the serial interface cannot generate an SRQ. A Service Request Message is the serial equivalent of asserting the SRQ line.

Multiple 2361s can be operated on one serial link by connecting them to an RS-485 network. Each unit is set to a different address just as is done with GPIB devices. When the network function is enabled, each unit will only respond to messages prefixed with its address sequence. (See paragraph 1.5.2)

3.9.1 Prompts and Response formats

The 2361's serial interface is factory set to operate at 9600 baud, with 8 data bits, 1 stop bit and no parity. At power turn-on, the RS-232 interface defaults to echo on for terminal operation. The echo function can be disabled for computer operation by sending the unit a CNTL-F. Sending the unit a CNTL-E turns the echo back on. The RS-485 interface is designed for half-duplex computer operation and does not support echo-back operation.

For terminal operation, echo should be on. With echo on, the unit will echo back the command or query, output a response if one is required and a prompt.

For program operation, echo should be turned off. With echo off, the unit will respond to a command by returning a prompt when ready for the next command. The unit will respond to a query with the response string. The user's program should check and wait for the expected prompt or response before sending the unit another command.

The prompt formats are:

<u>Echo</u> <u>back</u>	<u>RS-232</u> <u>Prompt</u>	<u>RS-485</u> <u>Prompt</u>	<u>Message</u> <u>Terminator</u>	<u>Prompt</u> <u>Sent</u>
On	CR LF > sp	n/a	CR LF	Always
Off	> LF	> LF	LF	After Cmds

3.9.2 Terminal Operation Examples

The following examples show the unit's response to user commands in bold type.

e.g. Terminal command with echo on:

```
CNTL-E          'power on default
*ESE 255 CR LF
*ESE 255 CR LF
CR LF > space
```

e.g. IDN query from a terminal with echo on:

```
*IDN? CR LF
*IDN? CR LF
ICS Electronics Corp., 2361, S/N 123456, Rev 00.00 CR LF
CR LF > space
```

where: LF is the linefeed character (HEX 0A)

CR is the carriage return character (HEX 0D)

3.9.3 Program operation examples

Send CNTL-F before any serial commands to turn echo off.

e.g. Program command with echo off:

```
*ESE 255 <LF>
> LF
```

e.g. Program IDN query with echo off:

```
*IDN? <LF>  
ICS Electronics Corp., 2361, S/N 123456, Rev 00.00 LF
```

e.g. Program baud rate change with echo off:

```
SYST:COMM:SER:BAUD 4800 <LF>      9600 baud  
> LF                                4800 baud  
*SAV 0<LF>                          4800 baud  
> LF                                4800 baud
```

where: <LF> or LF is the linefeed character (HEX 0A)

3.9.4 Programming Suggestions

For DOS programming, some languages have commands that give you access to the computer's serial ports. Two such languages are Quick Basic or Visual Basic.

For Windows 3.1 programming, use a serial command library to get control of the computer's serial ports. Recommended communication utility packages are:

COMBIOS from ICS Electronics
Phone 1-800-952-4499

COMM-DRV from Willies Computer Software Co.
2470 So. Dairy Ashford, Houston TX 77077.
Phone 713-498-4832.

Send the unit a CNTL-F character as part of the unit's initialization sequence before sending any other commands. Write the output routine to send the command string and terminate it with a linefeed. For commands, read the RX buffer until the prompt and linefeed character are received. For a query, read the RX buffer until the response and linefeed termination character are received.

3.9.5 Network Programming

Programming for network operation is the same as programming for direct serial control except that each command is preceded by the unit's two character address sequence. Each unit on a network must have a unique address. For a unit set to the factory default address of 4, the examples in 3.9.3 become:

e.g. Program command (echo off):

```
<STX> 4 *ESE 255 <LF>  
> LF
```

e.g. Program IDN query (echo off):

```
<STX> 4*IDN? <LF>  
ICS Electronics Corp., 2361, S/N 123456, Rev 00.00 LF
```

where: <LF> or LF is the linefeed character (HEX 0A)
<STX> is the Start Text character (HEX 02)

Note that when setting up the network, it is easier to set and save the unit's address before enabling the network operation. Use the **SYST:COMM:SER:NET:ADDR** command to change the unit's address and ***SAV 0** to save it. Verify the address change by a query or by watching the LEDs at power turn-on.

Use the **SYST:COMM:SER:NET ON** command to enable networking. WARNING - All subsequent commands after this command will only be recognized if they are prefixed with the correct address sequence.

To make the network mode the power-on default, use the **<STX> addr *SAV 0** command to save the configuration. Use **<STX> addr SYST:COMM:SER:NET OFF** to disable networking.