SRC20
Signal Generator

User Manual

Larson•Davis Inc.
1681 West 820 North
Provo, UT 84601-1341
Phone: (801) 375-0177
FAX: (801) 375-0182
www.lardav.com

P/N: ISRC20.01

Copyright

Disclaimer

The following paragraph does not apply in any state or country where such statements are not agreeable with local law:

Even though Larson•Davis, Inc. has reviewed its documentation, Larson•Davis Inc. makes no warranty or representation, either expressed or implied, with respect to this documentation. This documentation is subject to change without notice, and should not be construed as a commitment or representation by Larson•Davis Inc.

This publication may contain inaccuracies or typographical errors. Larson•Davis Inc. will periodically update the material for inclusion in new editions. Changes and improvements to the program described in this manual may be made at any time.

Please examine your instrument and record the following information below. You may be asked to give this information in any future communications you have with Larson•Davis, Inc.

SRC20 Serial # _____

Table of Contents

Chapter 1 Introduction 1-1

About This Manual 1-1
About This Chapter 1-2
Formatting Conventions 1-2
Features 1-3
SRC20 Components 1-4
System Diagram 1-6
Getting Started 1-6
Unpacking and Inspection 1-7
Accessories and Optional Equipment 1-7
Connecting Internal or External Power 1-8
Automatic Battery Save 1-9
Quick Start 1-9
Environmental Considerations 1-10

Chapter 2 Setting Up and Using the SRC20 2-1

Menu Items 2-4
Noise Function 2-4
Sine Function 2-5
Memory 2-7
Setup Examples 2-8
EXAMPLE 1 2-8
EXAMPLE 2 2-8

App. A Technical Specifications A-1

Pseudo Random Noise Characteristics A-4

App. B Serial Port Interface Remote Control B-1

Interface Cables B-1
Commands B-2

CHAPTER

1 *Introduction*

Welcome to the Larson•Davis SRC20 Function Generator. Although many users discover the features and operation of the SRC20 by glancing at its keypad, we invite you to read this manual to get the most out of your new Larson•Davis function generator.

About This Manual

This manual has 2 chapters and 2 appendices covering the following topics:

- Chapter 1 - Introduction*:* overview of this user manual and the SRC20's features & functions; unpacking the SRC20; quick start procedures.
- Chapter 2- Setting Up and Using the SRC20*:* overall system setup; description of each key along with its function and displays; working with menus.

Appendices

- Appendix A - Technical Specification: Technical Discussion and Specifications*:* listing of electronic, environmental, and physical characteristics of the SRC20.
- Appendix B - Serial Port Interface Remote Control: How to control the SRC20 using remote commands.

Index

About This Chapter

Specifically, this introductory chapter covers the following topics:

- Formatting Conventions: Explanation of the fonts and other formatting conventions used in this manual.
- Model SRC20 Features: A listing of the characteristics of the SRC20 keypad and function.
- Getting Started: Instructions for unpacking, inspecting and initially assembling the SRC20.

Formatting Conventions

This manual uses the following format conventions:

In step-by-step directions, the *process* (what you do) is shown in the left column, and the *rationale* (why you do it) with other cautions and comments are shown in the right column.

You may get out of the menu at any time by hitting the MUTE key or the SINE key. This is useful when you have to go into the menu to modify one of the settings.	**Step 2** Push the NEXT key to access the Les level. Since you want the return sweep to be attenuated as much as possible, set this to 40 dB. Now the end-to-start level is 80 dB below the start-to-end level.

Keys to press on the SRC20 are shown in a font representing the appropriate key. For example:

Press the ▼ key.

Features

The Larson•Davis SRC20 has the following features:

General

- Two instruments in one: pink and white noise generator and swept sinewave generator
- Setting up the generator is accomplished by simple menus accessed by well labeled keys.
- Store and recall up to eight generator setups
- The signal is muted at turn on or with any mode change. The output can be muted at any time by the touch of a key.
- The power source voltage may be checked at any time.
- The SRC20 is powered by an inexpensive, easy to obtain 9-Volt battery. When powered by the internal 9-Volt battery, the SRC20 turns off when idle after 10 minutes in the "mute" mode. It may also be powered with an external 8 to 16 Volt power supply.

Noise Generator Features

- The pink and white noise generator has a frequency response of 20 Hz to 20 kHz. It includes a pulse mode that is adjustable from 1 ms to 25,000 seconds (<416 minutes)

Sinewave Generator Features

- The sinewave generator has a frequency response of 0.01 to 25 kHz. The Sweep mode can be either linear or logarithmic with adjustable start to stop and stop to start times of between 1 ms and 25,000 seconds. The log sweep has an adjustable sweep rates of between 0.001 to 20 decades/second.

