

SR192 Firmware Release History

The purpose of this support note is to document the SR192 firmware revision history and describe any effects each release has on previous releases.

It is Talon Instruments goal to provide hardware and software that is 100% operational, however it is sometimes required to correct “undocumented features” that occasionally surface. In addition the modular concept of the SR192 requires that the firmware be updated every time a new module is developed in order for the system to initialize and program it.

Overview

The SR192 firmware is broken up into four sections:

- System support
- VXI WS parser
- SCPI parser
- SCPI execution code

The system support code includes the interrupt service routines, power on self test code, resource management code and the I/O drivers.

The VXI WS parser manages the word serial protocol and execution.

The SCPI parser performs the syntax checking of the SR192 command language.

The SCPI execution code performs the action once a valid SR192 SCPI is received.

Revision History

The following text will describe each revision by describing the new features added in the release and the “bugs” corrected from the previous release.

1.00 Released 5/3/95

Initial release of the SR192 firmware.

1.01 Released 5/25/95

Code fixes

ROUT:PATH:DEFINE query returned incorrect data for the SR112 modules.

TIMING:SETUP:TSINPUT2 query generates a parameter error.

TIMING:PAGE query adds one to the page after each query.

Eight bit memory modules (SR102, SR104, SR112) not programmed correctly.

TABLE:DATA and TABLE:MEMORY:DATA event and query data reversed from each other.

New Features

None.

Compatibility

Full compatibility with revision 1.00

1.02 Released 6/2/95

Code fixes

EXECUTE:SEQUENCE command programming the wrong table address.

New Features

None.

Compatibility

Full compatibility with revision 1.01

1.03 Released 8/17/95

Code fixes

None

New Features

Added SR114 I/O module support.

New Commands:

- INPUT:MSTROBE <group>,(TSSTROBE1 | FCNTL1)
- CHANNEL:MODE <group>,(HOLD | INCR<n> | RT<a> | SERIAL | MULTIPLEX)

Where <n> = 1, 2, 4 or 8 and <a> = O, Z, C.

Compatibility

Adding new commands can cause the SCPI parser to slow down. See the section on Asynchronous events.

1.04 Released 8/28/95

New development system build.

Code fixes

None

New Features

None.

Compatibility

Full compatibility with revision 1.03

1.05 Released 9/7/95

Code fixes

TABLE:DEFINE command causes error when defining tables for TSA and TSB separately

New Features

None.

Compatibility

Full compatibility with revision 1.04

1.06 Released 12/14/95

Code fixes

ROUTE:PATH:DEFINE didn't clear the used channel list if a syntax error occurred in the channel list.

Restricted channel groups only to modules of the same type.

New Features

Added SR107/SR106 support.

New Commands:

- EXECUTE:FIELD <group>,<data>
- OUTPUT:REGISTER:SOURCE <group>,(TSST<n> | FCNTL<n> | CSTROBE | CLKOUT)

Where <n> = 1 or 2.

Command Modifications:

- OUTPUT:ENABLE - Added CSTROBE, ALWAYS and NEVER to <source>.
- INPUT:STROBE - Added CSTROBE and TRANSPARENT to <source>

Compatibility

Adding new commands can cause the SCPI parser to slow down. See the section on Asynchronous events.

1.07 Released 1/23/96

Code fixes

TABLE:DATA causes system hang-up if eight and sixteen memory modules installed in the same system.

New Features

Added SR101 support.

New Commands:

- EXECUTE:SEQ <seq_num>,<cycle_name>
- SEQUENCE:INITIALIZE <seq_num>,<size>
- SEQUENCE:JUMP <seq_num>,<jump_seq>[,<condition>]

- SEQUENCE:GOSUB <seq_num>,<gosub_seq>[,<condition>]
- SEQUENCE:TIMING <seq_num>,<next_cycle_name>
- SEQUENCE:TABLE <seq_num>,<table_name>
- SEQUENCE:STOP <seq_num>,(ON | OFF)

Compatibility

Adding new commands can cause the SCPI parser to slow down. See the section on Asynchronous events.

1.08 Released 2/27/96

Code fixes

INPUT:ADELAY command with SR105 module not working.

TABLE:MEMORY:FILL command allowed operator to rotate more than the number of channels.

New Features

Motherboard EMA, Error Memory Address, now tested during POST.

SR110 now tested for installation during POST.

Compatibility

Full compatibility with revision 1.07

1.09 Released 3/27/96

Code fixes

SR114 module not initialized correctly during POST.

Valid level 5 interrupt not being masked after initial generation, causes system to continuously service the interrupt.

New Features

Added A24/A32 selector for memory configuration. Requires SR192-CPU revision 'F'.

Modified Commands:

- SEQUENCE:TIMING - Added jump timing set parameter.

Compatibility

Full compatibility with revision 1.08

1.10 Released 4/8/96

Code fixes

SR101 sequence loop error.

New Features

Soft reset modified to perform firmware update.

Compatibility

Full compatibility with revision 1.09

1.11 Released 6/3/96

Code fixes

None

New Features

Added SR115 support.

Compatibility

Full compatibility with revision 1.10

1.12 Released 7/22/96

Code fixes

TABLE:MEMORY:WORD query returned incorrect data for groups greater than 64 channels.

New Features

New Commands:

- OUTPUT:RESET (HIGH | LOW | PULSE,<100mil_ticks>)
- OUTPUT:ENABLE:DELAY <group>,(1-4)
- INPUT:STROBE:DELAY <group>,(1-4)

Modified Commands:

- *STB? - Bit 2 is HALT, Bit 1 is BUSY.
- MODULE:STATUS? - I/O modules do not return bits 1-4.
- OUTPUT:ENABLE => OUTPUT:ENABLE[:STATE]
- INPUT:STROBE => INPUT:STROBE[:STATE]

Compatibility

Adding new commands can cause the SCPI parser to slow down. See the section on Asynchronous events.

1.13 Released 8/22/96

Code fixes

TABLE:DEFINE error when DRA1-DRA6 all static and linked with TSB.

POST error testing all of SR101 timing memory.

SEQUENCE:DEFINE with SR101 fully supported.

New Features

New Command:

- SEQUENCE:RESET <sub_seq>

Modified Commands:

- All SR101 sub sequences can be specified as either (<seq_name>,<sub_seq#> | <sub_seq_addr>).

Compatibility

Adding new commands can cause the SCPI parser to slow down. See the section on Asynchronous events.

1.14 Released 10/1/96

Code fixes

ROUTE:PATH:DEFINE didn't clear the used channel list if a syntax error occurred in the channel list.

EXECUTE:SEQUENCE command now supports SR101.

New Features

New Command:

- TABLE:JENABLE <table>,(ALL | NONE | <txfr>,(ON | OFF))

Modified Command:

- EXECUTE:TIMING - Parameter list <cycle>,<table> => <cycle>,(<table> | <FMA>,<count>)

Compatibility

Only supports SR101 timing module up to revision "C". Adding new commands can cause the SCPI parser to slow down. See the section on Asynchronous events.

1.16 Released 11/8/96

Code fixes

CHANNEL:MODE command no longer generates an error for HOLD mode on I/O modules that don't have channel mode support.

OUTPUT:REGISTER:SOURCE command no longer generates an error on dynamic I/O modules when "STIM_LOAD" is selected.

INPUT:ADELAY command programmed both TSA and TSB.

SEQUENCE:DIRECTORY? Query with SR101.

TABLE:DELETE command was not copying all the memory from tables shifted in memory.

New Features

Sequence allocation routines added for SR101.

New Commands:

- SEQUENCE:BRANCH? (<Seq>,<sub_seq#> | <sub_seq_addr>)

Modified Commands:

- TIMING:TEST:CELL? - Added.
- TABLE:JEN? - Added
- SEQUENCE:JUMP and SEQUENCE:GOSUB - Removed ERR FALSE and CTIM FALSE parameter choices. Added JEN and NONE.

Compatibility

Supports SR101 revisions “D” and later. Adding new commands can cause the SCPI parser to slow down. See the section on Asynchronous events.

1.17 Released 1/3/97

Code fixes

None

New Features

Modified Commands:

- OUTPUT:ENABLE:DELAY - 2nd parameter was 1-4, now 0-3.
- INPUT:ENABLE:DELAY - 2nd parameter was 1-4, now 0-3.

Compatibility

Full compatibility with revision 1.16.

1.18 Released 1/4/97

Code fixes

TABLE:MEMORY:FILL error

New Features

None

Compatibility

Full compatibility with revision 1.17.

1.19 Released 1/30/97

Code fixes

TABLE:MEMORY:FILL error

New Features

None

Compatibility

Full compatibility with revision 1.18.

1.20 Released 3/19/97

Code fixes

Slow external clock reports error, increased delay when writing synchronized command register.

EXECUTE:MODE RESET problem when no SR_CLK programmed in timing cycle.

New Features

Error generated when OUTPUT:REGISTER:STATE command used on input only group.

SR120/SR211 prototype support added.

New Commands:

- INPUT:PROBE:MODE (AUTO | ACQUIRE | PULSE | MANUAL | RESET)
- INPUT:PROBE:STATUS?
- INPUT:PROBE:SWITCH <switch>,<function>
- INPUT:PROBE:REFERENCE:LOGIC (TTL | ECL | LV)
- INPUT:PROBE:REFERENCE:HIGH[:DATA] <value>
- INPUT:PROBE:REFERENCE:LOW[:DATA] <value>
- MEASURE:VOLTAGE?