- The output level may be adjusted in each mode. Different levels may be assigned in “start to end” and “end to start” while in sweep mode.

Remote Interface

- The SRC20 may be connected to and controlled by a computer with Microsoft Hypertext or other communications program.
- Sine waves of up to 126 kHz in 250 Hz increments may be accessed using the “high sine” command.

SRC20 Components

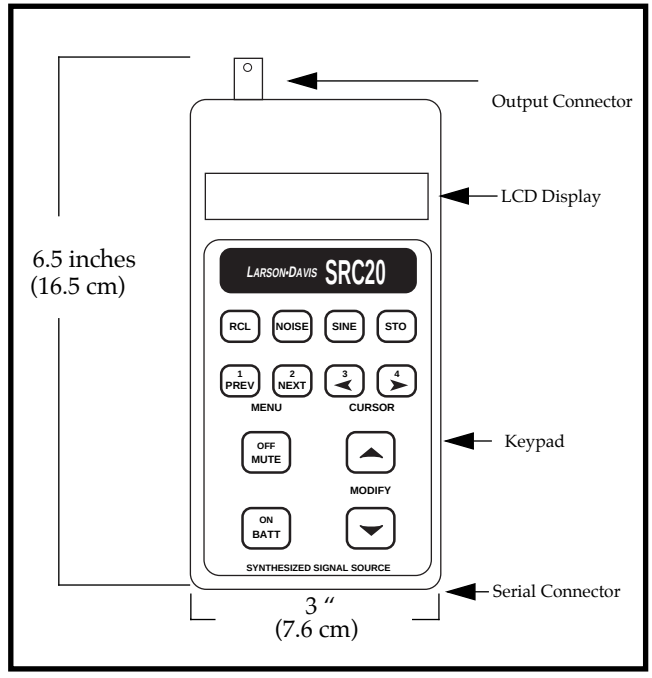

Figure 1-1 ***SCR20.*** The SRC20 is a convenient hand-held portable signal generator with a simple user interface.

The serial connector is used for external powering and computer interfacing.

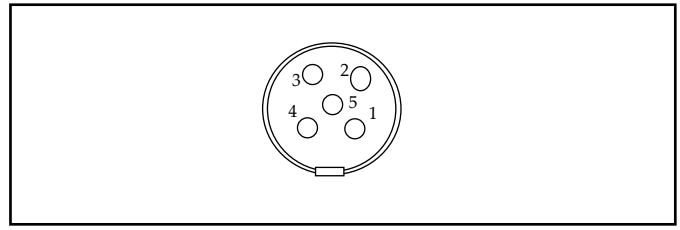

Figure 1-2 ***Serial Connector:*** The serial connector is a 5 pin Switchcraft connector with the following pinout:

1 - Ground
2 - Transmit data negative output (RS-232 levels)
3 - Receive data negative input (RS-422)
4 - External power input (8 - 16 Vdc 40 mA)
5 - Digital I/O

System Diagram

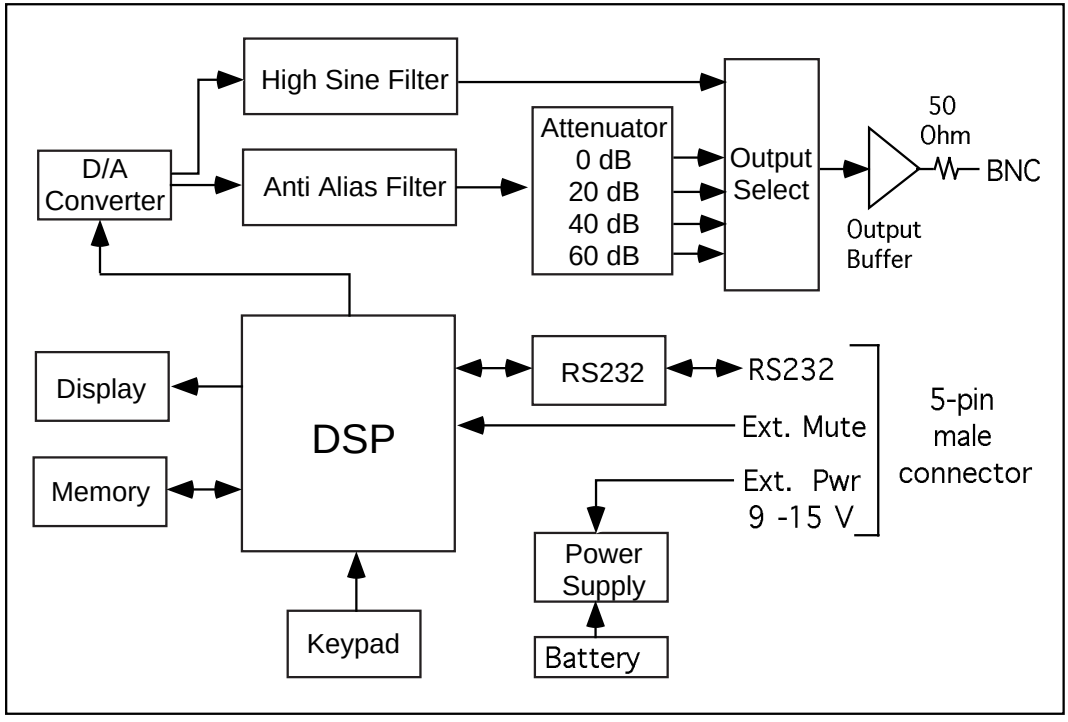

Figure 1-3 Block diagram of the SRC20.

Getting Started

This section outlines the steps to follow when you first receive and unpack the SRC 20. The following topics are covered:

- Unpacking and Inspection
- Accessories and Optional Equipment
- Connecting Internal or External Power
- Quick Start

- Environmental Considerations

Unpacking and Inspection

Your SRC20 has been shipped in protective packaging. Please verify the package contents with the following list (Accessories and Optional Equipment) and retain the shipping containers for safe shipment at a future date. Report any damage or shortage immediately to Larson•Davis, Inc. at (801) 375-0177

Complete and return the Warranty/Registration card. It will allow us to keep you informed of any version updates.

If you have not already done so, please record your instrument's serial number (located on the label on the back of the SRC20) and the purchase date at the beginning of this manual (see the copyright page). You may be asked to give this information in any future communications you may have with Larson•Davis, Inc.

Accessories and Optional Equipment

The SRC20 is delivered with the following *standard* accessories:

- SRC20 instrument
- Alkaline battery, 9-volt
- SRC20 User manual
- PSA005: AC power adapter (US only) 115 volts AC to 9 volts DC (Has 5-pin Switchcraft connector to plug in directly to the SRC20)
- CCS009: Cordura nylon pouch

The following *optional* equipment is also available:

- CBL101: Cable to power the SRC20 (Switchcraft 5-pin connector) and a 9-pin connector to connect to RS-232 port of most computers.
- CBL063: RS-232 9-pin connector and power cable.
- PSA001: 115 Vac to 9 Vdc, 50-60 Hz (used in conjunction with CBL0-63)
- CBL038: Connects SRC20 to an external battery and RS232 port of most computers.
- CBL034: Connects SRC20 to un-wired cable end (4-conductor shielded).
- CBL035: Connects SRC20 to customer supplied external battery or power supply (with alligator connectors on one end).
- PSA002: AC/DC power adapter, 220 Vac to 9Vdc, 50-60 Hz.

Connecting Internal or External Power

Alternatively, you may use an external power source via pin 1 (GND) and pin 4 (+) of the 5-pin connector. To do this, order cable CBL035 from Larson•Davis. The SRC20 accepts 8-16 Vdc@40 and is internally fused at 0.5 A.

To insert the 9-volt battery in the SRC20, slide down the battery cover on the left hand side of the instrument. Insert the battery with the negative connector up. Internal battery life is approximately 11 hours. (Refer to the description in Chapter 2 of this manual for additional battery information).

WARNING! Inserting the battery incorrectly can cause damage to the unit!

If the SRC20 is not being used for long periods of time (3 months or more), it is recommended that the battery be removed to avoid possible damage to the instrument.

Automatic Battery Save

Certain safeguards have been included.

- The SRC20 will turn off when the usable battery voltage drops below 5.7 volts.
- If the SRC20 stays in the mute mode for over 10 minutes while being powered by an internal 9 volt battery, the SRC20 will automatically turn off to conserve battery power.
- If the SRC20 is being powered by an external power source that maintains a voltage of greater than 9.5 volts, the unit will not turn off after 10 minutes if in the muted mode.
- The SRC20 will automatically switch between the internal battery or an external power source - which ever is greater.

Quick Start

This section will help you turn on the SRC20, check the battery, access the NOISE and SINE functions, and turn the instrument off.