Modified Command:

- INPUT:STROBE:SOURCE - Added TSSTROBE1 parameter to SR114 and SR115 groups. Revision "E" (SR114) and "D" (SR115) required.

Compatibility

Adding new commands can cause the SCPI parser to slow down. See the section on Asynchronous events.

1.21 Released 4/21/97

Code fixes

CALCULATE:PCRC? With SR101 error.

New Features

None

Compatibility

Adding new commands can cause the SCPI parser to slow down. See the section on Asynchronous events.

1.22 Released 5/16/97

Code fixes

OUTPUT:SYNC:POSITION with SR101 not programmed correctly.

SR101 sequence programming commands don't check the subsequence for lower limit violation.

New Features

None

Compatibility

Full compatibility with revision 1.21.

1.23 Released 6/2/97

Code fixes

SR101 sequences not assigned the correct address with TSA and TSB.

SEQUENCE:TIMING? Query does not return correct data with SR101 in TSB.

SEQUENCE:LOOP? and SEQUENCE:BRANCH? Queries return error when first subsequence selected.

New Features

POST and *TST? Now test SR211 Pod EEPROM test bit. Requires revision 1.1 firmware be installed in the SR211 Pod.

Compatibility

Full compatibility with revision 1.22.

1.24 Released 7/1/97

Code fixes

*OPC/*OPC? And *WAI error when both TSA and TSB used.

New Features

None

Compatibility

Full compatibility with revision 1.23.

1.25 Released 8/5/96

Code fixes

Interrupt level 5 sometimes causes system to lock up if the interrupt was generated before level 5 mask is set.

Pending operation fix in 1.24 not working. Re-structured code to correct.

Firmware update problem from 1.24 to 1.25. Make sure Self Test and Execution tasks are not active prior to soft reset.

Channel lists greater than 256 characters causes a syntax error, increased buffer size to 650.

Modified error reporting function so that more detailed error messages can be generated.

New Features

SR211PI support added.

New Commands:

- INPUT:PROBE:STROBE[:SOURCE] (TSSTROBE_n | FCNTL_n | TSOUT5 | PRBDAT)
- INPUT:PROBE:STROBE:DELAY (0 - 7)
- INPUT:PROBE:ORDELAY (ON | OFF)

Compatibility

Probe data on the SR211PI is located on the SR211PI board instead of the timing module. Adding new commands can cause the SCPI parser to slow down. See the section on Asynchronous events.

1.26 Released 8/22/97

Code fixes

Probe CRC still using the timing module memory instead of the SR211PI memory.

New Features

None.

Compatibility

SR120/SR211 prototype no longer supported.

1.27 Released 8/27/97

Code fixes

None.

New Features

SR122 support added.

Compatibility

Adding new commands/modules can cause the SCPI parser to slow down. See the section on Asynchronous events.

1.28 Released 9/19/97

Code fixes

Discovered pending operation fix in revision 1.25 causes SCPI execution time to increase. Restored pending operation code to pre 1.25. Verified correct operation between TSA and TSB.

INPUT:MSTROBE? Query doesn't return the correct setting.

SR115 groups assigned as multiplex mode were being assigned as bi-directional.

Update problem still exists. Caused by the uninitialized data space not being initialized after a soft reset.

New Features

None.

Compatibility

Updating firmware from revision 1.25, 1.26 and 1.27 requires a hard reset (SYSRESET) to be generated from the chassis. Adding new commands can cause the SCPI parser to slow down. See the section on Asynchronous events.

1.29 Released 1/16/98

Code fixes

None

New Features

Added SR210 support.

Compatibility

Adding new commands can cause the SCPI parser to slow down. See the section on Asynchronous events.

1.30 Released 4/9/98

Code fixes

SR114 serial mode bug fixed.

New Features

Added SR121 support.

Compatibility

Adding new commands can cause the SCPI parser to slow down. See the section on Asynchronous events.

1.31 Released 8/5/98

Code fixes

I/O module POST memory test not reporting errors correctly.

Scientific notation entry of <numeric> parameters corrected.

SEQ:LOOP?, SEQ:BRANCH? And SEQ:JUMP/GOSUB command errors corrected.

CALC:EMEM:ADDR? error corrected.

New Features

Modified routine that enables the output drivers to handle static only systems as well as TSA/TSB specific I/O modules.

Driver power now disables after the pending operation flag is reset.

Modified the pending operation commands (*OPC, *OPC? And *WAI).

Finished adding SR214, SR210 and SR121 support.