Step 1 Turn on the SRC20 by pressing the ON/BATT key. The Larson•Davis name appears while "booting up." The serial number and revision number will also appear for a short time.

Step 2 Check the battery level. After the SRC20 is turned on, you can check the battery level. To do this, press the ON/BATT key again. Hold the key down as long as you would like.

Step 3 Press the NOISE and then SINE function keys and notice how it switches between the two modes or functions.

Step 4 If the output of the SRC20 is connected to an amplifier and speaker, you can hit the OFF/MUTE key to generate an output signal.

Step 5 Turn off the instrument. To do this, press and hold the OFF/MUTE key for about two seconds. The instrument then turns off.

Environmental Considerations

The SCR20 can be used and stored in a wide range of temperatures, which are free of moisture and condensing humidity conditions. However, common-sense precautions should be taken. For example, allow the SRC20 ample time to adjust to abrupt temperature changes. Condensation may form inside a cold instrument if it is brought into a warm room or vehicle and may persist long after the outside case has adjusted to the ambient temperature.

Temperatures inside closed vehicles can also reach excessive levels. *Therefore, do not leave the instrument in direct sunlight in a vehicle.*

CHAPTER

2 *Setting Up and Using the SRC20*

This chapter contains information on the functions which are accessed through the SRC20 keypad.

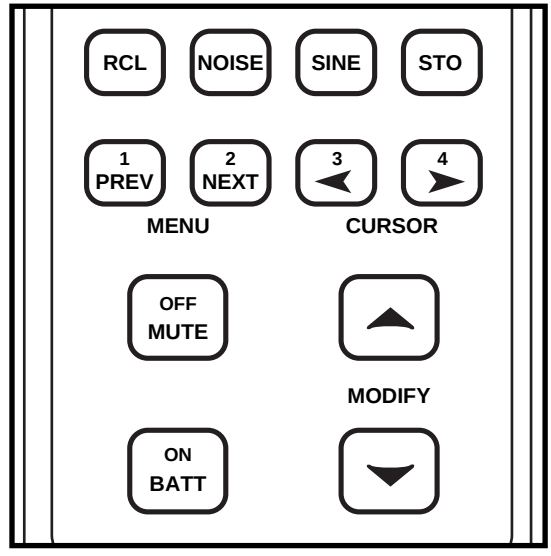

Figure 2-1 ***SRC20 Keypad.***

These keys are covered in the order in which they are typically used.

ON BATT	ON: Turns on the SRC20 BATT: Push and hold to check the supply voltage.

OFF MUTE	OFF: Hold down for about 2 seconds to turn the SRC20 off. MUTE: Push to activate output or push to deactivate signal generator output signal
NOISE	NOISE (or Noise Function Key): Push to activate the pink and white noise options. Pushing the button cycles through the four available options: Pink, Pink Pulse, White, & White Pulse.
SINE	SINE (or Sine Function Key): Push to activate the sine wave generator functions. Pushing the button toggles through the four available sine wave options: Sine wave (single frequency), linear sweep, logarithmic sweep, and burst. Note that in the SINE function with no sweeping or burst, the upper left hand of the display shows nothing.
STO	STO: Store the current setup into one of eight registers for later recall (4 registers for the NOISE function and four for the SINE function). This key would be followed by pushing one of the 1, 2, 3, or 4 keys.
RCL	RCL: Recalls one of eight previously stored system setups (up to four in the NOISE function and 4 in the SINE function). Push either the NOISE or SINE function key, the RCL key followed by pushing one of the 1, 2, 3, or 4 keys.

	PREV: used to move up through menu items. 1: Storage area #1 in which setups can be stored and recalled.
	NEXT: Used to move down through menu items. 2: Storage area #2 in which setups can be stored and recalled
	Left Arrow: used to move the cursor through numbers for setting frequencies, levels, and timing functions. Numbers that can now be modified blink. 3. Storage area #3 in which setups can be stored or recalled.
	Right Arrow: used to move the cursor through numbers for setting frequency, levels, and timing functions. Numbers that can now be modified blink. 4: Storage area #4 in which setups can be stored and recalled
	Up Arrow: used to increase the value of numbers currently blinking.
	Down Arrow: used to decrease the value of numbers currently blinking.

Noise Function

To access various NOISE modes, cycle though the various options by pushing the NOISE key. Depending on where you start, pushing the NOISE key cycles as follows: PINK, PINK PULSE, WHITE, & WHITE PULSE and then PINK again as displayed on the screen.

You may use the PREV key to get out of the menu area or you may push the MUTE or NOISE function key at any time to quickly exit from the menu area.

To access the menu items associated with the NOISE function, use the PREV or NEXT key. It will allow you to move through the various menu items. Below is a chart that shows the available menu settings.

Options Using Noise Function Key:	Menu Setting Options (Accessed by using the NEXT and PREV key):	Description:
PINK	Level	Adjust output level between 40 to 120 dB by use of the modify keys. The cursor can be moved by use of the right or left cursor keys.
PINK - PULSE	Level	Adjust output level.
	Ton	The NEXT arrow will take you to the Ton menu item. Adjust the time the pink noise is on.
	Toff	Push the NEXT key again to set the time the pink noise is off.
WHITE	Level	Adjust the output level (between 40 and 120 dB) by the use of the Modify keys. The cursor may be moved by use of the Cursor keys.

WHITE - PULSE	Level	Adjust the output level. Push the NEXT key to go to the Ton menu item.
	Ton	Adjust the time the White noise is on.
	Toff	Push the NEXT key again to set the time the white noise is off.

Sine Function

Note that in the SINE function with no sweeping or burst, the upper left hand of the display shows nothing.

To access various SINE functions, toggle through the various options by pushing the SINE key. Depending on where you start, pushing the SINE key toggles as follows: SINE, LIN (linear sweep), LOG (logarithmic sweep), and BRST (burst) and then SINE again as displayed on the screen.

You may use the PREV key to get out of the menu area or you may push MUTE or NOISE function key at any time to quickly exit from the menu area

To access the menu items associated with the SINE function, use the PREV or NEXT key. It will allow you to move through the various menu items. Illustrated below is a chart showing the available menu settings.

Note that the generator will immediately become unmuted as soon as the MUTE switch is pushed.

Options using the Sine Function key:	**Menu Setting Options (Accessed by using the NEXT and PREV key):**	**Description:**
SINE	Frequency	Adjust frequency by use of the MODIFY and CURSOR keys.
	Level	The NEXT key will take you to the level adjustment. Adjust the output level by use of the MODIFY and CURSOR keys.

SINE LINEAR SWEEP	Start Frequency	Adjust the start frequency by use of the CURSOR and MODIFY keys.
	Lse	Adjust the output level for the start to end of the sweep. The level immediately moves to this new level at the start of the sweep.
	End Frequency	Adjust the end frequency by use of the MODIFY and CURSOR keys.
	Les	Adjust the output level for the end to the start of the sweep.
	Tse	Adjust the time (in sec.) it takes to move from start of the sweep to the end of the sweep.
	Tes	Adjust the time (in sec.) it takes to move from the end to the start of the sweep.
SINE LOG SWEEP	Start frequency	Push the NEXT key to access the start frequency. Adjust the start frequency of the log sweep by use of the CURSOR and MODIFY keys.
	Lse	Adjust the output level of the start to end level of the sweep. The level immediately goes to this new level at the start of this sweep.
	End Frequency	Adjust the end frequency by use of the MODIFY and CURSOR keys.
	Les	Adjust the output level of the end to the start of the sweep.
	Rse	Adjust the rate (in decades/second) of the log sweep from the start to the end.
	Res	Adjust the rate (in decades/second) of the log sweep from the end to the start.

BURST	Start Frequency	Adjust the start frequency of the burst by use of the CURSOR and MODIFY keys.
	Lse	Adjust the output level of the start to the end level of the burst.
	End Frequency	Adjust the end frequency by use of the MODIFY and CURSOR keys.
	Les	Adjust the output level of the end to the start-level of the burst.
	Nse	Adjust the number of cycles it takes to get from beginning of the burst to the end of the burst (1 to 999, 000,000).
	Nes	Adjust the number of cycles it takes to get from the end of burst to the start of burst (1 to 999,000,000)

Memory

Nonvolatile memory means that you are not dependent on the SRC20 battery to maintain the memory.

The setups may be stored in one of eight nonvolatile memories - four for the NOISE function and four for the SINE function. Storing is simply done by pushing either the NOISE or SINE key, the STO key and then one of the 1, 2, 3, or 4 memory keys. This will store the current settings in the memory location you have chosen.

Setups that aren't stored are lost when the SRC20 is turned off.

You must be in either the main NOISE or SINE window and not in one of the menus windows to perform a setup store or recall.

To recall a previously stored setup, push the NOISE or SINE key, RCL key, and then the relevant memory number key.