New Commands:

- INPUT:PROBE:VERSion?
- OUTPut:PGMClk<n>[:DATA] (0 to 50e6)
- OUTPut:PGMClk<n>[:DATA]?
- OUTPut:PGMClk1:RESet
- OUTPut:PGMClk1:REFerence (INTernal | EXTernal)
- OUTPut:PGMClk1:REFerence?
- OUTPut:CLK<a>[:STATe] <boolean>
- OUTPut:CLK<a>[:STATe]?
- OUTPut:CLK<a>:DELay (0 - 7)
- OUTPut:CLK<a>:DELay?
- OUTPut:CLKC:REFerence:HIGH[:DATA] (-8.0 - +8.0)
- OUTPut:CLKC:REFerence:HIGH[:DATA]?
- OUTPut:CLKC:REFerence:LOW[:DATA] (-8.0 - +8.0)
- OUTPut:CLKC:REFerence:LOW[:DATA]?

Compatibility

Adding new commands can cause the SCPI parser to slow down. See the section on Asynchronous events.

1.32 Released 9/8/98

Code fixes

“INPut:REFerence:HIGH/LOW” commands using the “OUTPut:REFerence:SElect” volotage group selection.

Enable/strobe delay register not programmed correctly on SR122, SR123 and SR214 modules.

New Features

None

Compatibility

Full compatibility with revision 1.31.

1.33 Released 10/29/98

Code fixes

SR121 installed causes the POST error for probe memory to be generated.

Extended error message not formatted correctly.

New Features

None

Compatibility

Full compatibility with revision 1.32.

1.34 Released 3/16/99

Code fixes

The reference "INCRement" commands not supporting the 10mV resolution of the SR210.

"CLKOUT" being returned as the output register source instead of "STIM_LOAD"

"INPut:PROBe:REFeRence:DATA command not testing for a valid range (-10.0 to +10.0).

"OUTPut:CLK<a>:STATe? not returning the correct value.

"OUTPut:CLK<a>:DELay? not returning the correct value.

"OUTPut:CLKC:DELay not generating an error.

"OUTPut:RESet (HIGH | LOW),<numeric>" not generating an error.

New Features

"CALCulate:EMEMory:ADDReSS? 0" returns the present memory address.

Compatibility

Full compatibility with revision 1.33.

1.35 Released 12/2/99

Code fixes

SR211 reporting POST errors due to a change made in revision 1.31.

New Features

None.

Compatibility

Full compatibility with revision 1.34.

1.36 Released 7/11/00

Code fixes

Corrected self test code for SR214, SR122 and SR123 I/O modules.

New Features

Increased the output buffer from 6.5K to 25K to support table and sequence directories larger than 1K.

Compatibility

Full compatibility with revision 1.35.

1.37 Released 8/21/00

Code fixes

Corrected routine to detect uninstalled modules.

New Features

Added SR214S support.

Compatibility

Full compatibility with revision 1.36.

1.38 Released 5/9/01

Code fixes

Corrected TABLE:DELETE command causing "Settings Conflict" error.

New Features

None

Compatibility

Full compatibility with revision 1.37.

1.39 through 1.42 Released 2/02

These versions were not officially released but are included in this document for completeness only.

1.43 Released 5/3/02

Code fixes

Corrected SR210 references from getting out of sync with the SR192 processor causing the SR210 references to become unpredictable.

New Features

None

Compatibility

Full compatibility with revision 1.38.

Asynchronous Events

When a user upgrades SR192 firmware and the new system does not execute the test set that the previous firmware did, the most common reason is command conflicts with pending operations. This section will discuss the concept of pending operations as they pertain to the SR192 and how to resolve these conflicts.

There are two types of commands in the SR192 command language, synchronous and asynchronous. Synchronous commands generate an event or query response and are completed before the next sequential command is parsed and executed. For example the "TABLE:DIRECTORY?" command causes a query response to be placed in to the SR192 output buffer. Once the query data is placed in to the output buffer the command is complete and the next command in the input queue will be parsed and executed.

Asynchronous commands start an event or query, called a **Pending Operation**, and command parsing continues, possibly before the pending operation finishes. For example the "EXECUTE:TIMING TIM1,DAT2" command starts a timing generator sequence and is then considered complete. The sequence could take minutes or even hours to complete. During that time it is often necessary to query the SR192 to determine if the sequence is done because several commands will generate an "Execution Error" if they are sent while a pending operation is true.

There are three commands that can be used to test and synchronize pending operations, *WAI, *OPC and *OPC? discussed below.

1. *WAI This command forces the command parser to halt until the pending operation is complete. The only way to clear this wait condition is to send a low level word serial clear command (0xFFFF).
2. *OPC This command sets a bit in the Event Status register when the pending operation is complete, Bit 0 = OPC bit.
3. *OPC? This command places an ASCII "1" in the SR192 output buffer.