Setup Examples

EXAMPLE 1

You want to perform equalization of a sound system in a stadium. You connect the SRC20 to either a microphone or line-level input of the sound system. The sound system level should be turned down until the SRC20 is on and set.

Step 1 Turn the SRC20 on by pushing the ON key. Wait for the unit to "boot up."

Step 2 Check the battery voltage by holding down the ON/BATT key to make certain the battery will last through the session (it would be good to have an additional battery or AC power available).

Step 3 Push the NOISE key to access PINK noise. If it doesn't immediately appear on the screen, continue to push the NOISE key until PINK appears on the screen.

Step 4 Adjust the output level by using the CURSOR keys and MODIFY keys. If you are using a microphone input to access the sound system, adjust the level to around 80 dB.

Step 5 Now push the MUTE key to activate the output.

Step 6 Turn the sound system up to the appropriate level to perform the test. The SRC20's output level may also be adjusted if its output level is too low or too high.

Step 7 Push the MUTE key when the test is complete or to get ready for an additional test.

Step 8 Push and hold the OFF key to turn the SRC20 off.

EXAMPLE 2

You need to perform a test in a laboratory and need a linear swept sine wave in your test. The frequency sweep needs to go from 20 Hz to 20,000 Hz and take one minute to go from the start to the end of the sweep.

You want the end to start sweep attenuated as much as possible and don't want it to start the next sweep until 3 minutes after the previous.

Step 1 You can choose to operate the SRC20 using the internal battery or you may choose to plug the external power supply into it.

Step 2 Turn the SRC20 on by pushing the ON key. Wait for it to "boot up."

Step 3 You may want to check the battery voltage to make certain your external power supply is working satisfactorily. Push and hold the ON/BATT key.

Step 4 Continue to push the SINE key until the LIN screen appears.

Step 5 Push the NEXT key and set the Start Frequency to 20 Hz with the Cursor and Modify keys.

Step 6 Push the NEXT key and set the level to 120 dB by use of the CURSOR and MODIFY keys.

Step 7 Push the NEXT key again and set the END frequency to 20,000 by use of the CURSOR and MODIFY keys.

You may get out of the menu at any time by hitting the MUTE key. or the SINE key. This is useful when you have to go into the menu to modify one of the settings.

Step 8 Push the NEXT key to access the Les level. Since you want the return sweep to be attenuated as much as possible, set this to 40 dB. Now the end-to-start level is 80 dB below the start-to-end level.

Step 9 Push the NEXT key to set the time it takes to go from the start of the sweep to the end of the sweep. Set this to 60 seconds.

Step 10 Push the NEXT key to set the time it takes to go from the end of the sweep to the start. Set this to 180 seconds (3 minutes).

Step 11 Push the NEXT key to go to the LINEAR SWEEP window so that you can watch what is going on with the sweep.

On the screen you will see the ">>" and "<<." They show:

Step 12 Push the MUTE key to turn on the SRC20 output.

">>": sweeping start to end

"<< ": sweeping end to start

Step 13 Push MUTE when the test is completed. Since you would like to use your setup at another time, you store the setup in memory 2 by pushing the STO key and then the 2 key.

Step 14 Turn the SRC20 off by holding down the OFF key for about two seconds.

APPENDIX

A Technical Specifications

Specifications are subject to change without notice. Numerical values given are typical. Refer to specific calibration or test results for accurate data on a specific unit.

Frequency Characteristics	Sine Wave: Pink Noise: White Noise: High Sine:	0.01 Hz to 25 kHz 20 Hz to 20 kHz 1 Hz. to 20 kHz 250 Hz to 126 kHz
Sine Wave Spectral Purity	Harmonic Distortion 1 Hz to 10 kHz: 10 kHz to 20kHz:	 80 dBc 65 dBc

Output Characteristics	Sine Wave Amplitude (into ≥10 k ohm):	40 to 120 dBµV (100 µV to 1 Vrms)
	Sine Wave Accuracy (at 1 kHz):	± 0.02 dB (max)
	Sine Wave Flatness (relative to 1 kHz):	< 10 kHz: ±0.1 dB (max) 10 kHz to 16 kHz: ±0.2 dB (max) 10 kHz to 20 kHz: ±0.2 dB (max) 16 kHz to 20 kHz: ±0.4 dB (max) 20 kHz to 25 kHz: ±0.8 dB (max)
	High Sine Flatness (relative to 1 Khz. Only available using computer command):	250 Hz to 10 kHz, -0.00 dB ±0.1 dB 12.5 kHz, -0.02 dB ±0.1 dB 15.75 kHz, -0.04 dB ±0.1 dB 20.0 kHz, -0.06 dB ±0.1 dB 25.0 kHz, -0.10 dB ±0.2 dB 31.5 kHz, -0.16 dB ±0.3 dB 40.0 kHz, -0.26 dB ±0.4 dB 50.0 kHz, -0.41 dB ±0.6 dB 63.0 kHz, -0.65 dB ±0.8 dB 79.4 kHz, -1.02 dB ±1.0 dB 100.0 kHz, -1.55 dB ±1.5 dB 126.0 kHz, -2.30 dB ±2.0 dB
	High Sine Frequency Resolution:	250 Hz
	High Sine Amplitude Accuracy at 1 kHz:	±0.1dB
	High Sine Amplitude Resolution:	0.01 dB
	Pink Noise Output Level (set at 120 dB):	0.04 to 0.058 Vrms 0.0476 Volts (-26.4 dBV) Typical
	White Noise Output Level (set at 120 dB):	0.25 to .28 Volts 0.27 Volts (-11.3 dBV) Typical
	Output Impedance:	50 ohms
	Connector:	BNC Female

Frequency Sweep	Type Direction Start/Stop Frequency (direction changes at zero crossing) Times Rates	linear or logarithmic up or down 0.01 Hz to 25 kHz 1 ms to 25,000 seconds 0.001 to 20 decades/second
Sine Burst	Cycles	1 to 999 million
Pulsed Noise	Times	1 ms to 25,000 seconds
Mute		At turn on or mode change, the signal is muted. Signal is manually unmuted.
Battery		Reads internal battery voltage or externally applied voltage to tenths of a volt. SRC20 turns off below 5.7 volts.
Battery Save		SRC20 automatically turns off if voltage is below 9.5 volts and unit has been muted for 10 minutes.
Power Supply	Internal External Power Consumption	9 volt Battery NEDA 1604A IEC 6LR6 6 to 16 Vdc (SRC20 uses internal or external which ever is higher) 37 mA @ 9V, 340 mW
General	Operating Environment Dimensions (W x H x D) Weight	0 to 50°C, 95% RH non condensing 3 x 1 x 6.5 in. (7.62 x 2.54 x 16.5 cm) 7.9 oz. (246 grams)
Remote Interface (RS232)	5 Pin Switchcraft TB5M (male)	Pin 1: ground Pin 2: TXD output Pin 3: RXD input Pin 4: External power input Pin 5: Digital I/O

Pseudo Random Noise Characteristics

Modern noise generators are principally designed by digital synthesis. This means that signals are not totally random. However, signals that do not repeat for a substantial time are functionally equivalent if the repeat period is much longer than any system response to be tested. The advantages of digital generation are repeatability and stability. The noise generator in the SRC20 is a 24 bit shift register with feed back. This creates a maximum length sequence of 2^{24}-1 samples long. The sample rate is 102.4 kHz. The sequence repeats about every 3 minutes. The frequency shaping is controlled by digital filters. This makes the output spectrum very stable and accurate.

APPENDIX

B Serial Port Interface Remote Control

The SRC20 is fully controllable remotely via the Serial Port interface. Settings and operational mode can be altered.

This appendix will describe the Serial Port interfacing of the SRC20 and the various interface commands with their syntax. Microsoft Hypertext or similar communication programs may be used to send commands out to the SRC20.

Interface Cables

Serial Port communications are made through the 5-pin connector at the base of the SRC20. The instrument's signals conform to the RS232 standard using either the optional CBL101 (or the CBL063). If additional length is needed, a readily available computer serial cable may be used or you may use a Larson Davis CBL077.

Baud rate, Serial Port address and handshaking protocol are selected using the computer communication software. The SRC20 uses a 9600 baud rate, 1 stop bit, and no parity.

Step 1 With the instrument turned off, insert the cable connector in the 5-pin port.

Step 2 Connect the cable to the of the computer.

Step 3 Open the communications software and connect.

RS-232 Port -Pin configuration for the SRC20 is as follows:.

Switchcraft® 5-Pin Male Connector on SRC20	Computer 9-pin RS-232C Connector End	
Pin 1 Ground	GND	Pin 5 Ground
Pin 2 TXD Output	RD	Pin 2 Receive Data
Pin 3 RXD Input	TX	Pin 3 Send Data
Pin 4 Ext. Power Supply		No Connection
Pin 5 Digital I/O		

Commands

The commands are a series of ASCII characters with an alpha command and one or two numeric operands followed by a carriage return line feed.

Note: HIGH SINE MODE is only available by the use of commands. It extends the sine wave frequency response to 126,000 Hz in 250 Hz increments.

The following tables summarize all of the commands and are listed in this order: GENERAL, SINE MODE, NOISE MODE, HIGH SINE, and SPECIAL.

COMMAND	RESPONSE	EXAMPLE
GENERAL		
MØ	Set to sine mode	
M1	Set to noise mode	
M59	Set to high sine mode	
QM or ?M	Responds with number above.	If you were to send the "?M" command, you would get "1 cr lf" if you were in the noise mode.
SINE MODE		

F start, end	Set frequencies. The end value is optional if no sweep. Does not change mute status	"F1000.09, 21235.78 cr lf" will set start to 1000.09 Hz and end to 21235.78 Hz.
QF or ?F	Will return set frequencies	
Lse, es	Set levels for start to end and end to start sweeps. Lse is used for non sweep modes. It will unmute the source.	L100, 40.00
QL or ?L	Will respond with above settings.	
S type, se,es	Set the sweep type for sines, and timing parameters. If type is 0, No sweep If type is 1, Linear sweep, se is time start to end and es is time end to start. If type is 2, Log sweep, se is rate start to end and es is rate end to start. If type is 3, Burst sweep, se is cycles start to end, es is cycles end to start. Mutes the source.	"S0 cr lf" no sweep "S1, 1.23, .001" linear sweep 1.23 seconds start to end. 0.001 seconds end to start.
QS or ?S	Will respond as above	

NOISE MODE		
N type, ton, toff	Type is 0 for pink Type is 1 for white Type is 2 for pulsed pink Type is 3 for pulsed white If pulsed, ton is duration of high level and toff is duration off. N command will mute the source.	
QN or ?N	Responds as above	
L level	Sets noise level as above and unmutes the source	
QL or ?L	Responds as above	
HIGH SINE MODE	Warning: the only commands that may be used in this mode are the following two. Sending other commands while in the this mode will generate spurious noise superimposed on the sine wave.	
H frequency, level	In this case frequency is an integer that is in units of 250 Hz, i.e. 100 = 25,000 Hz. Level is also an integer range 0 to 32767. The value is scaled so that 32767 is 1 volt.	
QH or ?H	Responds as above	
SPECIAL COMMANDS		
@	Will reboot the SRC20	
QV or ?V	Will read the battery voltage. It will return hex value in .1 volt units.	

Index

Numerics

1 key 2-3
2 key 2-3
3 key 2-3
4 key 2-3

B

BATT
    key 2-1
BURST
    Sine function 2-7

C

Connector
    Serial Connector 1-5
Conventions
    Formatting 1-2

D

Down Arrow
    key 2-3

F

Format
    Conventions 1-2
Formatting Conventions 1-2

K

Keypad 2-1
Keys
    BATT 2-1
    down arrow 2-3
    left arrow 2-3
    MUTE 2-2
    NOISE 2-2
    ON 2-1 to 2-2
    PREV 2-3
    RCL 2-2
    right arrow 2-3
    SINE 2-2
    STO 2-2
    storage area 1 2-3
    storage area 2 2-3
    storage area 3 2-3
    storage area 4 2-3

L

Left Arrow
    key 2-3

M

Memory
    storing setups 2-7
MUTE
    key 2-2

N

NOISE
    key 2-2
Noise Function 2-4
    Pink 2-4
    pink pulse 2-4
    white 2-4
    white pulse 2-5

O

OFF
    key 2-2
ON
    key 2-1

P

Pin B-2
Pin configurations B-2
PREV
    key 2-3

Q

Quick Start 1-9

R

RCL
key 2-2
Right Arrow
key 2-3
RS-232 interface B-1

S

Serial number 1-7
Setups
examples 2-8
storage area 1 2-3
storage area 2 2-3
storage area 3 2-3
storage area 4 2-3
storing 2-7
SINE
key 2-2
sine function 2-5
Sine function
burst 2-7
sine 2-5
sine linear sweep 2-6
sine log sweep 2-6
SINE LINEAR SWEEP
sine function 2-6
SINE LOG SWEEP
Sine function 2-6
SRC20
Accessories and Optional Equipment 1-7
Components 1-4
Features 1-3
General Features 1-3
optional equipment 1-7
System Diagram 1-6
STO
key 2-2

U

Unpacking and Inspection 1-7
Up Arrow
key
Keys
up arrow 2-3

W

White Pulse
noise function 2-5